# I-20 East Texas Corridor Study Report

## From I-635 to Louisiana State Border

TxDOT, Transportation Planning and Programming Division

January 2015

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## Letter from the Chair

Honorable Mr. Chairman and Commissioners:

The I-20 East Texas Corridor Advisory Committee would like to thank the citizens of Northeast Texas for participating in the planning for the future of I-20 in East Texas.

Over the past 47 years, I-20 has become the backbone of the regional and national transportation system. To ensure this continued service over the next 50 years, improvements will be needed to enhance safety and mobility. With future transportation needs in mind, the Advisory Committee has worked hard to serve public interests and needs in an environmentally responsible manner.

One of the goals of this Committee was to encourage public participation throughout the process in order to identify regional needs that could serve a higher purpose for the State and Nation as well as improve the quality of life for citizens within the corridor. We accomplished this public involvement and feedback through local outreaches.

Members of the Advisory Committee were appointed as representatives by the Texas Transportation Commission. During the last 18-months, our objective was to provide the Texas Department of Transportation team with our conclusions on how I-20 could be improved.

It has been a pleasure working with the staff of TxDOT and their consultants. Their expertise made our job much easier. I would also like to thank those who contributed their time and talents to this process by joining me in serving the I-20 East Texas Corridor Advisory Committee. We believe, in the following pages, a master plan has been created for the I-20 East Texas Corridor that will reduce crashes and enhance mobility for residents and visitors in the great State of Texas.

Sincerely,

**Bill Stoudt**

**Gregg County Judge**

**Committee Chair, I-20 East Texas Corridor Advisory Committee**

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# 1. Introduction

The Interstate 20 (I-20) East Texas Corridor encompasses 155-miles from its interchange with I-635 in Dallas to the Texas/Louisiana State Border. The Corridor currently serves as an integral east-west connection for both travel and trade. This portion of the national interstate system was originally designated to "replace or run parallel to U.S. Route 80".

The East Texas portion of I-20 was opened to traffic in 1967, with the western section being added in 1971. As the interstate system ages and trade increases, its mission becomes more critical. The I-20 East Texas Corridor is an essential part of the national network, providing connectivity between Dallas-Fort Worth, Texas' largest metropolitan area, and the southeastern region of the nation. The evaluation of current as well as Long Term needs is critical to maintaining both regional and national transportation system in a manner that is safe, efficient, and responsive to future growth.

Built during the 1960's, and only benefiting from routine maintenance and modest repairs/expansion, the corridor approaches the next decade facing challenges in terms of safety, capacity and major maintenance needs. This study identifies its current condition as well as the impact of future demands. This information is then used to craft a comprehensive system of transportation solutions to solve current

## 1.1 Project Background

### 1.1.1. Project Study Area

This portion of I-20 connects the Dallas/Fort Worth metropolitan area through Shreveport/Bossier City to state capitals in Mississippi, Alabama, Georgia, and South Carolina. Within East Texas, I-20 serves as the backbone of the transportation network for many smaller communities. The approach used in this study is to strive for a better understanding of the personal travel and movement of goods along the corridor while evaluating current safety and capacity needs. Extending more than a hundred and fifty-five miles in East Texas, the corridor runs through six counties: Dallas, Kaufman, Van Zandt, Smith, Gregg, and Harrison. As such, it falls under the jurisdiction of three separate TxDOT districts: Dallas, Tyler, and Atlanta.

Figure 1.1 Study Area Location

Table 1.1 below depicts historic and projected population trends for counties within the study area and compares them to the population of all other counties in the Dallas Metroplex for the same period.

*Table 1.1: Historic and Projected population growth in study area counties.*

| Year | Kaufman | Van Zandt | Smith | Gregg | Harrison | Dallas | Rest of the Dallas Metroplex |
|---|---|---|---|---|---|---|---|
| **1970** | 32,392 | 22,155 | 97,096 | 75,929 | 44,841 | 1,327,321 | 2,412,813 |
| **1980** | 39,012 | 31,426 | 128,366 | 99,487 | 52,265 | 1,556,390 | 2,997,808 |
| **1990** | 52,220 | 37,944 | 151,309 | 104,948 | 57,483 | 1,852,810 | 3,958,833 |
| **1996** | 61,646 | 42,067 | 164,547 | 111,509 | 60,838 | 1,999,926 | 4,480,597 |
| **2003** | 81,322 | 50,293 | 184,254 | 113,775 | 62,018 | 2,246,432 | 5,444,711 |
| **2009** | 101,709 | 52,359 | 207,111 | 121,238 | 65,185 | 2,346,378 | 6,205,830 |
| **2012** | 106,753 | 52,427 | 214,821 | 122,658 | 67,450 | 2,453,843 | 6,557,328 |
| **2040** | 199,606 | 68,496 | 280,634 | 160,540 | 80,921 | 3,154,331 | 9,627,918 |

Source: US Census_ Decennial Census and Interdecennial Estimates; 2040 forecasts: TSDC 0.5 Scenario

Population has been growing along the corridor during the past forty-five years. According to the U.S. Census, the western edge of the corridor has experienced the biggest population increase with Dallas County reaching almost 2.5 million people in 2012. While Dallas County has been the anchor for this corridor during the past 40 years, the forecasts indicate that the surrounding counties of the Metroplex will grow even more rapidly over the next 30 years. This forecast not only indicates that the Metropolitan area will continue to heavily influence traffic demands along I-20, but also that the forecasted growth along the rural counties will follow the same growth trends. All other counties along the route had a population of approximately 565,000 people for the same year, and are expected to experience an almost 50% growth by the year 2040. The corridor was divided into three sections of two counties each in recognition of their unique characteristics, and for ease of reference. The West, anchored by Dallas and Kaufman Counties; the Central section encompassing Van Zandt and Smith Counties, and the East includes Gregg and Harrison Counties.

### 1.1.2. Existing Conditions

The Interstate corridor is composed of many elements within the state controlled rights-of-way. Besides the main travel lanes, it also includes some frontage roads, 60 interchanges, medians, bridges, and traffic control (signage) so that the public can travel safely along the route. Each of these is briefly described in the following paragraphs.

MAIN LANES: Within this corridor, I-20 has two distinctive segments. A six-lane divided facility from I-635 in Dallas County to FM 740 in Kaufman County is designated as an urban interstate facility with a posted speed of 65 miles per hour (mph). The rest of the corridor consists of a four-lane divided facility from FM 740 in Kaufman County to the Texas/Louisiana State line. This segment is designated as a rural interstate facility with a posted speed limit of 75 mph. For further reference see *Map 1.1 Posted Speed Limits*.

FRONTAGE ROADS: Development of frontage roads has been necessary as a result of the access controlled nature of the facility, and local desires to foster economic development for various land parcels along I-20. The corridor does not have continuous frontage roads through its entire length; however, portions of frontage roads have been developed; sometimes on only one side of the main lanes. Existing frontage roads total 116 directional miles, most of which are two-way facilities. Those located in Dallas County are one-way frontage roads located on both sides of the main lanes given the urbanized nature of this section.

The most complete frontage road sections are located in Dallas and Van Zandt counties. Kaufman County's frontage roads are only present around the city of Terrell, limiting direct accessibility to the Interstate by well-spaced interchanges for the rest of the county. In other cases, like Smith, Gregg and Harrison, frontage roads are discontinuous and do not provide

accessibility to many of the parcels adjacent to the Interstate. *Map 1.2 Frontage Roads*, depicts specific locations for all existing frontage roads.

RIGHT-OF-WAY: The width of land controlled for use on an interstate corridor can vary widely over its length. A basic width is required to provide room for the main lanes, a median, and even frontage roads. In areas where terrain or drainage features as well as where the need to accommodate cross streets and ramps at interchanges requires it, additional amounts of land may be required. For that reason, right-of-way widths vary throughout the corridor. To reduce confusion and provide a general snapshot of how much land is available along the corridor, average right-of-way width was calculated between each interchange using from the TxDOT Roadway-Highway Inventory Network (RHiNo) 2012 database. These data were cross-checked using aerial photography and field observations. The resulting information is summarized in *Map 1.3 Average Right-of-Way.*

MEDIANS AND MEDIAN TREATMENTS: Following Federal design standards for interstate highways, medians are found along the entire I-20 corridor. The purpose for these medians is to provide a "recovery" zone for vehicles that become disabled or lose control, as well as a location for drainage and future expansion. In many instances, modern design standards call for additional features (called median treatments) to minimize the potential for vehicles from one direction of travel crossing the median and endangering vehicles traveling in the opposite direction. An inventory of existing median treatments was compiled using current aerial imagery and cross-referenced with information from the TxDOT districts.

Median treatments are currently utilized in 70% of the corridor. Three types of median barriers have been installed: concrete, cable and guardrail. The Tyler District, including Van Zandt, Smith and Gregg counties, contains all 71 miles of existing concrete barrier. The Atlanta and Dallas Districts, on the other hand, opted for installation of cable barriers along another 37 miles of I-20 in order to minimize construction costs and create a more forgiving environment in the event of a vehicle leaving the travel lane. For Harrison County in the Atlanta District, most of I-20's median is protected with this strategy. The Dallas District's cable barriers on the other hand, were only installed from FM 1641 to Spur 557 in Kaufman County.

While concrete and cable barriers are designed to prevent errant vehicles from crossing a median into the opposing lanes of traffic, guard rail barriers are only used in specific locations for protection of interchange and bridge structures, stream crossings or drainage facilities. Examples include the connector with I-635 in the west edge of the corridor and locations where a bridge crosses over I-20 with support columns in or adjacent to the right-of-way. Design standards generally mandate their use in each situation. There are no locations within this corridor where additional guard rails appear to be needed in the median.

The corridor has a total of 47.9 miles of unprotected medians. Approximately 30.9 miles of median along the corridor either are greater than 80 ft. in width (and therefore require no median treatment), or contain natural elements or terrain changes, that make a barrier unnecessary. The remaining 17 miles of I-20 fall under the recommended minimum median of 80 ft., and have no mitigated features such as changes in elevation or major forest growth. Most of this mileage is found within the urbanized and most heavily used section of the corridor in Dallas and Kaufman Counties.

While the use of median barrier is generally recommended, installation in sections with more than 80-ft. wide medians is considered on a case-by-case basis. The longest section of unprotected median is found from Kaufman County just east of Terrell to the Van Zandt county line. *Map 1.4 Median Type*, shows specific locations for each type of median treatment along the corridor.

BRIDGES: The Texas Department of Transportation produces the BRidge INventory, inSpection and Appraisal Program (BRINSAP) to assess all aspects of structures within the transportation network. The I-20 East Texas Corridor has 60 interchanges. Additionally, I-20 must cross water channels, local roads, and even railroad lines, which call for additional bridges or culverts along I-20. According to the 2012 BRINSAP report, 314 structures along the corridor were assessed. 314 are in good condition. However, 24 structures at 14 locations are rated as "fair" but require additional repairs, while two structures that carry railroad tracks over I-20, are deemed to be in poor condition. **Figure 1.2** and **Table 1.2.A and B** show a detailed account of structures in need of attention. In addition, *Map 1.5 Bridge Condition* gives an outlook on the geographical locations of those structures.

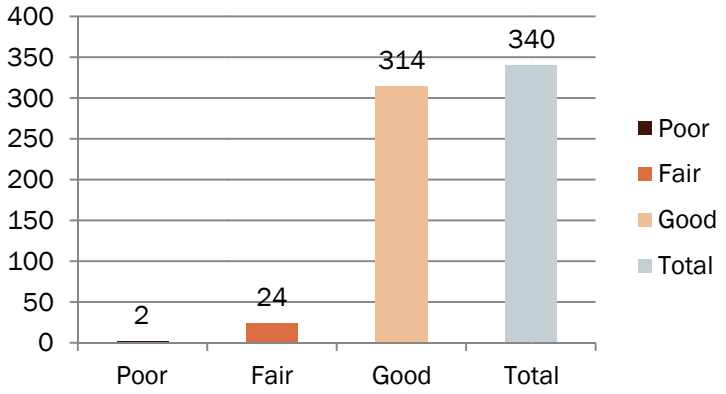

Figure 1.2 Total Structures per Ratings

Apart from their structural condition, bridges are evaluated in terms of vertical clearance to ensure traffic's safe passing. The Federal Highway Administration (FHWA) sets the acceptable vertical clearance at 16 ft. and TxDOT sets its minimum at 16 ft. 6 in. While most of the corridor meets TxDOT standards, 82 structures are still deemed appropriate only by FHWA standards and 10, don't currently meet either one. *Map 1.6 Vertical Clearances* offers a more detailed view at the locations of low bearing bridge structures along the corridor.

*Table 1.2 A: Bridge Structural Rating Totals*

| | Critical Condition (0.00-4.99) | Fair Condition (5.00-6.99) | Good condition (7.00-10.00) | Total |
|---|---|---|---|---|
| Total | 2 | 24 | 314 | 340 |

*Table 1.2 B: Low Rated Structure Locations*

| Bridge Location | Bridge Type | Vertical Clearance (ft) | Sufficiency Rating | Recommended Action |
|---|---|---|---|---|
| Fritz Swanson Rd Overpass | 4-span P/S bm* | 16'-1" | 75.0 | Replace |
| FM 2087 Overpass | Continuous St I-bm | 16'-0" | 84.1 | Replace |
| MLK Blvd Overpass | Continuous St I-bm | 16'-0" | 84.8 | Replace |
| Willow Branch Rd Overpass | Continuous St I-bm | 16'-1" | 68.3 | Replace |
| SH 110 Overpass | Continuous St I-bm | 16'-1" | 68.6 | Replace |
| FM 849 Overpass | Continuous St I-bm | 16'-0" | 66.8 | Replace |
| FM 47 Overpass | Continuous St I-bm | 16'-1" | 65.5 | Replace |
| FM 17 Overpass | Continuous St I-bm | 16'-8" | 56.5 | Replace |
| FM 1255 Overpass | Continuous St I-bm | 16'-7" | 65.5 | Replace |
| FM 773 Overpass | Continuous St I-bm | 16'-1" | 67.2 | Replace |
| SH 34 SB Overpass | Continuous St I-bm | 16'-7" | 63.3 | Replace |
| FM 2965 Overpass | Continuous St I-bm | 16'-5" | 69.6 | Replace |
| FM 450 Overpass | 4-span P/S bm | 15'-11" | 71.2 | Replace |
| Lansing Switch Rd Underpass | 4-span P/S bm | 16'-3" | 66.6 | Replace |

**P/S bm = Pre-stressed beam  Continuous St I-beam = Continuous Stretch I-beam*

Two additional overpasses which belong to private railroad companies (Union Pacific and South Electric Power Company) are in critical condition. However, these are outside of the jurisdiction of the State of Texas.

## 1.2 Planned and Programmed Projects

Despite its significance, currently there are only three projects either under construction or expected to be under construction along I-20; these include new freeway access ramps in Dallas County, two-way frontage roads south of Terrell in Kaufman County and the reconstruction of the FM 450 interchange in Harrison County[1]. In the Long Term, one new interchange is envisioned in Dallas County along I-20. The Loop 9 circumferential highway is anticipated to be constructed by 2020[2], but is not yet programmed.  Further east,

[1] Source: TxDOT Project Tracker (http://apps.dot.state.tx.us/apps-cq/project_tracker/projectquery.htm)

[2] Source:  Dallas-Fort Worth Region Transportation Improvement Program (TIP)

improvements are under development to construct I-369 around Marshall, however no monies have been identified for the construction of the interchange with I-20. In addition to these improvements, capacity expansions are planned for most counties; Gregg for 2030 as well as Smith and Harrison counties for 2035[3]. *Map 1.7 Planned and Programmed Projects*, depicts all aforementioned projects and their specific locations. Improvements projected for the coming decades still need to secure funding, and must complete the environmental studies and final design process before becoming ready for construction.

It should be noted that as part of the public involvement process for this effort, the North Central Texas Council of Governments (NCTCOG) and local governments along the corridor who are members of the Metropolitan Planning Organization (MPO), developed a preliminary financial plan to implement a number of additional projects. These projects should appear in the next updates of the regional transportation plans.

[3] Source: Statewide Long-Range Transportation Plan 2035

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## Map 1.1 Posted Speed Limits

# Speed Limits

**Legend**

**Speed Limit***

Miles per hour.

| 45 or less | 55 | 65 | 70 | 75 |
|---|---|---|---|---|

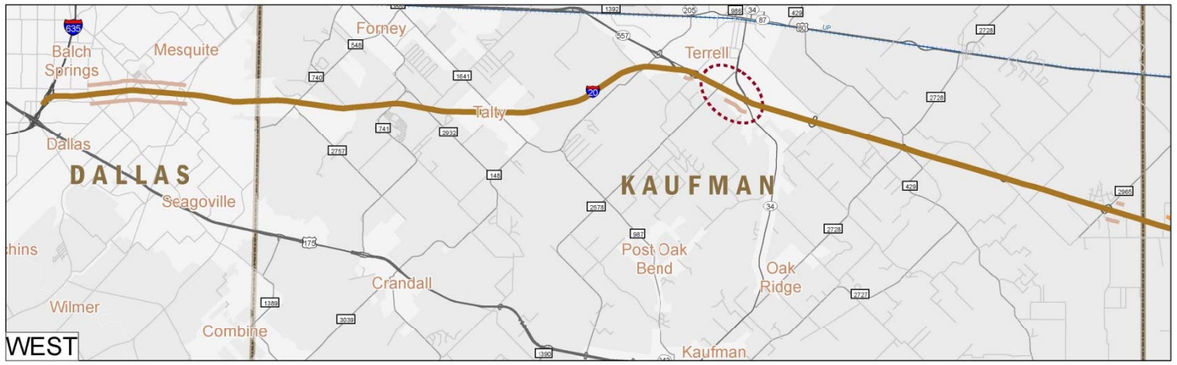
*maximum mph according to RHiNo Data 2011

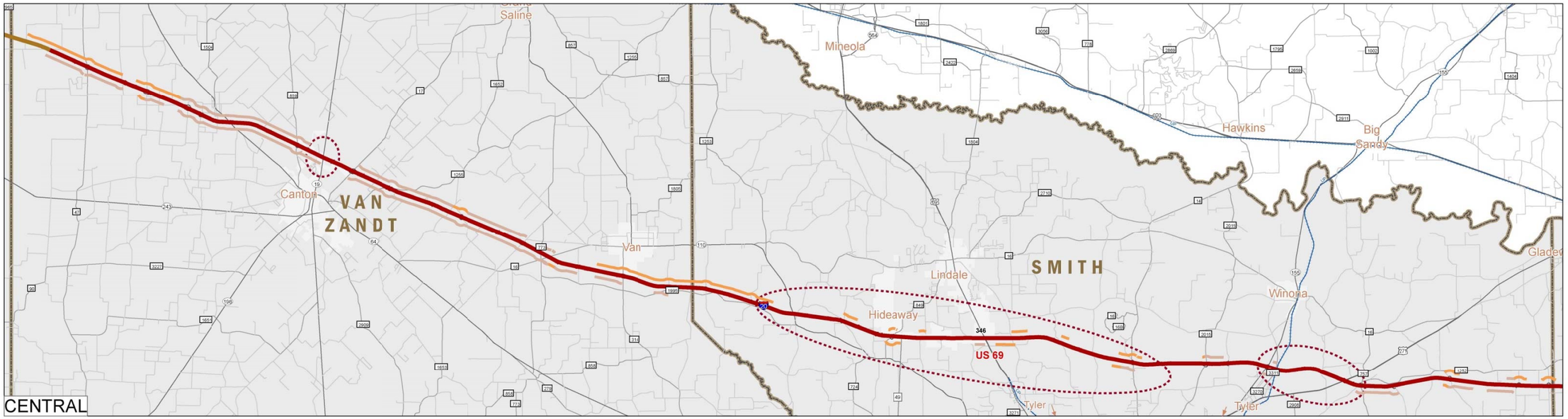
- Crash Hotspots
- Railroads
- I-20 Study Area Counties

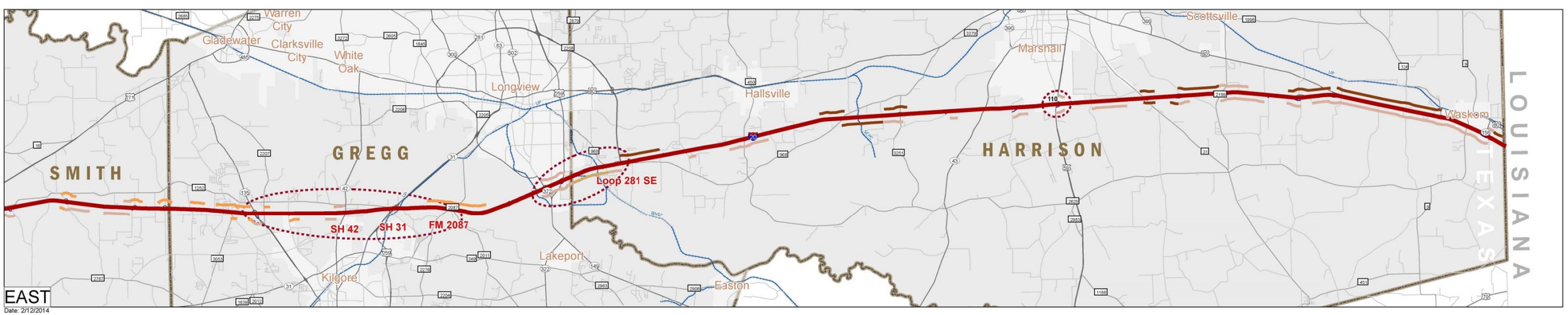
N

0 2.5 5 10 Miles

Source: TxDOT RHiNo Data (2011)

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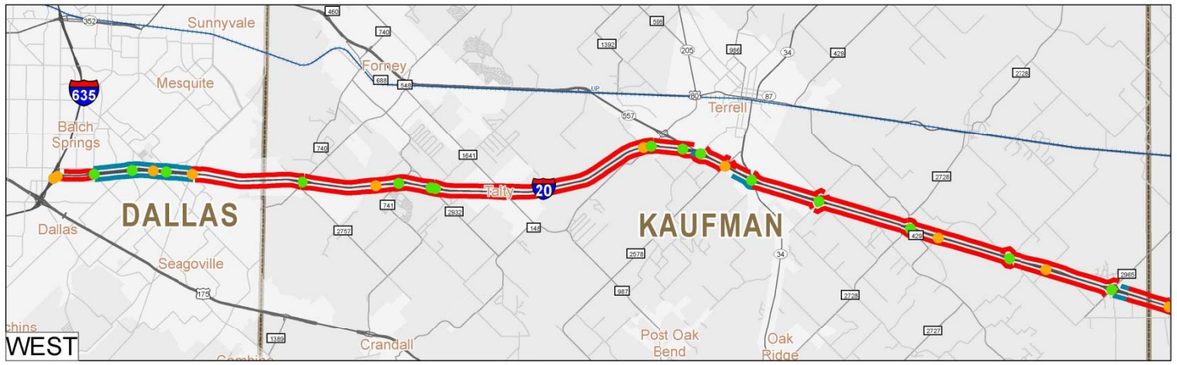
## Map 1.2 Frontage Roads

# Overpasses, Underpasses & Frontage Roads




**Legend**

- Interchange-Related Crossings
- Non-Interchange Crossings
- Frontage Roads*
- No Frontage Roads
- Railroads
- I-20 Study Area Counties

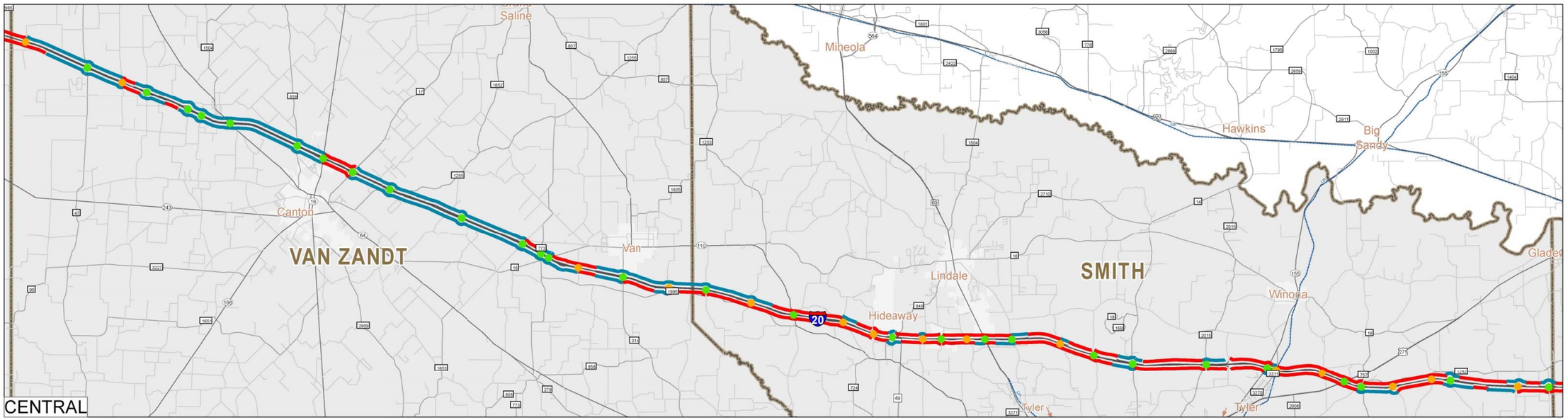
| | Length (Miles) |
|---|---|
| **Frontage Roads** | |
| Eastbound | **58.0** |
| Westbound | **58.4** |
| **Main Lanes** | **156.0** |

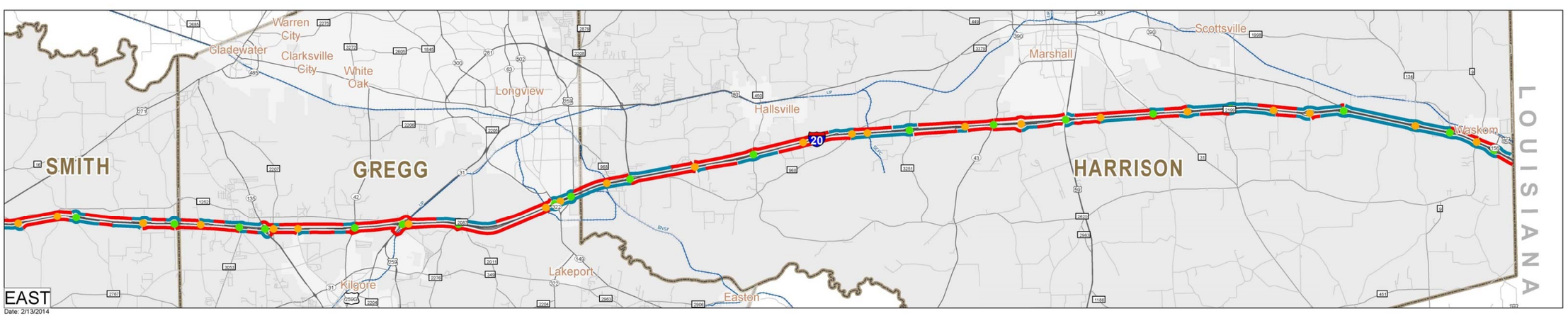
* All frontage roads allow two-way traffic except segments in Dallas County and in Terrell

0 2.5 5 10 Miles

N

Source: TxDOT RHiNo Data (2012); Jacobs; Google Maps

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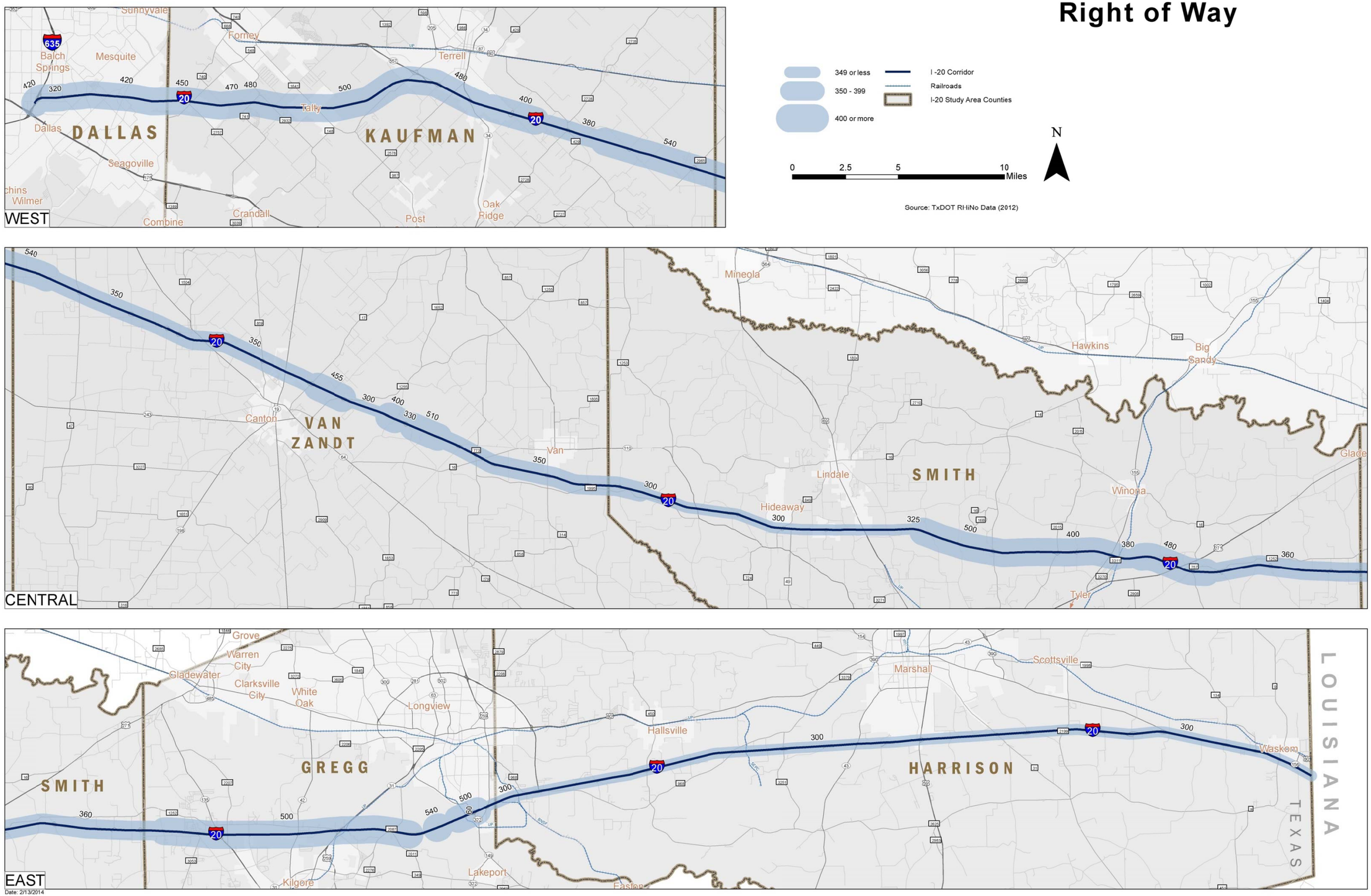
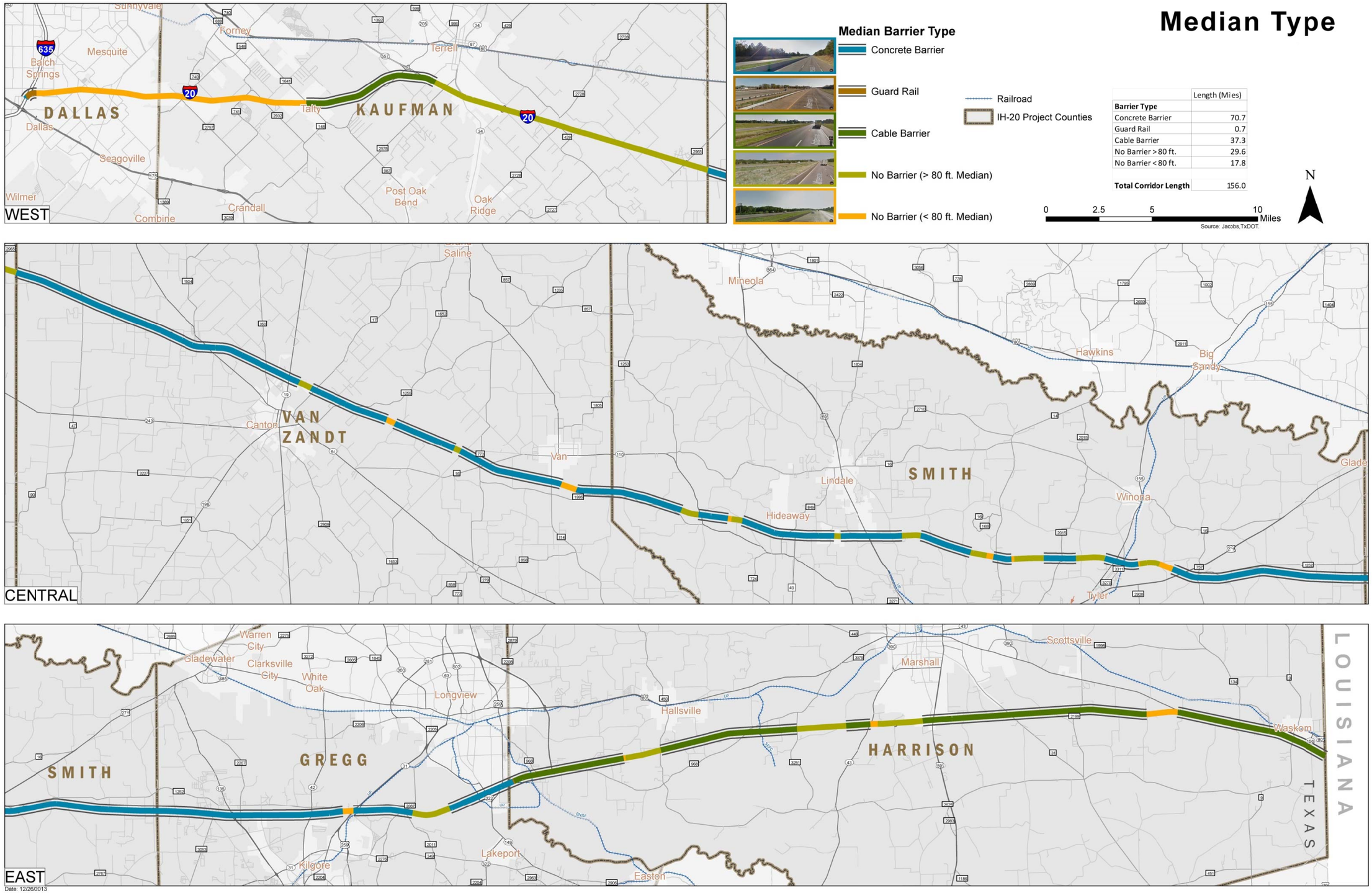
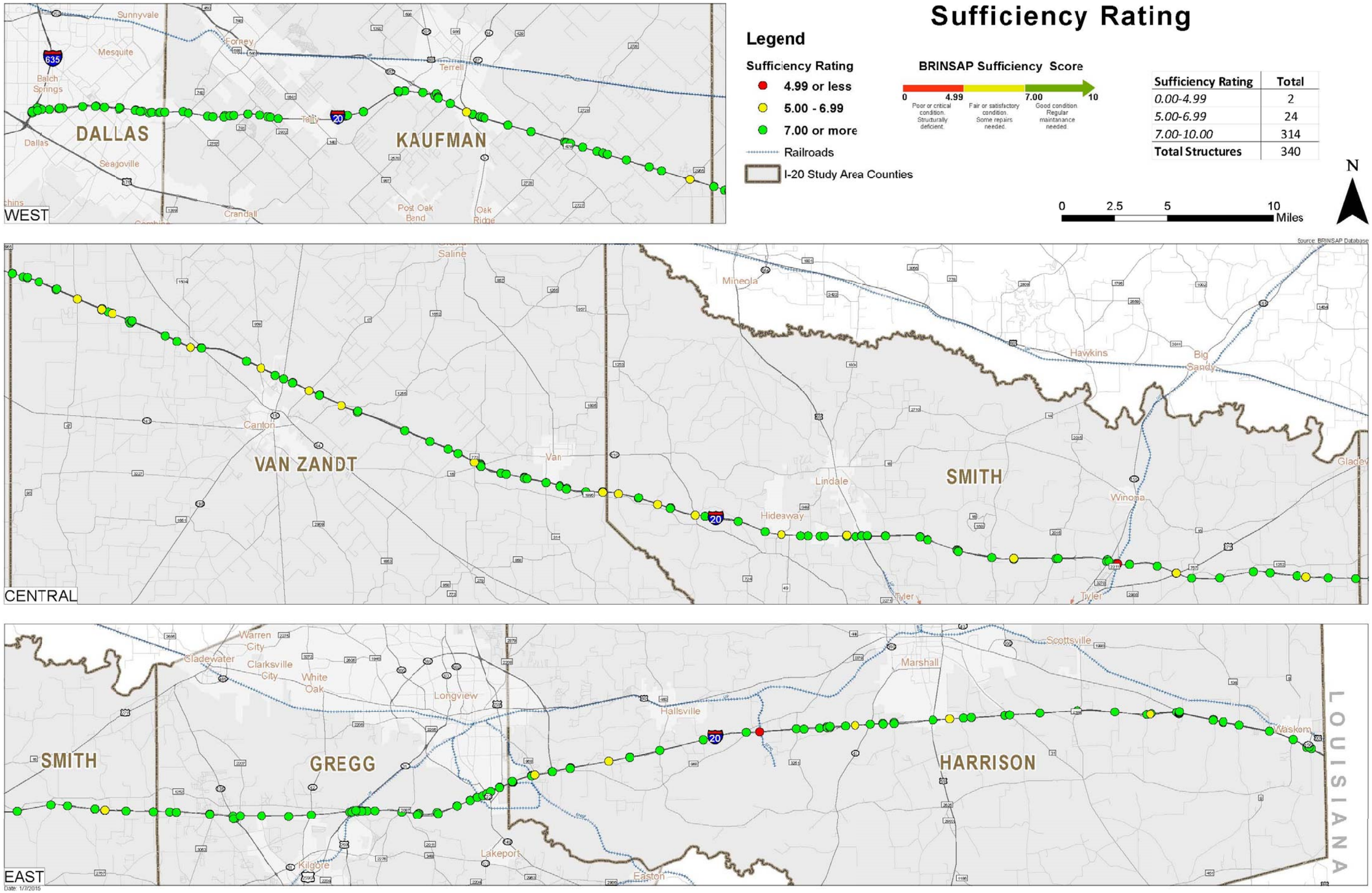
## Map 1.3 Average Right of Way



## Map 1.4 Median Barrier Type



Map 1.5 Bridge Condition



## Map 1.6 Vertical Clearances

# Vertical Clearances

### Legend

**Vertical Clearance at Overpasses**

Meets neither FHWA nor TxDOT standards | 16' | Meets FHWA but not TxDOT standards | 16'6" | Meets both FHWA and TxDOT standards

Interchanges (Half Mile Radius)
Railroads
I-20 Study Area Counties

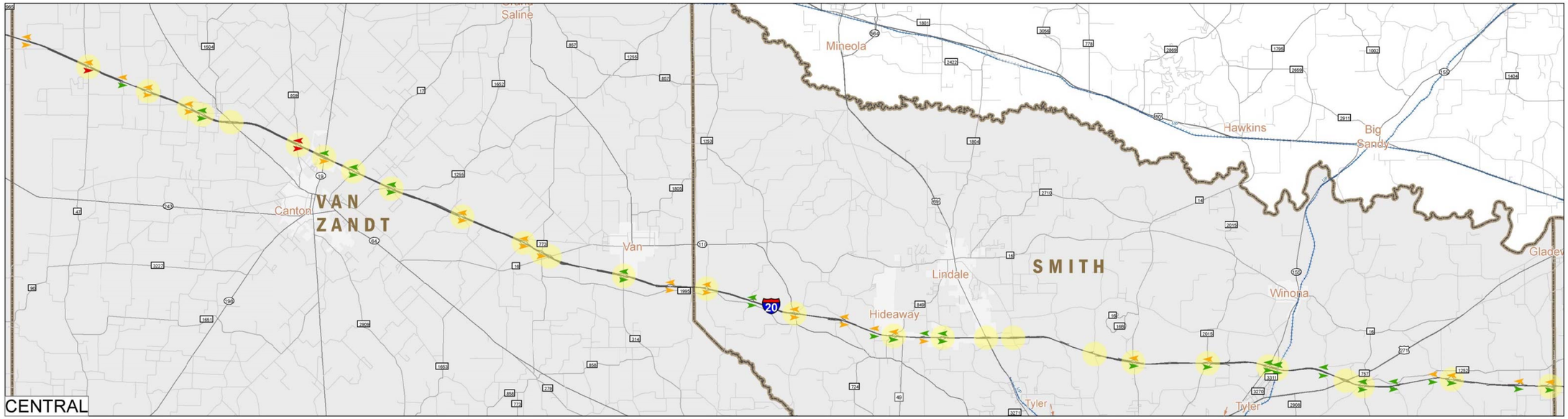
N

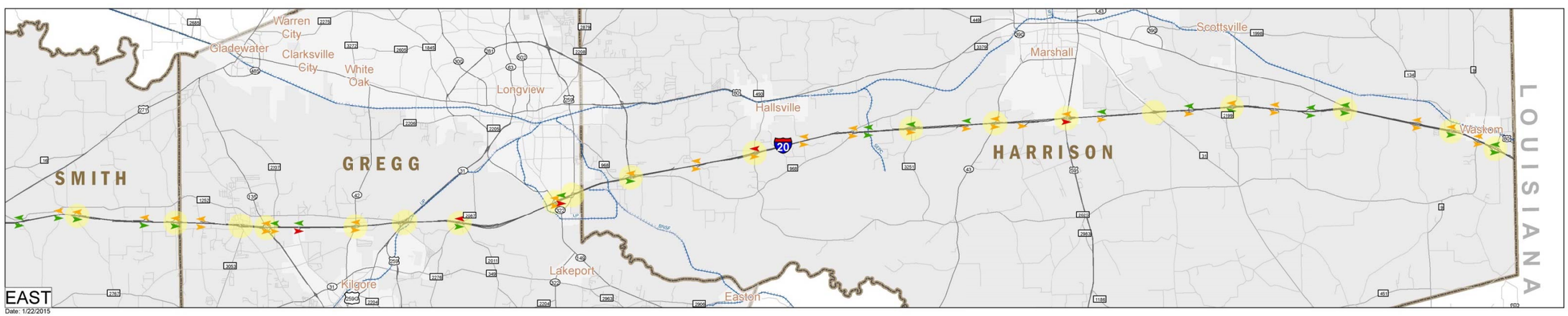
0 2 4 8 Miles

**Direction of Travel at Crossing**
Westbound
Eastbound

Source: Jacobs; Google Maps
Image: FHWA

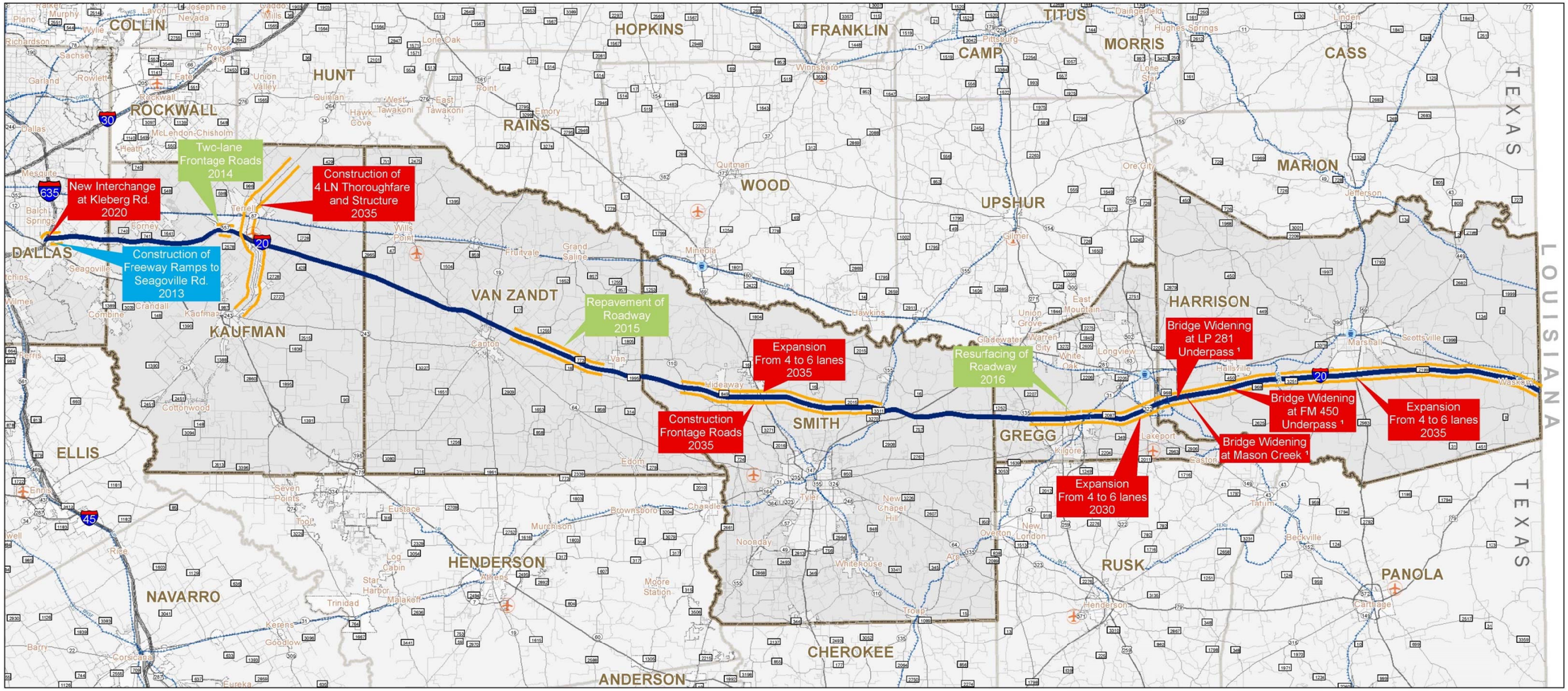
| Intersecting Overpass | Eastbound | Westbound | Total |
|---|---|---|---|
| Above FWHA and TxDOT | 40 | 42 | 82 |
| Above FWHA Standard ONLY | 39 | 43 | 82 |
| Below FWHA andTxDOT | 5 | 5 | 10 |
| | | Total Structures | 174 |




Date: 1/22/2015

## Map 1.6 Planned and Programmed Improvements




### Legend

- I-20 Study Corridor
- Interstate
- US Highway
- State Highway
- Railroads
- Amtrak Stations
- General Aviation Airport
- Reliever Airport
- I-20 Study Area Counties
- Counties
- City Boundaries

**Planned and Programmed Improvements**

- Project Boundaries
- Project Description

Project Development Stages

* Funding must be identified and secured before each step in the process.

¹ Year unavailable.

0 5 10 20 Miles

Source: TxDOT, MPOIP, TRTP,UTP.

N

Date: 9/8/2014

# I-20 East Corridor Study Location with Planned & Programmed Improvements

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## 2. Advisory Committee

TxDOT is working closely with the public to identify opportunities for improvement. In keeping with that goal, the I-20 East Texas Corridor Advisory Committee was created by the Texas Transportation Commission. The Advisory Committee is made up of 21 members representing communities with 15,000 people or more, the interests of the six counties included in the study area as well as MPOs.

Members of the Advisory Committee were tasked with providing insight into their communities' as well as becoming spokespeople for the study's objective and results. **Table 2.1** below includes the list of Advisory Committee members and their affiliation.

### 2.1 Background

Originally intended as a Working Group; members later decided to submit the group as the official I-20 East Texas Advisory Corridor Committee before the Texas Transportation Commission. As a consequence of Commission approval, the I-20 East Texas Working Group changed its name to I-20 East Texas Corridor Advisory Committee in October, 2013.

The purpose of the Advisory Committee as established by the Texas Transportation Commission was to facilitate and achieve consensus from affected communities, governmental entities and interested parties along the I-20 Corridor and in the establishment of development plans. The Advisory Committee's advice and recommendations provided TxDOT with greater understanding of the area and its needs; resulting in greater cooperation between all parties involved during the project planning and development. *Appendix A* includes the official Minute Order produced by the Texas Transportation Commission for the purpose of establishing the I-20 East Texas Corridor Advisory Committee.

*Table 2.1: Advisory Committee Members*

| | Organization | Member |
|---|---|---|
| Counties | Dallas County | Judge Clay Jenkins |
| | Gregg County | Judge Bill Stoudt |
| | Harrison County | Judge Hugh Taylor |
| | Kaufman County | Judge Bruce Wood |
| | Smith County | Judge Joel Baker |
| | Van Zandt County | Judge Rhita Koches / Commissioner Virgil Melton Jr. |
| Cities | City of Balch Springs | Honorable Mayor Dr. Carrie Gordon |
| | City of Canton | Honorable Mayor Richard W. Lawrence |
| | City of Forney | Honorable Mayor Darren Rozell |
| | City of Lindale | Honorable Mayor Robert Nelson |
| | City of Longview | Honorable Mayor Jay Dean |
| | City of Marshall | Honorable Mayor Ed Smith |
| | City of Mesquite | Honorable Mayor John Monaco |
| | City of Seagoville | Honorable Mayor Harold Magill |
| | City of Terrell | Honorable Mayor Hal Richards |
| | City of Tyler | Honorable Mayor Martin Heines / Mark McDaniel |
| Others | Dallas Area Rapid Transit (DART) | Gary C. Thomas |
| | North Central Texas Council of Governments (NCTCOG) | Michael Morris |
| | North East Texas Regional Mobility Authority (NETRMA) | Linda Ryan Thomas / Celia Boswell |
| | Longview MPO | Karen Owen |
| | Tyler Metropolitan Organization (MPO) | Heather Nick |

## 2.2 Goals and Objectives

In keeping with TxDOT 2015-2019 Strategic Plan Goals, the Advisory Committee developed general objectives that would be central in the development of priorities for the corridor and its improvements. These goals and possible objectives included the following:

*Involve local communities*

- Create Transportation Plans that complement local development plans
- Outline potential safety impacts
- Establish framework for Transportation Reinvestment Zone (TRZ) and adopt TRZs locally

*Consider current and future multimodal transportation needs*

- Accommodate all needed forms of transportation
- Consider impact of I-20 planning on Toll 49
- Consider US 80 and US 175 in addition to the I-20 corridor

*Improve safety*

- Reconstruct access ramps to current standards
- Additional lanes in congested areas on I-20
- Consider truck-only lanes

*Reduce congestion and enhance mobility for travelers and freight*

- Coordinate improvements with local governments
- Consider rail hubs as connectors to urban areas
- Build relationships with passenger service providers including plans for service expansion and diversification

*Enhance air quality*

- Construct continuous one-way frontage roads with priority to high volume/high crash areas
- Explore strategies to reduce idling in case of crash or lane closures
- Consider high occupancy lanes (HOL) to alleviate congestion

Finally, the Advisory Committee developed an overarching mission statement to guide them through this 18-month process.

### *Mission Statement*

*The I-20 East Texas Corridor Advisory Committee will promote and facilitate the involvement and input of affected local communities and interested stakeholders to identify and prioritize the multimodal transportation needs of this corridor with a focus on the safety, mobility, congestion and air quality for travelers and freight through East Texas.*

## 2.3 Advisory Committee Activities

Since its formation in July 2013, the Advisory Committee met eight times in different locations along the corridor. Progress was also presented during a special meeting associated with the Texas Transportation Forum in San Antonio on January 14th, 2013.

During the early stages of the process, Advisory Committee Members focused on learning about the
I-20 East Texas Corridor possibilities and challenges. The Kick–off Advisory Committee Meeting was held in Longview on July 18th, 2013 with an attendance of 12 members. For its first meeting, the Advisory Committee's main objective was to get acquainted with the corridor and the purpose of the project. First on the agenda was the discussion of particular issues and needs along the Interstate. For that purpose, 15-ft. long maps were provided for Advisory Committee members to provide insight on the location of points of interest including existing features, points of concern, constraints, and future considerations. This information helped enrich the environmental overview underway at the time. An example section of the environmental feature maps used during this process is provided in *Appendix H Constraints Mapping,* comments provided by Advisory Committee members were then integrated into the research effort and constituted into the final constraints maps. Advisory Committee members also proceeded to review the first draft of their mission statement and membership list. Finally, in planning for future meetings, members were encouraged to appoint an alternate in case they were unable to attend.

Main action items coming out of the meeting included:

- Extension of membership invitation to Canton, Forney, Seagoville, Lindale and DART.
- Further information requested on traffic generators, distribution centers and crash hotspots.

The next Advisory Committee Meeting was held on October 23rd, 2013 in Terrell with a total attendance of 17 members. During an open house at the beginning of the meeting, members reviewed data on crash rates, vertical clearances, median barriers types, existing community connections and traffic volumes, and related items. Moreover, members took a second look into the constraints maps developed during the kick-off meeting. During the same meeting members refined goals and objectives to be achieved in support of the mission statement.

In preparation for public outreach efforts, a brainstorming session for effective means of public outreach took place. Members mentioned previously successful efforts included the following methods: social media and website content, newsletters, public presentations, surveys and open houses.

Lastly, the Advisory Committee received a resolution from Van Zandt County in support of safety improvements to FM 314 exit ramp 540.
Main action items derived from the meeting included:

- Request for provision of an existing right-of-way inventory; and
- Request for further information on passenger rail feasibility and transportation reinvestment zones.

The Advisory Committee took advantage of the Texas Transportation Forum in San Antonio on January 16th, 2014 to hold their next meeting. With an attendance of nine members, the Advisory Committee heard from Judge John Thompson (Polk County: Guest Speaker) on the Alliance for I-69 Texas experience in furthering the needs of I-69. As a complement to this, TxDOT staff made a presentation on Transportation Reinvestment Zones and their applicability to the I-20 Corridor. Draft versions of the public involvement materials were also reviewed by members.

On February 18th 2014, the Advisory Committee members held their next meeting in Mesquite with a total attendance of 14 members. They reviewed progress on the technical study underway and final public outreach materials with a view towards getting acquainted with the materials target audience and proper use. Members requested the production of an online survey to gather feedback on project priorities.

Aided by the information provided during the Open House prior to the meeting; the Advisory Committee focused on the identification of improvement projects along the corridor. Improvements listed at this time were to be reviewed and complemented by technical staff and public input.

Main action items derived from the meeting included:

- Public Involvement Efforts were to be initiated by Advisory Committee members; and
- The April Committee meeting changed to a conference call format geared towards members updating the Committee on their public involvement activities.

As follow-up to the February meeting, members participated in two conference calls held on April 17th and 24th, 2014. Given the extended period of time between Advisory Committee meetings, these conference calls were used to present the group with good practices in terms of public involvement and next steps. Also in the agenda was the revision of the online public survey requested by members during the last meeting. Members approved the survey and agreed on its distribution with a window of participation from the beginning of May to June 9th, 2014. It was also agreed to have the survey published in TxDOT social media outlets and to be referenced in members' own media channels. A total of six activity forms were reported during both calls, with a total reach of approximately 200 people. NCTCOG agreed to provide an update on projects currently in development within the study area.

Members of the Committee asked for the inclusion of a discussion on passenger rail options during the next meeting.

The next Advisory Committee took place on June 11th 2014 and was held at the Tyler Rose Garden and Convention Center with a total of 16 members in attendance. Presentations included an update on the rail feasibility study produced by TxDOT and a presentation on Emerging Transportation Technologies. Both topics and their conclusions are explored further in their respective sections of this report. Advisory Committee Members listened to an update on public outreach activities. Included in the presentation was a summary of topics from the public comments stratified by county.

During this meeting, work on the identification of possible funding sources began. TxDOT staff provided an overview of funding processes and alternative options to be considered by the Committee. The main section of the meeting focused on members of the Committee revising and prioritizing a preliminary project list based on project evaluation scoring methods. Detailed accounts of both the technical evaluation and the prioritization processes are included in the Project Evaluation and Prioritization sections of this report.

The September 10th, 2014 meeting was held at the Balch Springs Civic Center with a total attendance of 15 members. The Advisory Committee took this time to review the summary from the previous Advisory Committee meeting as well as some topics of interest still on the table. These included a reassessment of the results from TxDOT's East Texas Passenger Rail Feasibility Study and ways in which alternative passenger services could be promoted along the corridor.

Members then went on to review a draft version of the Implementation Section included in this report. All proposed projects were classified according to proposed date of completion including near (2015-2020), mid (2021-2030) and Long Term (2031-2040) recommended projects. Several members highlighted the importance of identifying "early-win" projects in order to build momentum and rally community support for the Long Term goals of the study.

As a follow up to previous activities, staff presented a brief summary of public feedback received to date. Discussion then centered on plans for public outreach efforts for the previously reviewed implementation plan. Feedback received during this second period of public comment is detailed in the Draft Plan Public Outreach section in *Appendix C.*
After a brief discussion, members agreed on using all methods and materials used prior to this date as well as the introduction of new technologies like virtual open houses. The Advisory Committee requested outreach materials to be more locally tailored in an effort to better inform their constituents and communities.

Main action items derived from the meeting included:

- Members were to review and send comments on the Implementation Draft Plan.
- Public involvement efforts for the draft version of this report were to be conducted by Advisory Committee members.
- Need for informational materials to be fulfilled by TxDOT based on member requests.

Advisory Committee members met for the last time on December 2nd, 2014 with an attendance of 14 members. The meeting was focused around the discussion of the implementation plan  derived from public input received during the second outreach effort as well as a general overview of the materials to be presented the Transportation Commission as a result of the this study. The current document underwent the necessary adjustments based on said feedback.  Lastly, Advisory Committee Members reviewed and approved the current document for its public distribution and presentation before the Texas Transportation Commission on December 18th, 2014.

Summaries for each of these meetings and related materials can be found in *Appendix C: Advisory Committee Meeting Summaries.*

## 2.4 Initial Public Outreach

The initial public outreach took place from March to June, 2014 and was carried out parallel to the development of the technical analysis.  As part of the Public Involvement Plan (*Appendix C Public Involvement*) the following informational materials were developed to share information with the public and stakeholders.

### 2.4.1 Project Website

Serving as a general information hub for the project, the project website (**Figure 2.1**) was created in August 2013 and updated throughout the project to include recent project information. While on the website, users could view:

- Frequently asked questions (FAQs)
- Project fact sheet
- Meeting minutes
- Project maps

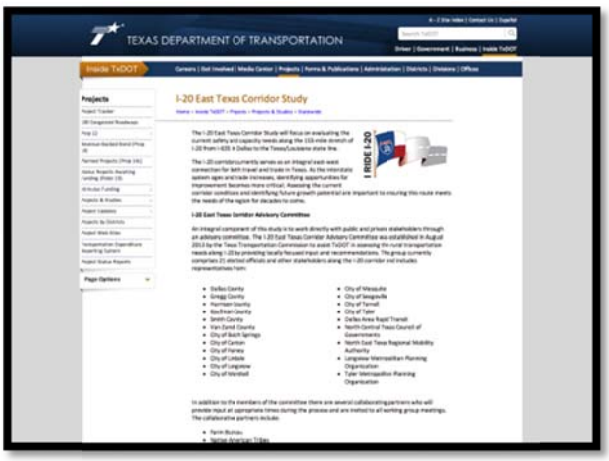


Figure 2.1 Project Website

Additionally, links were provided for an online comment form available the entire duration of the project and to the study's public survey made available during May and June 2014.

### 2.4.2 FAQs

A list of FAQs was compiled based on I-20 East Texas Corridor Advisory Committee members' suggestions (Figure 2.2). These questions were then answered and provided to the public through the project website and available through the Advisory Committee members' local offices beginning in February 2014.

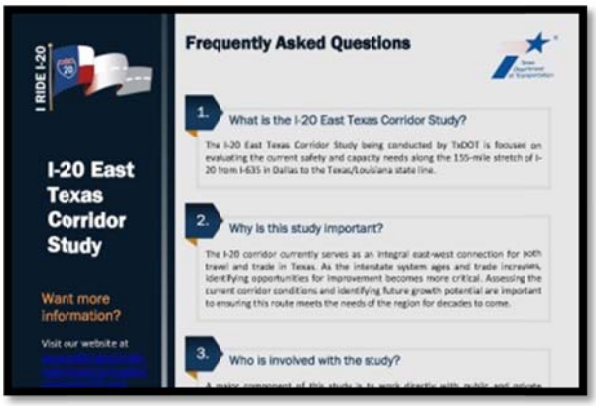


Figure 2.2 : Frequently Asked Questions

### 2.4.3 Project Fact Sheet

A project fact sheet was developed including a general overview of the I-20 East Texas Corridor Study, an explanation of what would be evaluated as part of the study scope, details on how to stay involved with the study, and information on the Advisory Committee members (Figure 2.3). The project fact sheet was provided to the public through the project website and available through the Advisory Committee members' local offices beginning in February 2014.

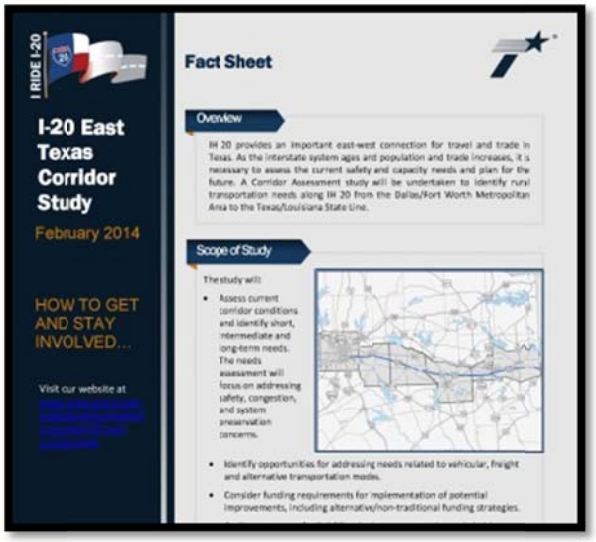


Figure 2.3 Project Fact Sheet

### 2.4.4 Online Survey

A 9-question public survey was created to gather specific feedback on priority for the projects and to assist the Advisory Committee in highlighting locations needing improvements. The questions included are as follows:

a. In what county do you live within the I-20 East Texas Corridor Study area?
b. How often do you travel along the I-20 corridor area between I-635 in Dallas County and the Texas/Louisiana state line?
c. Which of the following options best describes why you most frequently use I-20? (Options: Commuting to your work, Traveling for work away from your regular work place, Traveling for personal use, Hauling Freight, other)
d. Please select up to three strategies you think should be the highest priorities for the I-20 study. (Options: Reduce congestion and enhance mobility for travelers, Improve safety, Consider current and future multimodal transportation needs, Involve local

communities, Reduce congestion and enhance mobility for freight, Enhance air quality, Other)

e. Please select up to three of the following improvement areas you think are most important along the corridor. (Options: Adding lanes, Improving or adding frontage, Reconfiguring entrance and exit ramps, Creating passenger service opportunities, Improve median safety, Adjusting speed limits up, Adjusting speed limits down, Raising bridge heights, Other)
f. What specific areas along I-20 within your county do you feel need attention and what do you think should be done? (Example: lengthen the ramp at the [Street Name or Exit], lower the speed limit near City Name, etc.)
g. What areas along I-20 outside of your county do you feel need immediate attention? (Example: intersection of highways) Please provide name of specific city or between specific cities, etc.
h. Please leave any additional comments about the I-20 study below:
i. To join our mailing list for the project, please fill out the information below. Your information will be kept confidential and used only for this study.

The survey was available from May to June 2014. During this period, TxDOT received a total of 253 responses to the survey. Open commentary was included by survey respondents in 144 survey submittals, which were added to the public input considerations of this report. Geographical location of respondents as shown in **Figure 2.4** shows high levels of participation from the east section of the corridor with increased participation especially from Smith County.

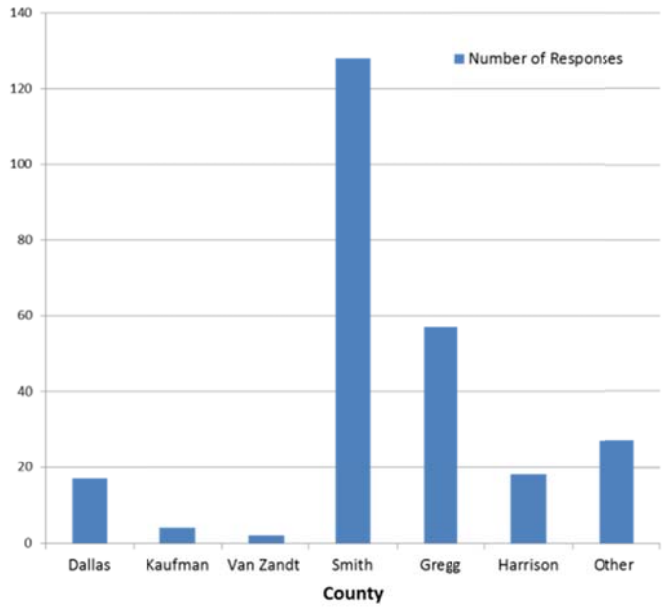


Figure 2.4 Survey Response Origin

### 2.4.5 Public Presentations

During the initial round of public involvement, Advisory Committee members gave a series of presentations to different organizations and public institutions including Chambers of Commerce, City Councils, Rotary clubs, Lions Clubs, Homeowners Associations and MPO public meetings -- reaching out to over 400 people. A copy of the general presentation used is included as part of the Public Involvement Update (*Appendix C Public Involvement*).

### 2.4.6 Public Comments

A total of 215 public comments were received during the initial section of public outreach from 18 counties. Sixty- four of them were obtained via the online comment form and seven as mail-in forms. The remaining 144 comments were taken from the answers to the open question section included in the online survey.

#### (i) Summary

Even though the public commentary section of this study turned out a range of unique issues, there were a number of recurring concerns express by the corridor users. People living within the study's counties expressed the need for a third lane in each direction of travel; raised issues with inconsistent speed limits as well as need for better enforcement of it; and identified existence of inadequate access ramps and as well as hazardous conditions on wet roads. **Figure 2.5** summarizes the breakdown of main concerns by county.

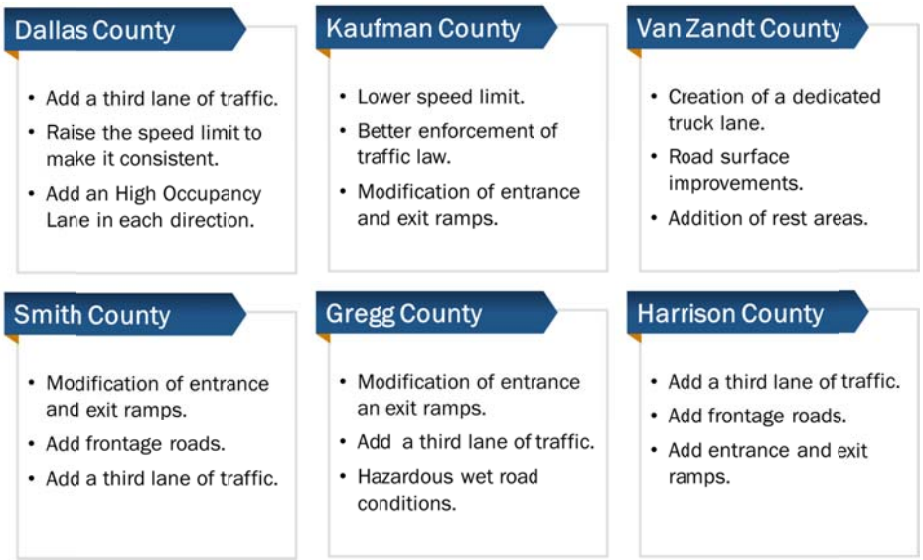


Figure 2.5 Main Concerns by County

A total of 22 comments from users living outside the study area were also received through multiple channels. Their comments expressed interest in the addition of a third lane of traffic in each direction and the improvement of entrance and exit ramps along the corridor.

## 2.5 Draft Plan Public Outreach

Following the development of a preliminary program of improvement projects for the I-20 East Texas Corridor, the Advisory Committee reviewed the plan and offered comments at a meeting held in Balch Springs on September 10, 2014. After that meeting, the Advisory Committee comments were incorporated into the preliminary program to create a Draft Implementation Plan for members to share with their constituents. The second phase of public outreach from September to November 2014, included public presentations performed by Advisory Members throughout the corridor as well as a virtual meeting created to provide access to the Draft Implementation Plan for the I-20 Corridor. Presentations focused on improvement projects selected as priorities in the corridor including near-, mid-

and Long Term projects.

### 2.5.1 Activities

#### *Advisory Committee Public Outreach*

I-20 East Texas Corridor Study Advisory Committee members were asked to create public outreach opportunities in their own communities with possible suggestions of social media posts, website links and community presentations. Members submitted an activity form to the study team that documented individual events.

Members submitted activity forms for six events held during the second phase of public involvement between Sept. 11 and Nov. 7, 2014, reaching out to over 3,056 local residents. Information was shared with local organizations, city council meetings and MPO meetings. A brief summary is provided below:

*Table 2.2 Initial Outreach- Activity Forms Submitted*

| Member | Activity Forms Returned | Total Audience Reach |
|---|---|---|
| Longview MPO | 4 | 3,047* |
| Tyler MPO | 1 | 9 |
| Lindale City Council | 1 | 12 |

**Longview MPO included information about the I-20 East Texas Corridor Study in two email blasts.*

#### *Virtual Open House*

In addition to public outreach efforts conducted by Advisory Committee members, TxDOT hosted a virtual open house online to increase participation of both citizens and corridor users. The virtual open house was hosted through Survey Monkey and included slides from the community presentations used by Advisory Committee members. This presentation included project information, status updates and proposed projects included in the draft plan. Maps and illustrations were used throughout the virtual open house, and opportunities to comment were available after each set of county-specific slides.

A video was also produced of the community presentation including a voiced narrative of the presentation. This video was uploaded to YouTube.

These internet based opportunities were publicized on various social media sites, and created a number of additional interactions as detailed below:

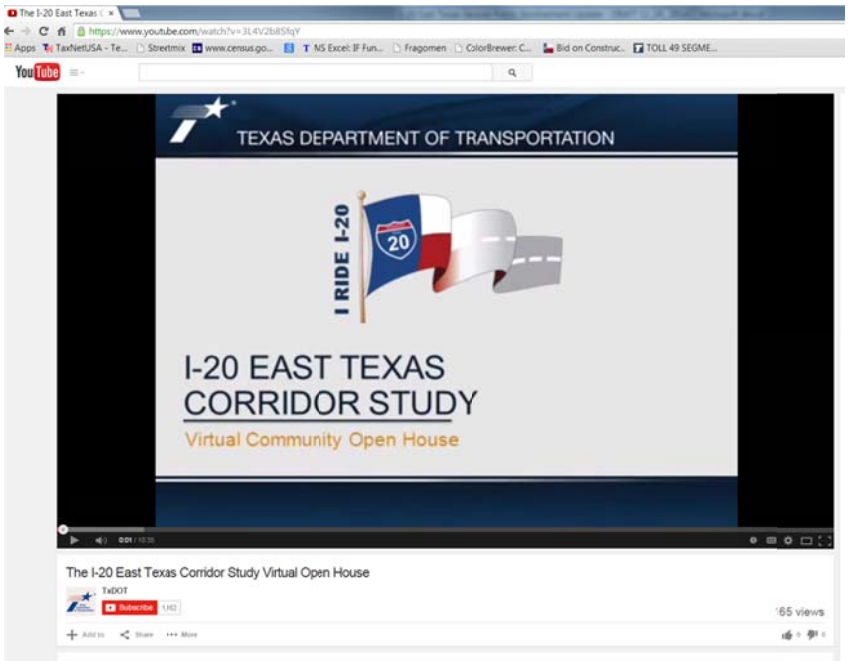


*Figure 2.6 Virtual Open House Video Presentation*

*Table 2.3 Draft Plan- Activity Forms Submitted*

| Outreach Activity | Availability | Number of Participants |
|---|---|---|
| Virtual Open House | Oct. 17 – Nov. 7, 2014 | 53 |
| Video Presentation | Oct. 20 – Nov. 7, 2014 | 138 |

## *Local Materials Distribution*

I-20 East Texas Corridor Study materials including project overview fact sheets, county-specific fact sheets with proposed project lists and maps, comment cards as well as pre-addressed and stamped envelopes were made available at seven locations throughout the corridor during this same time period. Their availability was advertised in a press release issued by TxDOT on Friday, Oct. 17.

*Table 2.4 P.I. Material Distribution Location*

| Location | County | Availability |
|---|---|---|
| Texas Travel Information Center | Harrison | From Oct. 17, 2014 |
| Longview Convention and Visitors Bureau | Gregg | From Oct. 17, 2014 |
| Gateway Travel Plaza | Gregg | From Oct. 17, 2014 |
| Tyler State Park | Smith | From Oct. 17, 2014 |
| Tyler Chamber of Commerce | Smith | From Oct. 17, 2014 |
| Canton Visitors Bureau | Van Zandt | From Oct. 17, 2014 |
| Terrell Chamber of Commerce | Kaufman | From Oct. 17, 2014 |

### 2.5.2 Public Comments

To ensure stakeholders were able to submit their opinions on the study, comments could be provided via the project website, Facebook, Twitter, email, mail, or at public meetings.

All of the public comments received during this phase were compiled and managed in a tracking database. Comments received from 12 different counties, between September 1, 2014 and November 7, 2014 are summarized below:

*Table 2.5 Comment Submittal Method*

| Method Comment was Received | Number of Comments |
|---|---|
| Web-based | 12 |
| Mailed-in | 0 |
| Turned in at public outreach events | 3 |
| Virtual meeting comments | 12[4] |
| **Total Comments Received** | **27** |

[4] Open commentary was optional when responding to the survey associated with the virtual meeting.

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# 3. Technical Analysis

Technical analyses of existing and forecasted conditions for the corridor were performed in coordination with the Advisory Committee efforts and public outreach. The focus areas of the technical analyses were grouped into four categories: Traffic Demands, Safety, Functionality, and Modal Considerations.

## 3.1 Traffic Analysis

One of the main concerns along I-20 is the existing traffic volume as well as the corridor's capacity to handle its growth over the coming years. Traffic analysis of existing and anticipated levels of traffic demand was required to assess potential needs in terms of through lanes on I-20.

Annual counts are produced as a measure of traffic and considerations are made based on average daily traffic counts for each facility TxDOT monitors traffic levels through its highway system, conducting traffic counts periodically to track usage and seasonal variations. These data are then expressed as Average Annual Daily Traffic volumes or AADT. These AADT are then used to describe the common daily traffic demand likely to be experienced along a portion of highway. Special classification counts are also collected along various segments so that commercial trucking levels can be defined separately, both as a percentage of total AADT and as a quantity.

The amount of existing traffic on any particular segment of highway is compared to the capacity for which of the corridor was built. Capacity is determined by the number of available lanes per direction, as well as the configuration characteristics and classification design factors of the facility and the traffic using it. Key factors include access control, lane and shoulder width, percent of commercial trucks, and grade. The urban section of the corridor has a general capacity of 80,000 vehicles per hour, while the rural section is deemed capable of handling approximately 45,000 vehicles per hour at a Level of Service (LOS) D.

Capacity is evaluated in terms of LOS which measures quality of service provided by a road under specific traffic levels.

A LOS of A or B is the most desirable ranking for a facility. Able to handle 49,000 vehicles or less average daily traffic (AADT) in an urban setting and 29,000 or less in rural areas, LOS A or B implies a condition of free-flowing traffic. However, entities in charge of highways strive for urban facilities with a LOS D since it is economically challenging to provide better conditions. In the case of rural interstates, citizens are less tolerant of congestion and planners strive to maintain better conditions.

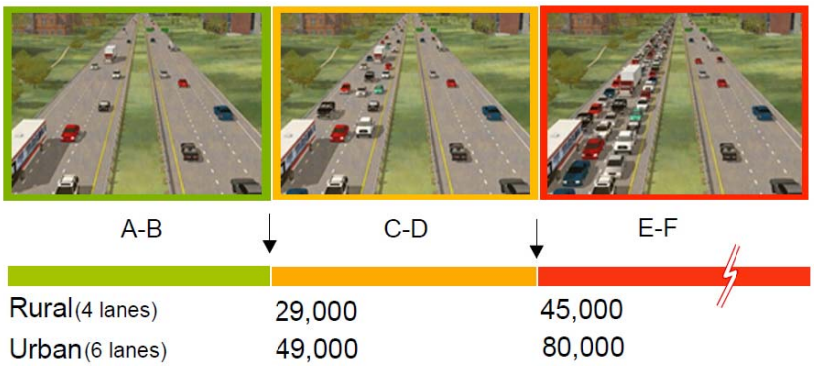



Figure 3.1 Level of Service (Main Lanes)

EXISTING TRAFFIC: Current traffic data for the I-20 East Texas Corridor was obtained from the 2012 RHiNo database. The RHiNo database records an AADT count and its corresponding freight trucking percentage for each segment of the state's road network. Maximum posted speed, minimum design speed; design capacity and right-of-way among other factors are part of the road attributes that can be found within the RHiNo database. *Map 3.1: 2012 Traffic and Level of Service* illustrates LOS for the corridor as of 2012, in addition to current levels of traffic illustrated using a bandwidth related to traffic volumes.

The highest volumes of traffic in the corridor are found in Dallas County, which currently operates under acceptable traffic conditions; its AADT remains well below the 49,000 vehicles that characterize the upper boundary of an urban LOS C-D. Traffic along the rest of the corridor fluctuates from 22,000 to 45,000 vehicles per day with the heavier traffic occurring along sections connecting adjacent communities like Terrell and Canton; Van and Hideaway/Lindale; as well as Tyler and Longview.

The I-20 East Texas Corridor has higher shares of freight traffic than typically found on rural highways, with an average of 30.5% being classified as commercial trucks at any point along the corridor. Although freight traffic remains stable, the section of the corridor from US 69 to US 271 exhibits the overall highest percentage of freight traffic in large part because passenger vehicle traffic falls to its lowest levels in this same stretch. Recent daily traffic counts that have been experienced on various segments of I-20 are identified in *Map 3.1: 2012 Traffic and Level of Service*. The percentage of commercial trucks in that stream of traffic is also defined. The segments are then color coded based on the general LOS these traffic volumes create.

FORECASTED TRAFFIC: Traffic projections for 2032 and 2040 were used to assess the future needs of the corridor in terms of capacity. Projections for 2032 were taken from the 2012
RHiNo database, while projections for 2040 were developed using the compound average growth rate of previous years to adjust results from the SAM V.3 state-wide traffic model. (See *Appendix E Technical White Papers* for details)

*Map 3.2 2040 Traffic and Level of Service* illustrates projected traffic volumes for the year 2040 with graphical representations of bandwidth. These traffic volumes are also translated into expected traffic conditions (LOS). Traffic for the west section has grown in accordance with the Metroplex expansion, to a point where it is expected to accommodate up to 61,000 vehicles a day by 2040. The central and eastern portions of the corridor are also projected to grow over the next 25 years with many segments experiencing demands in the 40,000 to 45,000 vehicles per day range.

In the year 2040, the corridor is projected to have an LOS of C or less throughout its entire 155 miles. Segments including I-20 from the Dallas County Line to FM 1641, I-20 from SH 34 to FM 3202 and the 2-mile segment from SH 134 to the Texas/Louisiana Border are projected to fall to LOS E-F with a demand of over 45,000 vehicles a day. Thus, 35 miles of the 155-mile corridor can be expected to operate under heavy congestion by the year 2040. This equates to more than 20 percent of the corridor's length. Because the most congested segments will be spread out through the entire corridor, there could be some "spill back" into less congested segments, creating more miles of congested travel.

Additionally, segments currently well in the middle of the LOS A-B range will have dropped to a C-D classification due to increased demand. This does not imply that I-20 will be unable to accommodate the increased traffic demands, but the drop in LOS could have safety implications for the corridor, especially with high freight traffic demands that I-20 experiences.

## 3.2 Pavement Condition

The TxDOT Pavement Management Information System (PMIS) uses the present condition of pavement surfaces for describing the overall condition of the State maintained highway system. TxDOT measures ride quality and rates pavement distress on the State network each year. Visual distress ratings, rutting and ride quality are summarized by section (usually 0.5-mile in length) along the entire corridor.

Pavement condition is also an important indicator of the need for rehabilitation. Various types of instruments are used to determine the condition of pavement surfaces. These instruments measure ride quality, structural adequacy, and skid resistance. These

automated procedures are supplemented with visual surveys of highways to determine pavement condition and define strategies for improvement. The current results of these efforts on I-20 in East Texas are depicted on *Map 3.3: Pavement Condition.* Most of the corridor pavement is described as Very Good, or Good; but some smaller sections connecting to Dallas, near Terrell, as well as the west side of Tyler have been described as Poor to Very Poor. Additionally, because of recent pavement resurfacing efforts, a major section of I-20 through Harrison County was awaiting an updated pavement rating while this report was being developed.

Unfortunately, all of these scores focus on the surface condition of the pavement. The visual appeal may be enhanced, but the overall condition of the pavement below the surface is continuing to age and deteriorate. Most interstate pavements are designed to last 20 to 30 years, and this portion of I-20 pavement is almost 50 years old. Additionally, the original design never anticipated the volumes of traffic, especially heavy commercial trucks present today. As a result, each District along the corridor is constantly performing routine maintenance in order to maintain good PMIS ratings. Meanwhile the foundation and base course of the roadway continues to deteriorate. At some point, the pavement must be completely rebuilt, and the cost to do so is far less than that of trying to keep maintaining the existing pavement.

The Atlanta District has hired the Texas Transportation Institute (TTI) to perform a detailed pavement analysis of I-20 in Harrison County. The goal of the study is to develop a 10-year pavement rehabilitation plan for each section based on determining the underlying cause of the pavement problems. The research team will conduct a full ground-penetrating radar (GPR) survey. Then after meeting with district personnel to discuss roadway history and priorities, the team will use a falling weight deflectometer test program to evaluate the in situ structural strengths and verification field-sampling program. For each section, the cause of the distress, the most appropriate repair strategy and the priority of the work will be reported.

## 3.3 Crash Analysis

Safety is also among the main concerns of I-20 users. To ensure safety is addressed at appropriate locations and in adequate manner, crash analyses are always part of a needs assessment. The objective of a crash analysis is to identify factors resulting in concentrations of crashes, and use this information to define the most effective ways to reduce future crash potentials by eliminating hazards or improving facility design.

Historical crash data was provided by TxDOT's Traffic Operations Division from the Crash Records Information System (CRIS) database for recent incidents occurring between 2008 and 2012. Incident reports include number of vehicles involved, manner of crash, light and

pavement conditions, first harmful event, severity and contributing factors, among others. An overall assessment of crash data for the entire corridor was produced along with individual crash rates for specific corridor segments. Results from both of these permitted planners to identify points of interest where concentrations of crashes occur. These concentrations are called "hotspots" and represent at least the most frequent location of crashes on I-20 within each county.

During the same 2008-2012 period, the state of Texas experienced an average crash rate of 43.9 crashes per hundred million vehicle miles travelled (VMT) for rural interstates. This portion of the I-20 Corridor experienced an average crash rate of 55.61 crashes per hundred million vehicle miles; which is 18 percent higher than the statewide average. This suggests that the corridor has the potential to operate in a safer manner if improvements can be implemented. If all of the necessary improvements were to be implemented immediately, safety could be enhanced by averting about 180 crashes per year with a reduction in economic costs of more than $ 60 million per year as detailed on **Table 3.1**. Over the next 25 years, the safety benefit could approach 4,500 crashes averted. Each crash has an impact on the quality of human life, and on the economy. Using standard valuations, the savings to the economy would be more than $ 1.5 Billion in current costs.

*Table 3.1: Economic Cost of Crashes by Severity.*

| | Fatal | Incapacitating Injury | Non-Incapacitating Injuries | Possible Injury | Not Injured | Unknown | Total |
|---|---|---|---|---|---|---|---|
| **I-20 Total Crashes** *(2008-2012)* | **72** | **155** | **535** | **843** | **3327** | **33** | **4,965** |
| Total Crashes Percentage *(2008-2012)* | 1.45% | 3.12% | 10.78% | 16.98% | 67.01% | 0.66% | **100.00%** |
| Total Crashes in 5-years if reduced to Statewide Average Rate | 59 | 127 | 438 | 690 | 2,724 | 27 | **4,065** |
| Cost of Existing Crashes (Yearly in Millions) | $131.04 | $121.16 | $ 74.00 | $ 4.60 | $ 6.06 | $ - | **336.86** |
| Cost of Crashes if reduced (Yearly in Millions) | $107.38 | $99.27 | $ 60.58 | $ 3.77 | $ 4.96 | $ - | **275.96** |
| **Difference (Yearly in Millions)** | **$23.66** | **$ 21.89** | **$ 13.42** | **$ 0.84** | **$ 1.10** | $ - | **60.90** |

Source:

### 3.3.1 Analysis by Crash Type

LOCATION ON THE ROAD: A total of 4,965 crashes were reported along the corridor from 2008 to 2012. The majority of them took place while motorists were traveling on the main lanes; however 6.1% of them were reported to have occurred on an entrance or exit ramp. Details are shown in **Table 3.2** below:

*Table 3.2: Crash Location on the Road.*

| Location of Crash | Main Lanes | Entrance / On-Ramp | Exit /Off-Ramp | Connector / Flyover | Other or Unknown | Total |
|---|---|---|---|---|---|---|
| Total | 4,646 | 117 | 188 | 12 | 2 | **4,965** |

VEHICLES INVOLVED: An overview of the corridor indicated a slight prevalence of single vehicle crashes (58.4), while multiple vehicle crashes amounted to 41.3% of all crashes. The remaining 0.3% constitutes instances where this detail was not included in the report.

FIRST HARMFUL EVENT: According to the definition provided by the crash incident database, a first-harmful event, like its name states, is the first incident that causes injury or damage in a crash. **Table 3.3 and Figure 3.2** illustrate the total crashes broken down by percentage and by year as well as categorized by first harmful event. Motor vehicles in motion are the most frequently cited first-harmful event in the 2008-2012 data. With 41.6% of all crashes, they represent the corridor's biggest challenge in terms of safety.

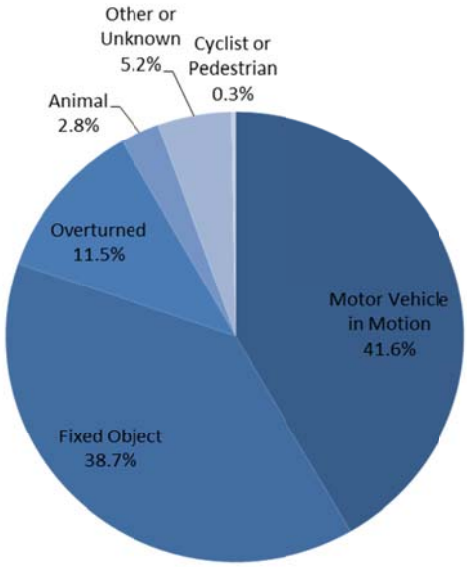



Figure 3.2 First Harmful Event

Fixed objects are the second most cited first-harmful event along the corridor after other motor vehicles in motion. In an effort to identify possible hazards related with infrastructure or physical features along the corridor, a crash analysis was performed focused on incidents related with fixed-objects.

Within the 5-year span there were 1,920 crashes between vehicles and fixed objects, which represented a 38.7% of all incidents along the corridor for the same time period.

*Table 3.3: Crash Totals by Year and First Harmful Event*

| Year | Vehicles in Motion | Fixed Object Crashes | Overturned Vehicles | Animal | Cyclist or Pedestrian | Other (Unreported) | Total Crashes |
|---|---|---|---|---|---|---|---|
| 2008 | 429 | 375 | 140 | 22 | 2 | 40 | 1,008 |
| 2009 | 417 | 431 | 116 | 33 | 3 | 35 | 1,035 |
| 2010 | 434 | 401 | 103 | 31 | 3 | 69 | 1,041 |
| 2011 | 385 | 336 | 91 | 23 | 1 | 61 | 897 |
| 2012 | 399 | 376 | 121 | 29 | 6 | 53 | 984 |
| Total per Type of Crash | 2,064 | 1,920 | 571 | 138 | 15 | 257 | 4,965 |

Based on this information, crashes per mile involving fixed objects where calculated. While normal crash rates are calculated with respect to the number of vehicles traveling along a specific section of highway, these crash rates were calculated based on the influence of specific fixed objects along the corridor. Geographic groupings of such crashes are more likely to identify roadside hazards. The overall number of crashes per mile throughout the corridor averaged 12.4, but portions of the corridor around the interchanges of US 69 in Smith County and SH 42, SH 31 and FM 2087 in Gregg County have more than 60 crashes per mile involving fixed object collisions. As detailed in *Map 3.4: Fixed Object Crashes*, the highest sections in terms of this type of crash coincide with some of the most prominent overall crash hotspots.

The presence of median barriers is intended to reduce head-on and fixed-object collisions Places where the barrier is continuous show lower crashes suggesting that speed and changing traffic movements have more to do with these crash concentrations.

Additionally, there were a total of 571 crashes involving overturned vehicles along the corridor from 2008 to 2012. Incident reports for this type of crash indicate a majority of them occur on the corridor's main lanes as opposed to entrance and exit ramps. Dallas and Kaufman Counties, on the west side of the corridor, have a significantly lower number of crashes involving an overturned vehicle than the rest of the corridor. *Map 3.5: Crashes involving Overturned Vehicles*, depicts a similar trend of reduction of overturned vehicle crashes on the east side of the corridor past the City of Marshall. However, Van Zandt, Smith and Gregg Counties experience higher numbers of this type of crash, with concentrations

that correspond to overall crash hotspots around the intersections of SH 42, SH 31 and FM 2087 as well as south of Hideaway and Lindale.

Other considerations into the way drivers react and drive the corridor, led to the analysis of locations of head-on collisions. There were a total of 35 such crashes from 2008 to 2012, ten of which resulted in fatalities – with six of them involving use of alcohol or controlled substances. Although there is no distinctive geographical pattern to the location of these crashes, minor concentrations appear between Kilgore and Longview. Even though these are geographically close, they involve only three and four crashes respectively over the last 5 years. Longview's concentration centers on the interchange of I-20 and US 259, with most crashes dating back to 2009. Kilgore's concentration on the other hand, is located east of the interchange of I-20 and FM 2087. Only two fatalities were related to this concentration. Although they were both associated with alcohol and drug consumption, they occurred in a section of the corridor with no median barrier but the 80-plus foot median width in this location would normally be sufficient for motorists to bring their vehicles under control upon leaving the highway.

SEVERITY: Crashes were also evaluated based on their severity; separating those involving fatalities, injuries, and those that were classified as Property Damage Only (PDO). The final category is the most common – totaling 3,360 crashes from 2008 to 2012, Identification of patterns for most types can be addressed by identifying general concentrations of crashes. Thirty- two percent of all crashes along the corridor involved injuries, serious injuries or fatalities. For specific percentages refer to **Figure 3.3** Severity of Crash. These distributions are in close agreement with the rural statewide crash experience.

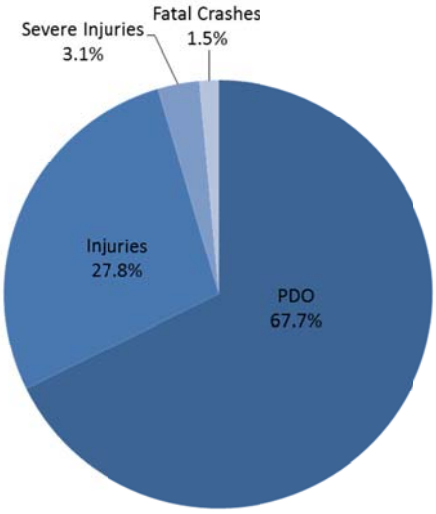


Figure 3.3 Severity of Crash

*Map 3.6 Crashes resulting in Fatalities and Incapacitating Injuries* depicts concentrations of crashes resulting in incapacitating injuries around US 69, as well as after US 271 all the way to the Smith/Gregg county line. Also coinciding with Gregg County's crash hotspot there is another concentration for both fatal and incapacity injuries. Kaufman County, although low on the incapacitating injury count, has a prevalence of fatalities from Spur 557 all the way to the Van Zandt County line. Lastly, Harrison County fatalities although not concentrated start appearing consistently from US 59 to the State Border.

PRIMARY CONTRIBUTING FACTOR: Just as incident reports identify first-harmful event, they also identify main factors influencing the incidence of crashes. Multiple contributing factors could be listed when documenting a crash; nonetheless they are included in order of importance within the reports. More than 50% of crashes reported from 2008-2012 identified excess speed or failure to control speed as the main contribution factor behind the crash. Each of the major contributing factors identified in these cases are the result of driver actions or inactions, as opposed to geometric deficiencies.

Unsafe lane change or lane departure, driver inattention or distraction and faulty evasive action were cited as the second, third and fourth highest contribution factors respectively after speed.Failure to yield right-of way represents only 5.84% of all reported crashes, however public concern over crashes occurring within exit and entrance ramps make it a significant point of interest for the I-20 corridor.

More uncommon occurrences included alcohol or drug related inefficiencies citations on any of the drivers involved, the presence of an animal within the right-of-way or the road, or crashes resulting from inappropriate spacing between vehicles in motion.
**Figure 3.4** Major contributing factors show the percentage of crahes that listed each factors during the 5-year timeframe.

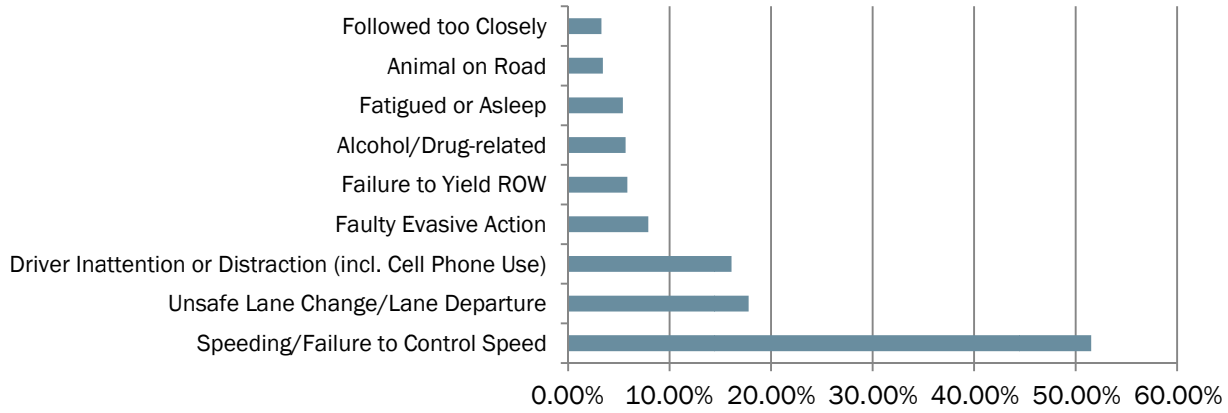



Figure 3.4 Major Contributing Factors

CLIMATE CONDITIONS: Weather related factors are also a major factor in analyzing crash incidence. For the past five years there were 14 snow day events with 84 crashes related to them. These are summarized in **Figure 3.5.**

Ice-related crashes are well scattered throughout the corridor; nonetheless they become less frequent as one moves from west to east in the corridor. As shown in *Map 3.7: Snow and Ice-related Crashes*, there are three visible concentrations of such crashes. The first one is located from FM 741 to Spur 557 in Kaufman County. The other two areas of frequent

weather related crashes coincide with segments previously identified as crash hotspots, South of Lindale from FM 849 to FM14 and north of Kilgore from SH 135 and FM 2087. These locations call for special strategies to identify when ice forms and in order to respond accordingly.

SURFACE CONDITIONS: The condition of the pavement also plays a major role in the incidence of crashes in certain locations. According to the previously mentioned crash data, more than half of all crashes happened over dry pavement (57.6%), followed by crashes over wet pavement or standing water (38.7%). Extreme conditions like sleet, hail or snow, usually identified with higher risk for crashes, were present only in 3.6% of all cases. As depicted in **Figure 3.6**, only 0.2% of crashes did not specify condition of the surface at the moment of the crash. In comparison, the statewide average for all rural facilities was much less influenced by adverse weather – with almost 82% of all crashes occurring on dry pavements.

LIGHT CONDITIONS: Incident reports also account for light conditions. Sixty-eight percent of crashes happened during daylight hours. Other conditions, as shown in **Figure 3.7**, accounted for 32% of all crashes including those reported under dark unlighted conditions (22.9%), dark lighted conditions (5.8%) and others including dawn, dusk and unknown (3.3%).

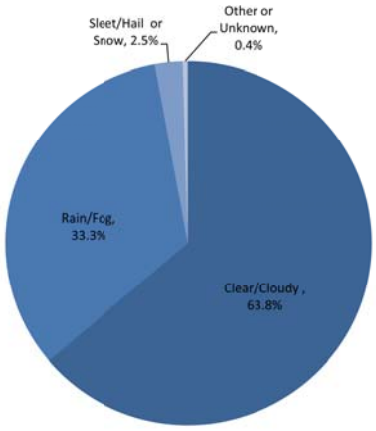



Figure 3.5 Climate Conditions

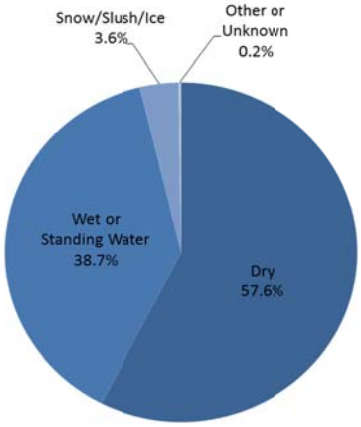



Figure 3.6 Surface Conditions

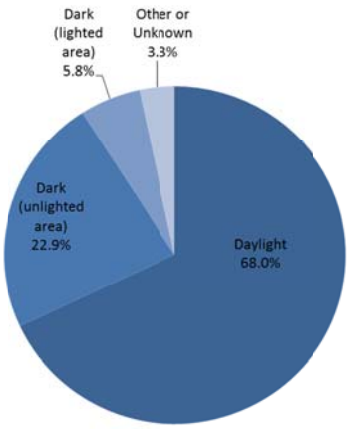



Figure 3.7 Lighting Conditions

## 3.4 Crash Rates

Average crash rates were calculated and assigned to each of the unique corridor segments to determine how frequently crashes occurred after adjusting for the amount of traffic in each segment. This permitted problem areas to be identified. Given the time span of five years (2008 to 2012) crash data provided by TxDOT, rates were calculated and these results

were compared to the average crash rate (43.9) for all rural interstate facilities in the State of Texas for the same time span.

Half-a-mile radii were established around each interchange in order to measure the influence of major traffic flows and produce locally relevant results. These areas of influence were meant to capture all interchange-related incidents, leaving areas between them to be considered as separate segments. As a result, crash rates were produced for 106 segments along the corridor. Individual crash rates for each segment were calculated by dividing the number of crashes per year per hundred million vehicle miles travelled (VMT), which were calculated using the length of the segment times multiplied by the average daily traffic volume, and then annualized using times 365 days in a year.

$$Crash\ Rate = \frac{Total\ Number\ of\ Crashes\ \ (2008\ to\ 2012)\ X\ 100\ million}{Average\ ADT\ (2008\ to\ 2012)\ X\ Segment\ Length\ X\ 5\ years\ X\ 365}$$

*Map 3.8 Crash Rates,* indicating results for all segments, showcases segments with rates below the statewide average in green, those up to two times the statewide rate in yellow, and those over twice the statewide rate in red.

As previously stated, *Map 3.8 Crash Rates* depicts the highest concentrations of crash rates by segment, and 59 of the 106 segments have ratings well above the statewide average. Based on these results crash hotspots were identified for further study.

## 3.5 Hotspots

The analysis defined seven crash hotspots along the corridor which were identified as sections of road with rates above the statewide crash rate of 43.9. From the total of 4,965 crashes, 2,153 incidents representing 43.3% of all crashes in the corridor were reported to have occurred within these hotspots. These hotspots include 37.42 miles of the 155 mile corridor. The analysis into the conditions and contributing factors previously mentioned was conducted within the specific boundaries of the hotspots. This analysis found speed was the main contributing factor in most cases, followed by driver distraction and unsafe lane changes. Seventy-one percent of all incidents on these segments happened during daylight periods, and more than half of the crashes were associated wet or icy pavement conditions. Both of these findings are in relatively close agreement with corridor-wide experience.

Incident reports for all hotspots were then analyzed to determine main contributions factors for each location looking to establish a course of action for each one. A list outlining all hotspots can be found in **Table 3.4** Crash Hotspots.

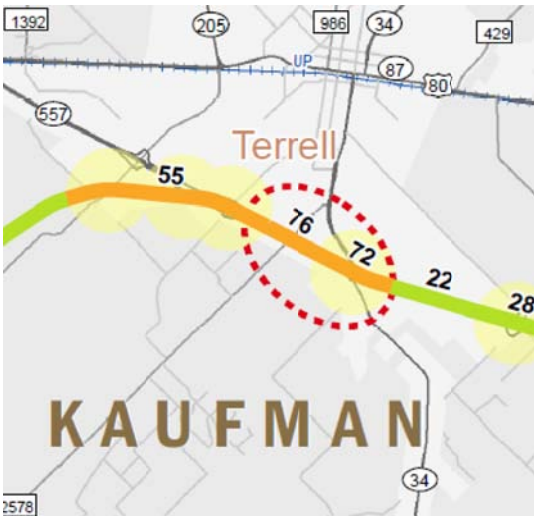
*Table 3.4: Crash Hotspots*

| Hotspot | Limits | Crash Rate | County |
|---|---|---|---|
| 1 | Interchange of SH 34 | 72-76 | Kaufman County |
| 2 | Interchange of SH 19 | 88 | Van Zandt County |
| 3 | From the interchange of County Road 110 to the interchange of FM 14 | 58-346 | Smith County |
| 4 | From the interchange of SH 155 to the interchange of FM 757 | 98-109 | Smith County |
| 5 | From the interchange of SH 135 to FM 2087 | 47-295 | Gregg County |
| 6 | From the interchange of Estes Parkway to the interchange of SE Loop 281 | 116-153 | Gregg County and Harrison County |
| 7 | Interchange of US 59 | 110 | Harrison County |

The following figures provide more details on each of the seven previously mentioned hotspots.

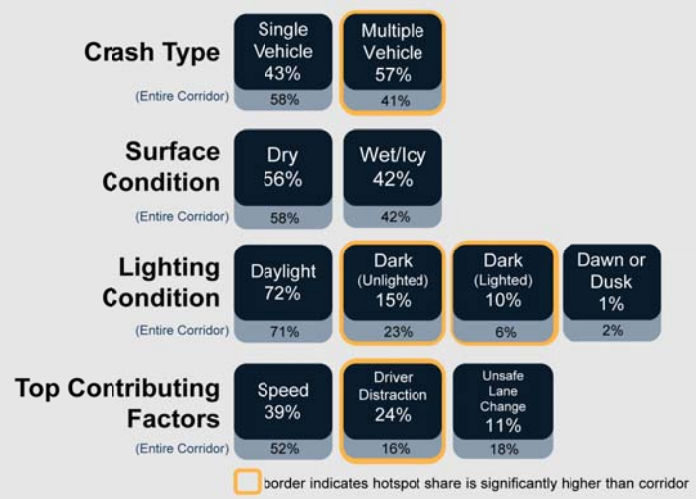
## HOTSPOT #1:

The interchange of SH 34, south of Terrell, includes a 1.7 mile stretch of highway with a crash rate of 72-76 crashes per hundred million vehicle miles travelled. Not only is the frequency of crashes higher than the Statewide average, but the severity of the corridor as a whole. 57% of crashes involved multiple vehicles, which is 40% higher than the I-20 average with a majority of them happening during the daytime over dry pavement. Speed and unsafe lane changes were cited less often than in the corridor as a whole, but driver distraction appeared to be a bigger contributor according to crash reports.



Crash Rate

Location

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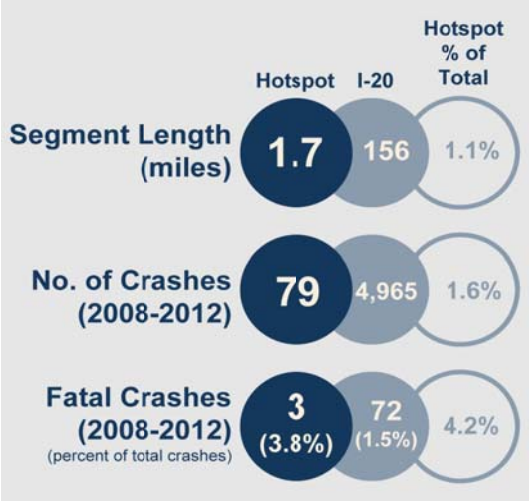
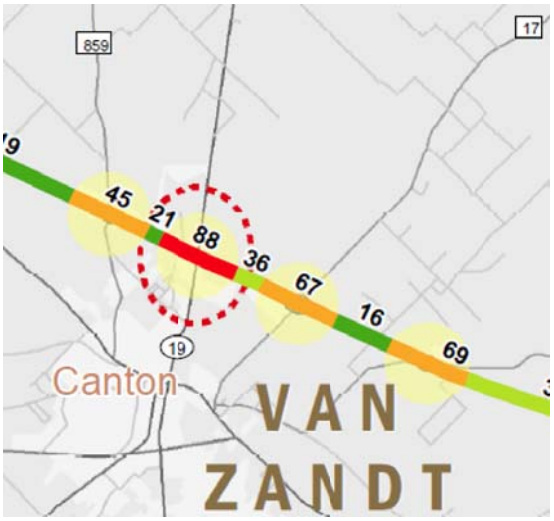



Summary

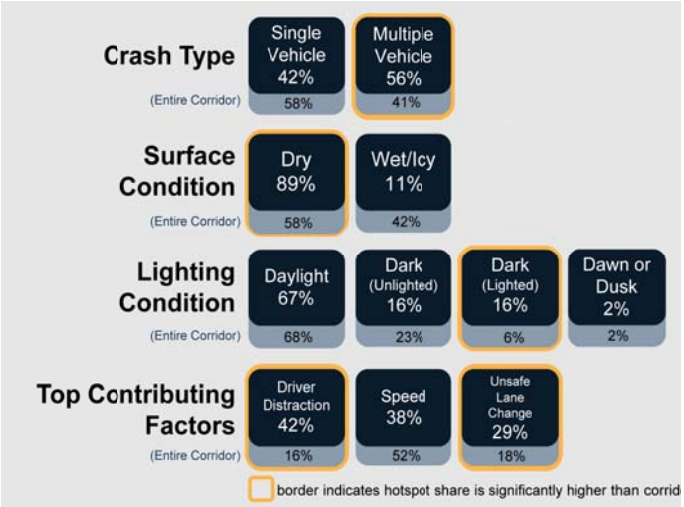
Figure 3.8 Crash Hotspot #1

## HOTSPOT #2:

Located north of Canton, Hotspot #2 includes a one mile stretch around the SH 19 interchange with a crash rate of 88 crashes per hundred million vehicle miles travelled. Multiple vehicle crashes are predominant in this case, occurring at a pace more than forty percent higher than the corridor as a whole. It is the only hot spot where distracted driving surpassed speed as the most-cited contributing factor. Driver distraction was cited at a rate that approached 2.6 times the corridor wide experience. Unsafe lane change is also reported as a significant contributing factor, almost doubling the corridor average percentage.




Location

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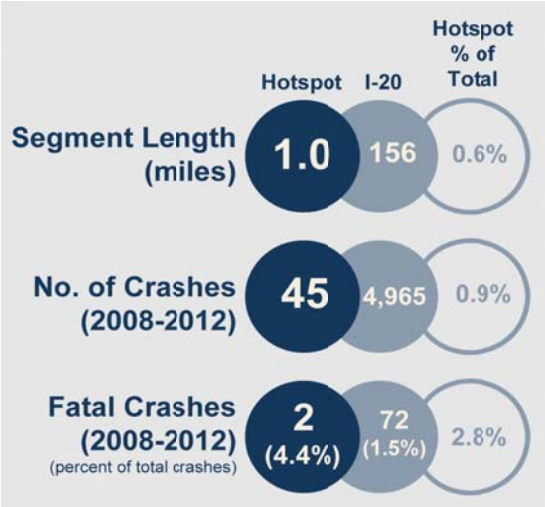
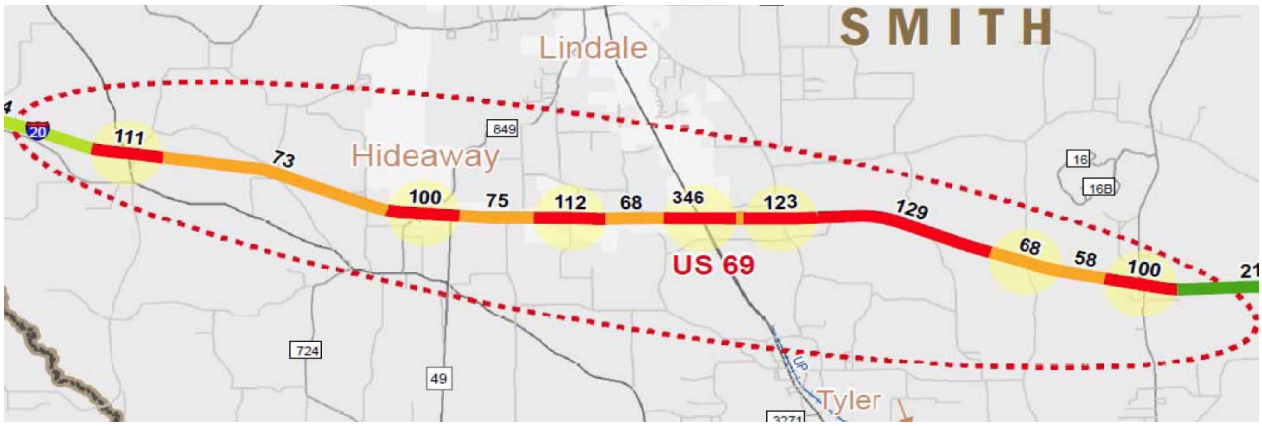



Summary

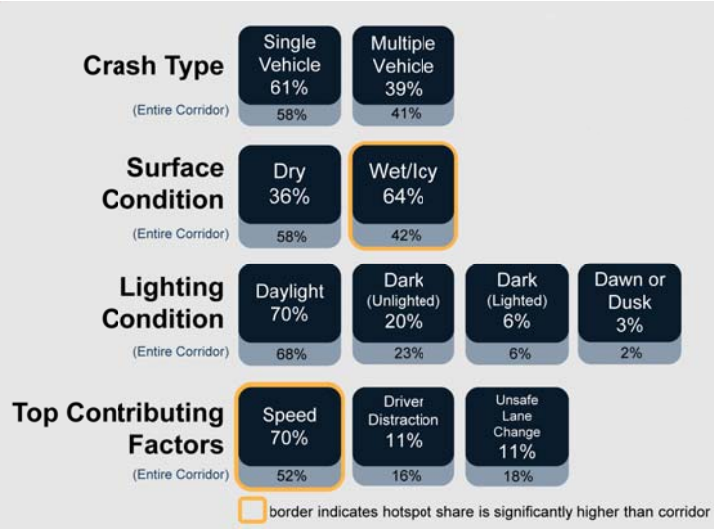
Figure 3.9 Crash Hotspot #2

## HOTSPOT #3:

The longest hotspot of the corridor stretches 15.3 miles from half-a-mile west of the interchange of County Road 110 to half-a-mile east of the interchange with FM 14. This hotspot presents a high crash rate varying from 58 to 346 crashes per hundred million vehicle miles travelled. However, the highest rate is registered south of Lindale around the interchange with US 69. The major contributing factor cited in this general location was speed, which significantly surpassed both driver distraction and unsafe lane changes. Like the corridor as a whole, more than half the incidents involved a single vehicle but a much higher percentage of them occurred during wet and icy conditions. Dangerous driving conditions in this area during adverse weather conditions were confirmed by public input during this study.




Location

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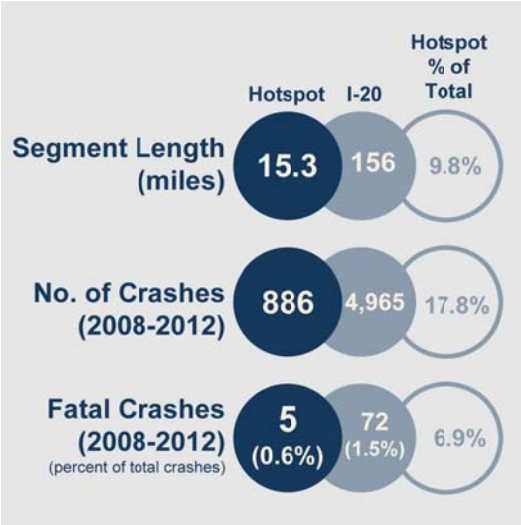
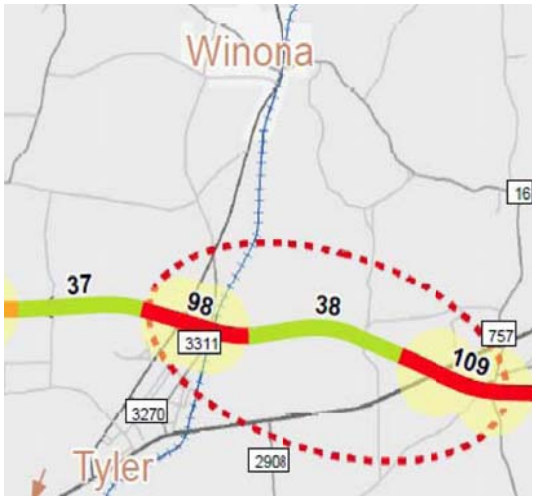



Summary

Figure 3.10 Crash Hotspot #3

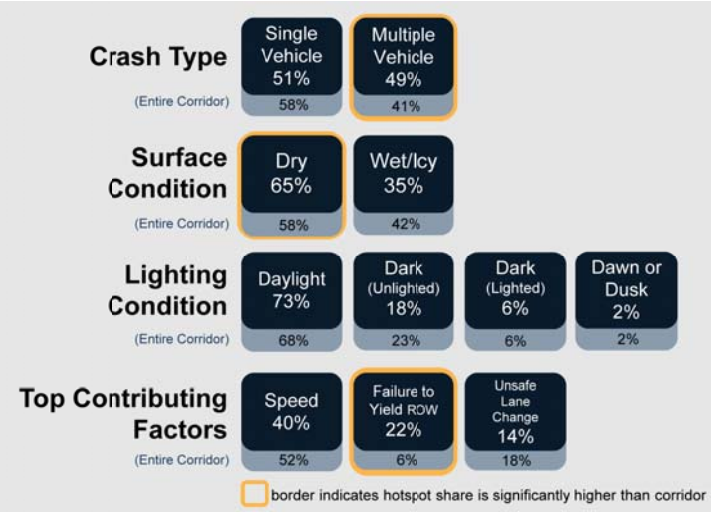
## HOTSPOT #4:

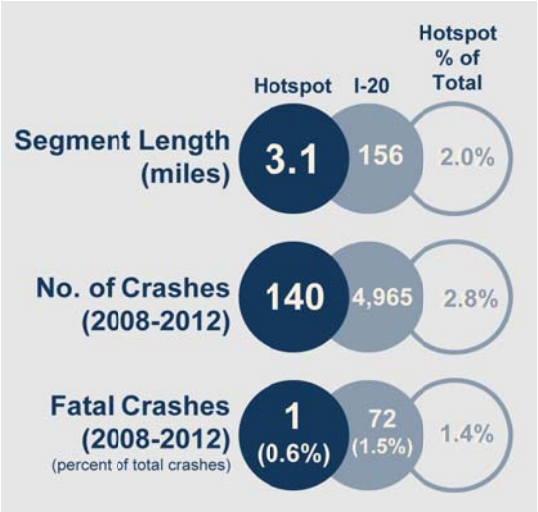
A 3.1 mile segment of corridor within Smith County from the interchange of SH 155 to the interchange FM 757, Hotspot #4 has a crash rate of 98-109 crashes per hundred million vehicle miles travelled. Speed is again the major contributing factor but failure to yield right-of-way and unsafe lane change are also among the top-cited causes of crashes. In particular, failure to yield right-of-way was cited almost four times more often for this hotpot than the rest of the corridor.



Crash Rate

Location



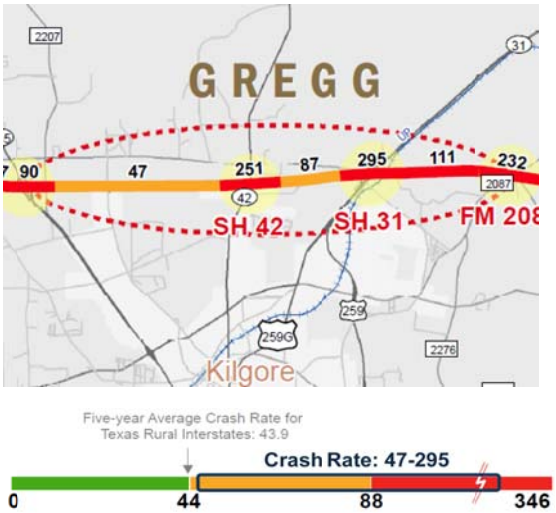

Characteristics

Summary

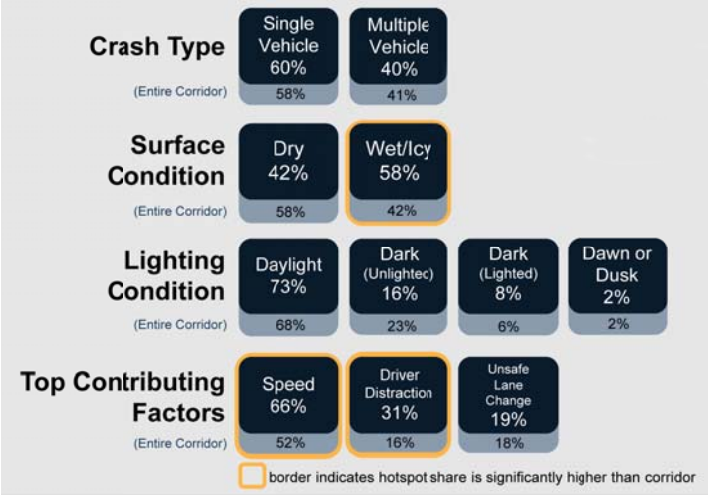
Figure 3.11 Crash Hotspot #4

## HOTSPOT #5:

This hotspot presents the highest percentage of fatalities in the corridor. It includes three of the five segments with the highest crash rates along the I-20 East Texas Corridor. Comprising most of Gregg County, it begins west of the interchange with SH 135 to east of the interchange with FM 2087. Motorists traveling through this area experience a crash rate of 47 to 295 crashes per hundred million vehicle miles travelled. Particularly troublesome interchanges include SH 42, SH 31 and FM 2087 all of which experience a crash rate over 200. A significant share of these incidents occurred during daylight under wet or icy conditions. Top contributing factors are speed, cited in about two thirds of all incidents, followed by driver distraction and unsafe lane changes. Driver distraction was cited as a contributing factor more than twice as often as the corridor as a whole.




Location and Crash Rate

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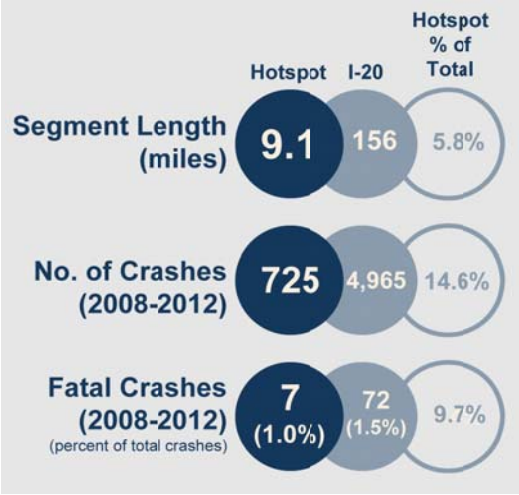
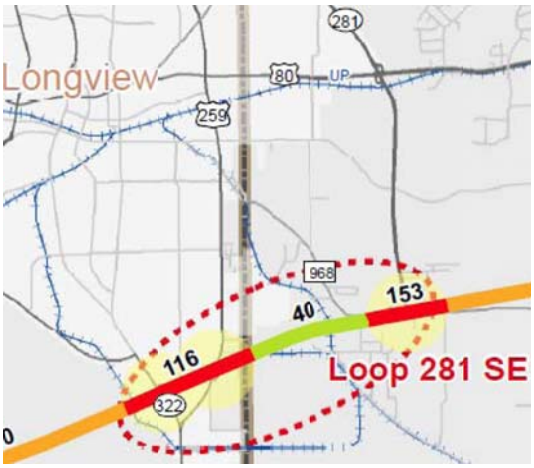



Summary

Figure 3.12 Crash Hotspot #5

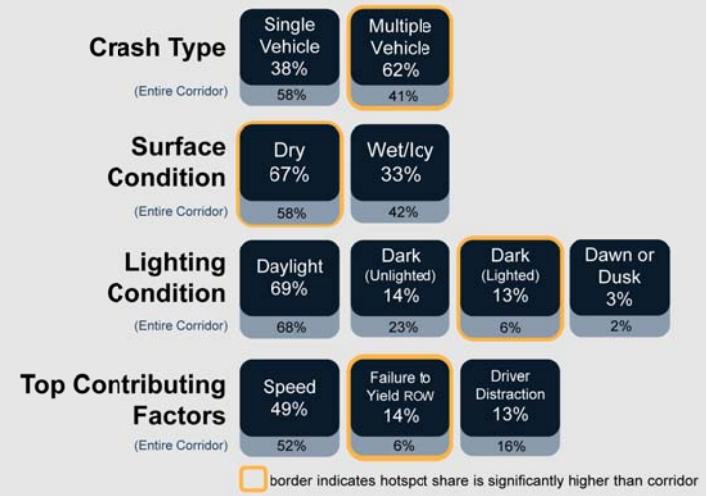
## HOTSPOT #6:

At the border of Gregg and Harrison Counties, this hotspot includes the Estes Parkway and US 259 interchanges in Longview and the interchange at SE Loop 281. The crash rate in Hotspot #6 links two interchanges in a 2.8 mile section, with crash rates between 116 and 153. 69 % of crashes happened during the daytime hours generally on dry pavement, with a majority of them involving multiple vehicles. Speed, failure to yield right-of-way and driver distraction are listed as major contributing factors

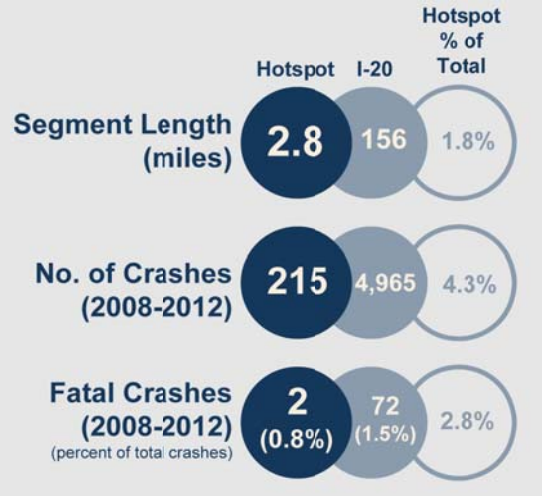


Crash Rate

Location




Characteristics

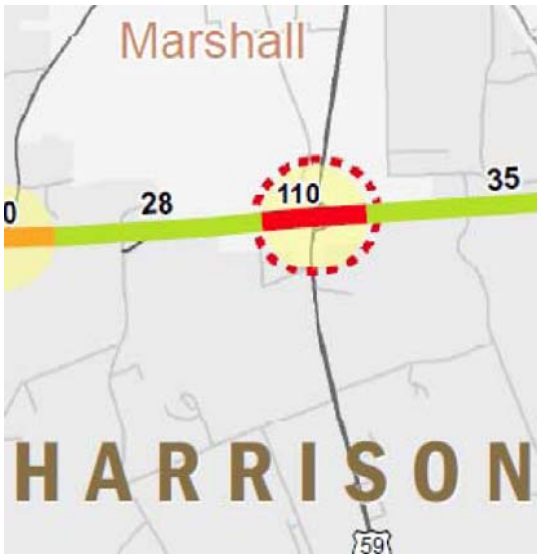



Summary

Figure 3.13 Crash Hotspot #6

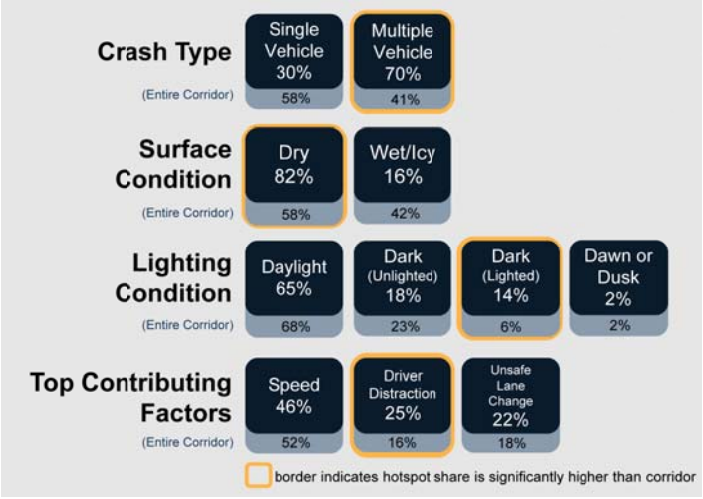
## HOTSPOT #7:

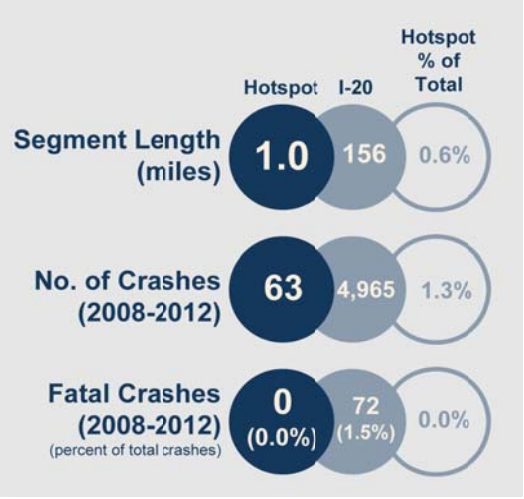
The one-mile segment around the interchange of US 59, south of Marshall, exhibits a rate of 110 crashes per hundred million vehicle miles travelled. Most of the incidents occurred in daylight with dry pavement conditions. Major contributing factors include speed, driver distraction and unsafe lane changes. Although not experiencing any fatalities in the last five years, it is still the only hotspot where Driving While Intoxicated (DWI) represented a higher share as a contributing factor than anywhere else in the corridor. Driving under the influence was cited in 9.2% of all crashes around this intersection in contrast with the next closest hotspot which cited the same factor in only 4.55% of all crashes.



Crash Rate

Location




Characteristics

Summary

Figure 3.14 Crash Hotspot #7

## 3.6 Geometrical Analysis

Throughout the years roadway design standards have evolved to reflect new measures of safety and efficiency as well as to support improved vehicle performance. Increasing speed limits made it necessary to adjust interchanges to accommodate these higher speeds. But since its construction in the late 1960's, few improvements have been made to I-20 in East Texas. In some instances, fifty years after its construction, the Corridor has become somewhat dated in its design.

A geometrical evaluation of the entrance and exits ramps was performed to determine their consistency with current design standards. Technical staff used aerial photography to assess the geometric (horizontal and vertical) characteristics of 60 interchanges, including, basic design and as well as acceleration and deceleration ramp lengths. Based on the criteria set in TxDOT's Roadway Design Manual, a required stopping sight distance of 800 ft. in near level conditions was determined to be ideal.

Results of these evaluations were rated summarized as follows: A= Excellent, for cases exceeding requirements; B= Meets minimum standard, for cases who comply with the norm; C = Acceptable, for cases where minimum requirements are met and D= Below minimum standard, for cases where current construction falls below minimum standards. *Map 3.9 Interchange Ratings* depicts a summary of individual ramp rating results along the corridor.

A total of 145 ramps where rated as Excellent (A), another 24 were rated as Meets minimum standards (B), while 34 were rated as Acceptable (C) and 29 as Below minimum standard (D). Ramps not classified as a "hook" or "slip" ramps were not included in this rating due to the case-specific nature of their design characteristics. Analysis identified 18 such ramps along the corridor.

Concentrations of low-rated ramps can be found in Van Zandt and Smith Counties, with the former including 34 ramps rated "C" or lower. Ramps in Harrison and Dallas counties are rated mostly A or B. Kaufman County, on the other hand, has ramps with good ratings on the west side of the county. But the ratings slip as the corridor approaches the Van Zandt County line.

Details regarding the rating system and results can be found in *Appendix E Technical White Papers* under Criteria for Evaluation of Entrance and Exit Ramps along I-20 East Texas Corridor.

During the crash analyses at interchanges along the corridor, certain interchanges appeared to have driver distraction as a contributing factor. This is especially true for the interchanges with SH 34 (Terrell), SH 19 (Canton), SH 135, SH 42, SH 31, Loop 281 W/US 259 (Longview) as well as FM 2087 (Kilgore) and US 59 (Marshall). The frequency that distracted

driving as a contributing factor exceeds the corridor wide average in these areas suggests that there may be more than usual factors causing distractions. Therefore, it is recommended that as part of the design of geometric improvements around these interchanges, a thorough review of guidance provided to motorists be undertaken to provide information that better meets driver expectations and understanding.

## 3.7 Other Considerations

### 3.7.1 Rail

The I-20 East Texas Corridor serves as a major connection between Texas and its neighbors to the East. Both freight and passenger rail services are currently provided along portions of the existing Union Pacific rail line located to the north of the I-20 corridor. This facility is a major freight line connecting Dallas through Marshall with Memphis and St. Louis. The Texas Eagle (Amtrak) also uses this line, turning north at Marshall to reach Chicago. As with all passenger services operating on private freight railroad lines, lower priorities are assigned to passenger operations, and there can be schedule conflicts with freight trains. This limits the speed and frequency of passenger services offered. As such rail provides a big part of the corridor's mobility for freight and to a lesser degree passenger service. Members of the Advisory Committee and the general public expressed their interest in furthering the development of rail along the corridor.

TxDOT oversaw a study conducted by Amtrak to determine the viability of an improved passenger rail option along the corridor. Findings from this study were presented to members of the Advisory Committee during their June meeting. Rail options along the corridor were deemed impractical in the near future without a significant funding source which remains to be identified. Details of the presentation can be found in *Appendix B Advisory Committee Meeting Summaries.*

### 3.7.2 Emerging Technologies and Transportation Trends

One of the main challenges in looking into the future of the I-20 East Texas Corridor is the integration of new and alternative transportation modes into the system. Thankfully, though, as innovation is creating transportation opportunities from bicycles, electric automobiles and possibly to high-speed trains, there are system-wide approaches that could be applied. In the decades since the advent of the Federal Interstate Highway System in 1956, very little has changed in the way Americans travel across the surface of their communities and across the country. In fact, a credible argument could be made that transportation choices have actually declined. However, a host of emerging technologies and services hold out promise to change the way the next generation moves about.

While driving may be starting to decline, U.S. transit use is on the rise. For example, Intercity bus service has experienced a resurgence in ridership, with both Greyhound and Megabus expanding their networks. Most of this expansion in intercity bus demand has been accomplished through the introduction of web-based express services that operate with reduced infrastructure using more flexible locations and transportation linkages.

Currently Greyhound is the only passenger service provider along the I-20 corridor offering intercity services. Current routes connect with in-town terminals several miles away from the interstate, in most cases. Improving the usefulness of alternate modes of transportation could extend the reach of these passenger services enough to make the relocation of express services stops to the interstate feasible. Such a reorganization of intercity services could substantially reduce overall travel time for passengers, making intercity bus travel more attractive. Travel times for buses would begin to approach those of private automobiles.

Figure 3.15 depicts possible time savings in passenger service operations with some changes in the configuration of the system.

Possible locations for express service stops have been identified at significant interchanges along the corridor considering their proximity to it, along with available public services.

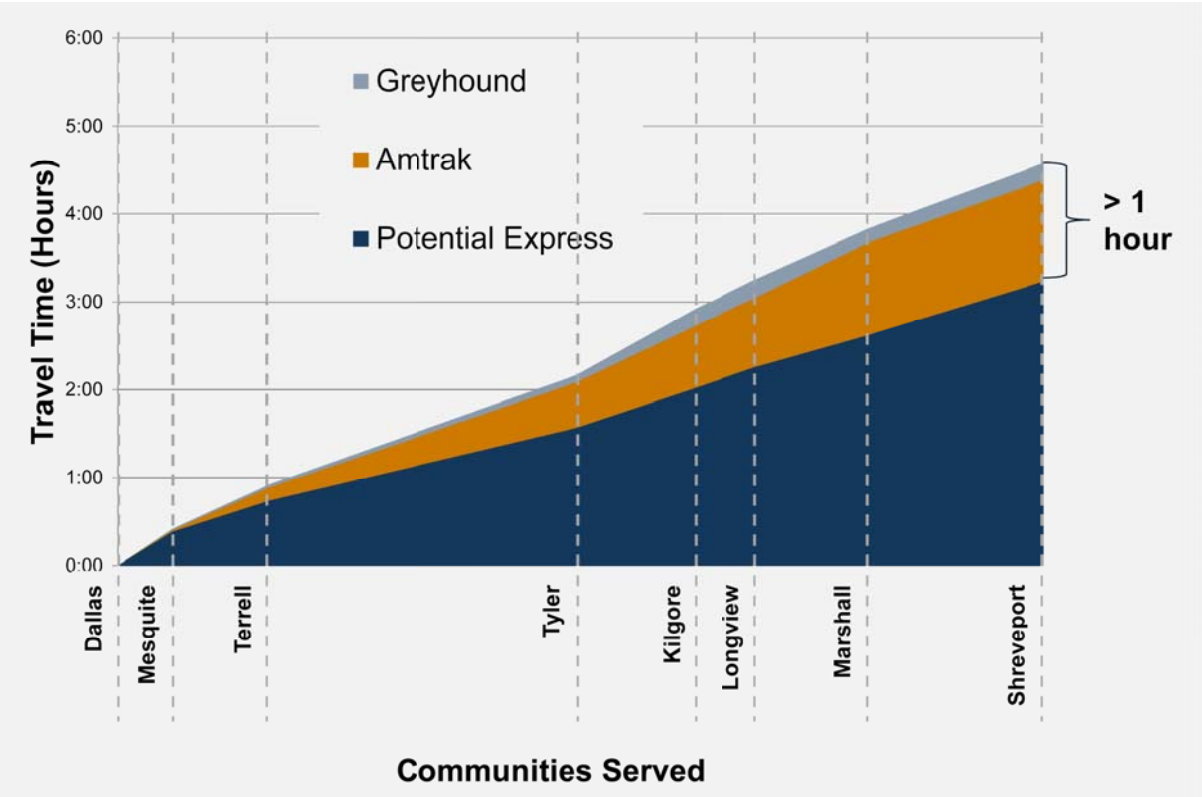



Figure 3.15 : Travel Time Comparison with Passenger Service Operation Improvements

The rapid advance in telecommunications has resulted in the development of new transportation systems and services with the potential to increase transportation choices along the I-20 Corridor.

One of these platforms is car-sharing, through which paid members reserve vehicles online or through a mobile application; then pick up the reserved vehicle at designated locations using an access card to gain entry. Rental fees, whether by-the-hour or by-the-minute, cover all the normal costs associated with owning a vehicle for just the period of the trip—including fuel and insurance. Peer-to-peer car sharing and ride-sharing services are variations of these options, with vehicle owners renting out their private vehicles and setting their own pricing and availability. Vehicle sharing options also include bicycle-sharing. According to recent studies, each shared-use vehicle in service removes between 4 and 20 vehicles from the road in urban areas. Not to be left behind, the taxi industry is also using technology to become more efficient and expand its reach through mobile apps and technologic advancements in order to increase rider convenience.

Public transportation ridership continues to grow domestically anchored by technology-based increased efficiency and major investments currently taking place throughout the U.S. thus reaching levels not seen since the early 1950's.

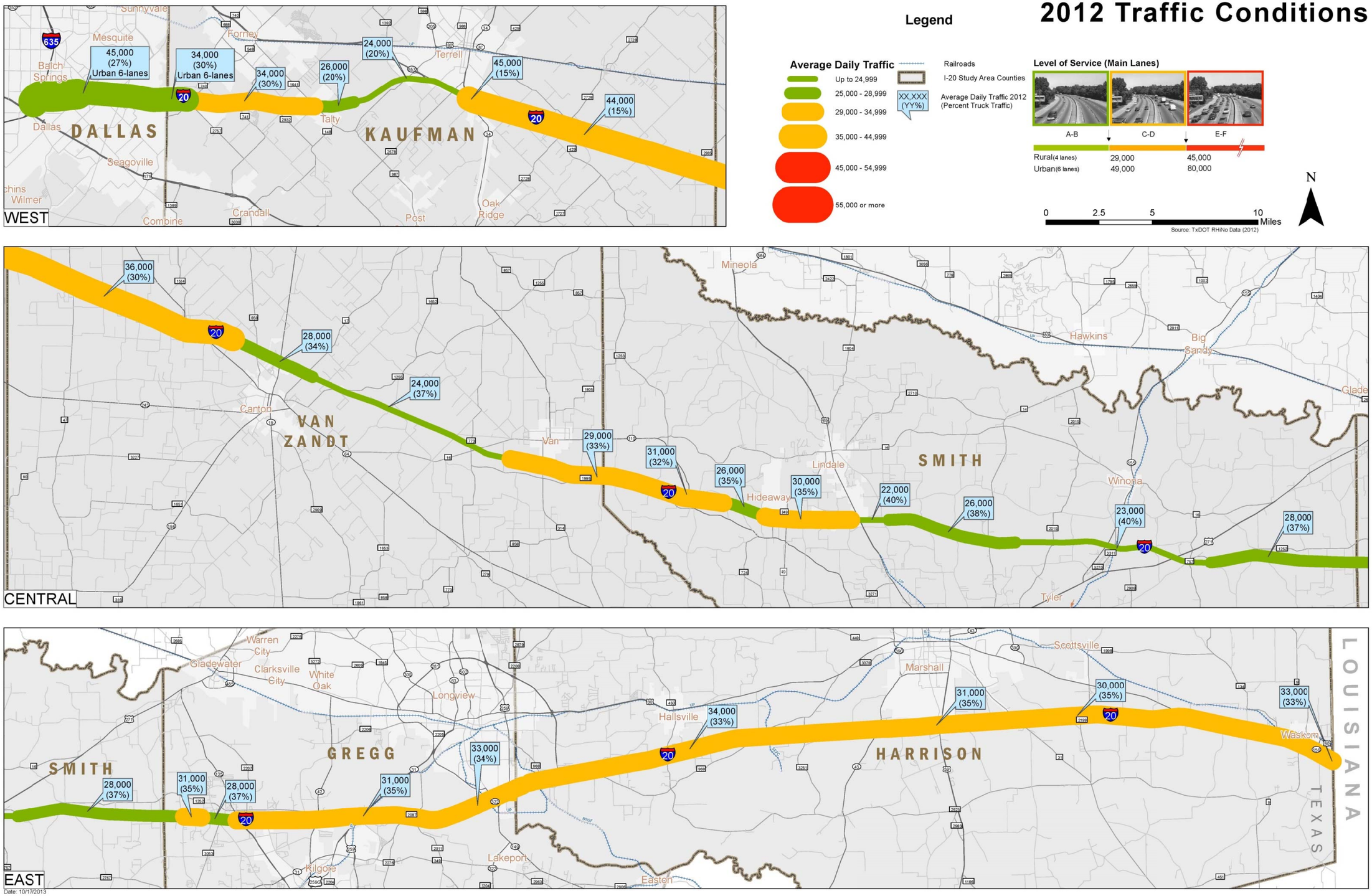
If there is any segment where changes in transportation technology are becoming increasingly apparent, it is that of the private automobile. Today's generation of new cars includes a growing fleet of fully electric vehicles (EVs). Their sales though, still represent just half a percent of all new vehicles mainly due to range restrictions and limited charging infrastructure. However batteries and charging technologies are evolving at a staggering pace because of faster charging times and new power sources.

Existing public EV networks are limited along the corridor, but generally operate following one of three models: pay-as-you-go, subscription-based, and free charging. Need for such service networks will become increasingly important along I-20 as the share of EV's continues to grow. The potential opportunity for the use of solar pavements to recharge vehicles in motion and to generate revenue for the State should not be discounted over the next 10 to 25 years.

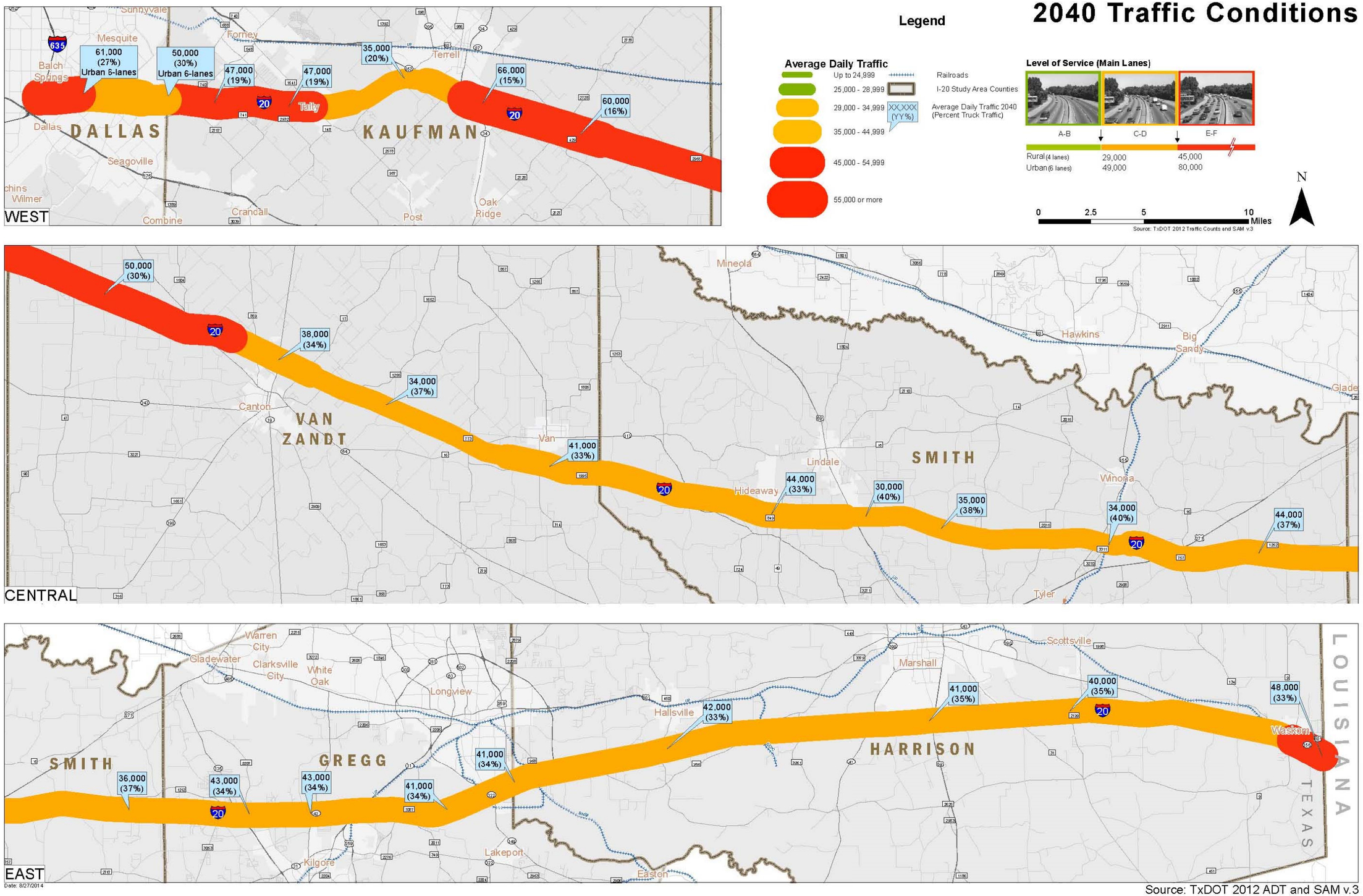
Nonetheless, the biggest innovation coming from the automotive industry over the last couple years is about autonomous vehicles. First steps in the path to a driverless car are currently being developed including Ford's Traffic Jam Assist, Cadillac's Super Cruise and Google's fully automated car. Once these technologies reach a wider audience, they will have the potential to increase corridor capacity by reducing headways times between vehicles without raising safety implications.

Finally, technology improvements on freight are currently focused on improving fuel-consumption efficiency as well as departing from fossil-fuel powered vehicles.

## Map 3.1 2012 Traffic and Level of Service

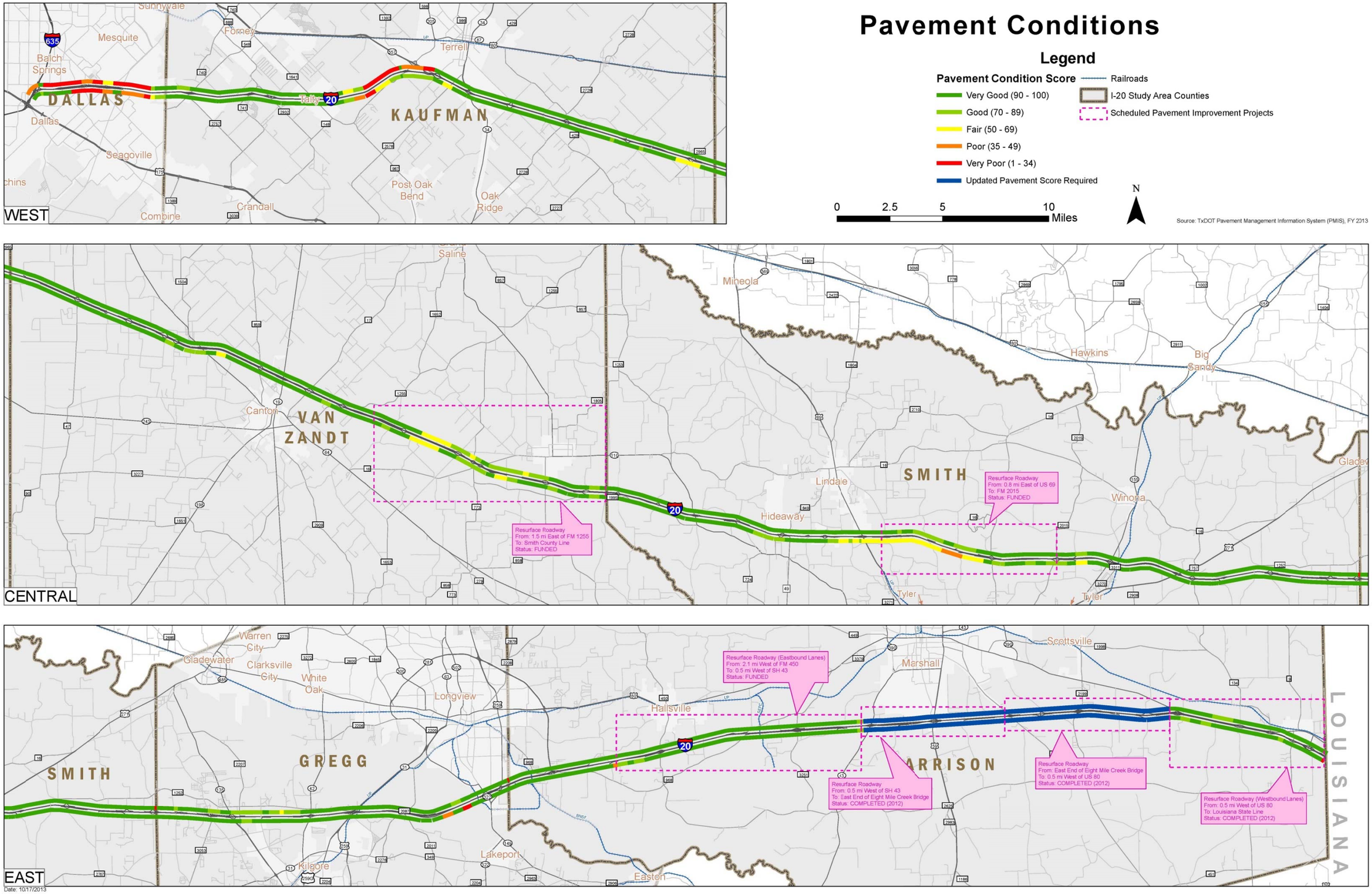


## Map 3.2 2040 Traffic and Level of Service

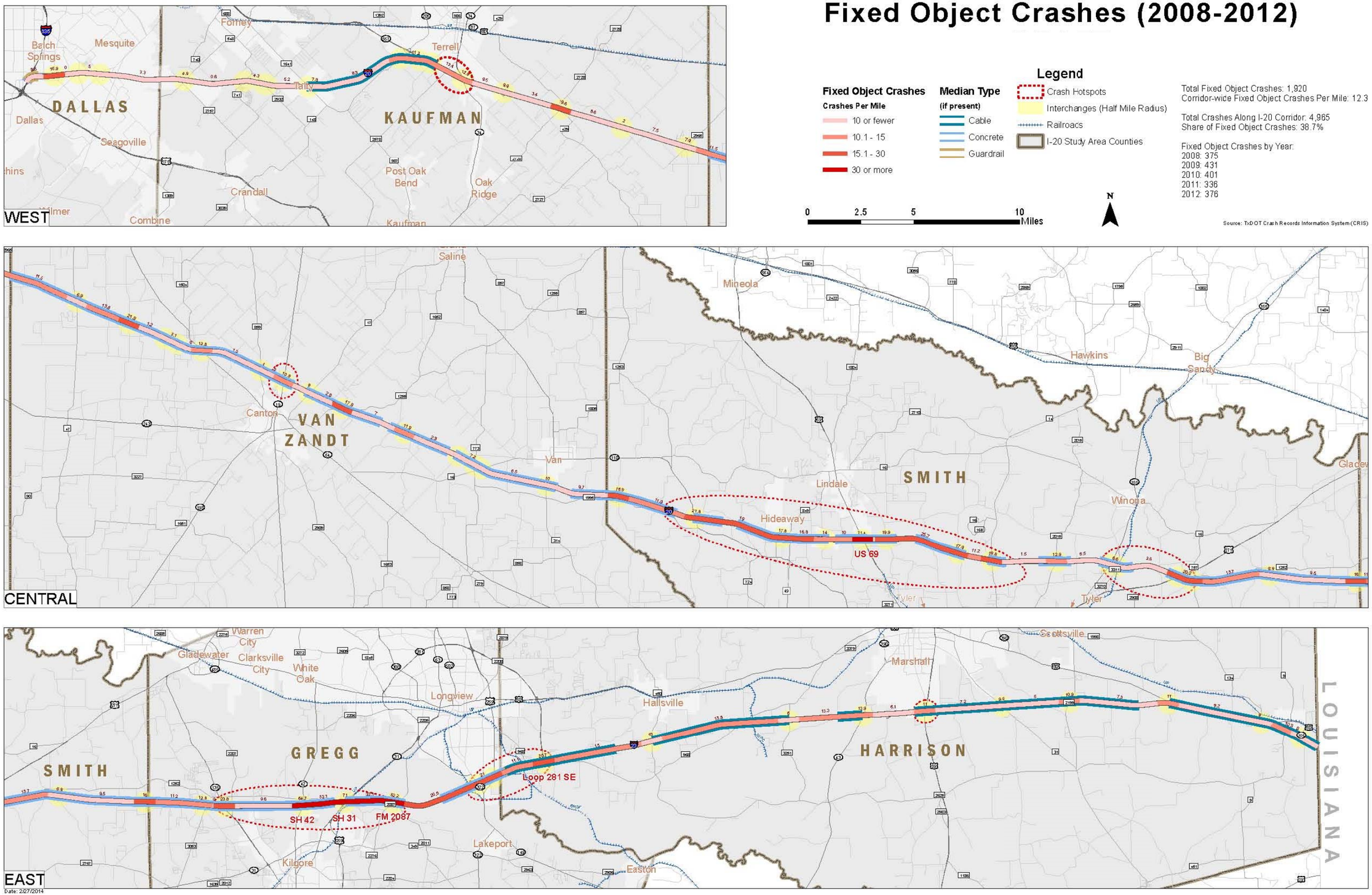



Source: TxDOT 2012 ADT and SAM v.3

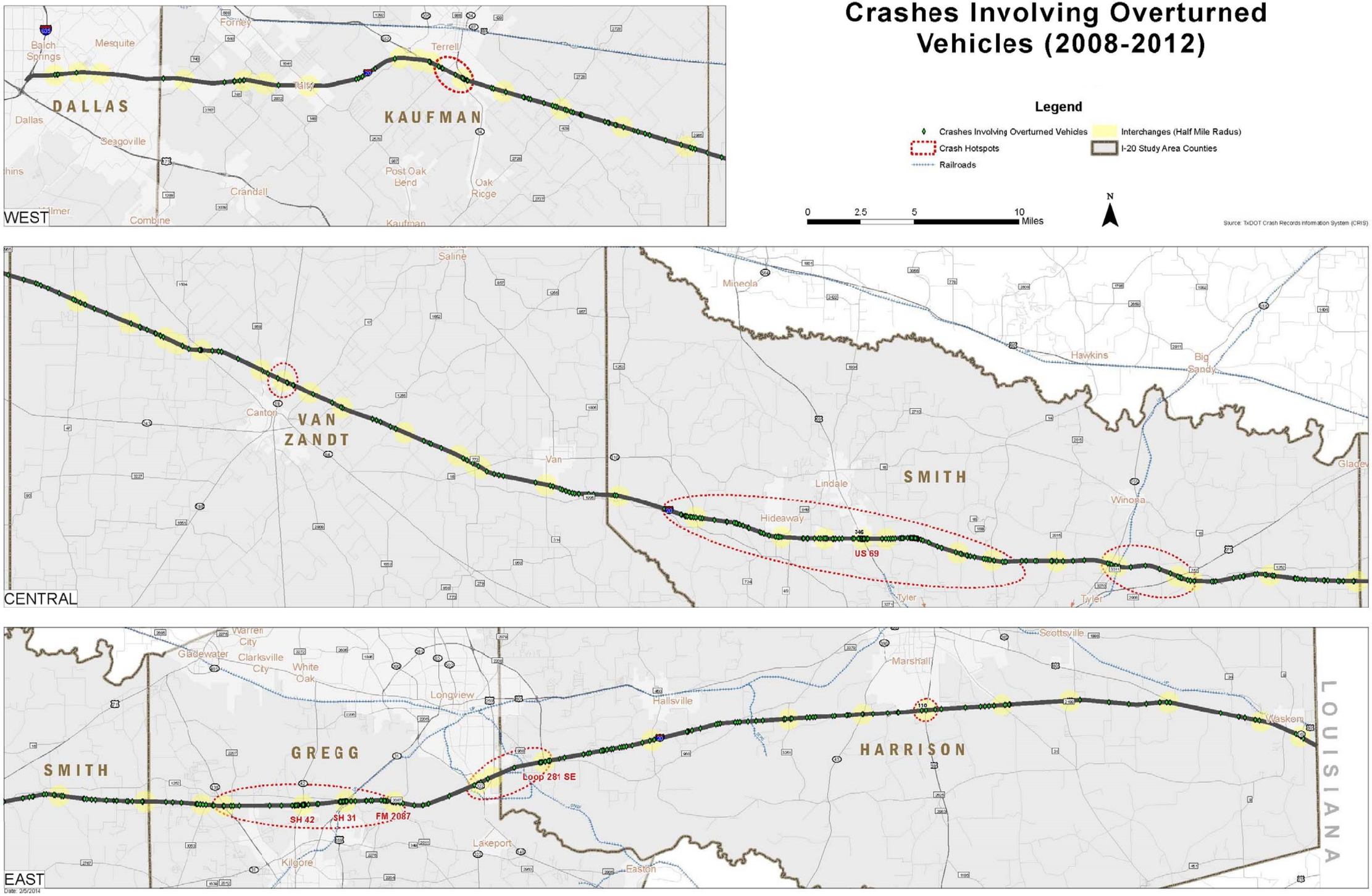
## Map 3.3 Pavement Conditions



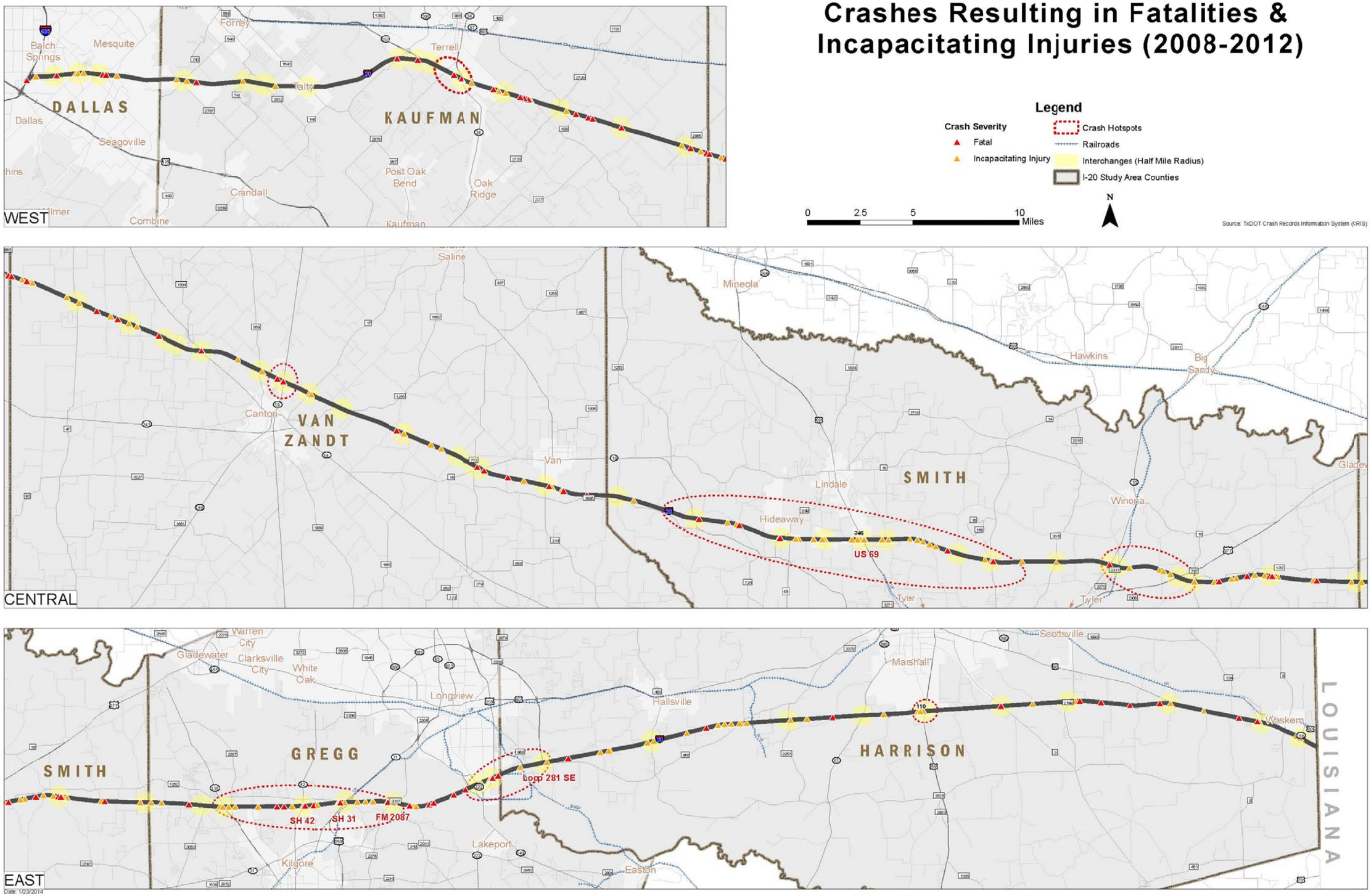
## Map 3.4 Fixed Object Crashes



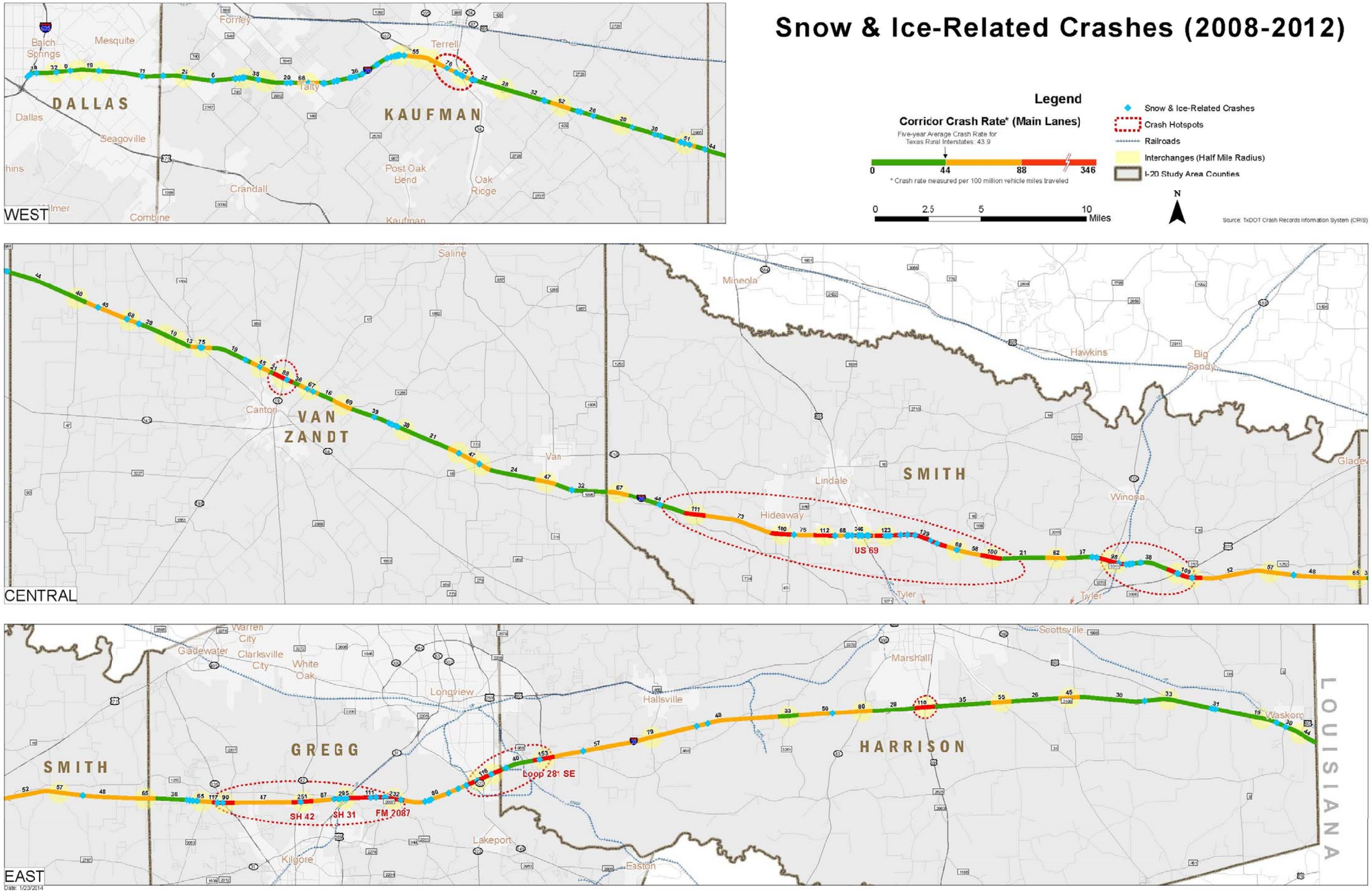
Map 3.5 Crashes Involving Overturned Vehicles



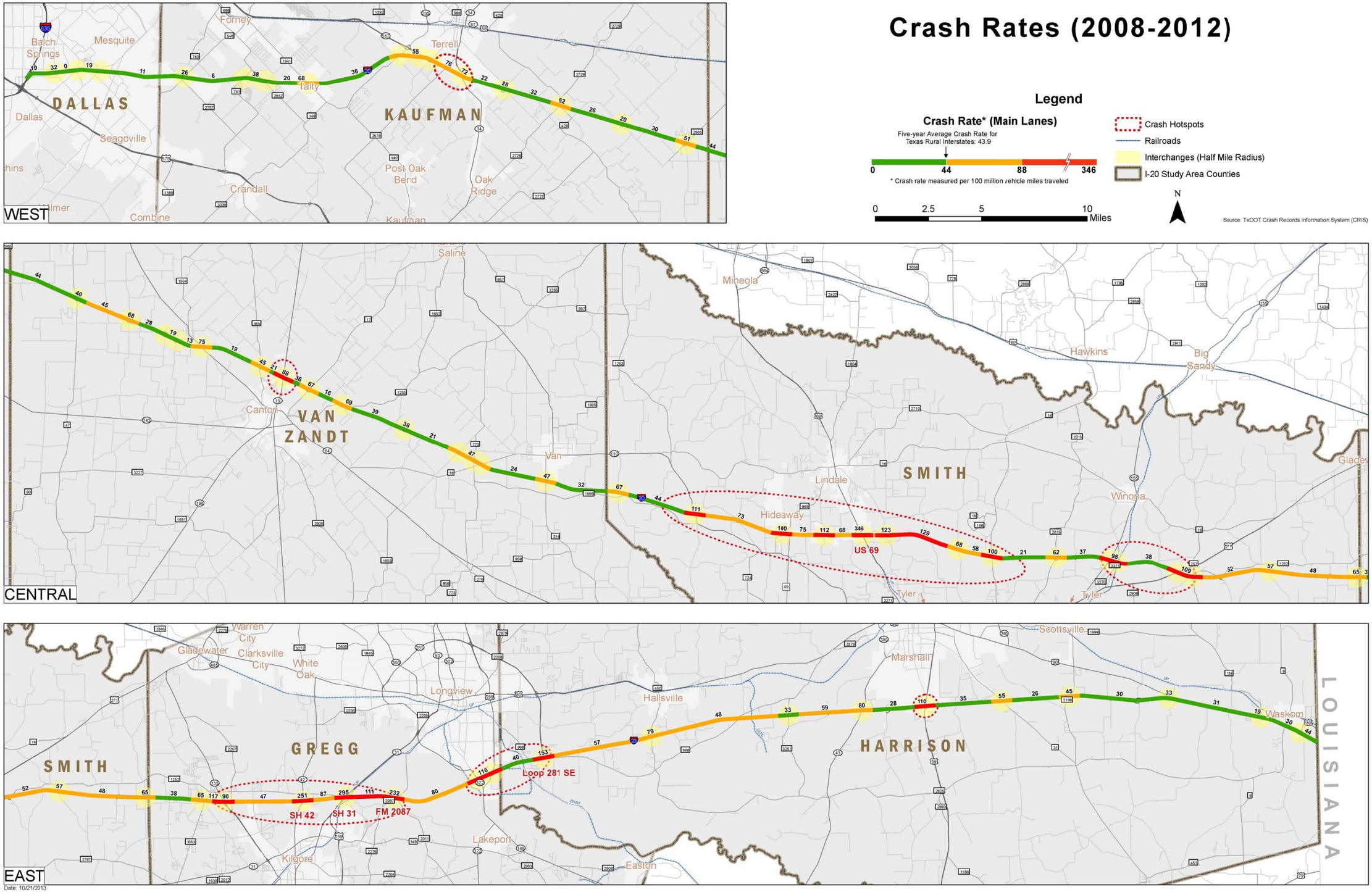
Map 3.6 Crashes resulting in Fatalities and Incapacitating Injuries



Map 3.7 Snow & Ice-Related Crashes

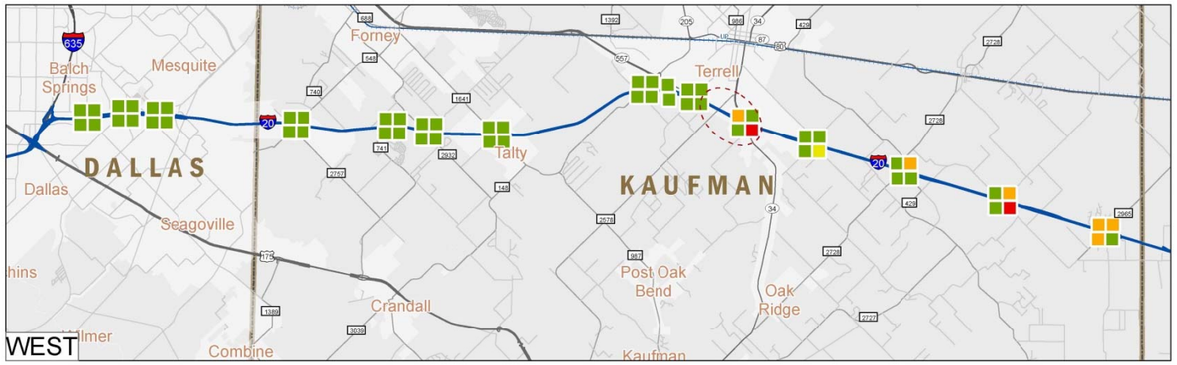


## Map 3.8 Crash Rates



Map 3.9 Interchange Ratings

# Interchange Safety Rating




## Interchange Rating

- A: Excellent
- B: Meets Requirements
- C: Marginally Acceptable
- D: Below Minimum Standards

## Ramp Rating

Westbound Exit | Westbound Entrance
Eastbound Entrance | Eastbound Exit

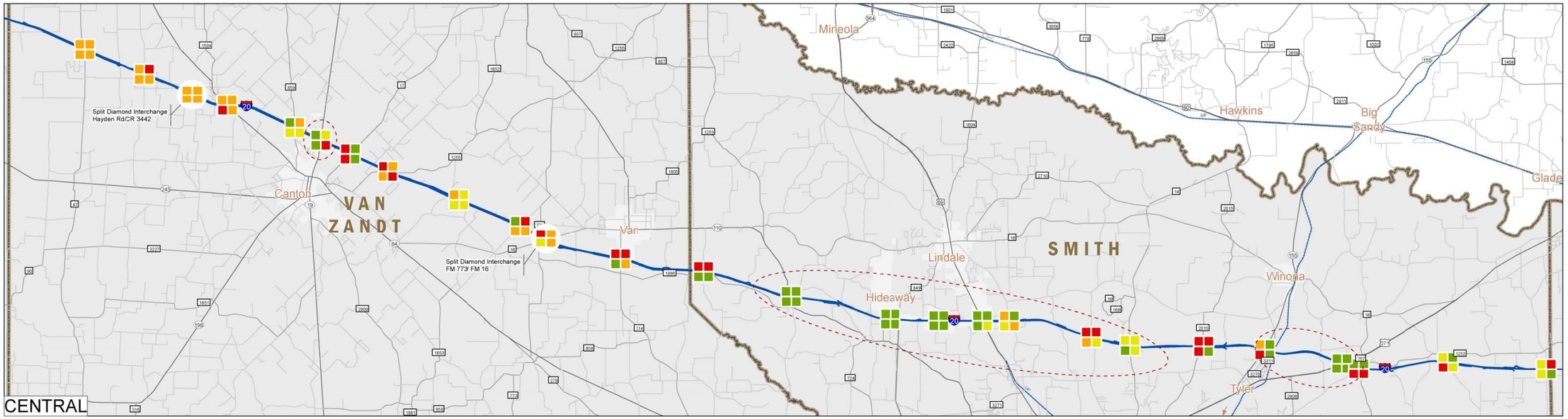
| Rating | Entrance Ramps | Exit Ramps | Total Ramps |
|---|---|---|---|
| A | 72 | 73 | 145 |
| B | 11 | 13 | 24 |
| C | 17 | 17 | 34 |
| D | 14 | 15 | 29 |
| N/A | 8 | 10 | 18 |
| Total | 122 | 128 | 250 |
| | | Total Interchanges | 62 |

- IH 20 Study Corridor
- Crash Hotspots
- Railroads
- City
- IH-20 Project Counties

0 1.25 2.5 5 Miles

N

Source: Jacobs.



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# 4. Implementation Program Development

The purpose for this study is to develop an improvement program that TxDOT and local governments can use in the Long Term maintenance and development of the corridor. This must be accomplished within their fiscal constraints and project development schedules without creating unnecessary short-term investments that would have to be torn out at a future date to accommodate longer term improvements. The following subsections describe the process employed and the reasons for the development of this program, while identifying each improvement project that will be included.

## 4.1 Project Identification

A list of proposed projects along the corridor aimed at improving specific areas (capacity expansion, safety, pavement rehabilitation, vertical clearances, and improved access to adjacent lands) was prepared based on the previously described analysis. These projects and concepts were verified and amplified through feedback gathered during the February 18th, 2014 Advisory Committee Meeting and public comments submitted during the initial public outreach efforts.

## 4.2 Proposed Projects

The preliminary project list for the I-20 East Texas Corridor included 131 projects. Once a comprehensive but preliminary list was developed, projects were classified into categories depending on their scope and nature. Table 4.1 identifies the total number and type of proposed projects in each county. Segments along the corridor were defined to help phased construction of new lanes as well as the rehabilitation of existing pavements. Projects identified as added capacity are used for this purpose, with the suggestion that new pavement be put into service first, so that traffic can then be diverted to the new lanes before beginning work on the rehabilitation of existing lanes.

Frontage road projects were classified either as construction of new roads, wherever necessary if no facilities currently exist, or reconstruction of existing ones. New frontage road segments were proposed by Advisory Committee members based on local interests; they are proposed as one-way frontage roads wherever current land uses and highway architecture will permit so to achieve optimum safety and efficiency. Reconstruction of existing segments was deemed necessary to bring them to meet current design standards and eliminate current two-way operation, which is typically viewed as undesirable from a safety standpoint. In some cases, this required the extension of the frontage road system beyond that specified by the Advisory Committee so that one-way frontage roads would connect to existing streets or to underpasses where U-turn facilities could be constructed to permit adequate circulation.

**Interchange related projects** fell within one of two categories: **interchange** and **ramp improvements**. Projects were classified as interchange improvements whenever existing access ramps were rated less than adequate and other elements like vertical clearance or bridge sufficiency were also found to be in conflict with desired policies and standards. Interchanges with individual access ramps rated as adequate but inconsistent with current design standards or needing enhancement for added capacity or improved safety were included as ramp improvements.

The BRINSAP database, as previously stated in the Existing Conditions section, was used to identify bridges in less than optimal conditions. Improvements in those cases are classified as bridge modification projects. Lastly, median barrier installation projects were considered for sections of the corridor with less than the recommended unprotected median width.

*Table 4.1: Total Projects by County and Type of Project.*

| County | Added Capacity | New Frontage Roads | Frontage Road Reconstruction | Interchange Improvements | Ramp Improvements | Median Barrier Installation | Bridge Modification | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Dallas | 2 | 1 | 1 | - | 1 | 1 | - | 6 |
| Kaufman | 5 | 3 | - | 6 | 7 | - | 2 | 23 |
| Van Zandt | 8 | 3 | 4 | 12 | - | - | 5 | 32 |
| Smith | 6 | 1 | 3 | 11 | 3 | - | 2 | 26 |
| Gregg | 4 | - | 3 | 1 | 4 | - | 4 | 16 |
| Harrison | 10 | 5 | 4 | - | 4 | - | 5 | 28 |
| TOTAL | 35 | 13 | 15 | 30 | 19 | 1 | 18 | 131 |

*Appendix D* includes a complete list of all projects, their characteristics and classification.

## 5. Preliminary Cost Estimates

In an effort to prepare for future corridor needs, technical staff prepared preliminary cost estimates for all projects using 2014 bid prices, as depicted by **Table 5.1** below.
Almost $1.9 Billion dollars would be needed to complete all proposed projects below if the work could be completed now. If required there would additional costs to rehabilitate the existing pavement.

*Table 5.1: Total Costs by County and Type of Project (in $2014 Millions)*

| County | Added Capacity | New Frontage Roads | Frontage Road Reconstruction | Ramp Improvements | Median Barrier Installation | Bridge Modification | TOTAL |
|---|---|---|---|---|---|---|---|
| Dallas | 13 | 36 | 13 | 1 | 5 | 0 | 68 |
| Kaufman | 148 | 93 | 0 | 12 | 0 | 6 | 259 |
| Van Zandt | 263 | 83 | 58 | 15 | 0 | 13 | 432 |
| Smith | 307 | 108 | 8 | 9 | 0 | 9 | 441 |
| Gregg | 151 | 0 | 4 | 4 | 0 | 11 | 170 |
| Harrison | 345 | 130 | 28 | 2 | 0 | 13 | 518 |
| TOTAL BY PROJECT TYPE | 1,227 | 450 | 111 | 43 | 5 | 52 | 1,888 |

## 6. Project Evaluation

Projects identified during this study were evaluated according to units based on Moving Ahead for Progress in the 21st Century Act (MAP- 21) performance measures. Results from the evaluation were presented to the Advisory Committee Members during their June 11th, 2014 meeting, as a tool to facilitate an informed process of project prioritization. The evaluation measures used for this purpose and their respective sources are included in **Table 6.1** as follows.

*Table 6.1: Evaluation Measures*

| Category | Corridor Study Measure | Source |
|---|---|---|
| Safety | Fatalities (2008-2012) | 2008-2012 Crash Data |
| | Ratio of Crash Rate to Statewide Average | 2008-2012 Crash Data |
| | Interchange Rating | Interchange Ratings Analysis |
| | Vertical Clearance | Vertical Clearance Database |
| Pavement Condition | Mainlane Condition Score | International Roughness Index Average- PMIS |
| Bridges | Bridge Condition | BRINSAP Sufficiency Score |
| Freight | Average Annual Daily Truck Traffic (2012) | TxDOT RHiNo 2012 Annual Average Truck Traffic |
| Congestion Mitigation and Air Quality | Traffic Volume (2012 and 2040) to Build-Capacity Ratio | SAM Model Compound Average Growth Rate |

Using a Geographical Information Systems (GIS) based process, values on each measure were compiled for every project. Scores for each one were produced in a scale of 1 to 5, with one being more desirable and five being less desirable, and assigned to corresponding categories.

Safety concerns were addressed through a combination of measures. For example, in terms of the ratio of a segment's crash rate to that of the state as a whole, a project area with a crash rate ratio of one earned a score of 3. Segments with crash rates ratios below one earned a score of 1, since they have low crash incidence and those above a ratio of one earned a score of 5 indicative of an undesirable situation. Fatalities, on the other hand, assigned a score of 5 for project areas with more than one fatality within the last five years

while a project without any fatalities earned a score of 1. Scoring principles for each measure are summarized in **Table 6.2** following:

*Table 6.2: Evaluation Criteria*

| Corridor Study Measure | Score Metrics | | | | |
|---|---|---|---|---|---|
| | 1 (Low) | 2 | 3 (Medium) | 4 | 5 (High) |
| Fatalities (2008-2012) | 0 | | 1 | | >1 |
| Ratio of Crash Rate to Statewide Average | < 50% Statewide average | | 50% to 100% statewide average | | > Statewide average |
| Interchange Rating | All ramps in excellent or acceptable conditions | One ramp marginally acceptable or below standards | Two ramps marginally acceptable or below standards | Three ramps marginally acceptable or below standards | All ramps marginally acceptable or below standards |
| Vertical Clearance | Both directions > 16' | | One greater than 16', other less than 16' | | Both less than 16' |
| Main lane Condition Score | 90 to 100 | 70 to 89 | 50 to 69 | 35 to 49 | 1 to 34 |
| Bridge Condition | Good: 700 to 1000 | | Fair: 500 to 699 | | Poor: 499 or less |
| Average Annual Daily Truck Traffic (2012) | Lowest ⅓ of all truck volumes | | Middle ⅓ of all truck volumes | | Highest ⅓ of all truck volumes |
| Traffic Volume on main lanes (2012) to Build-Capacity Ratio | < 0.50 | | 0.50-1.00 | | > 1.00 |

## 6.1 Results

Once analysis of the 131 projects along the corridor was completed, they were ranked according to the obtained summation of evaluation measure results. Projects that scored 50 or more on a scale of 0 to 100 were deemed as high priority. Projects with scores above forty were defined as medium range projects. The evaluation ranking results highlight the following projects in **Tables 6.3 - 5.**

**Project ID Key**

| *First Letter = Source* | + | *Second Letter = Type* | - | *Project Number* |
|---|---|---|---|---|
| **A=** Advisory Committee | | **A=** Interchange Improvements: 3 or more ramps | | |
| **T=** Technical Analysis | | **B=** Interchange Improvements: 2 or less ramps | | |
| | | **C=** Added Capacity | | |
| | | **D=** Interchange Improvements: One ramp | | |
| | | **F=** New Frontage Road | | |
| | | **G=** Frontage Road Reconstruction | | |
| | | **I** = Ramp Improvement : Hook ramp elimination | | |
| | | **J=** Bridge Modifications: Replacement or Vertical Clearance Adjustment | | |

| | |
|---|---|
| | High Score (55<) |
| Technical Score | Mid Score (50-54) |
| | Low Score (50>) |

*Table 6.3: West Section Results*

| | Project Type | Project ID | County | Road | Limit from | Limit to | Technical Score |
|---|---|---|---|---|---|---|---|
| DALLAS | New Frontage Road | AF-1 | Dallas | I-20 | Lawson Rd | FM 740 | 55 |
| | Median Barrier Addition | AE-1 | Dallas | I-20 | Loop 635 | Dallas County Line | 58 |
| | Added Capacity | TC-1 | Dallas | I-20 | I-635 | Lawson Rd | 58 |
| | | TC-2 | Dallas | I-20 | Lawson Rd | Dallas County Line | 50 |
| | Frontage Road Reconstruction | TG-1 | Dallas | I-20 | Seagonville Road | Lawson Road | 50 |
| | Ramp Improvement | TI-1 | Dallas | Lawson Rd | - | - | 40 |
| KAUFMAN | Interchange Improvements | AB-1 | Kaufman | SH 34 | - | - | 68 |
| | | AD-1 | Kaufman | FM 429 | - | - | 45 |
| | | AD-3 | Kaufman | Wilson Road | - | - | 20 |
| | | AD-4 | Kaufman | FM 429 | - | - | 45 |
| | Added Capacity | AC-1 | Kaufman | I-20 | SH 557 | Wilson Rd | 58 |
| | New Frontage Road | AF-2 | Kaufman | I-20 | FM 740 | FM 741 | 35 |
| | | AF-3 | Kaufman | I-20 | SH 557 | FM 138 | 53 |
| | | AF-13 | Kaufman | FM 741 | SH 557 | Kaufman | 45 |
| | Interchange Improvements | TB-2 | Kaufman | FM 2965 | - | - | 63 |
| | | TD-1 | Kaufman | CR 310 (Hiram Rd) | - | - | 43 |
| | Added Capacity | TC-3 | Kaufman | I-20 | Dallas County Line | FM 741 | 35 |
| | | TC-4 | Kaufman | I-20 | FM 741 | SH 557 | 53 |
| | | TC-5 | Kaufman | I-20 | Wilson Rd | FM 310 | 50 |
| | | TC-6 | Kaufman | I-20 | FM 310 | Kaufman County Line | 50 |
| | Ramp Improvement | TI-2 | Kaufman | FM 740 | - | - | 35 |
| | | TI-3 | Kaufman | FM 741 | - | - | 35 |
| | | TI-4 | Kaufman | FM 2932 | - | - | 35 |
| | | TI-5 | Kaufman | FM 1641 | - | - | 50 |
| | | TI-6 | Kaufman | FM 148 | - | - | 55 |
| | | TI-7 | Kaufman | SH 557 | - | - | 45 |
| | | TI-8 | Kaufman | CR 304 | - | - | 38 |
| | Bridge Modifications | TJ-8 | Kaufman | SH 34 | - | - | 68 |
| | | TJ-10 | Kaufman | SH 34 | - | - | 68 |

## *Table 6.4: Central Section Results*

| | Project Type | Project ID | County | Road | Limit from | Limit to | Technical Score |
|---|---|---|---|---|---|---|---|
| VAN ZANDT | Interchange Improvements | AA-3 | Van Zandt | FM 859 | - | - | 53 |
| | New Frontage Road | AF-4 | Van Zandt | I-20 | FM 47 | SH 64 | 50 |
| | | AF-5 | Van Zandt | I-20 | SH 19 | FM 17 | 40 |
| | Interchange Improvements | TA-1 | Van Zandt | SH 19 | - | - | 53 |
| | | TB-3 | Van Zandt | FM 47 | - | - | 60 |
| | | TB-4 | Van Zandt | CR 3412 | - | - | 53 |
| | | TB-5 | Van Zandt | SH 64 | - | - | 60 |
| | | TB-6 | Van Zandt | FM 1255 | - | - | 55 |
| | | TB-7 | Van Zandt | CR 1311 | - | - | 48 |
| | | TD-2 | Van Zandt | FM 3439 / CR 3442 | - | - | 48 |
| | | TD-3 | Van Zandt | FM 17 | - | - | 55 |
| | | TD-4 | Van Zandt | CR 1308 | - | - | 40 |
| | | TD-5 | Van Zandt | FM 773 / FM 16 | - | - | 63 |
| | | TB-1 | Van Zandt | FM 314 | - | - | 58 |
| | Added Capacity | TC-7 | Van Zandt | I-20 | Kaufman County Line | FM 47 | 55 |
| | | TC-8 | Van Zandt | I-20 | FM 47 | SH 64 | 50 |
| | | TC-9 | Van Zandt | I-20 | SH 64 | SH 19 | 50 |
| | | TC-10 | Van Zandt | I-20 | SH 19 | FM 1255 | 50 |
| | | TC-11 | Van Zandt | I-20 | FM 1255 | CR 1308 | 40 |
| | | TC-12 | Van Zandt | I-20 | CR 1308 | FM 773 | 38 |
| | | TC-13 | Van Zandt | I-20 | FM 773 | FM 314 | 48 |
| | | TC-14 | Van Zandt | I-20 | FM 314 | Van Zandt County Lire | 45 |
| | Frontage Road Reconstruction | TG-2 | Van Zandt | I-20 | County Line | FM 47 | 55 |
| | | TG-3 | Van Zandt | I-20 | US 64 | SH 19 | 50 |
| | | TG-4 | Van Zandt | I-20 | FM 17 | CR 1311 | 48 |
| | | TG-5 | Van Zandt | I-20 | CR 1311 | FM 314 | 48 |
| | Bridge Modifications | TJ-9 | Van Zandt | FM 859 | - | - | 55 |
| | | TJ-11 | Van Zandt | FM 47 | - | - | 65 |
| | | TJ-12 | Van Zandt | FM 17 | - | - | 58 |
| | | TJ-13 | Van Zandt | FM 1255 | - | - | 55 |
| | | TJ-14 | Van Zandt | FM 773 | - | - | 68 |
| | New Frontage Road | AF-6 | Van Zandt, Smith | I-20 | FM 314 | SH 110 | 50 |
| SMITH | New Frontage Road | AF-7 | Smith | I-20 | Toll 49 | US 271 | 53 |
| | Interchange Improvements | TA-2 | Smith | US 69 | - | - | 40 |
| | | TB-1 | Van Zandt | FM 314 | - | - | 53 |
| | | TB-8 | Smith | CR 35 (Lavender Rd) | - | - | 48 |
| | | TB-9 | Smith | FM 2015 | - | - | 45 |
| | | TD-6 | Smith | CR 426 | - | - | 45 |
| | | TD-7 | Smith | CR 431 | - | - | 40 |
| | | TD-8 | Smith | SH 155 (Lawton Ave) | - | - | 53 |
| | | TD-9 | Smith | FM 757 | - | - | 35 |
| | | TD-10 | Smith | CR 3101 | - | - | 50 |
| | | TD-11 | Smith | CR 3111 | - | - | 40 |
| | | TD-12 | Smith | FM 14 | - | - | 45 |
| | Added Capacity | TC-15 | Smith | I-20 | Van Zandt County Line | CR 110 | 40 |
| | | TC-16 | Smith | I-20 | CR 110 | US 69 | 50 |
| | | TC-17 | Smith | I-20 | US 69 | FM 14 | 48 |
| | | TC-18 | Smith | I-20 | FM 14 | SH 155 | 45 |
| | | TC-19 | Smith | I-20 | SH 155 | US 271 | 40 |
| | | TC-20 | Smith | I-20 | US 271 | Smith County Line | 50 |
| | Bridge Modifications | TJ-5 | Smith | SH 110 | - | - | 50 |
| | | TJ-6 | Smith | FM 849 | - | - | 50 |
| | Frontage Road Reconstruction | TG-6 | Smith | I-20 | SH 110 | FM 849 | 50 |
| | | TG-7 | Smith | I-20 | US 271 | Gregg County Line | 50 |
| | | TG-8 | Smith | I-20 | Gregg County Line | SH 42 | 45 |
| | Ramp Improvement | TI-9 | Smith | CR 110 | - | - | 55 |
| | | TI-10 | Smith | FM 849 | - | - | 50 |
| | | TI-11 | Smith | US 271 | - | - | 45 |

## *Table 6.5: East Section Results*

| | Project Type | Project ID | County | Road | Limit from | Limit to | Technical Score |
|---|---|---|---|---|---|---|---|
| GREGG | Interchange Improvements | AD-2 | Gregg | SH 31 | - | - | 45 |
| | Bridge Modifications | TJ-1 | Gregg | Fritz Swanson RD | - | - | 40 |
| | | TJ-2 | Gregg | MLK Blvd | - | - | 53 |
| | | TJ-3 | Gregg | FM 2087 | - | - | 58 |
| | | TJ-15 | Gregg | MLK Blvd | - | - | 48 |
| | Frontage Road Reconstruction | TG-9 | Gregg | I-20 | SH 42 | FM 2087 | 55 |
| | | TG-10 | Gregg | I-20 | FM 2087 | Loop 281 W | 60 |
| | | TG-11 | Gregg | I-20 | Loop 281 W | County Line | 60 |
| | Ramp Improvement | TI-12 | Gregg | FM 3053 | - | - | 45 |
| | | TI-13 | Gregg | SH 42 | - | - | 50 |
| | | TI-14 | Gregg | FM 2087 | - | - | 58 |
| | | TI-15 | Gregg | Loop 281 W | - | - | 45 |
| | Added Capacity | TC-21 | Gregg | I-20 | Smith County Line | SH 135 | 45 |
| | | TC-22 | Gregg | I-20 | SH 135 | SH 42 | 58 |
| | | TC-23 | Gregg | I-20 | SH 42 | FM 2087 | 55 |
| | | TC-24 | Gregg | I-20 | FM 2087 | Gregg County Line | 60 |
| HARRISON | New Frontage Road | AF-8 | Gregg, Harrison | I-20 | US 259 | Loop 281 | 50 |
| | | AF-9 | Harrison | I-20 | FM 968 | SH 43 | 45 |
| | | AF-10 | Harrison | I-20 | SH 43 | FM 31 | 50 |
| | | AF-11 | Harrison | I-20 | FM 31 | Buck Sherrod Rd | 45 |
| | | AF-12 | Harrison | I-20 | US 80 | FM 2199 | 45 |
| | Added Capacity | TC-25 | Harrison | I-20 | Gregg County Line | Loop 281 | 45 |
| | | TC-26 | Harrison | I-20 | Loop 281 | FM 450 | 55 |
| | | TC-27 | Harrison | I-20 | FM 450 | FM 3251 | 55 |
| | | TC-28 | Harrison | I-20 | FM 3251 | SH 43 | 50 |
| | | TC-29 | Harrison | I-20 | SH 43 | US 59 | 43 |
| | | TC-30 | Harrison | I-20 | US 59 | FM 31 | 45 |
| | | TC-31 | Harrison | I-20 | FM 31 | FM 2199 | 35 |
| | | TC-32 | Harrison | I-20 | FM 2199 | US 80 | 45 |
| | | TC-33 | Harrison | I-20 | US 80 | FM 134 | 45 |
| | | TC-34 | Harrison | I-20 | FM 134 | Texas State Line | 45 |
| | Bridge Modifications | TJ-4 | Harrison | FM 450 | - | - | 53 |
| | | TJ-7 | Harrison | Lansing Switch Road | - | - | 50 |
| | | TJ-16 | Harrison | FM 450 | - | - | 58 |
| | | TJ-17 | Harrison | US 59 | - | - | 53 |
| | | TJ-7 | Harrison | Lansing Switch Road | - | - | 54 |
| | Frontage Road Reconstruction | TG-12 | Harrison | I-20 | County Line | Loop 281 E | 45 |
| | | TG-13 | Harrison | I-20 | Loop 281 E | FM 450 | 58 |
| | | TG-14 | Harrison | I-20 | FM 450 | FM 3251 | 60 |
| | | TG-15 | Harrison | I-20 | US 80 | Texas State Line | 53 |
| | Ramp Improvements | TI-16 | Harrison | Loop 281 E | - | - | 43 |
| | | TI-17 | Harrison | FM 3251 | - | - | 35 |
| | | TI-18 | Harrison | FM 31 | - | - | 45 |
| | | TI-19 | Harrison | FM 2199 | - | - | 45 |

Detailed results for all evaluated projects can be found in *Appendix D: Proposed Projects.*

## 7. Project Prioritization

Limited resources and programming needs make prioritization of projects a necessity. Advisory Committee Members outlined preferred projects based on results of the evaluation and their personal knowledge of study area. During the Advisory Committee Meeting on June 11th 2014, members participated in a prioritization process divided in two sections, beginning at a general level, and then focusing onto project specific elements. During the first round process, Advisory Committee members prioritized generalized improvement strategies. An overall ranking of improvement concepts is shown summarized below in **Table 7.1.**

*Table 7.1: Priority Ranking per Section*

| Overall Priorities | West Section Priorities | Central Section Priorities | East Section Priorities |
|---|---|---|---|
| 1.Making ramp improvements | 1. Making ramp improvements | 1. Making ramp improvements | 1. Adding capacity to I-20. |
| 2.Constructing frontage roads | 2. Constructing frontage roads | 2. Constructing frontage roads | 2. Making ramp improvements |
| 1.Adding capacity to I-20. | 3. Adding capacity to I-20 | 3. Adding capacity to<br>4. I-20. | 3. Constructing frontage roads |
| 3.Considering emerging trends and technologies | 4. Considering emerging trends and technologies | 5. Identifying other improvement types | 4. Identifying other improvement types |
| 2.Identifying other improvement types | 5. Identifying other improvement types | 6. Considering emerging trends and technologies | 5. Considering emerging trends and technologies |

For the second level of prioritization, members focused on a corridor section according to the geographical location (West, Central, and East) of their communities and expressed support for specific projects of interest. Each of the groups had three different maps with proposed projects categorized as ramp and interchanges improvements, frontage road construction and improvements, as well as added capacity on main lanes. Each Advisory Committee member was provided six stickers to place on the maps marking projects they wanted to be high priority. Results were tabulated and presented to the Advisory Committee for review and further comments.

*Map 7.1: West Section Prioritization, Map 7.2: Central Section Prioritization, Map 7.3 East Section Prioritization,* depict results as collected during the second section of this analysis.

Advisory Committee members representing the western section of the corridor consistently gave higher preference to ramp improvement projects, especially those closer to I-635

during both the general and specific project prioritization processes. The ramp priorities were followed by addition of median barriers on the urban section of the corridor. Continuing existing frontage roads by adding new segments past the Dallas/Kaufman County line ranked third. Preferences for capacity improvements were included but were not as uniformly identified as the previously mentioned project categories.

The central section focused its interest around US 69, with members prioritizing construction of frontage roads from Toll 49 to US 271 in Smith County as their number one priority followed by construction of additional main lanes from County Road 110 to US 69 and ramp improvements to the US 69 interchange. Safety improvements to other access ramps ranked third with a variety of interchanges identified as lesser priorities.

Although preferences and priorities along the corridor were generally consistent, the east section indicated the construction of additional capacity and frontage roads was more important than any other kind of project around their communities. This prioritization made sense in view of the fact that the interchanges within the eastern region were mostly assessed as compliant with geometrical standards and are expected to handle lower levels of traffic than the west and central portions.

Tables 7.2, 7.3 and 7.4 summarize priority projects by county and summarizes priority projects based on evaluation results (technical score) along with their Advisory Committee scoring in the prioritization exercise. Specific projects with low scores were highlighted purple in the following list after being mentioned by the public as presenting safety issues during the Public Outreach section of this study.

**Project ID Key**

| *First Letter = Source* | + | *Second Letter = Type* | - | *Project Number* |
|---|---|---|---|---|
| **A=** Advisory Committee | | **A=** Interchange Improvements: 3 or more ramps | | |
| **T=** Technical Analysis | | **B=** Interchange Improvements: 2 or less ramps | | |
| | | **C=** Added Capacity | | |
| | | **D=** Interchange Improvements: One ramp | | |
| | | **F=** New Frontage Road | | |
| | | **G=** Frontage Road Reconstruction | | |
| | | **I =** Ramp Improvement : Hook ramp elimination | | |
| | | **J=** Bridge Modifications: Replacement or Vertical Clearance Adjustment | | |

Technical Score
High Score (55<)
Mid Score (50-54)
Low Score (50>)

High Public Comment Preference

High Advisory Committee Preference based on 06/11/2014 Committee meeting.

*Table 7.2: West Section Prioritization*

| | Project Type | Project ID | County | Road | Limit from | Limit to | Advisory Committee Preferences | Technical Score |
|---|---|---|---|---|---|---|---|---|
| DALLAS | New Frontage Road | AF-1 | Dallas | I-20 | Lawson Rd | FM 740 | 4 | 55 |
| | Median Barrier Addition | AE-1 | Dallas | I-20 | Loop 635 | Dallas County Line | 4 | 58 |
| | Added Capacity | TC-1 | Dallas | I-20 | I-635 | Lawson Rd | 2 | 58 |
| | | TC-2 | Dallas | I-20 | Lawson Rd | Dallas County Line | 0 | 50 |
| | Frontage Road Reconstruction | TG-1 | Dallas | I-20 | Seagonville Road | Lawson Road | 2 | 50 |
| | Ramp Improvement | TI-1 | Dallas | Lawson Rd | - | - | 0 | 40 |
| KAUFMAN | Interchange Improvements | AB-1 | Kaufman | SH 34 | - | - | 2 | 68 |
| | | AD-1 | Kaufman | FM 429 | - | - | 0 | 45 |
| | | AD-3 | Kaufman | Wilson Road | - | - | 0 | 20 |
| | | AD-4 | Kaufman | FM 429 | - | - | 0 | 45 |
| | Added Capacity | AC-1 | Kaufman | I-20 | SH 557 | Wilson Rd | 1 | 58 |
| | New Frontage Road | AF-2 | Kaufman | I-20 | FM 740 | FM 741 | 0 | 35 |
| | | AF-3 | Kaufman | I-20 | SH 557 | FM 138 | 3 | 53 |
| | | AF-13 | Kaufman | FM 741 | SH 557 | Kaufman | 3 | 45 |
| | Interchange Improvements | TB-2 | Kaufman | FM 2965 | - | - | 0 | 63 |
| | | TD-1 | Kaufman | CR 310 (Hiram Rd) | - | - | 0 | 43 |
| | Added Capacity | TC-3 | Kaufman | I-20 | Dallas County Line | FM 741 | 0 | 35 |
| | | TC-4 | Kaufman | I-20 | FM 741 | SH 557 | 0 | 53 |
| | | TC-5 | Kaufman | I-20 | Wilson Rd | FM 310 | 0 | 50 |
| | | TC-6 | Kaufman | I-20 | FM 310 | Kaufman County Line | 0 | 50 |
| | Ramp Improvement | TI-2 | Kaufman | FM 740 | - | - | 0 | 35 |
| | | TI-3 | Kaufman | FM 741 | - | - | 0 | 35 |
| | | TI-4 | Kaufman | FM 2932 | - | - | 0 | 35 |
| | | TI-5 | Kaufman | FM 1641 | - | - | 0 | 50 |
| | | TI-6 | Kaufman | FM 148 | - | - | 0 | 55 |
| | | TI-7 | Kaufman | SH 557 | - | - | 0 | 45 |
| | | TI-8 | Kaufman | CR 304 | - | - | 0 | 38 |
| | Bridge Modifications | TJ-8 | Kaufman | SH 34 | - | - | 2 | 68 |
| | | TJ-8 | Kaufman | SH 34 | - | - | 2 | 68 |

## *Table 7.3: Central Section Prioritization*

| | Project Type | Project ID | County | Road | Limit from | Limit to | Advisory Committee Preferences | Technical Score |
|---|---|---|---|---|---|---|---|---|
| VAN ZANDT | Interchange Improvements | AA-3 | Van Zandt | FM 859 | - | - | 0 | 53 |
| | New Frontage Road | AF-4 | Van Zandt | I-20 | FM 47 | SH 64 | 1 | 50 |
| | | AF-5 | Van Zandt | I-20 | SH 19 | FM 17 | 0 | 40 |
| | Interchange Improvements | TA-1 | Van Zandt | SH 19 | - | - | 1 | 53 |
| | | TB-3 | Van Zandt | FM 47 | - | - | 1 | 60 |
| | | TB-4 | Van Zandt | CR 3412 | - | - | 1 | 53 |
| | | TB-5 | Van Zandt | SH 64 | - | - | 1 | 60 |
| | | TB-6 | Van Zandt | FM 1255 | - | - | 0 | 55 |
| | | TB-7 | Van Zandt | CR 1311 | - | - | 0 | 48 |
| | | TD-2 | Van Zandt | FM 3439 / CR 3442 | - | - | 0 | 48 |
| | | TD-3 | Van Zandt | FM 17 | - | - | 1 | 55 |
| | | TD-4 | Van Zandt | CR 1308 | - | - | 0 | 40 |
| | | TD-5 | Van Zandt | FM 773 / FM 16 | - | - | 0 | 63 |
| | | TB-1 | Van Zandt | FM 314 | - | - | 0 | 58 |
| | Added Capacity | TC-7 | Van Zandt | I-20 | Kaufman County Line | FM 47 | 0 | 55 |
| | | TC-8 | Van Zandt | I-20 | FM 47 | SH 64 | 1 | 50 |
| | | TC-9 | Van Zandt | I-20 | SH 64 | SH 19 | 0 | 50 |
| | | TC-10 | Van Zandt | I-20 | SH 19 | FM 1255 | 0 | 50 |
| | | TC-11 | Van Zandt | I-20 | FM 1255 | CR 1308 | 0 | 40 |
| | | TC-12 | Van Zandt | I-20 | CR 1308 | FM 773 | 0 | 38 |
| | | TC-13 | Van Zandt | I-20 | FM 773 | FM 314 | 0 | 48 |
| | | TC-14 | Van Zandt | I-20 | FM 314 | Van Zandt County Line | 0 | 45 |
| | Frontage Road Reconstruction | TG-2 | Van Zandt | I-20 | County Line | FM 47 | 1 | 55 |
| | | TG-3 | Van Zandt | I-20 | US 64 | SH 19 | 0 | 50 |
| | | TG-4 | Van Zandt | I-20 | FM 17 | CR 1311 | 0 | 48 |
| | | TG-5 | Van Zandt | I-20 | CR 1311 | FM 314 | 0 | 48 |
| | Bridge Modifications | TJ-9 | Van Zandt | FM 859 | - | - | 0 | 55 |
| | | TJ-11 | Van Zandt | FM 47 | - | - | 1 | 65 |
| | | TJ-12 | Van Zandt | FM 17 | - | - | 1 | 58 |
| | | TJ-13 | Van Zandt | FM 1255 | - | - | 0 | 55 |
| | | TJ-14 | Van Zandt | FM 773 | - | - | 0 | 68 |
| | New Frontage Road | AF-6 | Van Zandt, Smith | I-20 | FM 314 | SH 110 | 0 | 50 |
| SMITH | New Frontage Road | AF-7 | Smith | I-20 | Toll 49 | US 271 | 8 | 53 |
| | Interchange Improvements | TA-2 | Smith | US 69 | - | - | 7 | 40 |
| | | TB-8 | Smith | CR 35 (Lavender Rd) | - | - | 2 | 48 |
| | | TB-9 | Smith | FM 2015 | - | - | 0 | 45 |
| | | TD-6 | Smith | CR 426 | - | - | 0 | 45 |
| | | TD-7 | Smith | CR 431 | - | - | 0 | 40 |
| | | TD-8 | Smith | SH 155 (Lawton Ave) | - | - | 0 | 53 |
| | | TD-9 | Smith | FM 757 | - | - | 0 | 35 |
| | | TD-10 | Smith | CR 3101 | - | - | 2 | 50 |
| | | TD-11 | Smith | CR 3111 | - | - | 0 | 40 |
| | | TD-12 | Smith | FM 14 | - | - | 0 | 45 |
| | Added Capacity | TC-15 | Smith | I-20 | Van Zandt County Line | CR 110 | 0 | 40 |
| | | TC-16 | Smith | I-20 | CR 110 | US 69 | 7 | 50 |
| | | TC-17 | Smith | I-20 | US 69 | FM 14 | 0 | 48 |
| | | TC-18 | Smith | I-20 | FM 14 | SH 155 | 0 | 45 |
| | | TC-19 | Smith | I-20 | SH 155 | US 271 | 0 | 40 |
| | | TC-20 | Smith | I-20 | US 271 | Smith County Line | 1 | 50 |
| | Bridge Modifications | TJ-5 | Smith | SH 110 | - | - | 0 | 50 |
| | | TJ-6 | Smith | FM 849 | - | - | 0 | 50 |
| | Frontage Road Reconstruction | TG-6 | Smith | I-20 | SH 110 | FM 849 | 0 | 50 |
| | | TG-7 | Smith | I-20 | US 271 | Gregg County Line | 1 | 50 |
| | | TG-8 | Smith | I-20 | Gregg County Line | SH 42 | 0 | 45 |
| | Ramp Improvement | TI-9 | Smith | CR 110 | - | - | 0 | 55 |
| | | TI-10 | Smith | FM 849 | - | - | 0 | 50 |
| | | TI-11 | Smith | US 271 | - | - | 0 | 45 |

## *Table 7.4: East Section Prioritization*

| | Project Type | Project ID | County | Road | Limit from | Limit to | Advisory Committee Preferences | Technical Score |
|---|---|---|---|---|---|---|---|---|
| GREGG | Interchange Improvements | AD-2 | Gregg | SH 31 | - | - | 2 | 45 |
| | Bridge Modifications | TJ-1 | Gregg | Fritz Swanson RD | - | - | 0 | 40 |
| | | TJ-2 | Gregg | MLK Blvd | - | - | 0 | 53 |
| | | TJ-3 | Gregg | FM 2087 | - | - | 0 | 58 |
| | | TJ-15 | Gregg | MLK Blvd | - | - | 0 | 48 |
| | Frontage Road Reconstruction | TG-9 | Gregg | I-20 | SH 42 | FM 2087 | 3 | 55 |
| | | TG-10 | Gregg | I-20 | FM 2087 | Loop 281 W | 1 | 60 |
| | | TG-11 | Gregg | I-20 | Loop 281 W | County Line | 0 | 60 |
| | Ramp Improvement | TI-12 | Gregg | FM 3053 | - | - | 0 | 45 |
| | | TI-13 | Gregg | SH 42 | - | - | 1 | 50 |
| | | TI-14 | Gregg | FM 2087 | - | - | 0 | 58 |
| | | TI-15 | Gregg | Loop 281 W / US 259 | - | - | 1 | 45 |
| | Added Capacity | TC-21 | Gregg | I-20 | Smith County Line | SH 135 | 0 | 45 |
| | | TC-22 | Gregg | I-20 | SH 135 | SH 42 | 2 | 58 |
| | | TC-23 | Gregg | I-20 | SH 42 | FM 2087 | 1 | 55 |
| | | TC-24 | Gregg | I-20 | FM 2087 | Gregg County Line | 1 | 60 |
| HARRISON | New Frontage Road | AF-8 | Gregg, Harrison | I-20 | US 259 | Loop 281 | 3 | 50 |
| | | AF-9 | Harrison | I-20 | FM 968 | SH 43 | 0 | 45 |
| | | AF-10 | Harrison | I-20 | SH 43 | FM 31 | 4 | 50 |
| | | AF-11 | Harrison | I-20 | FM 31 | Buck Sherrod Rd | 2 | 45 |
| | | AF-12 | Harrison | I-20 | US 80 | FM 2199 | 0 | 45 |
| | Added Capacity | TC-25 | Harrison | I-20 | Gregg County Line | Loop 281 | 1 | 45 |
| | | TC-26 | Harrison | I-20 | Loop 281 | FM 450 | 1 | 55 |
| | | TC-27 | Harrison | I-20 | FM 450 | FM 3251 | 0 | 55 |
| | | TC-28 | Harrison | I-20 | FM 3251 | SH 43 | 0 | 50 |
| | | TC-29 | Harrison | I-20 | SH 43 | US 59 | 0 | 43 |
| | | TC-30 | Harrison | I-20 | US 59 | FM 31 | 1 | 45 |
| | | TC-31 | Harrison | I-20 | FM 31 | FM 2199 | 0 | 35 |
| | | TC-32 | Harrison | I-20 | FM 2199 | US 80 | 0 | 45 |
| | | TC-33 | Harrison | I-20 | US 80 | FM 134 | 0 | 45 |
| | | TC-34 | Harrison | I-20 | FM 134 | Texas State Line | 0 | 45 |
| | Bridge Modifications | TJ-4 | Harrison | FM 450 | - | - | 0 | 53 |
| | | TJ-7 | Harrison | Lansing Switch Road | - | - | 0 | 50 |
| | | TJ-16 | Harrison | FM 450 | - | - | 0 | 58 |
| | | TJ-17 | Harrison | US 59 | - | - | 0 | 53 |
| | | TJ-7 | Harrison | Lansing Switch Road | - | - | 0 | 54 |
| | Frontage Road Reconstruction | TG-12 | Harrison | I-20 | County Line | Loop 281 E | 0 | 45 |
| | | TG-13 | Harrison | I-20 | Loop 281 E | FM 450 | 0 | 58 |
| | | TG-14 | Harrison | I-20 | FM 450 | FM 3251 | 0 | 60 |
| | | TG-15 | Harrison | I-20 | US 80 | Texas State Line | 0 | 53 |
| | Ramp Improvements | TI-16 | Harrison | Loop 281 E | - | - | 0 | 43 |
| | | TI-17 | Harrison | FM 3251 | - | - | 0 | 35 |
| | | TI-18 | Harrison | FM 31 | - | - | 0 | 45 |
| | | TI-19 | Harrison | FM 2199 | - | - | 0 | 45 |

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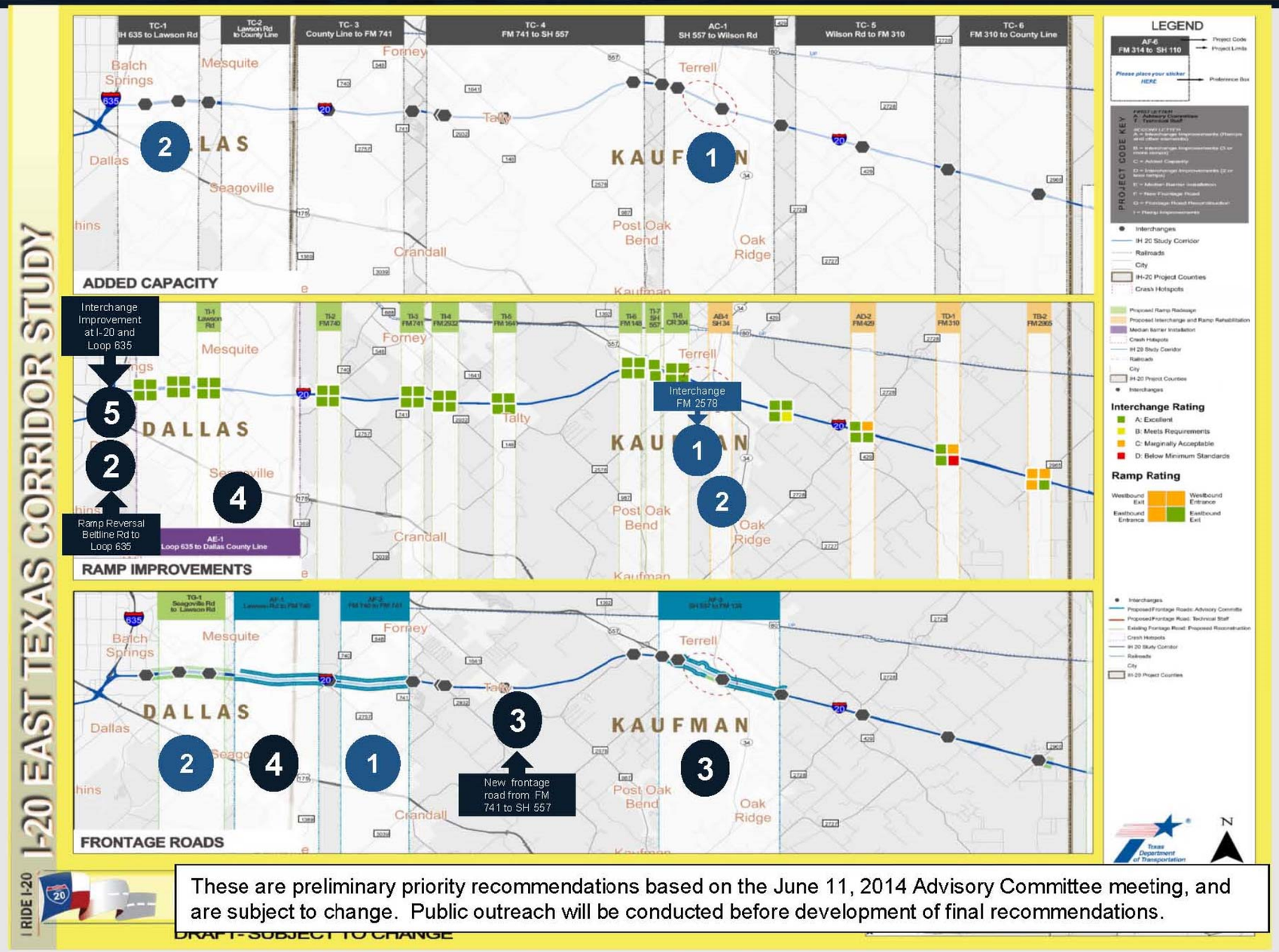
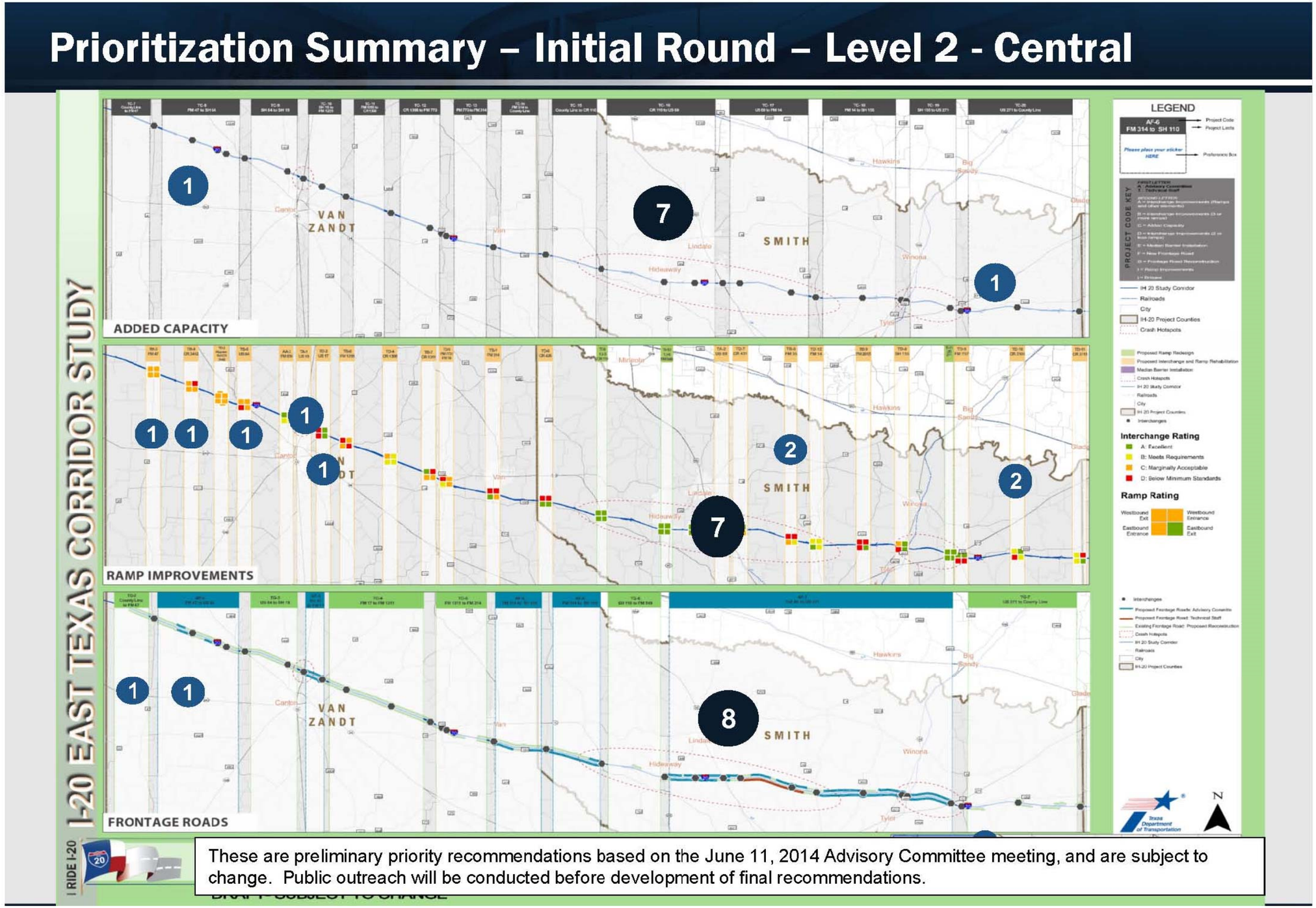
Map 7.1 West Section Prioritization

# Prioritization Summary – Initial Round – Level 2 - West

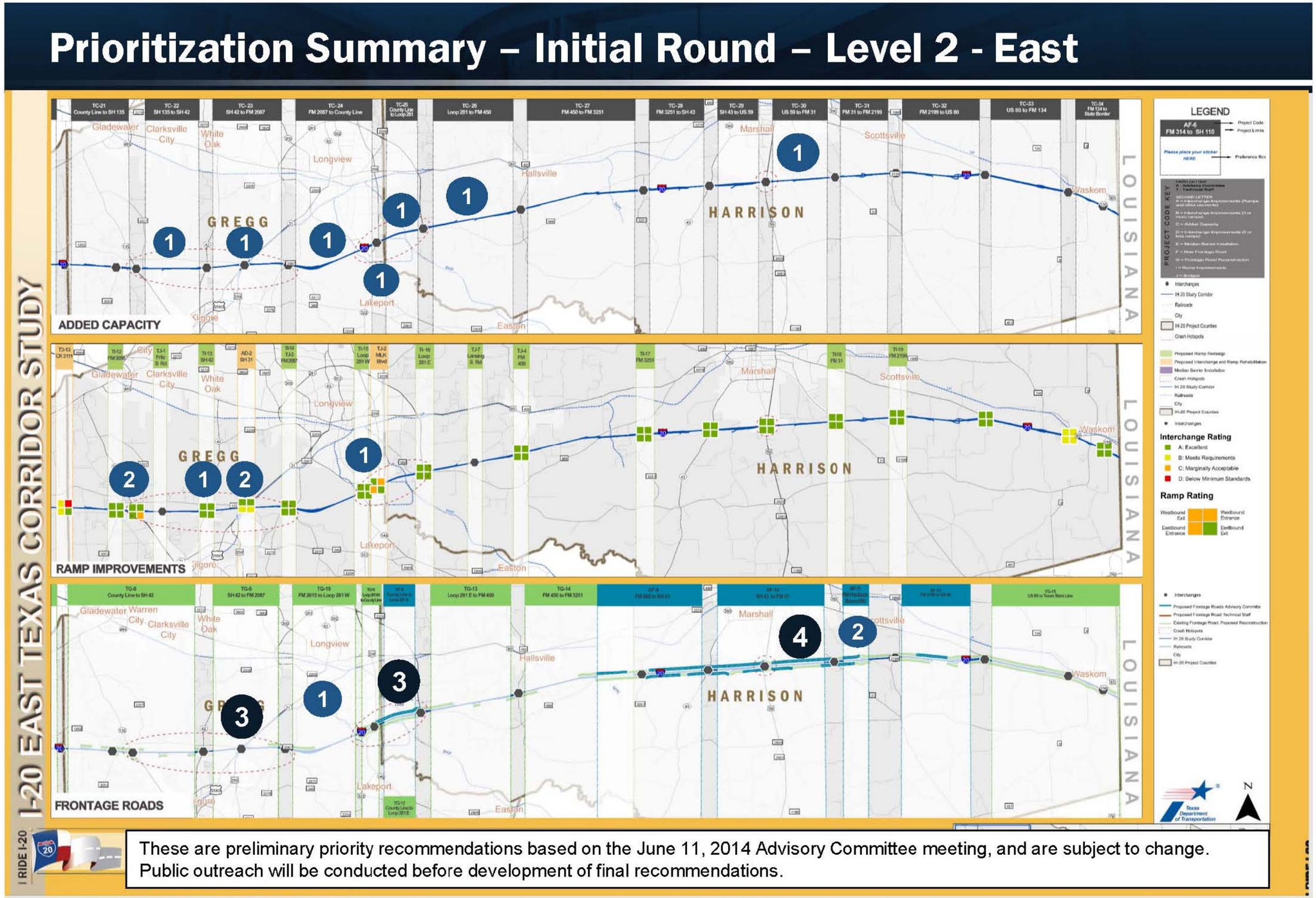



These are preliminary priority recommendations based on the June 11, 2014 Advisory Committee meeting, and are subject to change. Public outreach will be conducted before development of final recommendations.

Map 7.2 Central Section Prioritization



Map 7.3 East Section Prioritization



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# 8. Implementation Plan

Based on previously described feedback from the Advisory Committee, public input provided through comments and results from the needs assessment performed by staff an implementation plan was compiled for the I-20 Corridor.

The plan provides programmatic recommendations for the corridor as a whole, as well as project level recommendations broken down by logical timeframe. Projects classified as Near Term are recommended to be completed between 2015 and 2020. Projects in the Mid Term category are recommended to be completed between 2021 and 2030. Finally, Long Term projects are considered in the 2031 to 2040 interval.

## 8.1 Programmatic Recommendations

Actions necessary to ensure the facility has the capacity to meet future transportation needs are included as programmatic recommendations to be applied to the corridor as a whole. These recommendations are as follows:

- Construct median barriers in locations that are warranted but not yet installed.
- Upgrade/replace bridges that have low sufficiency ratings or whose vertical clearances are less than current TxDOT standards. In consideration of evolving needs of the increased size of freight movements and the Long Term potential for passenger rail services in the corridor, each of these bridges should be reconstructed with a minimum vertical clearance of 18-feet, and an ultimate desirable 23-foot clearance.
- Modernize ramp designs to serve increasing traffic demands and improve safety.
- Reconstruct interchanges which have operational or safety concerns.
- When needed, perform major rehabilitation of existing highway including possible full-depth reconstruction of pavements.
- Construct additional lanes along I-20 for three main reasons:
  - I. Permit the maintenance of traffic during other major improvements.
  - II. Reduce crash frequencies caused by elevated levels of freight
  - III. Alleviate future congestion.
- Construct new, one-way frontage roads or reconstruct/convert existing two-way frontage roads to safer one-way operations in areas identified by local officials.
- Promote local initiatives to foster more frequent/efficient intercity bus service.

*Major improvements are needed on I-20 to improve safety, to protect the investment made in the existing facility, and to maintain or enhance the ability to move traffic.*

**8.1.1 Safety:** This portion of I-20 experiences an overall crash rate that is 18% higher than the statewide average – and a number of specific locations are as much as 8 times higher than the statewide average. If untreated, this safety deficiency could result in 4,500 more crashes over the next 25 years; with an economic consequence of as much as $ 1.8 Billion.

Median Treatments - Some safety improvements are very simple and easy to implement, such as the installation of 6 miles of median barrier in Dallas and Kaufman Counties. In the broader corridor, median barriers have already been constructed, and not only have the incidence of head-on collisions been sharply reduced, but single vehicle collisions have not increased at these locations, suggesting that besides eliminating very serious types of crashes, the barriers themselves do not foster other types of collisions.

Modernize/Improve Interchange Ramps – Because of the increase in traffic levels, and particularly heavier commercial vehicles, the original design of some ramps along I-20 are not adequate for current conditions. During this study, the geometry of each of the entry and exit ramps along the corridor was assessed, and a total of 63 ramps were found to require improvement. Many of these improvements are relatively low cost in nature, and will not create impacts outside of the existing rights-of-way. In some cases however, these small improvements occur at interchanges with more extensive deficiencies – resulting in the need for more far ranging improvements.

Reconstruct Existing Interchanges - In a number of locations, the need for more comprehensive solutions requires complete reconstruction of existing I-20 interchanges. Some of these needs are based solely on safety, and others address safety as well as other concerns. The need to extend a ramp at one interchange in order to reduce the steepness of slopes may require extension of the ramp(s) which would then be too close to a second interchange. To create a comprehensive solution, both concerns must be addressed, and this frequently leads to more complex solutions that address safety, capacity, and even local access considerations. Generalized solutions to these problems have been developed for costing purposes, but the final designs will depend on detailed project development efforts conducted by individual TxDOT districts and local stakeholders.

Ongoing Studies – During the course of this study, several observations about localized issues were made by the public. These issues require more detailed evaluation than are possible during this assignment. Subsequent investigations may lead to safety improvements such as revisions to existing signage. They include:

- Guidance signing on westbound I-20 south of Terrell. Motorists appear to be experiencing confusion over which lane to use to get to SP 557.
- Districts should monitor future crash histories as they are released by Texas Department of Public Safety (DPS) within the seven "hotspots" identified under this study. Additional information over the coming years may provide more insight into the causes of crashes and permit the evaluation of how effective various improvements are in reducing them.
- Consider whether every bridge identified for replacement because of structural deficiency or limited vertical clearance ( Section 1.1) actually needs to be replaced. Such studies will have to be conducted in cooperation with local agencies. Several structures appear to provide inefficient services to the motoring public. Not constructing replacements after demolition could save money and could free land area for additional economic development. One example would be the Martin Luther King Jr Blvd bridge over I-20 in Longview.
- Several locations have frequent weather-related (ice & snow) crashes including:
  - FM 741 to Spur 557 in Kaufman County,
  - FM 849 to FM 14 near Lindale, and
  - SH 135 to FM 2087 near Kilgore,

  As part of a corridor-wide Intelligent Transportation System (ITS), strategies should be developed to identify and advise the public when ice forms on I-20.
- Develop alternative transportation services networks between urban populations and possible express intercity bus stops at I-20 interchanges to encourage companies to upgrade their services along I-20.
- Promote the development of electrical vehicle (EV) charging stations in public as well as privately owned land developments along I-20. In addition, closely monitor developments related to the new highway technologies that might permit EVs to recharge while traveling along the corridor.

**8.1.2 Maintenance:** As previously stated, much of the I-20 pavement is approaching 50 years of service life and is carrying more and heavier traffic than it was originally designed to accommodate. Interstate pavements generally have a life of 20 to 30 years, but through good maintenance can last longer, as the **Figure 8.1** below depicts.

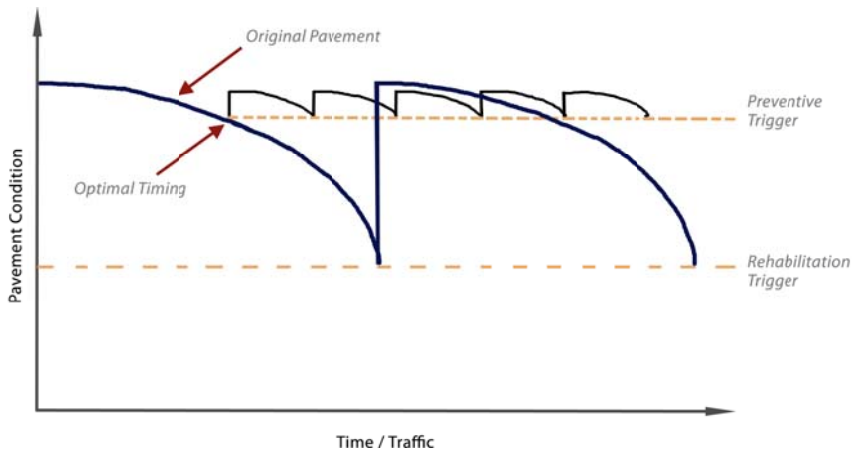


Figure 8.1: Pavement Preservation Concept

Source: FHWA Principles of Pavement Preservation

When first constructed, the look and feel of pavement is very good, but as time goes on the wear and tear from traffic and from environmental conditions like hot weather and precipitation will cause pavements to deteriorate. If pavement surfaces are maintained on a regular basis, the deterioration process can be slowed or even reversed. But if maintenance is deferred, the deterioration begins to accelerate, and efforts to renew the pavement become much more expensive. If permitted to deteriorate to the lowest of rating levels, only complete reconstruction (replacement) becomes a viable option. **Figure 8.2** illustrates the role of each of these pavement rehabilitation strategies.

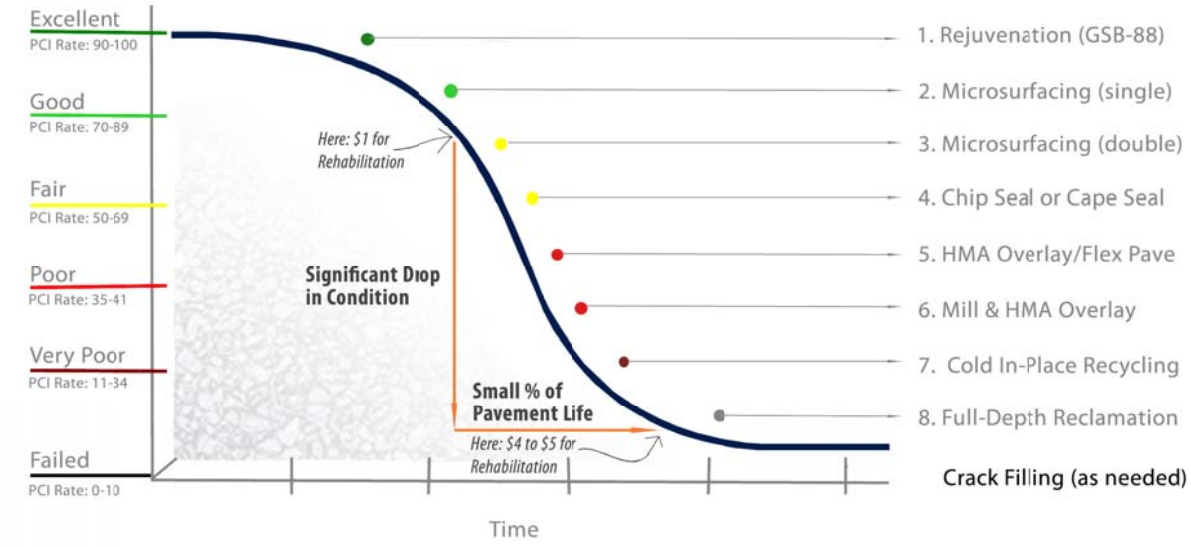


Figure 8.2:Pavement Distress Solutions

Source: NYBIT Optimizing Road Investments

During the last 10 years, as noted in Table 8.1, records maintained by the Maintenance Division indicate that approximately $20 million has been spent on pavement maintenance along I-20. Additional funds were budgeted by individual Districts for the same purposes.

*Table 8.1: 2004 to 2013 Pavement Maintenance Expenditures*

| Location | I-20 Main Lanes | Frontage Roads | Total |
|---|---|---|---|
| Atlanta | 4,333,000 | 1,807,000 | 6,140,000 |
| Dallas | 2,050,000 | 436,000 | 2,486,000 |
| Tyler | 7,925,000 | 3,292,000 | 11,217,000 |
| Total | $14,308,000 | $5,535,000 | $19,843,000 |

Source: Maintenance Division, TxDOT

This would be the equivalent of providing stopgap repairs on less than half the corridor during the past decade. Given the limited maintenance budgets and keen competition with other important facilities in each of the three TxDOT Districts, additional resources have not been available. But the fundamental question is: "How much longer will the pavement last?". During the early years of a pavement's life, simple restoration activities on the surface can be very beneficial. But at almost 50 years, the same simple restoration activities can actually mask the true condition of pavement by hiding damage to the base and foundation of the roadbed.

As the following table indicates, these maintenance actions have generally protected the quality of the surface condition, with most surfaces rated in the Excellent to Good range. Only 10% is classified as Poor or Very Poor.

*Table 8.2: Surface Condition Rating by Direction of Travel (in Miles)*

| Surface Pavement Condition | Miles | Percentage |
|---|---|---|
| Excellent (90-100) | 222 | 71% |
| Good (70-89) | 39 | 12% |
| Fair (50-69) | 20 | 7 % |
| Poor (35-49) | 7 | 2 % |
| Very Poor (1-34) | 25 | 8 % |

This is not necessarily an accurate picture of what the pavement condition is however. A more thorough inspection of the underlying structure and foundation may reveal serious problems. A comprehensive analysis of each section of I-20 using specialized equipment is appropriate – and therefore, the pavement assessments currently underway in Harrison County should be expanded to the entire corridor. With the results of these analyses along the entire 155-miles of the corridor, TxDOT will know where pavement has reached its maximum service life and requires complete replacement, how pavement life can be extended with various maintenance activities, and most importantly what the most cost-effective solutions will be.

If TxDOT determines that all pavement throughout the corridor needs to be reconstructed or replaced, the expense could exceed $1.5 Billion in current dollars. Besides the cost, a second obstacle to such an improvement program would be how to maintain traffic while performing pavement reconstruction. The existing traffic flows along I-20 must be maintained, and the removal/replacement of these pavements is likely to take individual sections of highway out of service for as much as 18-months. Closing one lane at a time would not be cost-effective, be unacceptable to the motoring public, and expose construction workers to hazards from traffic passing through the work zone.

**8.1.3 Adding Capacity:** The solution to maintaining traffic during reconstruction of existing pavements would be to construct at least two lanes of traffic adjacent to the current lanes. A review of the typical corridor cross-sections identified a means to do so, without having to discard the investment in new pavement after the existing lanes have been reconstructed.

As shown in **Figure 8.3**, these two additional lanes can be created by narrowing down the existing lanes and ramps, and reconstructing/paving the median and a portion of the existing pavements (Stage 1 Construction). Then traffic can be shifted from the current eastbound and westbound lanes to these new median lanes. In the second stage of construction, the existing lanes will be reconstructed. When the improvements to the existing lanes are completed, traffic can be transitioned back to the original lanes, and the entire section of highway can be utilized as a six-lane interstate (Stage 3). Such a cross-section would reduce crash potentials by providing greater separation between through movements and traffic seeking to enter or exit the freeway.

Some concern should be noted where overpasses include support columns in the median. As shown on **Figure 8.4** and **Figure 8.5**, the minimum median width between existing lanes and such columns throughout the corridor is approximately 15-feet. Again, temporarily narrowing existing lanes and eliminating shoulders will be necessary. This will permit construction of two lanes, as well as necessary barriers, but less than minimum shoulders and clearances in the median (Stage 1 Construction). Traffic can then be moved to the new median pavements, and the remaining existing pavements reconstructed (Stage 2 Construction). Design exceptions would have to be obtained for both of these temporary conditions. When complete, the area around overpasses will contain six lanes and shoulders, although a permanent design exception would have to be granted for 8.5-foot shoulders instead of the minimum specified 10-foot shoulders. In an effort to identify the most appropriate sections for major rehabilitation along the corridor, a detailed pavement assessment study is recommended to be performed by TxDOT.

Results from this comprehensive study, would identify the current pavement conditions and provide for more targeted interventions based on current and future deficiencies. Such efforts should identify those sections of I-20 whose maintenance needs should be coordinated with the Long Term capital program to expand portions of I-20 to a six-lane interstate.

**8.1.4 Capital Improvement:** Except during periods where traffic on I-20 is impeded by short term conditions such as vehicle crashes, vehicle breakdowns, or temporary maintenance activities, the current traffic flow is acceptable throughout the corridor. However, for the next 25 years, population and traffic are forecasted to grow by as much as 50 percent. This will create unacceptable traffic conditions in most of the corridor, which could only be alleviated through the construction of an additional lane of traffic in each direction of travel. Of the 155 miles of interstate included in this study, more than 90 miles will begin to experience traffic congestion symptomatic of an LOS D or worse nature between today and the Year 2040. These highway segments were previously illustrated in *Map 3.2 Traffic and Level of Service 2040.* The remaining 65 miles are likely to experience the same congestion within eight to ten years following the 2040 Study Horizon.

As discussed in the preceding section on maintenance needs, there is at least one strategy to expand the highway without seriously impeding traffic flows during construction. However, the segments of I-20 requiring reconstruction to solve existing or anticipated pavement deterioration may not always coincide with those portions of I-20 requiring expansion for capacity purposes. In such cases, a decision will have to be made to accelerate capacity expansions to accommodate maintenance needs, or to defer longer term pavement maintenance activities until closer to the time of need for additional capacity.

## 8.2 Programmatic Structure

The short, medium, and long range nature of this program is intended to recognize funding availability, project development considerations, and the timing of needs. All projects that are immediately implementable because they are already part of an approved transportation plan (including environmental approval and funding availability) have been included in the Near Term plan since they are essentially “shovel ready”. In some instances, one type of improvement is advisable during the Near Term, with related improvements in the same general location being required at a later date. Rather than work on a particular portion of I-20 multiple times (at much higher cost and greater inconvenience to the motoring public), efforts have been made to coordinate improvements to minimize cost and disruption. In some instances this means accelerating longer term improvements so they occur at the same time as more immediate needs are addressed.

## 8.3 Project Level Recommendations

Project level recommendations were created from the previously mentioned proposed project lists within each region of the corridor. The prioritization process was used to define specific sections of the project area needing action. Technical staff used these local preferences and combined it with overall goals to identify projects and assign them to a logical construction timeframe based on "shovel readiness", cost, and ability to be constructed independently or as part of a larger project.

Table 8.3 includes details of projects by type and desired timeframe in addition to preliminary cost estimates for each phase.

*Table 8.3: Implementation Plan Summary*

| Recommended Improvements | Near Term (2015-2020) | Mid Term (2021-2030) | Long Term (2031-2040) | Total |
|---|---|---|---|---|
| Miles of Added Median Barrier | 6 | - | - | 6 |
| # of Bridge Modifications | 14 | - | - | 14 |
| # of Ramp/Interchange Improvements | 5 | 21 | 9 | 35 |
| Miles of Frontage Road Improvements | 12 | 49 | 38 | 99 |
| Miles of Additional Capacity | - | 65 | 25 | 90 |
| Preliminary Cost Estimate (2014$ Millions) | $230 | $800 | $400 | $1,430 |
| Pavement Reconstruction (2014$ Millions) | | Up to $1,470 | | $1,470 |
| Potential Funding Needs (2014$ Millions) | | | | $2,900 |

Figure 8.3 below illustrates funding need totals by type of improvement.

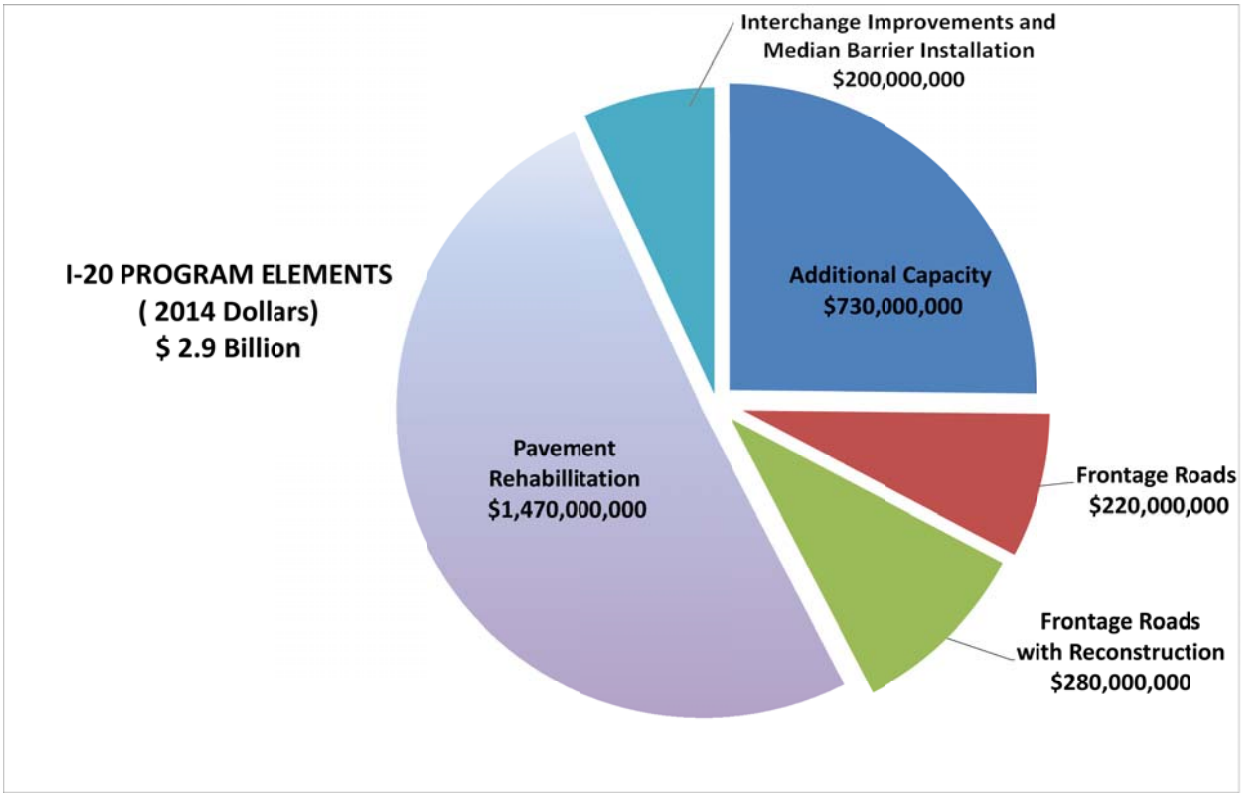


*Figure 8.3: Implementation Plan Summary*

*Map 8.1: Implementation Plan Dallas & Kaufman, Map 8.2: Implementation Plan Van Zandt, Map 8.3 Implementation Plan Smith, Map 8.4 Implementation Plan Gregg, Map 8.5 Implementation Plan Harrison* depict all projects considered in this implementation plan along with their locations within said counties.

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Figure 8.4: Additional Capacity Construction Phasing

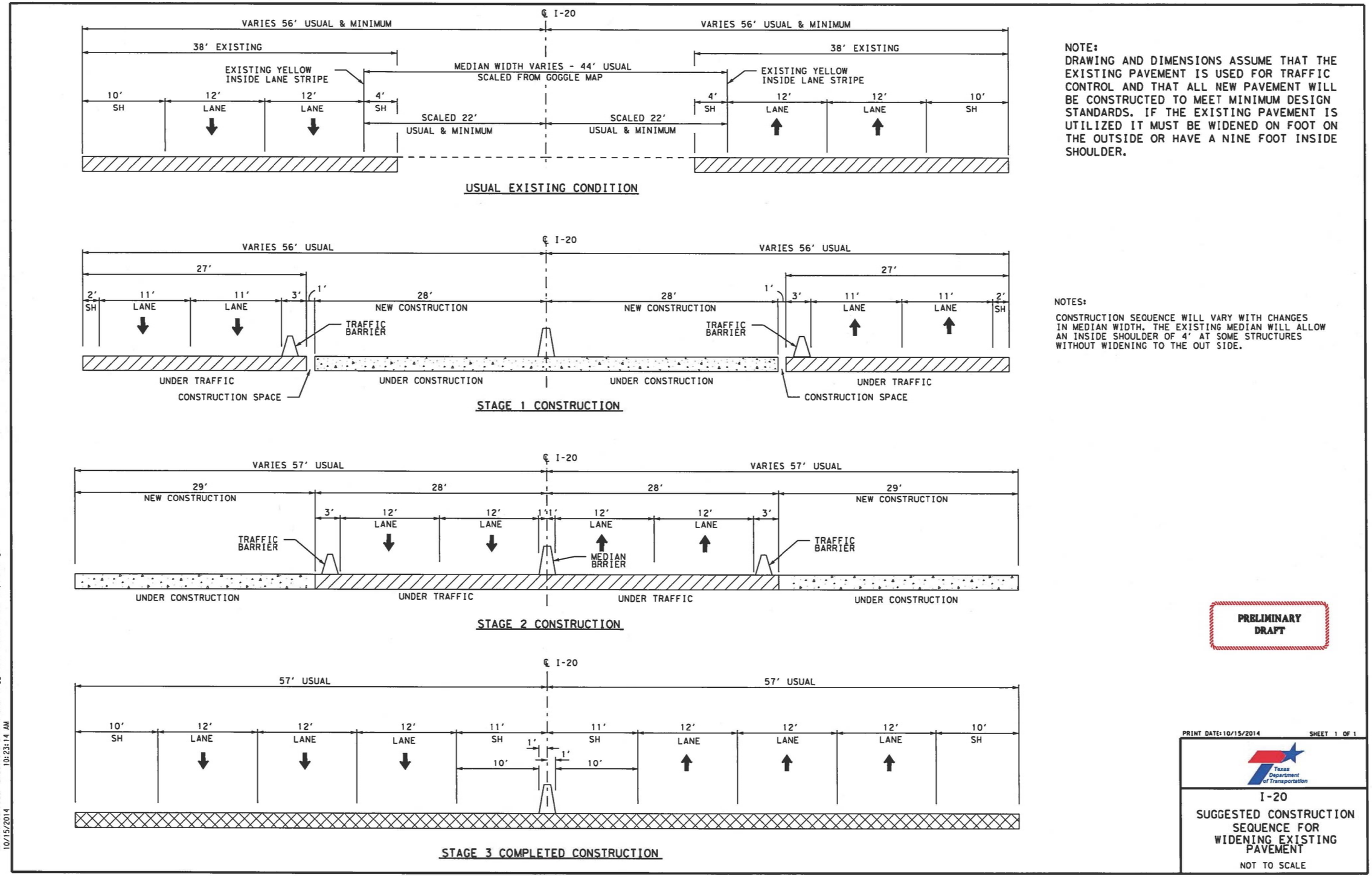


Figure 8.5 Additional Capacity Construction Phasing in Underpasses

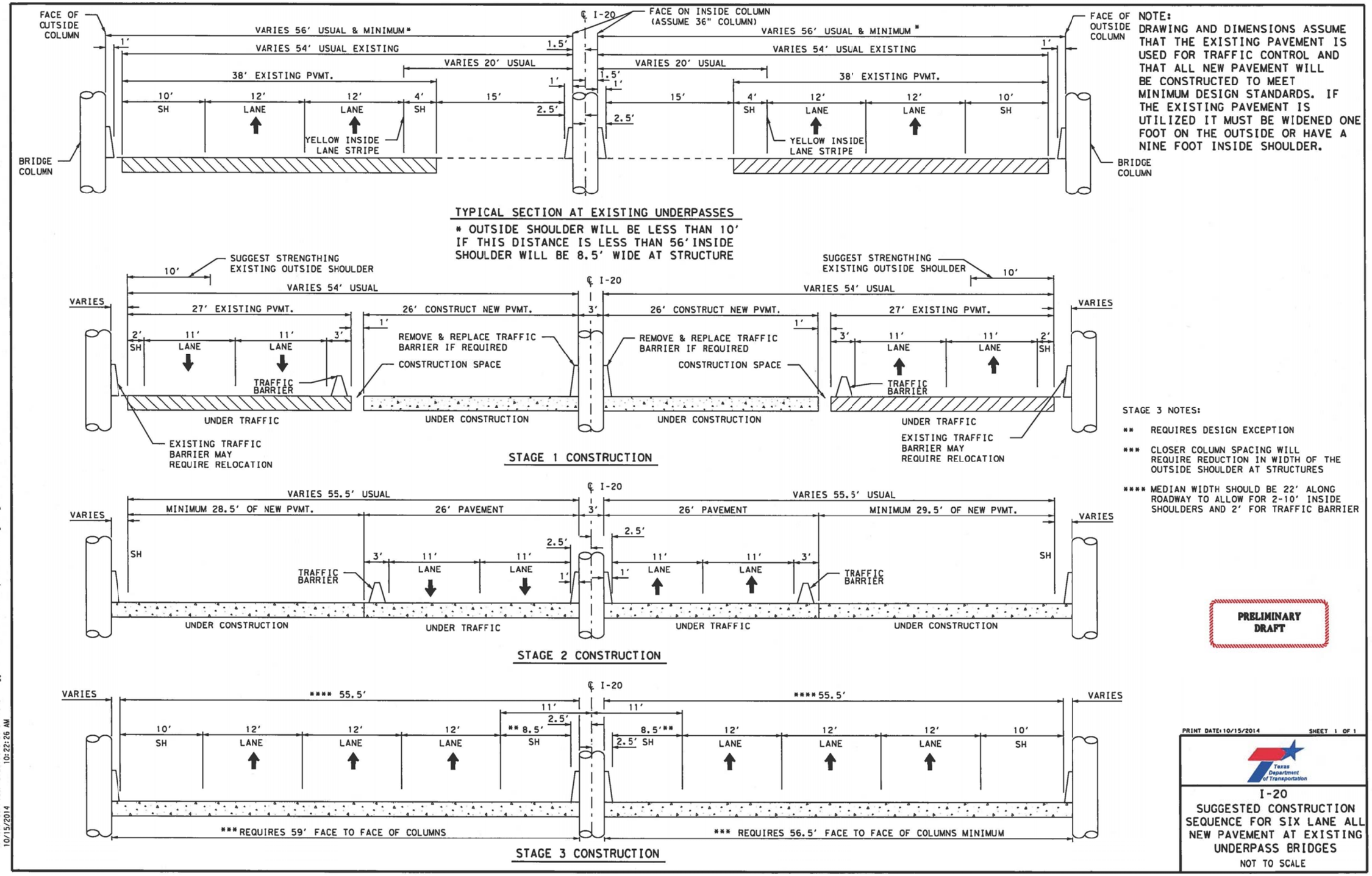
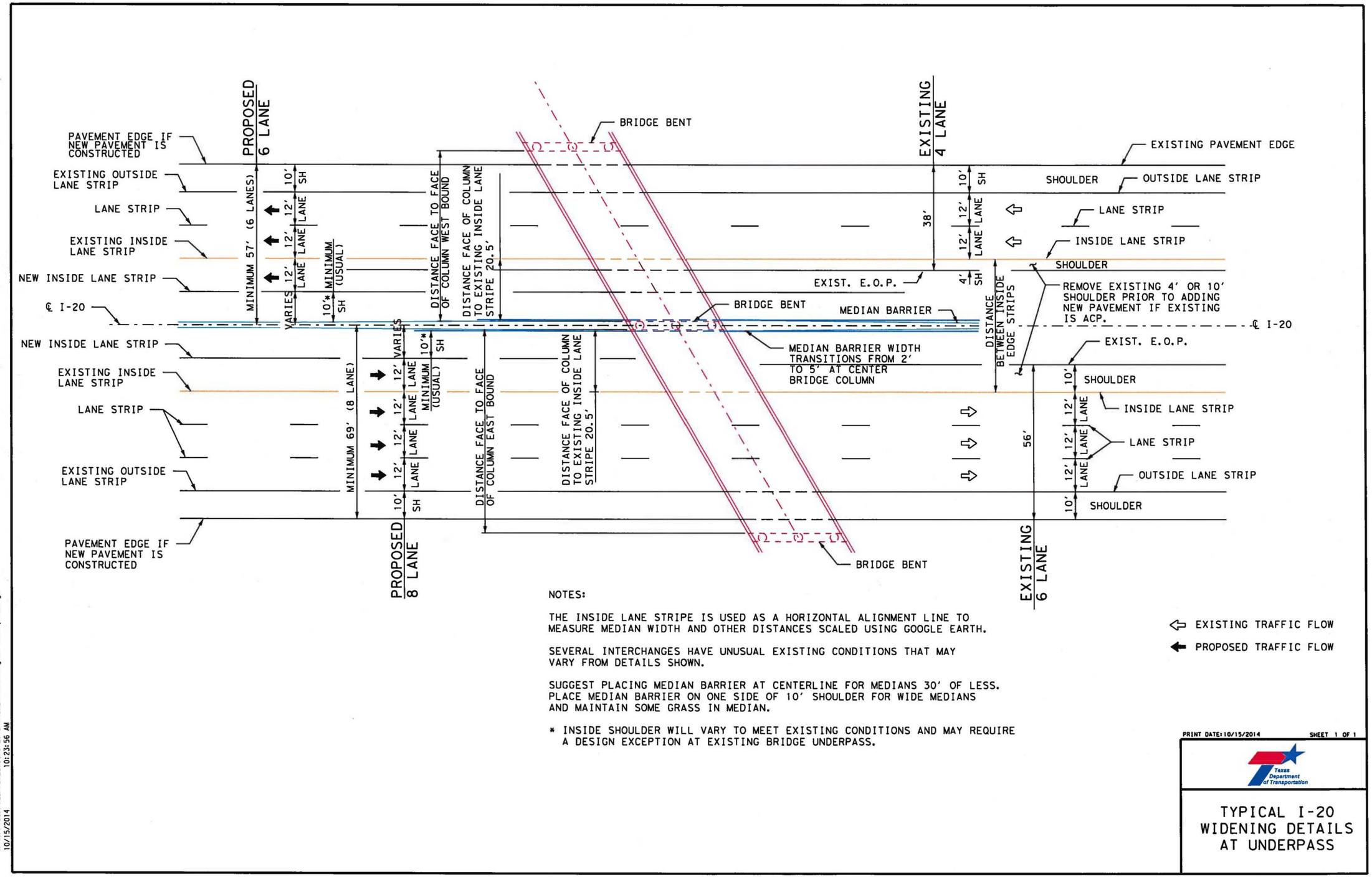


Figure 8.6 Additional Capacity Construction Phasing in Underpasses –Plan View




NOTES:

THE INSIDE LANE STRIPE IS USED AS A HORIZONTAL ALIGNMENT LINE TO MEASURE MEDIAN WIDTH AND OTHER DISTANCES SCALED USING GOOGLE EARTH.

SEVERAL INTERCHANGES HAVE UNUSUAL EXISTING CONDITIONS THAT MAY VARY FROM DETAILS SHOWN.

SUGGEST PLACING MEDIAN BARRIER AT CENTERLINE FOR MEDIANS 30' OF LESS. PLACE MEDIAN BARRIER ON ONE SIDE OF 10' SHOULDER FOR WIDE MEDIANS AND MAINTAIN SOME GRASS IN MEDIAN.

* INSIDE SHOULDER WILL VARY TO MEET EXISTING CONDITIONS AND MAY REQUIRE A DESIGN EXCEPTION AT EXISTING BRIDGE UNDERPASS.

PRINT DATE: 10/15/2014 SHEET 1 OF 1

Texas Department of Transportation

TYPICAL I-20 WIDENING DETAILS AT UNDERPASS

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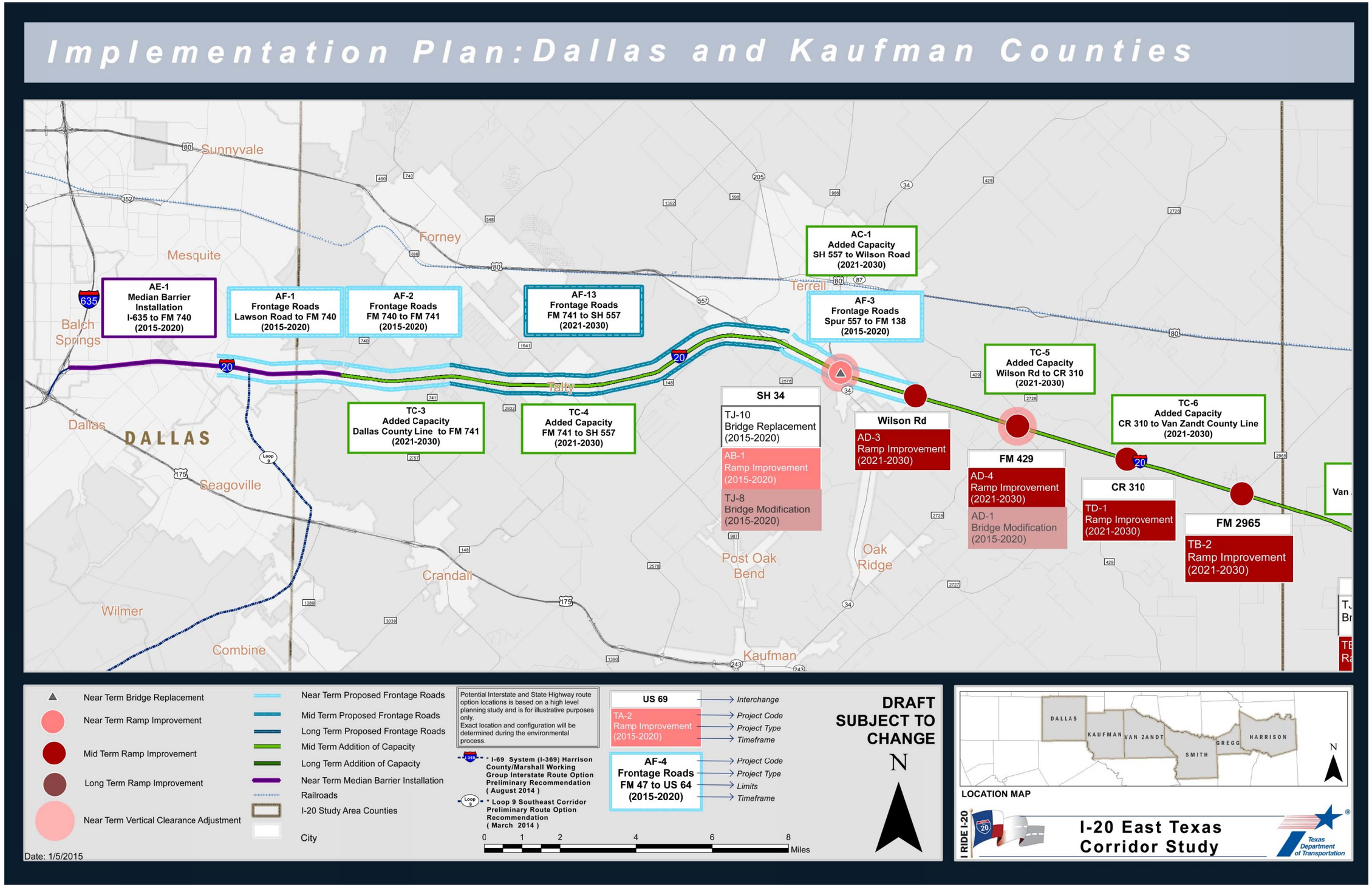
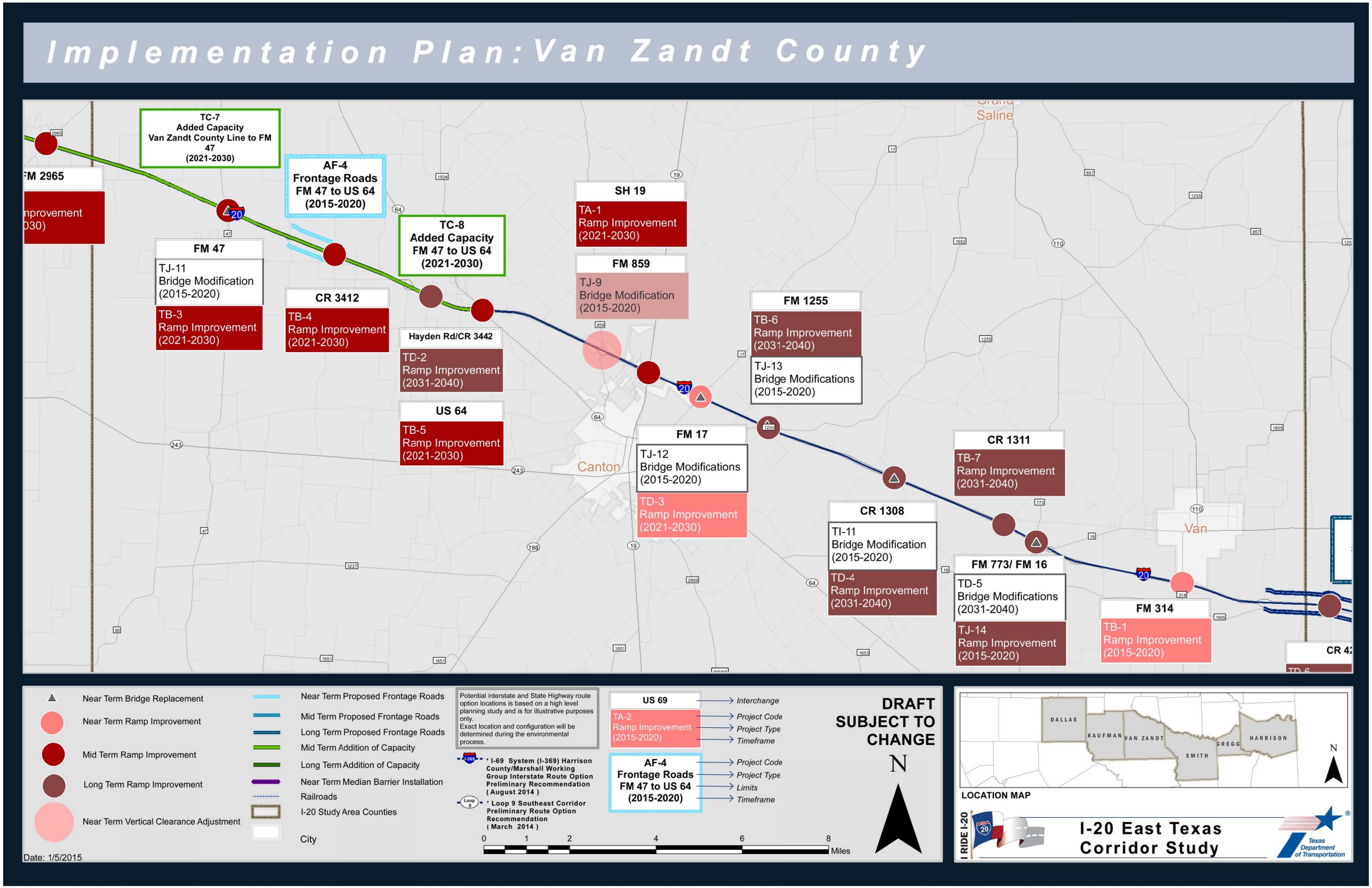
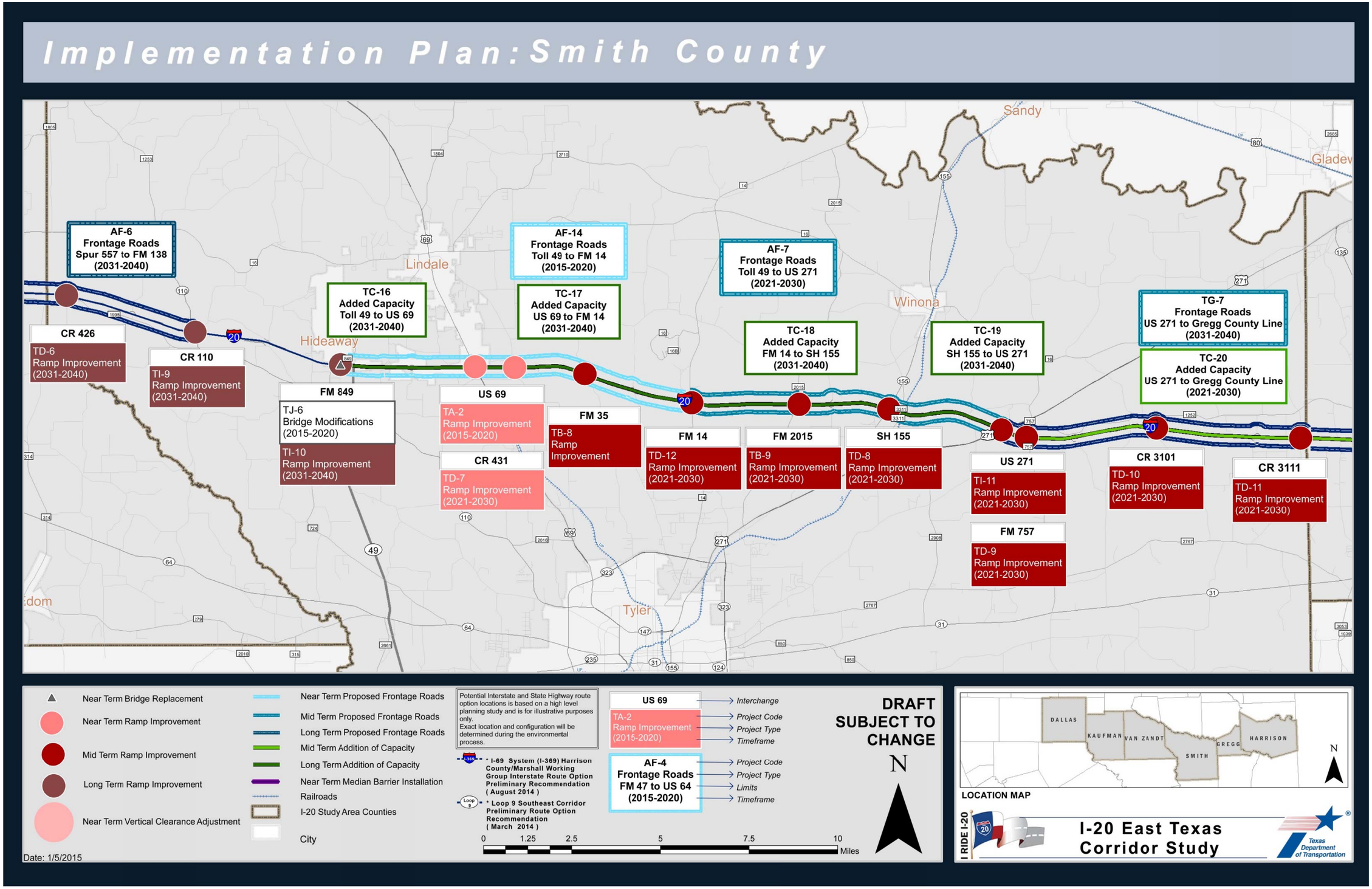
Map 8.1 Implementation Plan: Dallas and Kaufman Counties



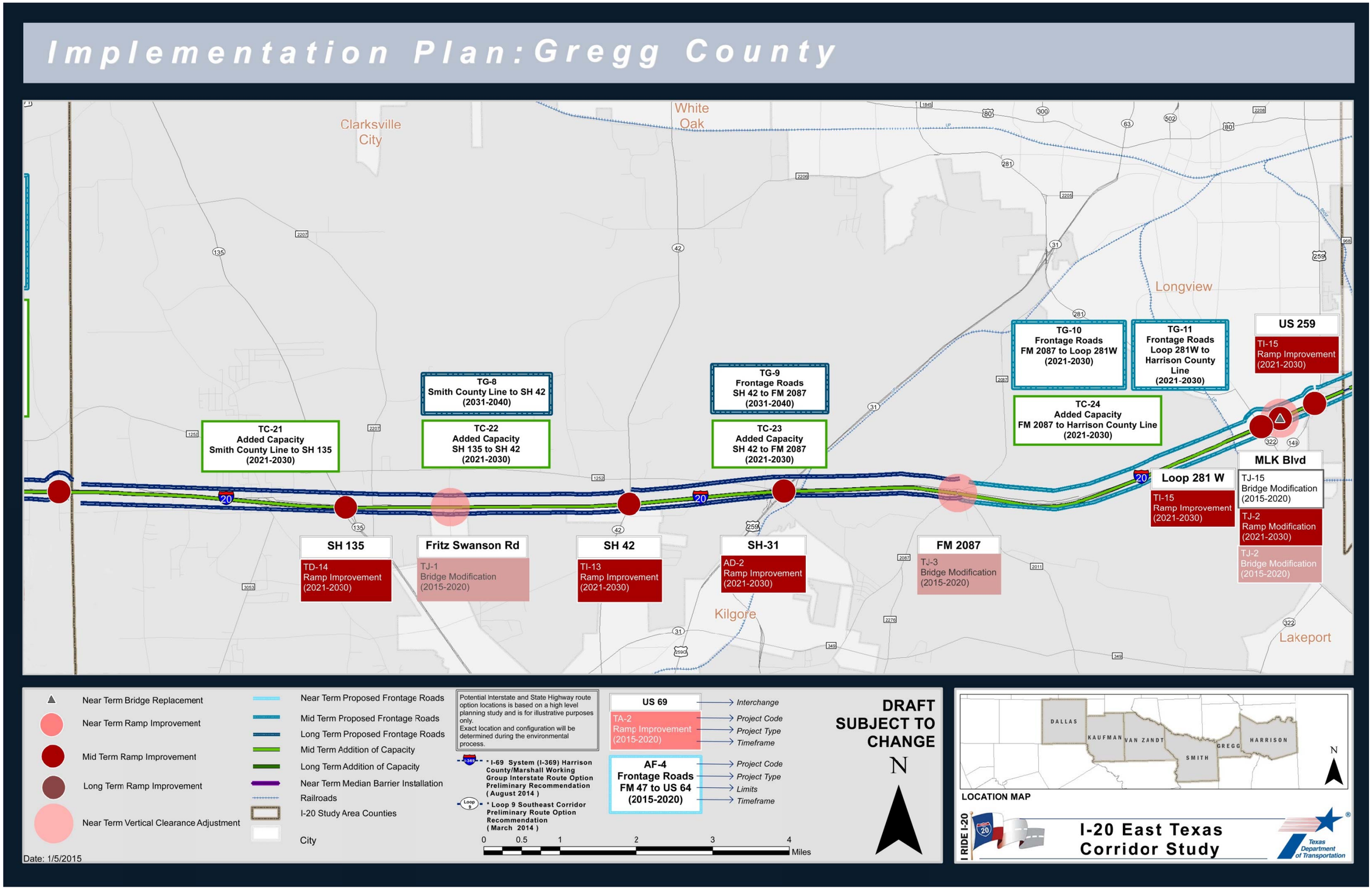
Map 8.2 Implementation Plan: Van Zandt County



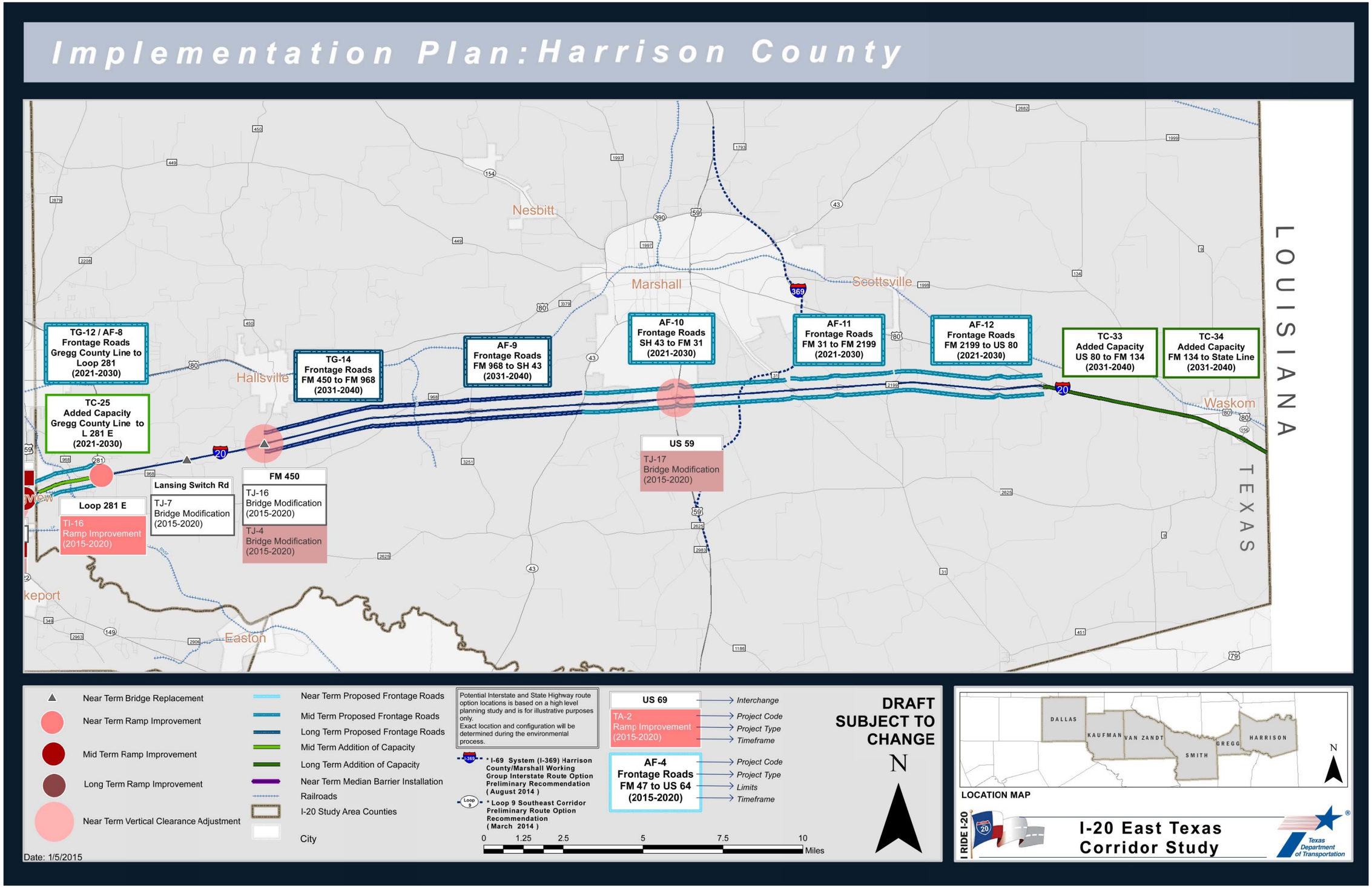
Map 8.3 Implementation Plan: Smith County



Map 8.4 Implementation Plan: Gregg County



Map 8.5 Implementation Plan: Harrison County



# 9. Funding

Dwindling sources of traditional revenues and a growing need for statewide infrastructure requires the development of alternative sources of funds. The uncertain nature of state funding makes it important to systematically plan for unpredictability. In doing so, it is necessary to consider trends indicating a steady decline in traditional revenue streams based on improvements to vehicle fuel economies – particularly with the expansion of electric powered fleets. At the same time, the need to comply with MAP-21 performance-based planning requirements such as fiscal constraint remains vital. With a program of improvements approaching $3 billion, a variety of funding sources should be considered to improve I-20.

## 9.1 Existing Funding Sources:

FEDERAL AND STATE FUNDING: Based on current funding sources, the Texas Department of Transportation allocates funding based on a 10-year Unified Transportation Plan (UTP), as required by the Texas Administrative Code (TAC, Section 16.105). The plan, approved by the Texas Transportation Commission every year, includes all travel modes on the state system. **Figure 9.1** UTP Statewide Funding summarizes the UTP Statewide funding potential for the years 2004 to 2022, where future funding is expected to be lower than it has been over the last 10 years.

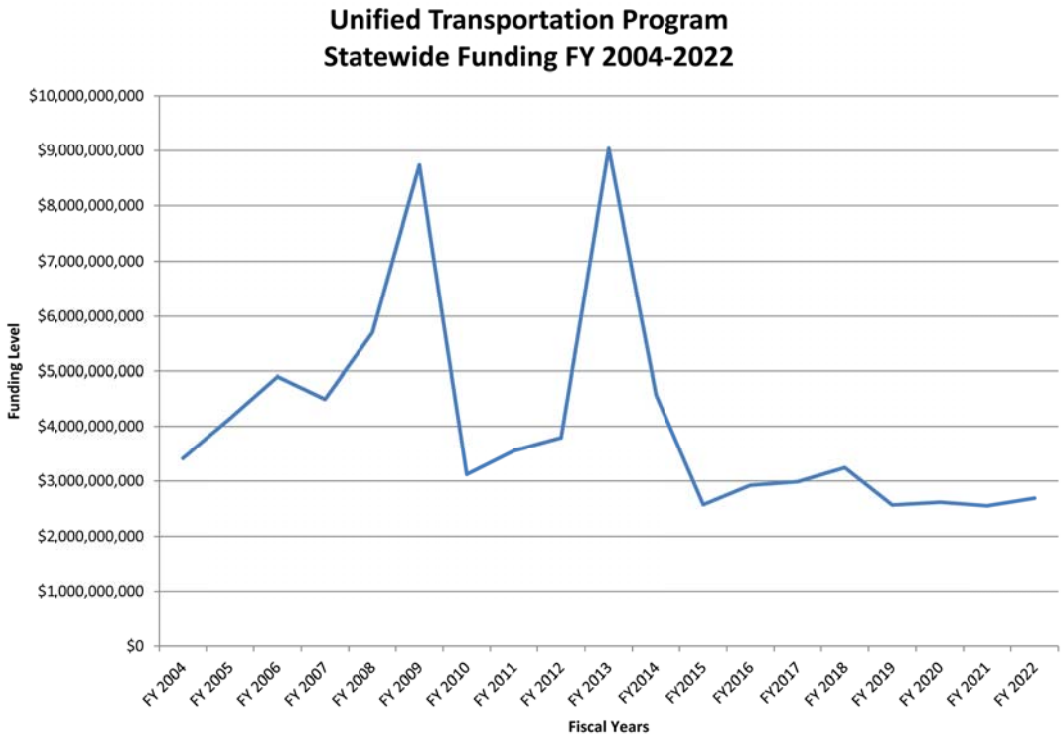



Figure 9.1: Unified Transportation Program Statewide Funding FY 2004-2022

Source:http://ftp.dot.state.tx.us/pub/txdot-info/tpp/utp/statewide_funding.pdf

Altogether, UTP funds allocated to the Districts along I-20 approach $1.7 billion, but a majority of this (over $1.3 billion) is allocated within the Dallas District. The Dallas District has a high level of need and a transportation system that only includes a small portion of the I-20 East Texas Corridor. The Tyler and Atlanta Districts have a combined allocation of less than $400 million (distributed over 10 years), with most of these monies allocated to preventive maintenance and rehabilitation. Again, I-20 is only a small portion of each District's transportation system.

Proposition One was passed during the election of November, 2014. Passage of this referendum increases transportation funding by about $1.2 billion a year, by authorizing annual disbursements from the State's oil and gas production tax collection to the State Highway Fund. Preliminary plans for these monies anticipate the Dallas District receiving a $ 240 million infusion for all categories, while the Atlanta and Tyler Districts get $ 30 and $ 46 million respectively.

MPO FUNDS: The MPO funding allocation is higher than the District funding allocation by about $2 billion, but again the NCTCOG funding level is substantially larger, with less than $50 million allocated to Tyler and Longview MPOs (over 10 years). **Table 9.1** provides the funding allocation by MPO along the corridor.

*Table 9.1: MPO Funding Allocation*

| MPO | UTP (2014-2023) in Millions of Dollars |
|---|---|
| NCTCOG | 3,694.18 |
| Tyler MPO | 21.17 |
| Longview MPO | 16.50 |
| **Total** | **3,731.85** |

*Source: UTP 2014*

LOCAL FUNDS: Cities along the I-20 East Texas Corridor have an annual budget of approximately $460 million dollars. However, only a very small portion of that budget is allocated to transportation. In addition, the five counties outside of the Dallas metro area have an annual budget of approximately $200 million, which again is primarily directed to other services than transportation.

## 9.2 Estimated Funding Availability and Gap:

Estimated available funds were determined using TxDOT's long range revenue forecast for FY 2014 to FY 2038. In addition, an annual contribution of $1.2 Billion was estimated from Prop 1, with the following distributions:

- 40% distributed to MPOs to address congestion;

- 30% distributed to TxDOT districts to address connectivity;
- 15% distributed to TxDOT districts to address maintenance needs and
- 15% distributed to TxDOT districts for roads in Texas' energy sector.[5]

The sum of the remaining Prop 1 funding and estimated funds from long range revenue forecast were distributed to the Districts proportionately based on Vehicles Miles Traveled (VMT), and further estimated for I-20 based on its VMT ratio with the District total. **Figure 9.2** summarizes the estimated annual funding available for I-20 improvements by Near Term, Mid Term, and Long Term, along with the estimated needs for the program (in year of expenditure dollars, escalated using TxDOT Highway Cost Index from 1999-2014). This leads to the identification of the gap between needs and funding.

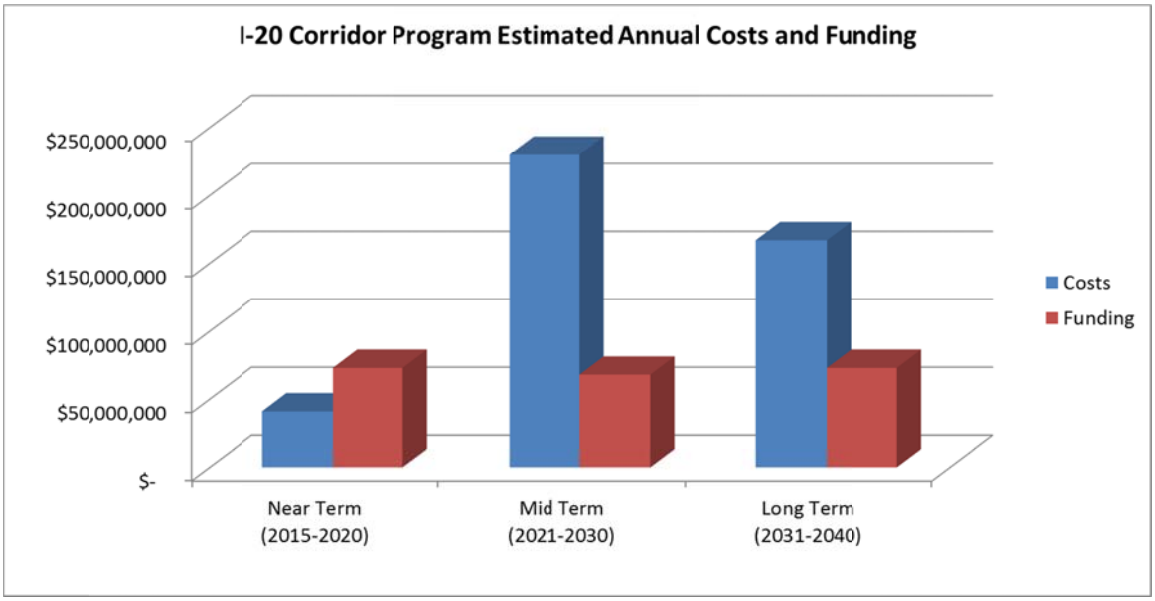



Figure 9.2: I-20 Corridor Program Cost and Funding

The overall annual need is approximately $162 million (in year of expenditure dollars), with potential available funding of about $71 million, leaving a gap of $91 million annually to implement the corridor program.

### 9.3 Future Funding Possibilities:

In addition to the existing sources, there are other funding possibilities that could benefit the implementation of the Corridor Plan.

FEDERAL: The Federal Government has authorized several pilot projects to toll new lanes constructed along existing Interstates. While I-20 in Texas is not currently on such a list,

[5] http://www.txdot.gov/inside-txdot/office/state-affairs/ballot-proposition.html

challenges with Federal funding levels could lead to such options. However, tolling new lanes on I-20 is not likely to produce sufficient monies to pay for such construction, as traffic forecasts do not suggest that congestion levels would be high enough to encourage substantial use of toll lanes. Few motorists would be willing to pay the additional monies necessary to use the presumably less congested lanes if constructed.

The possibility of tolling existing lanes on Interstates is being considered in the forthcoming Federal transportation legislation. If this mechanism were to be approved and enacted in law, it could provide an additional funding source for the reconstruction and expansion of this corridor. Since tolls would be collected from all motorists using I-20, toll avoidance would be reduced, and anticipated improvements would likely receive adequate funding. Currently, Texas legislation/policy does not permit tolling of existing capacity, and therefore, a change at the State level would also be required before this funding mechanism could be considered.

STATE: Strategies to generate more revenue include an increase in vehicle registration fees statewide to fund transportation projects. A reduction in the diversion of existing motor fuels tax revenues to non-transportation purposes, such as education and public safety, could also be considered. Such legislative changes could be considered during the 2015 state legislative session. Such actions cannot be quantified at this time, but would increase the State allocation to each District along the corridor.

LOCAL: Some counties in Texas have approved an increased vehicle registration fee to fund transportation improvements. This has led to an increase in county revenues ranging from $2 million to $12 million annually. These include:

- Bexar County (~$12 million)
- El Paso County (~$6 million)
- Hidalgo County (~$4 million)
- Webb County (~$2 million).

The actual revenue increase for each county would depend on the size of the increased vehicle registration fee.

### 9.4 Other Funding/Financing Strategies:

There are other funding/financing strategies that could be applicable to the implementation of portions of the I-20 Corridor Plan. These include:

TRANSPORTATION REINVESTMENT ZONES (TRZ): A TRZ is a value capture strategy to fund transportation improvements that directly impact the real estate values in a defined zone. An example for how this strategy might be employed along I-20 would be to develop a new

frontage road within the jurisdiction of a community. Passage of a TRZ for this district, and subsequent construction could generate new economic activity along the segment of this new frontage road. The improvements could be funded through the sale of bonds. Some of the future increase in property tax revenues resulting from the enhanced economic activity could be utilized to fund the development, and pay off bonds used to construct of the frontage road. Requests for new frontage roads by local entities is anticipated to be funded using TRZs. Local entities have signaled a willingness to implement TRZs to fund development of frontage roads that could enhance economic development opportunities.

STATE INFRASTRUCTURE BANK (SIB) LOANS: The SIB provides borrowers access to funds at lower interest rates, and helps leverage larger amounts of money from other sources – all to be used for capital improvements. Projects must be eligible for funding under the existing federal highway rules in order to comply with SIB requirements. Specifically, a candidate project must be on the State Highway System and included in the Statewide Transportation Improvement Program (STIP). An example of how the SIB loan could be used along I-20 might include obtaining a loan from the State for the construction of part of the frontage road system mentioned in the TRZ discussion above. Future tax revenues from local sources could be used to pay off the loan, and the provision of the loan might make private developers more willing to partner in the process by contributing funds of their own to construction.

TRANSPORTATION INFRASTRUCTURE FINANCE AND INNOVATION ACT (TIFIA): The TIFIA loan program is available from through the federal government to provide access to lower interest rates. The TIFIA program requires meeting certain criteria, including being part of the STIP, and total eligible project cost must be at least $50 million or $15 million (for ITS projects). TIFIA credit assistance is limited to a maximum of 33 percent of the total eligible project costs.

TRANSPORTATION INVESTMENT GENERATING ECONOMIC RECOVERY (TIGER): TIGER is a supplementary discretionary grant program from the American Recovery and Reinvestment Act (ARRA) of 2009. TIGER funding requires competitive grant applications. The program has been active since 2009, with varying funding levels from $1.5 billion in 2009 to $600 million in 2014. Generally, funding for projects in this program is in the range of $ 10 million to $ 20 million.

GRANT ANTICIPATION REVENUE VEHICLE (GARVEE) BONDS: GARVEE is a bond issued in anticipation of revenue from a specific source to advance upfront funding for a project. In general, the anticipated revenue source is expected to be Federal aid grants such as the Highway Trust Fund.

PRIVATE ACTIVITY BONDS (PABs): PABs can be issued for projects that are being privately developed and operated, and allow private entities to be involved while maintaining tax exempt status of the bonds. This strategy could be considered if the State decided to partner with one or more private companies through an alternative delivery procurement process like a Design/Build contract. PAB's have been utilized on several projects in Texas including the North Tarrant Expressway in Fort Worth, Texas.

SECTION 129 LOANS: Section 129 of Title 23 allows Federal participation in a state loan to support projects with dedicated revenue stream including tolls, taxes, or user fees. Similar to SIB, Section 129 loans allow states to leverage limited transportation resources.

PUBLIC-PRIVATE PARTNERSHIPS (PPP OR P3): PPPs are contractual agreements between a public agency and a private entity that provide opportunity for innovation on projects through greater private sector participation. The level of risk sharing varies based on the contractual arrangement (e.g. Design-Build, Concession, etc.). PPPs provide ability to utilize private funding for projects that would otherwise be delayed due to lack of public funding Public/Private partnerships for the corridor could be based on strategies like "availability payments", where the state would provide a monthly or annual payment in exchange for the private sector building and operating highway facilities or passenger rail services along I-20. This funding strategy is comparable to the use of a mortage to purchase a private residence. The revenues from vehicle registration fees, property taxes (TRZ) or even passenger tickets could be used to fund this revenue stream.

Some or all of the previously mentioned strategies could be used to fill the gap between presently anticipated highway revenues and the annual costs of implementing the I-20 Corridor improvements in East Texas.

## 10. Conclusions and Next Steps

The I-20 East Texas Corridor between Dallas and the Louisiana State Line has been the subject of a comprehensive study covering topics from its existing designs and safety concerns, as well as maintenance and capacity needs.

Since this portion of I-20 was designed in the 1960's and opened to traffic in 1967,the type and number of vehicles using this facility has steadily grown. The facility needs major renovation if it is to continue providing the high levels of mobility and economic development benefits it has already provided to the state and nation. Since its opening, the population along the corridor has grown from 1.6 million to 4 million people, and overall traffic levels have jumped from 10,000 to as much as 45,000 vehicles per day. **Figure 10.1** Impact of I-20 on population growth, identifies the impact on population for rural counties along the corridor after completion of the Interstate.

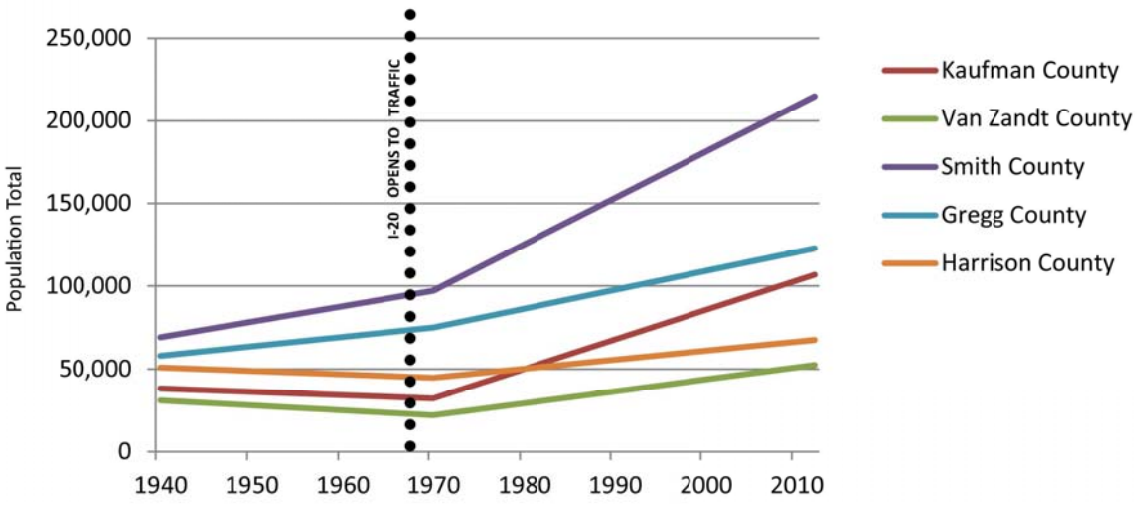



*Figure 10.1 Impact of I-20 on Population Growth*

During the first 47 years of its life, the infrastructure has been modestly expanded and maintained, however, such activities have not been given priority due to a continual erosion of State's transportation funds' purchasing power, principally the motor fuels tax.

Safety is an issue as well. Currently, 40% of the entry and exit points at its 60 interchanges suffer from short ramps, steep grades or other undesirable designs which create safety and capacity problems. According to the most recent five years of data, 4,965 crashes have occurred along the corridor. If the crash experience on this portion of Interstate could be lowered to the average of all rural interstates in Texas, 200 fewer crashes would have

occurred during these last five years. This would have saved the economy as much as $60 million.

Therefore, this study has developed a series of programmatic recommendations focused on improving safety and mobility while preserving the current infrastructure investment and continuing to foster economic development. These recommendations have been developed through a blend of public input and technical analysis, resulting in an ambitious but achievable plan for incremental improvement. An initial road map that has the flexibility included to permit changes based on the results of more detailed studies and funding programs has been developed.

This plan begins with a series of safety improvements, and gradually adds elements to maintain mobility, preserve existing infrastructure, and foster economic development. It also includes strategies to improve the movement of people in more efficient modes than the private automobile. All of these improvements have been structured to fit together in a complementary fashion over the Near, Mid, and Long term of the next 25 years.

## 10.1 Localized Improvements Required for Safety

During the study, there was unanimous citizen support for improvements to individual ramps, bridges and interchanges. This support matched the results of technical analysis in identifying "crash hotspots" throughout the corridor. Because these improvements are relatively low cost and do not create impacts outside of the existing right-of-way, they have largely been recommended for construction during the Near Term improvement period. Six miles of median barriers, along high traffic segments, have also been identified for improvement during this period together with several bridges that are either structurally deficient, or were built with vertical clearances that currently create barriers to the movement of some goods.

Crash analysis also revealed certain interchanges that appear to have driver distraction as a major contributing factor. This is especially true for the interchanges with SH 34 (Terrell), SH 19 (Canton), SH 135, SH 42, SH 31, Loop 281 W/US 259 (Longview) as well as FM 2087 (Kilgore) and US 59 (Marshall). Therefore, a thorough guidance signage review is recommended as part of the geometric improvements around these interchanges.

The Advisory Committee recommended that TxDOT consider going beyond current policy discussions of 18-foot vertical clearances on all new and improved projects to create a 23-foot clearance that would serve oversized cargo movements. This would also permit future consideration of high speed passenger movements in the median of I-20. More detailed planning and design by individual TxDOT Districts in concert with continued public input may result in modification of specific projects to accommodate additional needs and coordinate construction with other projects and available funding.

## 10.2 Interstate Expansion Required in Long Term

Today, I-20 through East Texas has six main lanes near the Dallas urban area, and the standard four-lane section through the rest of the corridor. On the western end (with the six lanes), traffic volumes are in the range of 45,000 vehicles per day, while the four-lanes found throughout the rest of the corridor serves approximately 22,000 to 44,000. These volumes are not generally indicative of major congestion, but with 30% to 40% of these volumes being associated with large commercial truck movements, the public is strongly in favor of widening the facility for safety considerations.

Traffic forecasts indicate that continued growth will occur throughout the corridor over the next 25 years, with many segments becoming congested or heavily congested. Therefore, beginning in the Mid and Long Term periods, approximately 95 miles of Interstate have been identified for widening. The remaining 60 miles are expected to require widening in the following decade (2041-2050), including 7.14 miles of six-lane highway in the Dallas District that the Advisory Committee elected to defer widening because they had higher priorities for safety and interchange improvements during the next 25 years.

It should be noted that in addition to reducing future congestion along I-20, the additional lanes will improve safety by reducing the proximity of vehicles to each other while traveling the corridor. Furthermore, the additional lanes of traffic will make it easier to maintain traffic flows during maintenance or reconstruction projects along the existing lanes.

## 10.3 Pavement Maintenance Considerations

While community representatives and the general public did not give a high priority to maintenance considerations, this 25-year master plan of improvements for I-20 in East Texas assumes that as much as $ 1.5 Billion will ultimately have to be dedicated to the rehabilitation or reconstruction of pavement. Driving the Interstate today gives little sense of this need, because the surface condition suggests that the pavement is in relatively good condition. However, much of the pavement is 47 years old, which is already double the expected lifespan of 20 to 30 years. While the age of the pavement is of concern, at the present time the condition of the pavement below the surface is unknown.

The Harrison County portion of I-20 is currently undergoing comprehensive assessments and testing of pavement to determine the answers to these basic questions. One strong recommendation of this study is to extend this pavement review along I-20 in all six counties. With the information from such comprehensive analysis, it will be possible to craft a proper reconstruction program to address all of these deficiencies. Care should be taken to coordinate these pavement rehabilitation efforts with the addition of lanes of traffic on associated portions of the Interstate. Additional lanes of traffic will be required to maintain existing traffic flows while existing pavements are strengthened or replaced. Once the

pavement rehabilitation needs are known, it would be advisable to review the program of highway expansion to coordinate activities so that the additional lanes of traffic can be in place before existing lanes are closed to traffic.

## 10.4 Fostering Economic Development

As much as the construction of I-20 has fostered economic development along this 155-mile corridor, substantial pockets of land abutting the Interstate have yet to be developed. Construction of modern frontage roads could help make these parcels more attractive for development, with the resulting increase in jobs and economic activity. Even where frontage roads currently exist, their design as two-way facilities creates major conflicts between traffic accessing local land developments and the safe/efficient movement of traffic between the Interstate and local/regional transportation systems.

The Advisory Committee identified approximately 133 directional miles of new or improved frontage roads which they felt needed to be added to the highway system for economic development purposes. Some of those facilities would provide both economic development and safety benefits. Because safety and economic development are so related on this issue, a partnership between the State and local units of government appears warranted. Such a partnership could be initiated if the State advances some or all of the cost of constructing safe, one-way frontage roads. Repayment of the loan by local governments and private developers could happen as economic development occurs.

## 10.5 Other Potential Projects Not Included

Several other projects are being developed independently from this effort, and the costs for such projects (I-369, Loop 9, SH 34 relief route) are not included in this study. Additionally, public concerns about weaving movements in the interchange at I-20, I-635 and US 175 have been noted, but is recommended to be studied independently since it is outside the study area.

## 10.6 Passenger Rail Services in the Corridor

There was a great deal of interest and support from both community leadership and members of the general public to incorporate passenger rail services in the corridor. During the course of this 18-month effort, Amtrak in cooperation with the TxDOT Rail Division released a study on the feasibility of improving existing passenger rail services on the existing Union Pacific rail line that parallels I-20 and US 80. It was determined that the expense of adding services would not produce a large enough increase in passengers to justify the additional cost over the foreseeable future. Such a finding can be understood when reviewing existing and future population concentrations along the corridor. On the western end, there is a larger population center, but the only comparably sized anchor on the eastern end is located 750 miles away in Atlanta, Georgia. State and Federal rail plans

anticipate creating a high speed rail corridor between Texas and the East Coast using the I-10 corridor in Texas.

A high-level examination of rail passenger services in the I-20 corridor found use of the median to be challenging. First, if rail services used the median, the rail line would have to exit the median in order to connect with adjacent land uses and stations. From an engineering perspective, this would create complex curves and grades that would significantly increase cost and reduce operating speed at such locations. Second, locating passenger rail services in the median would require reconstruction of 78 more overpasses to provide vertical clearances of as much as 23 feet. Thus, installation of high speed rail services in the median would require significant additional investment to highway/interchange improvements (in addition to the cost of constructing the rail line). At this time, such an investment does not appear to make financial sense as ridership levels are anticipated to remain low. Finally, at a number of locations throughout the corridor, the full median will be required to add an additional lane of traffic in both directions. In that instance, unless a commitment is made to acquire additional right-of-way, the choice must be between expanding the highway and reserving the median for future rail passenger services. It should be noted that the Advisory Committee stance on this issue is to remain flexible by creating a 23-foot vertical clearance on each overpass and interchange that gets improved in the meantime. This would provide for both oversized freight movements and passenger rail services.

This study recognizes that alternatives to travel by private automobile must be incorporated into the transportation system. While high speed rail does not appear to be a viable solution at this time, a number of other strategies do hold the promise for enhancing mobility and safety. Travel by intercity bus along I-20 is relatively modest due to current travel times being as much as 50% higher compared to travel by private automobile. And today, if one travels to a distant community by intercity bus, there are few means of maintaining mobility upon arrival.

Section 3.7 described how current intercity bus services could be made competitive with the private automobile. Express bus services could be added along I-20 by addressing the “final mile” linkages to individual communities. Alternative modes of transportation such as local transit, taxi, car sharing, and even bicycle rentals could be used for this purpose. This concept, which is illustrated in the following figure, summarizes how partnerships between local communities and the private sector could enhance alternatives to travel by private automobile along I-20.

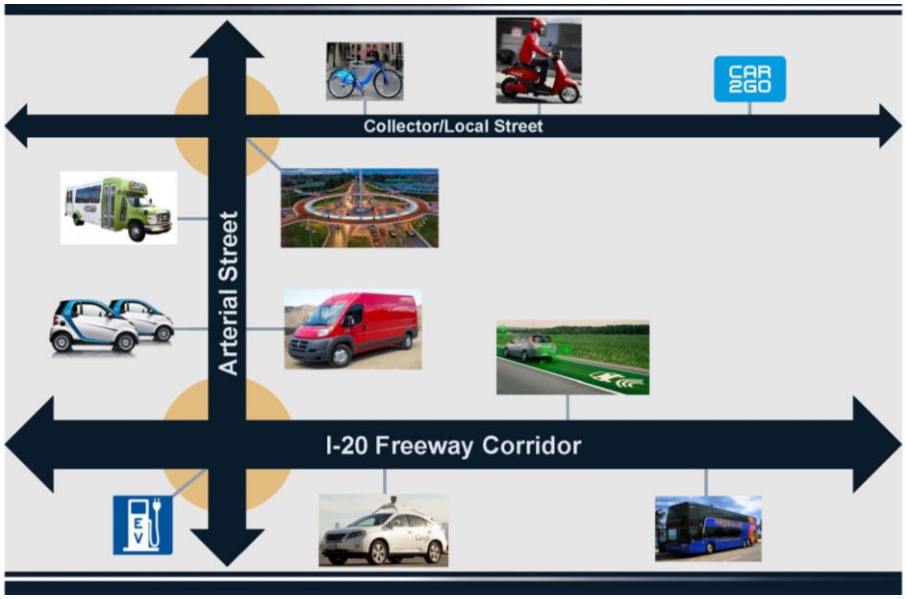



*Figure 10.2 Potential Non-Highway Enhancements*

Local communities should aggressively pursue the development of this system of transportation improvements by:

- Arranging for modest intermodal transfer facilities at key interchanges with I-20
- Develop linkages from the central core to these transfer facilities with transit, car sharing, and even bicycle opportunities; and
- Convincing intercity bus companies to convert/create express bus services along I-20.

## 10.7 Next Steps

The results of the I-20 East Texas Implementation Plan were presented to the Texas Transportation Commission on December 18, 2014. Speakers stressed that the study findings and conclusions were needed to improve safety, avert long term congestion, preserve the existing investment in the facility, and foster economic development throughout the corridor. The Commission enthusiastically received the study findings, thanking all participants for the comprehensiveness of the plan, and promising to begin implementation as funds become available in future years.

The first step in implementing the plan is to program the projects in the appropriate planning and programming documents. The focus will be on including the Near Term and Mid Term projects and determining funding sources for those projects. The Transportation Planning and Programming (TP&P) Division of TxDOT will work with each of the three Districts to accomplish this step. The next steps will be to advance these projects through the development process of design, environmental clearance, and, ultimately, construction.

TxDOT will work closely with the communities along the I-20 East Texas Corridor each step of the way to achieve a safer, less congested, and more connected I-20.