# I-37 Corridor Study Report Executive Summary

## I-69 to I-410

TxDOT, Transportation Planning and Programming Division

January 2018

EXECUTIVE SUMMARY

## ES-1 INTRODUCTION

Interstate 37 (I-37) is located in southcentral Texas and extends between San Antonio and Corpus Christi for a length of 143 miles. Construction of this interstate began in the 1960s in the urban areas of Corpus Christi and San Antonio, and the segments in the rural areas were completed in the 1980s. US 281 and I-37 are co-located at two different locations between south of San Antonio and Three Rivers.

This facility in Corpus Christi provides access to the downtown, Corpus Christi International Airport, and the Port of Corpus Christi. In San Antonio it provides access to the downtown, the River Walk, the Alamo, Brooks City-Base, and to the San Antonio International Airport via US 281.

I-37 is a hurricane evacuation route and is part of the National Highway System (NHS) and Interstate System. It is also included in the Strategic Highway Network (STRAHNET), which is the network identified for domestic operations by the U.S Department of Defense, and serves as a corridor for highway freight movement to and from Corpus Christi and the Brownsville-Harlingen-McAllen region.

### Corridor Study Purpose, Goals and Objectives

The goal of the I-37 Corridor Study is to measure corridor performance to inform the development of near-term, mid-term, and long-term strategic solutions that are cost-effective and account for potential risks. This goal is accomplished by following the process described below:

- Assess existing performance based on quantifiable performance measures
- Quantify needs based on a comparison of existing performance to performance objectives
- Identify solutions that can provide quantifiable benefits relative to the performance measures
- Prioritize solutions for future implementation, accounting for performance effectiveness and risk analysis findings

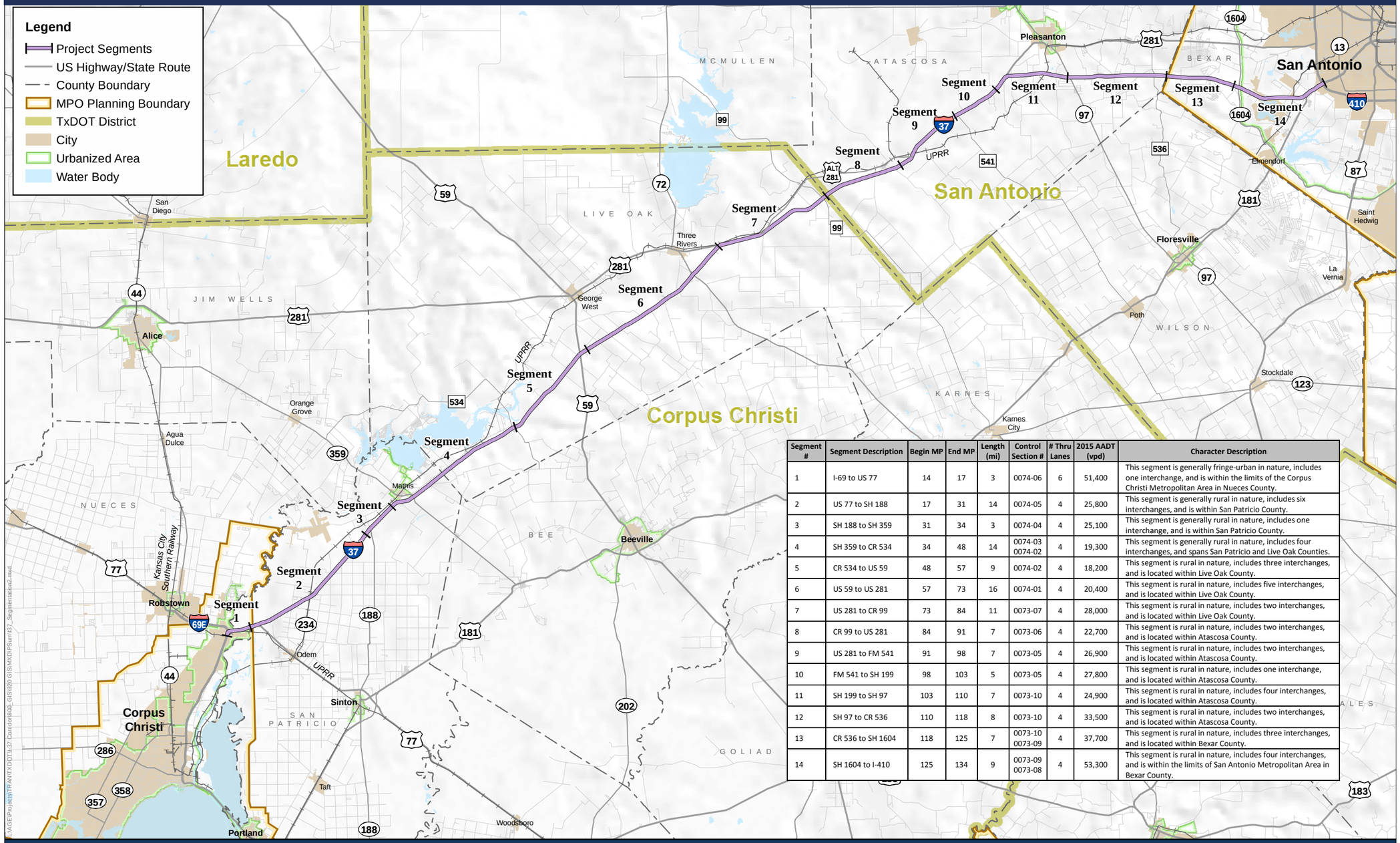
The objective of this study is to identify a recommended set of prioritized potential solutions for consideration in future construction programs, derived from a transparent, defensible, logical, and replicable process. The I-37 Corridor Study defines solutions and improvements for the corridor that are evaluated and ranked to determine which investments offer the greatest benefit to the corridor in terms of enhancing performance.

The performance based approach was developed consistent with requirements of the Fixing America's Surface Transportation (FAST) Act and Texas House Bill 20.

### Study Location and Corridor Segments

The I-37 Corridor is divided into 14 planning segments for analysis and evaluation. The corridor is segmented at logical breaks where the context changes due to differences in characteristics such as terrain, daily traffic volumes, roadway typical sections, control sections, or jurisdictional boundaries. Corridor segments are shown in **Figure ES-1**.

*Figure ES-1 Corridor Locations and Segments*




| Segment # | Segment Description | Begin MP | End MP | Length (mi) | Control Section # | # Thru Lanes | 2015 AADT (vpd) | Character Description |
|---|---|---|---|---|---|---|---|---|
| 1 | I-69 to US 77 | 14 | 17 | 3 | 0074-06 | 6 | 51,400 | This segment is generally fringe-urban in nature, includes one interchange, and is within the limits of the Corpus Christi Metropolitan Area in Nueces County. |
| 2 | US 77 to SH 188 | 17 | 31 | 14 | 0074-05 | 4 | 25,800 | This segment is generally rural in nature, includes six interchanges, and is within San Patricio County. |
| 3 | SH 188 to SH 359 | 31 | 34 | 3 | 0074-04 | 4 | 25,100 | This segment is generally rural in nature, includes one interchange, and is within San Patricio County. |
| 4 | SH 359 to CR 534 | 34 | 48 | 14 | 0074-03<br>0074-02 | 4 | 19,300 | This segment is generally rural in nature, includes four interchanges, and spans San Patricio and Live Oak Counties. |
| 5 | CR 534 to US 59 | 48 | 57 | 9 | 0074-02 | 4 | 18,200 | This segment is rural in nature, includes three interchanges, and is located within Live Oak County. |
| 6 | US 59 to US 281 | 57 | 73 | 16 | 0074-01 | 4 | 20,400 | This segment is rural in nature, includes five interchanges, and is located within Live Oak County. |
| 7 | US 281 to CR 99 | 73 | 84 | 11 | 0073-07 | 4 | 28,000 | This segment is rural in nature, includes two interchanges, and is located within Live Oak County. |
| 8 | CR 99 to US 281 | 84 | 91 | 7 | 0073-06 | 4 | 22,700 | This segment is rural in nature, includes two interchanges, and is located within Atascosa County. |
| 9 | US 281 to FM 541 | 91 | 98 | 7 | 0073-05 | 4 | 26,900 | This segment is rural in nature, includes two interchanges, and is located within Atascosa County. |
| 10 | FM 541 to SH 199 | 98 | 103 | 5 | 0073-05 | 4 | 27,800 | This segment is rural in nature, includes one interchange, and is located within Atascosa County. |
| 11 | SH 199 to SH 97 | 103 | 110 | 7 | 0073-10 | 4 | 24,900 | This segment is rural in nature, includes four interchanges, and is located within Atascosa County. |
| 12 | SH 97 to CR 536 | 110 | 118 | 8 | 0073-10 | 4 | 33,500 | This segment is rural in nature, includes two interchanges, and is located within Atascosa County. |
| 13 | CR 536 to SH 1604 | 118 | 125 | 7 | 0073-10<br>0073-09 | 4 | 37,700 | This segment is rural in nature, includes three interchanges, and is located within Bexar County. |
| 14 | SH 1604 to I-410 | 125 | 134 | 9 | 0073-09<br>0073-08 | 4 | 53,300 | This segment is rural in nature, includes four interchanges, and is within the limits of San Antonio Metropolitan Area in Bexar County. |

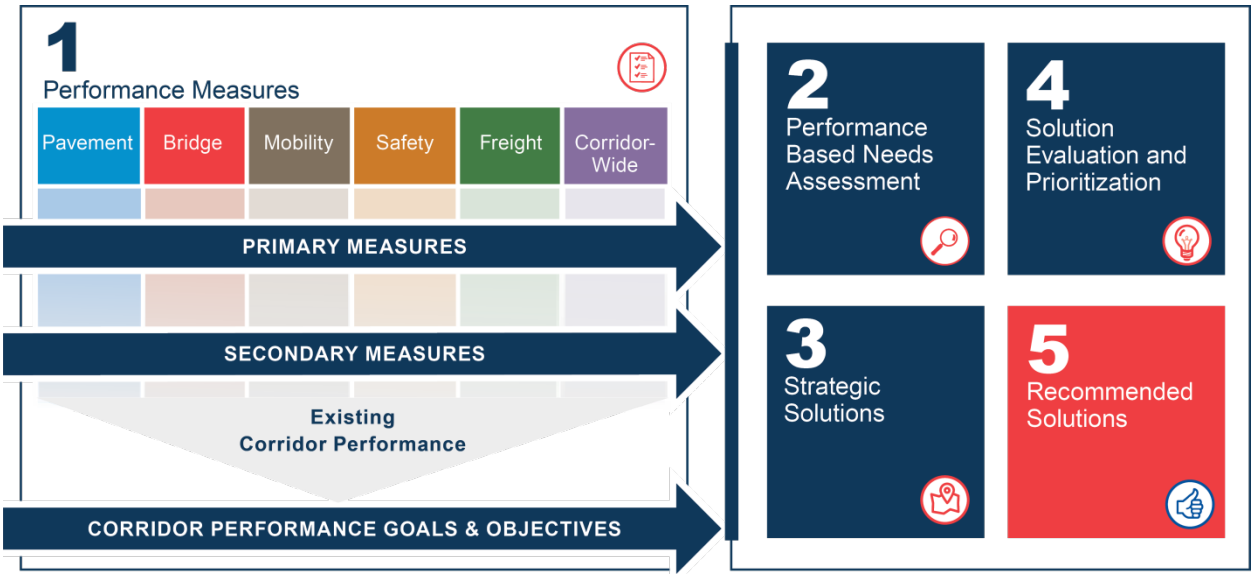
## ES-2 CORRIDOR PERFORMANCE

A series of performance measures were used to assess the I-37 corridor. The results of the performance evaluation were used to define corridor needs and develop short-term, mid-term, and long-term solutions for the corridor.

### Corridor Performance Framework

This study used a performance-based process to define baseline corridor performance, assess corridor needs, develop corridor solutions, and prioritize strategic corridor investments. **Figure ES-2** illustrates the performance framework, which included a two-tiered system of performance measures (primary and secondary) to evaluate baseline performance.

*Figure ES-2 Corridor Profile Performance Framework*




The following six performance areas guided the performance-based corridor analyses:

- Pavement
- Bridge
- Mobility
- Safety
- Freight
- Corridor-Wide

The performance measures include five primary performance measures (called "Index" measures): Pavement Index, Bridge Index, Mobility Index, Safety Index, and Freight Index. Additionally, the use of a set of secondary performance measures provided for a more detailed analysis of corridor performance. **Table ES-1** contains the complete list of primary and secondary performance measures for each of the six performance areas.

*Table ES-1 - Corridor Performance Measures*

| Performance Area | Primary Measure | Secondary Measures |
|---|---|---|
| **Pavement** | **Pavement Index**<br>Based on a combination of Pavement Condition Rating for the mainlanes and frontage Roads | • Directional Mainlane Distress Score<br>• Directional Mainlane Ride Score<br>• Frontage Road Pavement Condition Score<br>• Pavement Failure<br>• Pavement Hot Spots |
| **Bridge** | **Bridge Index**<br>Based on lowest of deck, substructure, superstructure and structural evaluation rating | • Bridge Sufficiency<br>• Functionally Obsolete Bridges<br>• Bridge Rating<br>• Culvert Rating<br>• Bridge Hot Spots |
| **Mobility** | **Mobility Index**<br>Based on combination of existing and future daily volume-to-capacity ratios on the mainlanes and frontage roads | • Future Daily V/C<br>• Peak Hour V/C<br>• Frontage Road Existing V/C<br>• Frontage Road Future V/C<br>• Directional Travel Time Index<br>• Directional Planning Time Index<br>• Interchange Existing V/C<br>• Interchange Future V/C |
| **Safety** | **Safety Index**<br>Based on rate of fatal and incapacitating injury crashes on the mainlanes and frontage roads | • Directional Mainlane Crash Rate<br>• Frontage Road Crash Rate<br>• Safety Hot Spots |
| **Freight** | **Freight Index**<br>Based on bi-directional truck buffer index | • Truck Directional Travel Time Index<br>• Truck Directional Planning Time Index<br>• Bridge Vertical Clearance<br>• Bridge Load Ratings<br>• Bridge Vertical Clearance Hot Spots |
| **Corridor-Wide** | **N/A** | • % of Segment with Frontage Roads<br>• Truck Parking Availability<br>• Frequency of Access Control Breaks<br>• Floodplain Crossings<br>• Parallel Route Travel Demand |

Each of the primary and secondary performance measures identified in the table above is comprised of one or more quantifiable indicators. A three-level scale was developed to standardize the performance scale across the six performance areas, with numerical thresholds specific to each performance measure:

| | |
|---|---|
| Good/Above Average Performance | – Rating is above the identified desirable/average range |
| Fair/Average Performance | – Rating falls within the identified desirable/average range |
| Poor/Below Average Performance | – Rating is below the identified desirable/average range |

## Corridor Performance Summary

**Table ES-2** shows a summary of corridor performance for all primary performance measures and secondary measure indicators for the I-37 Corridor. A weighted corridor average rating (based on the length of the segment) was calculated for each primary and secondary measure as shown in **Table ES-2**.

The following general observations were made related to the I-37 Corridor performance:

Pavement & Bridge

- The mainlane pavement generally shows "good" performance with the exception of 14 miles that show "poor" performance.
- The frontage road pavement generally shows "good" or "fair" performance with the exception of 35 miles that show "poor" performance.
- The bridges generally show "good" or "fair" performance.

Mobility & Freight

- The current (2015) mainlane traffic operations could generally be described as having "good" performance.
- At the far north end of the corridor (segments 13 and 14), the mainlanes are anticipated to experience severe congestion by 2025.
- Future traffic growth along the corridor will cause five segments to show "poor" mainlane performance by the year 2040 (segments 1, 7, and 12-14).
- Two segments (segments 5 and 14) currently show "poor" performance in interchange operations.
- Future traffic growth along the corridor will cause eight segments to show "poor" performance in interchange operation by the year 2040 (segments 3-6,8, 12-14).
- Generally, the corridor appears to be fairly reliable (for general mobility as well as freight) as both the TTI and PTI scores show "good" performance.
- No bridges along the corridor are currently load posted (all have Operating Rating > HS 20).

Safety

- A majority of the corridor segments show either "above average" or "average" performance in safety performance.
- Segments 3 and 9 experience fatal and incapacitating crash rates that are above the statewide average for rural interstates.
- Five segments (segments 2, 3, 5, 10, 12) experience crash rates along the frontage roads that are above the statewide average for rural 2-lane highways.
- "Hotspots" for fatal and incapacitating crashes were identified near mileposts 93-95 and 124-125.

Corridor-Wide

- The estimated demand for truck parking generally matches the truck parking available along the corridor.
- Approximately 65% of the corridor has frontage roads.
- Of the existing frontage roads, nearly all provide two-way operation with the few exceptions being at the far north and south ends of the corridor.
- The frequency of access control breaks is higher in segments 7, 8, and 10.
- One location (in segment 1) encroaches into a designated floodplain at Nueces River.

*Table ES-2 - Corridor Performance Summary by Segment and Performance Measure*

| | | | | Pavement Performance Area | | | | | | | | Bridge Performance Area | | | | | Mobility Performance Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Mainline Directional Distress Score | | Mainline Directional Ride Score | | Frontage Rd Condition Score | | | | | | | | | | Existing Mainline Peak Hour V/C | | Frontage Road V/C | | Interchange V/C | | Directional TTI (all vehicles) | | Directional PTI (all vehicles) | |
| Segment | BMP | EMP | Length (miles) | Pavement Index | NB | SB | NB | SB | NB | SB | Sub-Standard Pavement | Bridge Index | Bridge Sufficiency | Bridge Rating | Culvert Rating | Func. Obsolete Bridges | Mobility Index | Mainline Future V/C | NB | SB | 2015 | 2040 | 2015 | 2040 | NB | SB | NB | SB |
| 1 | 14 | 17 | 3 | 94.73 | 93.20 | 96.30 | 3.96 | 3.94 | 92.69 | 95.95 | 1.5% | 5.85 | 81.70 | 5 | 6.00 | 14.3% | 0.61 | 0.85 | 0.60 | 0.65 | 0.05 | 0.09 | N/A | N/A | 1.14 | 1.12 | 1.38 | 1.25 |
| 2 | 17 | 31 | 14 | 96.11 | 100.00 | 95.29 | 4.69 | 4.21 | 67.19 | 63.53 | 18.1% | 6.10 | 90.09 | 5 | 6.53 | 8.0% | 0.47 | 0.64 | 0.45 | 0.49 | 0.01 | 0.02 | 0.17 | 0.34 | 1.10 | 1.09 | 1.22 | 1.22 |
| 3 | 31 | 34 | 3 | 97.22 | 100.00 | 97.83 | 4.67 | 4.82 | 59.17 | 67.50 | 25.0% | 7.00 | 95.50 | 7 | N/A | 0.0% | 0.46 | 0.63 | 0.43 | 0.49 | 0.04 | 0.07 | 0.42 | 0.81 | 1.09 | 1.10 | 1.22 | 1.23 |
| 4 | 34 | 48 | 14 | 80.74 | 69.36 | 91.74 | 3.97 | 4.70 | 86.27 | 92.86 | 19.4% | 6.58 | 91.01 | 6 | 6.51 | 5.3% | 0.37 | 0.53 | 0.34 | 0.38 | 0.02 | 0.04 | 0.39 | 0.80 | 1.08 | 1.10 | 1.21 | 1.19 |
| 5 | 48 | 57 | 9 | 82.91 | 70.78 | 93.61 | 4.21 | 4.50 | 95.78 | 98.83 | 4.3% | 6.39 | 95.26 | 6 | 6.24 | 0.0% | 0.35 | 0.50 | 0.32 | 0.36 | 0.02 | 0.04 | 0.92 | 1.92 | 1.07 | 1.10 | 1.19 | 1.23 |
| 6 | 57 | 73 | 16 | 77.48 | 68.97 | 85.91 | 4.06 | 4.21 | 88.09 | 68.47 | 18.0% | 6.74 | 92.80 | 5 | 6.43 | 0.0% | 0.39 | 0.55 | 0.37 | 0.38 | 0.04 | 0.08 | 0.61 | 1.28 | 1.08 | 1.10 | 1.21 | 1.22 |
| 7 | 73 | 84 | 11 | 80.77 | 79.79 | 82.71 | 4.20 | 3.97 | 80.08 | 63.16 | 16.3% | 6.91 | 93.00 | 6 | 6.29 | 0.0% | 0.55 | 0.77 | 0.54 | 0.51 | 0.09 | 0.20 | 0.23 | 0.48 | 1.09 | 1.10 | 1.19 | 1.20 |
| 8 | 84 | 91 | 7 | 92.35 | 88.13 | 96.57 | 3.97 | 4.36 | N/A | N/A | 0.0% | 6.57 | 96.27 | 5 | 6.74 | 0.0% | 0.46 | 0.62 | 0.44 | 0.42 | N/A | N/A | 0.53 | 1.12 | 1.09 | 1.10 | 1.20 | 1.20 |
| 9 | 91 | 98 | 7 | 93.90 | 88.36 | 99.93 | 4.02 | 4.35 | 82.52 | 98.39 | 9.7% | 6.45 | 95.26 | 6 | 6.61 | 0.0% | 0.52 | 0.74 | 0.51 | 0.50 | 0.01 | 0.01 | N/A | N/A | 1.09 | 1.09 | 1.20 | 1.19 |
| 10 | 98 | 103 | 5 | 98.81 | 99.30 | 100.00 | 4.53 | 4.58 | 64.80 | 99.40 | 12.5% | 7.00 | 95.80 | 7 | N/A | 0.0% | 0.54 | 0.76 | 0.53 | 0.51 | 0.08 | 0.17 | 0.22 | 0.46 | 1.09 | 1.09 | 1.20 | 1.18 |
| 11 | 103 | 110 | 7 | 95.76 | 93.36 | 100.00 | 4.19 | 4.26 | 79.33 | 75.36 | 3.4% | 5.69 | 88.31 | 5 | 6.64 | 0.0% | 0.48 | 0.68 | 0.48 | 0.46 | 0.11 | 0.22 | 0.28 | 0.59 | 1.10 | 1.10 | 1.24 | 1.21 |
| 12 | 110 | 118 | 8 | 97.47 | 98.19 | 98.63 | 4.49 | 4.40 | 84.48 | 73.00 | 2.9% | 6.23 | 97.04 | 6 | 6.79 | 0.0% | 0.67 | 0.97 | 0.63 | 0.63 | 0.04 | 0.10 | 0.68 | 1.49 | 1.10 | 1.08 | 1.25 | 1.19 |
| 13 | 118 | 125 | 7 | 99.66 | 99.90 | 100.00 | 4.74 | 4.54 | N/A | 88.00 | 0.0% | 6.50 | 96.60 | 6 | 6.51 | 0.0% | 0.77 | 1.07 | 0.43 | 0.43 | 0.30 | 0.66 | 0.63 | 1.38 | 1.10 | 1.10 | 1.19 | 1.22 |
| 14 | 125 | 134 | 9 | 93.89 | 93.45 | 96.54 | 4.57 | 4.46 | 81.40 | 49.71 | 9.4% | 6.56 | 94.87 | 6 | 6.19 | 0.0% | 0.99 | 1.40 | 0.56 | 0.58 | 0.27 | 0.59 | 0.84 | 1.86 | 1.07 | 1.09 | 1.24 | 1.26 |
| | | | 120 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | **Corridor Averages** | 89.30 | 85.67 | 93.84 | 4.29 | 4.36 | 81.34 | 77.17 | 11.4% | 6.48 | 93.14 | 5.68 | 6.47 | 1.9% | 0.53 | 0.74 | 0.46 | 0.47 | 0.08 | 0.16 | 0.49 | 1.04 | 1.09 | 1.10 | 1.22 | 1.21 |
| | | | | | | | | | | | | | | | | | | | | | | | | | **Uninterrupted Flow** | | | |
| Good/Above Average Performance | | | | > 80 | > 80 | | > 3.0 | | > 80 | | < 5% | > 6.5 | > 80 | > 5 | > 6.5 | < 12% | < 0.56 | | | | | | | | < 1.15 | | < 1.30 | |
| Fair/Average Performance | | | | 60 - 80 | 70 - 80 | | 2.0 - 3.0 | | 60 - 80 | | 5% - 20% | 5.0 - 6.5 | 50 - 80 | 5 | 5.0 - 6.5 | 12% - 40% | 0.56 - 0.76 | | | | | | | | 1.15 - 1.33 | | 1.30 - 1.50 | |
| Poor/Below Average Performance | | | | < 60 | < 70 | | < 2.0 | | < 60 | | > 20% | < 5.0 | < 50 | < 5 | < 5.0 | > 40 % | > 0.76 | | | | | | | | > 1.33 | | > 1.50 | |

*Table ES-2 - Corridor Performance Summary by Segment and Performance Measure (continued)*

| | | | | Safety Performance Area | | | | Freight Performance Area | | | | | | | Corridor-Wide Performance Area | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Segment | BMP | EMP | Length (miles) | Safety Index | Directional Mainline Rates NB | Directional Mainline Rates SB | Frontage Road Rate | Freight Index | Directional TTI (trucks only) NB | Directional TTI (trucks only) SB | Directional PTI (trucks only) NB | Directional PTI (trucks only) SB | Bridge Load Ratings | Bridge Vertical Clearance | % of Frontage Roads on Segment NB | % of Frontage Roads on Segment SB | Parallel Route Travel Demand (V/C) | Number of Access Control Breaks (ramps/mile) | % of Parking Demand Served | Total Width of Floodplain Crossings (ft) |
| 1 | 14 | 17 | 3 | 4.46 | 76.69 | 111.49 | 118.16 | 0.15 | 1.04 | 1.04 | 1.19 | 1.16 | Good | 16.33 | 87% | 70% | | 0.0 | | 8,000 |
| 2 | 17 | 31 | 14 | 3.47 | 32.83 | 34.35 | 189.96 | 0.11 | 1.02 | 1.02 | 1.11 | 1.13 | Good | 16.08 | 96% | 99% | | 0.4 | | 0 |
| 3 | 31 | 34 | 3 | 6.25 | 46.66 | 49.57 | 208.57 | 0.08 | 1.02 | 1.02 | 1.09 | 1.10 | Good | 16.75 | 100% | 100% | 0.34 | 0.0 | 112% | 0 |
| 4 | 34 | 48 | 14 | 3.11 | 41.27 | 44.50 | 120.16 | 0.07 | 1.02 | 1.02 | 1.09 | 1.07 | Good | 16.25 | 90% | 15% | | 0.2 | | 0 |
| 5 | 48 | 57 | 9 | 4.53 | 65.67 | 44.89 | 513.35 | 0.12 | 1.01 | 1.03 | 1.07 | 1.15 | Good | 16.17 | 100% | 91% | | 0.1 | | 0 |
| 6 | 57 | 73 | 16 | 3.48 | 34.53 | 33.19 | 146.43 | 0.08 | 1.02 | 1.03 | 1.09 | 1.11 | Good | 16.42 | 100% | 100% | | 0.3 | | 0 |
| 7 | 73 | 84 | 11 | 3.05 | 27.03 | 27.75 | 73.22 | 0.09 | 1.02 | 1.03 | 1.10 | 1.12 | Good | 16.50 | 66% | 63% | 0.47 | 0.9 | 118% | 0 |
| 8 | 84 | 91 | 7 | 4.14 | 43.43 | 43.43 | N/A | 0.10 | 1.02 | 1.03 | 1.08 | 1.13 | Good | 16.17 | 0% | 0% | | 1.0 | | 0 |
| 9 | 91 | 98 | 7 | 6.66 | 68.77 | 52.45 | 80.15 | 0.06 | 1.02 | 1.02 | 1.08 | 1.08 | Good | No UP | 87% | 80% | | 0.0 | | 0 |
| 10 | 98 | 103 | 5 | 2.25 | 47.30 | 26.81 | 149.61 | 0.06 | 1.02 | 1.02 | 1.08 | 1.08 | Good | No UP | 100% | 100% | | 0.8 | | 0 |
| 11 | 103 | 110 | 7 | 2.70 | 52.86 | 39.64 | 29.71 | 0.09 | 1.02 | 1.02 | 1.11 | 1.09 | Good | 15.83 | 34% | 16% | | 0.4 | | 0 |
| 12 | 110 | 118 | 8 | 2.22 | 35.16 | 46.60 | 146.98 | 0.07 | 1.02 | 1.01 | 1.09 | 1.05 | Good | 16.83 | 31% | 30% | 0.60 | 0.4 | 100% | 0 |
| 13 | 118 | 125 | 7 | 2.37 | 21.19 | 22.44 | 0.00 | 0.10 | 1.01 | 1.02 | 1.06 | 1.12 | Good | 16.33 | 0% | 6% | | 0.1 | | 0 |
| 14 | 125 | 134 | 9 | 2.52 | 56.62 | 53.20 | 27.89 | 0.19 | 1.04 | 1.05 | 1.18 | 1.24 | Good | 16.50 | 52% | 47% | | 0.4 | | 0 |
| | | | 120 | | | | | | | | | | | | | | | | | |
| | | | **Corridor Averages** | 3.48 | 43.16 | 40.99 | 141.90 | 0.10 | 1.02 | 1.03 | 1.10 | 1.12 | Good | 16.32 | 77% | 64% | 0.46 | 0.38 | 110% | 200 |
| | | | | | | | | **Uninterrupted Flow** | | | | | | | | | | | | |
| Good/Above Average Performance | | | | < 3.27 | < 51.78 | | < 97.9 | < 0.15 | < 1.15 | | < 1.30 | | * | >16.5 | > 90% | | < 0.56 | < 0.10 | > 95% | < 250’ |
| Fair/Average Performance | | | | 3.27-4.91 | 51.78 - 77.67 | | 97.9-146.9 | 0.15-0.35 | 1.15 - 1.33 | | 1.30 - 1.50 | | * | 16.0-16.5 | 40% –90% | | 0.56 – 0.76 | 0.10 – 0.50 | 50% - 95% | 250’ – 2500’ |
| Poor/Below Average Performance | | | | > 4.91 | > 77.67 | | > 146.9 | > 0.35 | > 1.33 | | > 1.50 | | * | <16.0 | < 40% | | > 0.76 | > 0.50 | < 50% | > 2500’ |

* Good = no bridges have a posted load limit (Operating Rating > HS 20)
Fair = At least one bridge has a posted load limit but condition ratings are 5 or above
Poor = At least one bridge has a posted load limit but condition ratings are below 5

## ES-3 NEEDS ASSESSMENT

The performance-based needs assessment evaluates the difference between baseline performance and performance objectives for each of the six performance areas used to characterize the health of the corridor: Pavement, Bridge, Mobility, Safety, Freight, and Corridor-Wide.

The needs assessment compares baseline corridor performance with performance objectives to provide a starting point for identifying performance needs. This mathematical comparison results in an initial need rating of None, Low, Medium, or High for each primary and secondary performance measure. An illustrative example of this process is shown in **Figure ES-3**.

The initial level of need for each segment is refined to account for hot spots and recently completed or under construction projects, resulting in a final level of need for each segment. The final levels of need for each primary and secondary performance measure are combined to produce a weighted final need rating for each segment. A detailed review of available data helps identify contributing factors to the need and locations of a high level of historical investment.

*Figure ES-3 - Initial Need Ratings in Relation to Baseline Performance*

| Performance Level | Initial Level of Need | Description |
|---|---|---|
| Good | None | All levels of Good |
| Good | | |
| Good | | |
| Fair | Low | Upper 2/3 of Fair |
| Fair | | |
| Fair | Medium | Lower 1/3 of Fair and top 1/3 of Poor |
| Poor | | |
| Poor | High | Lower 2/3 of Poor |
| Poor | | |

### Summary of Corridor Needs

**Table ES-3** provides a summary of needs for each segment across all performance areas, with the average need score for each segment presented in the last row of the table. A weighting factor of 1.5 is applied to the need scores of the performance areas identified as emphasis areas (Mobility, Freight and Safety) for the I-37 Corridor. More information on the identified final needs in each performance area is provided below.

*Pavement Needs*

- Based on the segment-level analysis, Pavement needs were identified on approximately 45% of the corridor.
- All of segment-based Pavement needs were classified as Low need. Pavement hot spots were identified at:
  - Segment 7 southbound mainlanes MP 76 - 77
  - Segment 9 northbound mainlanes MP 92 - 94
  - A total of approximately 35 miles along the frontage roads in Segments 1 - 4, 6, 7, 9 – 12, and 14

*Bridge Needs*

- Based on the segment-level analysis, Bridge needs were identified on approximately 85% of the corridor.
- Approximately 75% of the corridor has a Low Bridge need while the remaining 10% has an elevated (Medium or High) level of need.
- Eight bridges along the corridor have been identified as a hot spot.
- 15 bridges along the corridor were identified as having their ratings change more frequently than the corridor average over the last 20 years.
- One bridge along the corridor has been identified as a hot spot and was identified though the historical review process:
  - Corgey Rd UP (Str #310250)(MP 108.55)

*Mobility Needs*

- Based on the segment-level analysis, Mobility needs were identified on approximately 80% of the corridor.
- Approximately 60% of the corridor has a Low Mobility need while the remaining 20% has an elevated level of need.
- MP 14 – 17 (Segment 1) has an elevated level of need primarily related to future travel demand along the mainlanes in the Corpus Christi area.
- MP 110 – 134 (Segments 12 -14) has an elevated level of need primarily related to future travel demand along the mainlanes, and existing and future travel demand at several interchanges in the San Antonio area.
- The US 59 interchange (MP 56.5)(Segment 5) has been identified as a mobility bottleneck based on existing and future travel demand.

*Safety Needs*

- Based on the segment-level analysis, Safety needs were identified on approximately 50% of the corridor.
- Approximately 30% of the corridor has a Low Safety need while the remaining 20% has an elevated level of need.
- MP 14 – 17 (Segment 1) has an elevated level of need due to all crashes along the mainlanes, and crashes along the frontage roads.
- MP 31 – 34 (Segment 3) has an elevated level of need primarily related to fatal and incapacitating crashes along the mainlanes, and crashes along the frontage roads.
- MP 48 – 57 (Segment 5) has an elevated level of need primarily related to fatal and incapacitating crashes along the mainlanes, and crashes along the frontage roads.
- MP 91 – 98 (Segment 9) has an elevated level of need primarily related to fatal and incapacitating crashes along the mainlanes.
- A crash hot spot was identified at MP 124-125 along the mainlanes (Segment 13).

*Freight Needs*

- Based on the segment-level analysis, Freight needs were identified on approximately 40% of the corridor.
- All of segment-based Freight needs were classified as Low need.
- Freight bottlenecks were identified at the US 59, FM 791, Coughran Rd, and SH 97 Interchanges.

*Corridor-Wide Needs*

- Segments 4, 7, 8, and 11 – 14 are missing significant sections of frontage roads.
- Segments 2, 4, 6, 7, 8, 10, 11, 12, and 14 have a high number of access control breaks.
- Segment 1 has 100-year floodplain that encroaches on I-37 at the Nueces River.

*Overlapping Needs*

Overlapping performance needs on I-37 were identified to provide guidance to develop strategic solutions that address more than one performance area. Completing projects that address multiple needs may present the opportunity for more effectively improving overall performance. A summary of the overlapping needs that relate to locations with elevated levels of need is provided below.

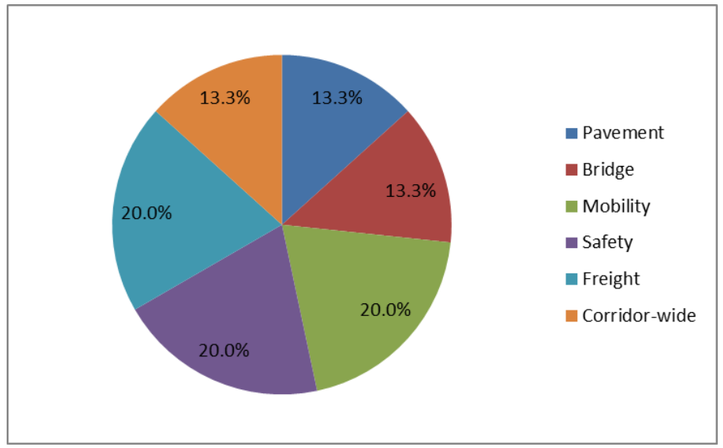
- MP 14 - 17 (Segment 1) has elevated needs in the Bridge, Safety, Mobility and Corridor-Wide performance areas. The Bridge and Corridor-Wide needs are related to the Nueces River Bridge and the Mobility needs are related to future travel demand. The safety needs are related to crashes along the mainlanes.
- MP 17 – 31 (Segment 2) has elevated needs in the Corridor-Wide performance area, and has Pavement, Bridge, and Mobility hot spots. The Corridor-Wide needs are related to access control breaks. The pavement hot spot is located along the frontage roads, and the Mobility hot spot is related to the US 77 interchange. The Bridge hot spots are at the CR 1726/Cooper Road underpass and the SH 234 frontage road underpass.
- MP 31 - 34 (Segment 3) has an elevated need in Safety and has a Pavement hot spot. The Safety needs are primarily related to fatal and incapacitating crashes along the mainlanes, and crashes along the frontage roads. The Pavement hot spot is along the frontage road.
- MP 48 - 57 (Segment 5) has an elevated level of need in Safety and a Mobility hot spot. The Safety need is primarily related to fatal and incapacitating crashes along the mainlanes, and crashes along the frontage roads. The Mobility hot spot is at the US 59 interchange.
- MP 57 - 73 (Segment 6) has a Pavement hot spot and a Bridge hot spot. The Pavement hot spot is located along the frontage road and the Bridge hot spot is at the Sulphur Creek overpass.
- MP 73 – 84 (Segment 7) has an elevated need in the Corridor-Wide performance area and has Pavement hot spots. The Pavement hot spots are located along the mainlanes and the frontage roads. The Corridor-Wide needs are related to the lack of frontage roads and to access control breaks.
- MP 84 - 91 (Segment 8) has an elevated need in the Corridor-Wide performance area, and has a Bridge hot spot and a Freight hot spot. Both hot spots are at the FM 791 underpass bridge. The Corridor-Wide need is related to the lack of frontage roads, and the access control breaks.
- MP 91 - 98 (Segment 9) has elevated needs in Safety and has a Pavement hot spot. The Safety need is primarily related to fatal and incapacitating crashes along the mainlanes. The Pavement hot spot is located on the mainlanes.
- MP 98 - 103 (Segment 10) has an elevated Corridor-Wide need and a Pavement hot spot. The Corridor-Wide need is related to access control breaks and the Pavement hot spot is located along the frontage road.
- MP 103 – 110 (Segment 11) has elevated needs in the Bridge and the Corridor-Wide performance areas, and has Freight hot spots. The Bridge needs are related to the Atascosa River bridges and the Corgey Road bridge. The Freight hot spots are located at the SH97 and Coughran Road bridges. The Corridor-Wide needs are related to the lack of frontage roads and to access control breaks.
- MP 110 – 118 (Segment 12) has elevated needs in the Mobility and Corridor-Wide performance areas. The Mobility needs are related to future travel demand along the mainline and at interchanges while the Corridor-Wide needs are related to the lack of frontage roads and to access control breaks.
- MP 118 - 125 (Segment 13) has an elevated Mobility need and Corridor-Wide need, and has a Safety hot spot. The Mobility needs are primarily related to future travel demand along the mainlanes and at interchanges. The Safety hot spot is related to fatal and incapacitating crashes along the mainlanes. The Corridor-Wide needs are related to the lack of frontage roads.

*Table ES-3 - Summary of Needs by Segment*

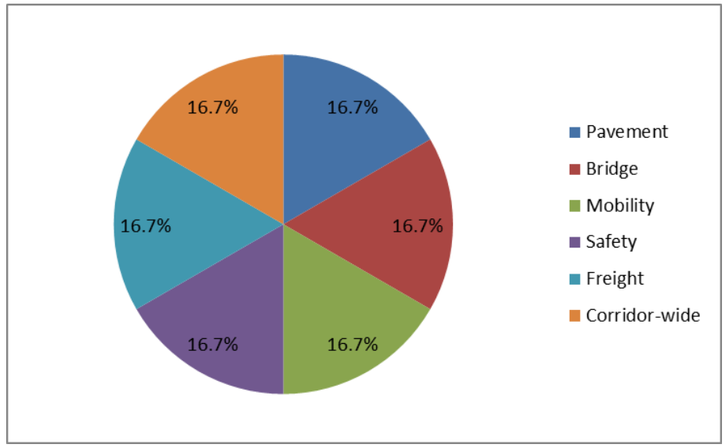
| Performance Area | Segment & Milepost | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| | MP 14-17 | MP 17-31 | MP 31-34 | MP 34-48 | MP 48-57 | MP 57-73 | MP 73-84 | MP 84-91 | MP 91-98 | MP 98-103 | MP 103-110 | MP 110-118 | MP 118-125 | MP 125-134 |
| Pavement | 0.03 | 0.52 | 0.68 | 0.11 | 0.03 | 0.52 | 0.94 | 0.00 | 0.71 | 0.83 | 0.14 | 0.12 | 0.00 | 0.35 |
| Bridge | 1.75 | 1.27 | 0.00 | 0.53 | 0.76 | 0.62 | 0.23 | 0.73 | 0.63 | 0.00 | 1.65 | 0.81 | 0.60 | 0.60 |
| Mobility * | 1.62 | 0.73 | 0.45 | 0.29 | 1.41 | 0.77 | 0.85 | 0.70 | 0.60 | 0.74 | 0.37 | 2.95 | 3.88 | 6.66 |
| Safety * | 2.29 | 1.01 | 3.67 | 0.48 | 3.11 | 0.89 | 0.30 | 1.30 | 3.80 | 0.23 | 0.06 | 0.22 | 0.50 | 0.14 |
| Freight * | 0.70 | 0.55 | 0.00 | 0.25 | 0.57 | 0.15 | 0.15 | 0.92 | 0.00 | 0.00 | 0.55 | 0.00 | 0.33 | 0.90 |
| Corridor-Wide | 5.86 | 1.69 | 0.36 | 1.67 | 0.57 | 1.32 | 3.82 | 4.58 | 0.55 | 3.35 | 2.13 | 1.93 | 2.23 | 1.61 |
| Weighted Average Need (0-3) | 1.94 | 0.92 | 1.06 | 0.62 | 1.27 | 0.75 | 0.93 | 1.29 | 1.13 | 0.75 | 0.72 | 1.02 | 1.32 | 1.88 |
| Unweighted Average Need (0-3) | 2.04 | 0.96 | 0.86 | 0.56 | 1.08 | 0.71 | 1.05 | 1.37 | 1.05 | 0.86 | 0.82 | 1.01 | 1.26 | 1.71 |

| Level of Need | Score |
|---|---|
| NONE | 0 - 0.5 |
| LOW | 0.5 - 1.5 |
| MEDIUM | 1.5 - 2.5 |
| HIGH | >2.5 |

Weighted Average Need*




Unweighted Average Need




* Emphasis Areas are weighted by a factor of 1.5

## ES-4 STRATEGIC SOLUTIONS

The first step in the development of strategic solutions was to identify areas of elevated levels of need (Medium or High or hot spots) because addressing these needs will have the greatest effect on corridor performance. Segments with Medium or High needs and specific locations of hot spots were considered strategic investment areas for which strategic solutions were developed. The I-37 strategic investment areas (resulting from the elevated needs) are shown in **Figure ES-4**.

### Screening Process

In some cases, needs that are identified do not advance to solutions development and are screened out from further consideration because they have been or will be addressed through other measures including:

- A project is programmed to address this need.
- The need is a result of a Pavement or Bridge hot spot that does not show historical investment issues. These hot spots will likely be addressed through other TxDOT programming means.
- A bridge is not a hot spot but is located within a segment with a Medium or High level of need. This bridge will likely be addressed through current TxDOT bridge maintenance and preservation programming processes.
- The need is determined to be non-actionable (i.e., cannot be addressed through a TxDOT project).
- The conditions/characteristics of the location have changed since the performance data used to identify the need was collected.

### Candidate Solutions

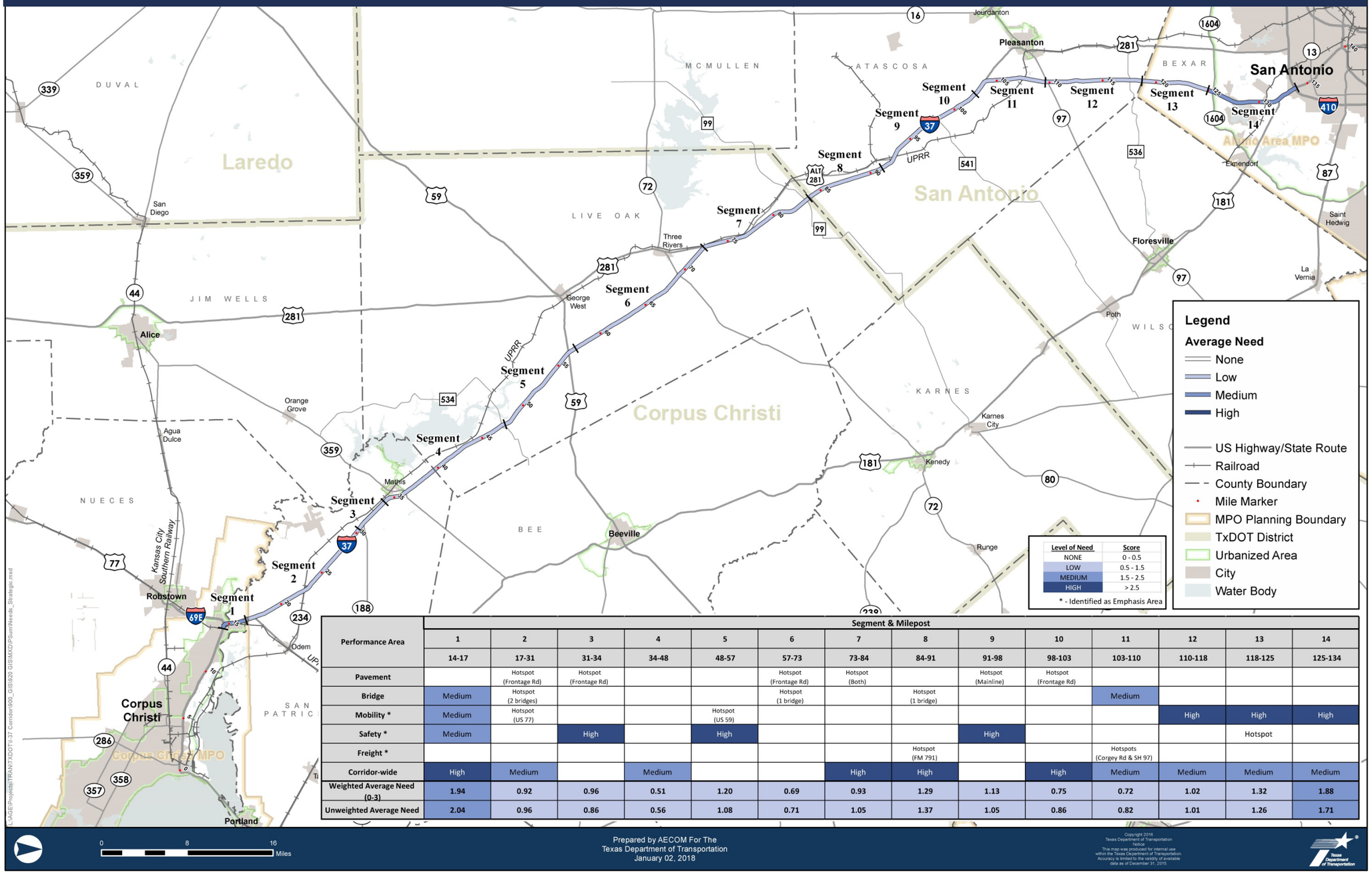
For each elevated need within a strategic investment area that is not screened out, a candidate solution is developed to address the identified need.

Documented performance needs serve as the foundation for developing candidate solutions for the corridor. Candidate solutions include some or all of the following characteristics:

- Address elevated levels of need (High or Medium) and hot spots
- Address overlapping needs
- Reduce costly repetitive maintenance
- Provide measurable benefit.

Candidate solutions developed to address an elevated need in the Pavement or Bridge performance areas include two options: rehabilitation or full replacement. These solutions are initially evaluated through a Life-Cycle Cost Analysis (LCCA) to provide insights into the cost-effectiveness of these options so that a recommended approach can be identified. Candidate solutions developed to address an elevated need in the Mobility, Safety, or Freight performance areas are advanced directly to the Performance Effectiveness Evaluation. In some cases, there may be multiple solutions identified to address the same area of need.

*Figure ES-4 Strategic Investment Areas*




| Performance Area | Segment & Milepost | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| | 14-17 | 17-31 | 31-34 | 34-48 | 48-57 | 57-73 | 73-84 | 84-91 | 91-98 | 98-103 | 103-110 | 110-118 | 118-125 | 125-134 |
| Pavement | | Hotspot (Frontage Rd) | Hotspot (Frontage Rd) | | | Hotspot (Frontage Rd) | Hotspot (Both) | | Hotspot (Mainline) | Hotspot (Frontage Rd) | | | | |
| Bridge | Medium | Hotspot (2 bridges) | | | | Hotspot (1 bridge) | | Hotspot (1 bridge) | | | Medium | | | |
| Mobility * | Medium | Hotspot (US 77) | | | Hotspot (US 59) | | | | | | | High | High | High |
| Safety * | Medium | | High | | High | | | | High | | | | Hotspot | |
| Freight * | | | | | | | | Hotspot (FM 791) | | | Hotspots (Corgey Rd & SH 97) | | | |
| Corridor-wide | High | Medium | | Medium | | | High | High | | High | Medium | Medium | Medium | Medium |
| Weighted Average Need (0-3) | 1.94 | 0.92 | 0.96 | 0.51 | 1.20 | 0.69 | 0.93 | 1.29 | 1.13 | 0.75 | 0.72 | 1.02 | 1.32 | 1.88 |
| Unweighted Average Need | 2.04 | 0.96 | 0.86 | 0.56 | 1.08 | 0.71 | 1.05 | 1.37 | 1.05 | 0.86 | 0.82 | 1.01 | 1.26 | 1.71 |

## ES-5 SOLUTION EVALUATION AND PRIORITIZATION

Candidate solutions were evaluated using the following steps: LCCA (where applicable), Performance Effectiveness Evaluation, Solution Risk Analysis, and Candidate Solution Prioritization. The methodology and approach to this evaluation is shown in **Figure ES-5** and described more fully below.

### Life-Cycle Cost Analysis

All Pavement and Bridge candidate solutions have two options: rehabilitation/repair or reconstruction. These options are evaluated through an LCCA to determine the best approach for each location where a Pavement or Bridge solution is recommended. The LCCA can eliminate options from further consideration and identify which options should be carried forward for further evaluation.

All Mobility, Safety, and Freight strategic investment areas that result in multiple independent candidate solutions are advanced directly to the Performance Effectiveness Evaluation.

### Performance Effectiveness Evaluation

After completing the LCCA process, all remaining candidate solutions are evaluated based on their performance effectiveness. This process includes determining a Performance Effectiveness Score (PES) based on how much each solution impacts the existing performance and needs scores for each segment. This evaluation also includes a Performance Area Risk Analysis to help differentiate between similar solutions based on factors that are not directly addressed in the performance system.

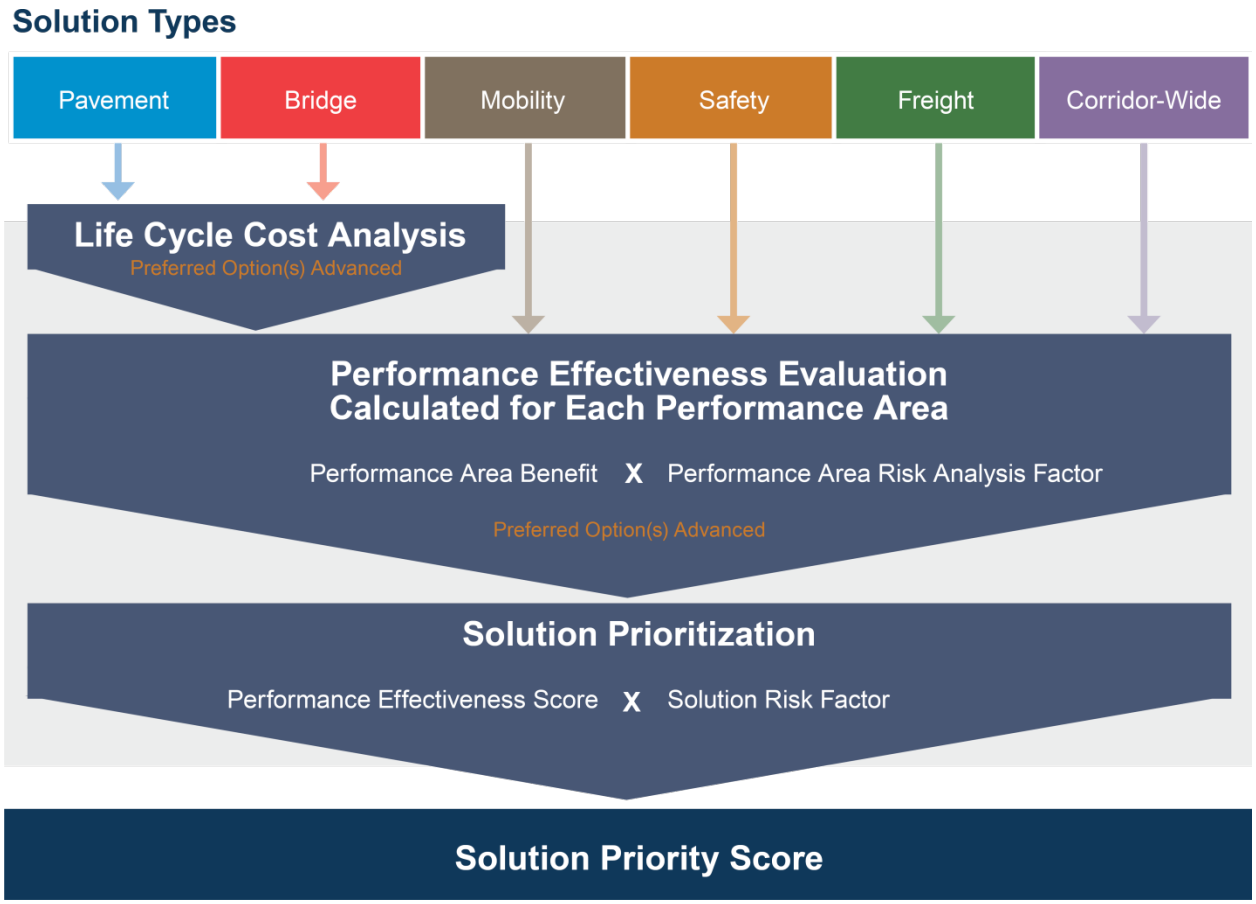
### Solution Risk Analysis

All candidate solutions advanced through the PES are also evaluated through a Solution Risk Analysis process. A solution risk probability and consequence analysis is conducted to develop a solution-level risk weighting factor. This risk analysis is a numeric scoring system to help address the risk of not implementing a solution based on the likelihood and severity of the performance failure.

### Candidate Solution Prioritization

The PES, weighted risk factor, and segment average need score are combined to create a prioritization score. The candidate solutions are ranked by prioritization score from highest to lowest. The highest prioritization score indicates the candidate solution that is recommended as the highest priority. Solutions that address multiple performance areas tend to score higher in this process.

*Figure ES-5 - Candidate Solution Evaluation Process*



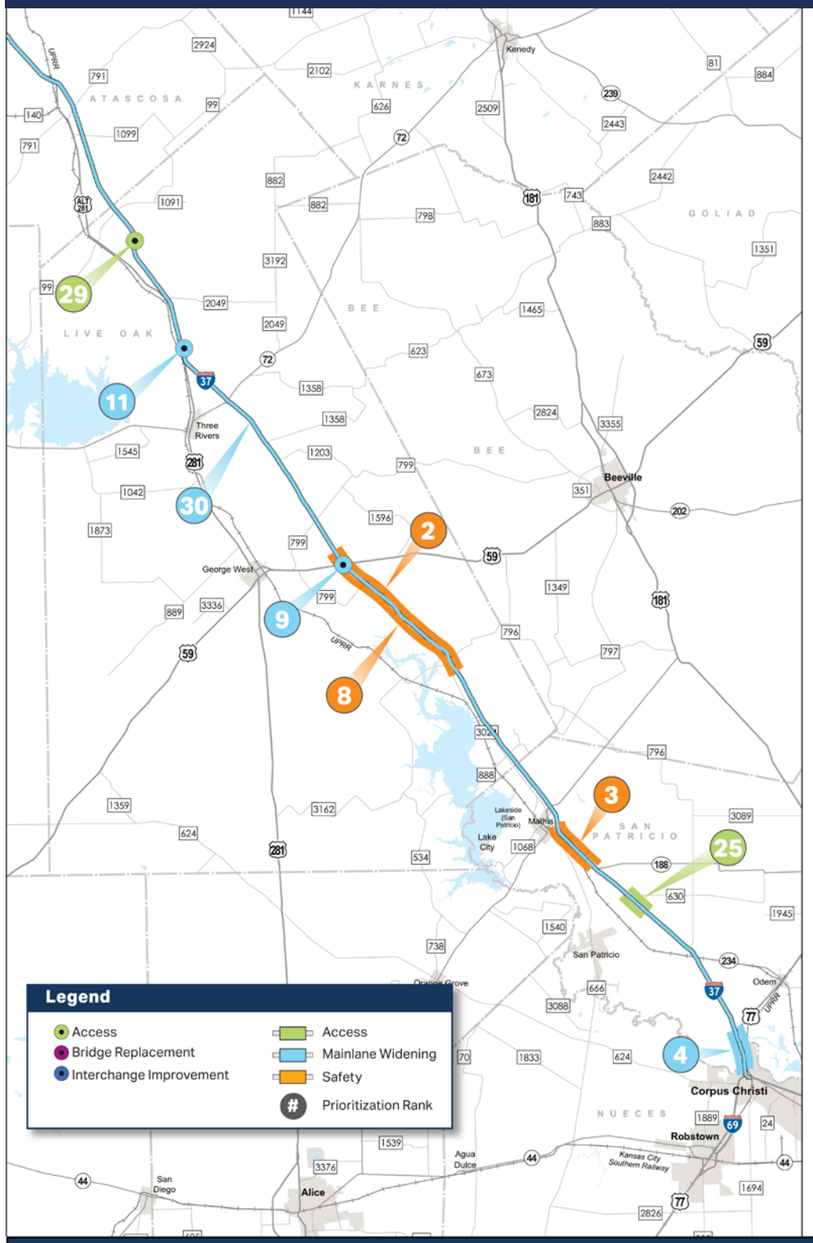

## ES-6 SUMMARY OF CORRIDOR RECOMMENDATIONS

Based on the results of the prioritization process described above, the solutions were classified as near-term (before year 2025) and mid-term (between year 2025 and 2035) priorities. The highest ranked solutions are anticipated to have the greatest effect on overall corridor performance. Long-term (after year 2035) priorities were generally developed based on TxDOT policies including widening the entire corridor to provide three mainlanes in each direction of travel, continuous frontage roads, and a minimum of 18.5 foot vertical clearance at underpass structures. **Figure ES-6** shows the solutions within the Corpus Christi District and **Figure ES-7** shows the solutions within the San Antonio District.

Since a 2040 horizon year was used in this study, and a 20-year planning horizon is typical to estimate future demand, it is possible that travel demand will increase more rapidly than anticipated, and the widening currently classified as long term may be warranted sooner.

The purpose of this study was to identify and prioritize potential projects for consideration in future TxDOT programming activities. Any project recommended as part of this study would be subject to further engineering and environmental study after it is selected to move forward in the programming process.

*Figure ES-6 – Solutions Within the Corpus Christi District*




| Rank | Candidate Solution # | Solution Name and Location | Proposed Improvements | Estimated Cost (in millions) | Anticipated to Require New R/W | TxDOT District |
|---|---|---|---|---|---|---|
| **Recommended Near-Term Solutions (Before 2025)** | | | | | | |
| 2 | 4 | George West Safety (MP 48-57) | • Construct NB & SB mainlane safety improvements<br>• Construct NB & SB frontage road safety improvements<br>• Construct roundabouts at ramp/frontage roads intersections | $18.1 | ● | Corpus Christi |
| 3 | 3 | Mathis Safety (MP 31-34) | • Construct NB & SB mainlane safety improvements<br>• Construct roundabouts at ramp/frontage roads intersections at SH 188 interchange<br>• Construct safety improvements at SH 188 Interchange | $12.7 | ● | Corpus Christi |
| 4 | 1 | Corpus Christi Mobility (MP 14-18) | • Widen mainlanes to add one lane in each direction from I-69 to US 77<br>• Replace Nueces River Bridges and raise profile to remove from floodplain | $188.3 | ● | Corpus Christi |
| 8 | 6 | George West Lighting (MP 48-57) | • Install safety lighting | $1.8 | | Corpus Christi |
| **Recommended Mid-Term Solutions (2025 – 2035)** | | | | | | |
| 9 | 5 | US 59 TI (MP 56.5) | • Construct intersection improvements | $1.7 | | Corpus Christi |
| 11 | 7 | Three Rivers Mobility (MP 73-73.5) | • Extend acceleration/deceleration lengths for US 281 ramps | $0.9 | | Corpus Christi |
| 25 | 2 | Corpus Access (MP 25-29) | • Construct NB & SB exit and entrance ramps near MP 25.5 & 28 | $8.2 | | Corpus Christi |
| 29 | 8 | Three River Access (MP 80-81) | • Construct NB & SB exit and entrance ramps near MP 80.8 | $4.1 | | Corpus Christi |
| **Recommended Long-Term Solutions (Beyond 2035)** | | | | | | |
| 30 | Separate project limits TBD | | • Add one mainlane lane in each direction from US 77 to SH 97 (MP 17 -110) | N/A | | Corpus Christi & San Antonio |
| 31 | N/A | N/A | • Construct frontage roads MP 16.5 - 17 | N/A | | Corpus Christi |
| 32 | N/A | N/A | • Construct SB frontage road MP 36 - 48 | N/A | | Corpus Christi |
| 33 | N/A | N/A | • Construct frontage roads MP 76.5 - 80 | N/A | | Corpus Christi |
| 35 | Separate project limits TBD | | • Replace underpass bridges to provide 18.5' vertical clearance | N/A | | Corpus Christi & San Antonio |

All recommended improvements will require further engineering and environmental study. The cost estimates shown are planning-level estimates based on standardized unit prices for the purposes of conducting a comparative analysis and will require further refinement for future programming.

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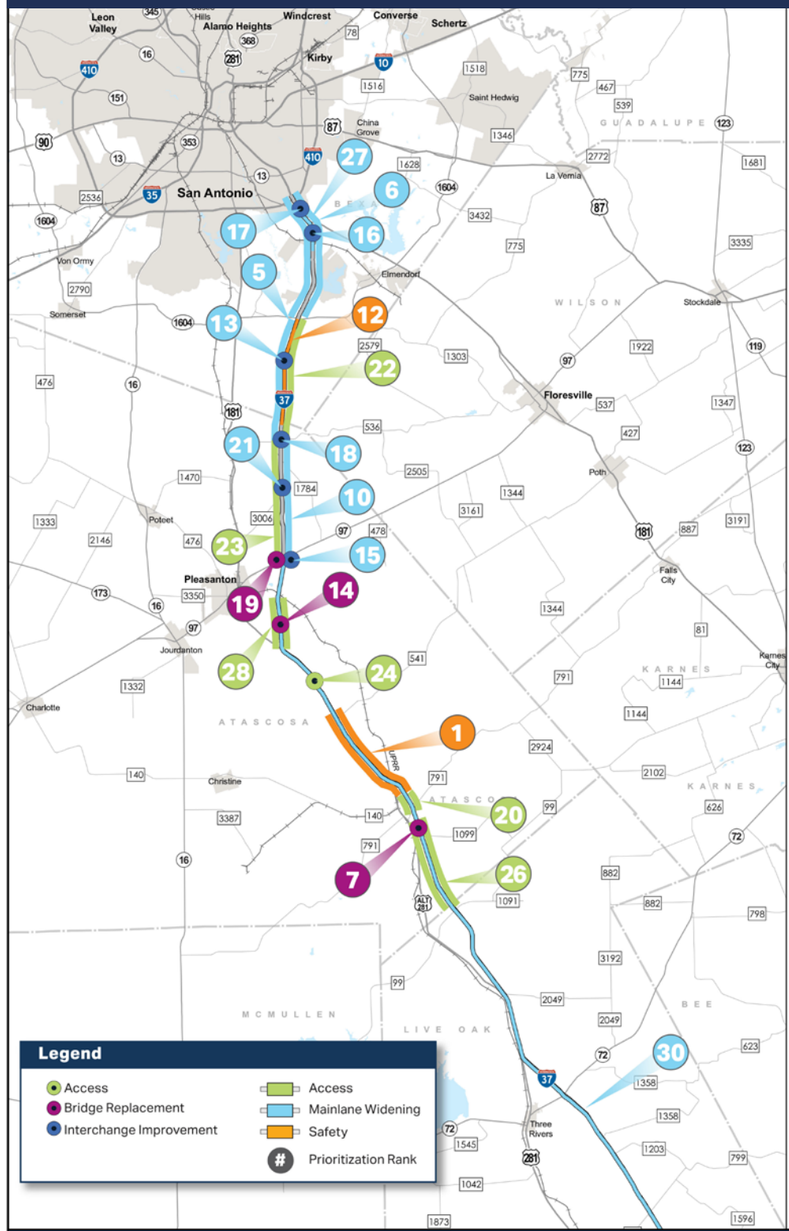
*Figure ES-7 – Solutions Within the San Antonio District*




| Rank | Candidate Solution # | Solution Name and Location | Proposed Improvements | Estimated Cost (in millions) | Anticipated to Require New R/W | TxDOT District |
|---|---|---|---|---|---|---|
| **Recommended Near-Term Solutions (Before 2025)** | | | | | | |
| 1 | 12 | Cambellton Safety (MP 91-98) | • Construct NB & SB mainlane safety improvements<br>• Install safety lighting<br>• Extend acceleration length for NB entrance ramp from US 281A | $7.2 | | San Antonio |
| 5 | 24 | Floresville Mobility (MP 118-125) | • Widen mainlanes to add one lane in each direction from FM 536 to SH 1604 | $34.3 | | San Antonio |
| 6 | 27 | San Antonio Mobility (MP 125-134) | • Widen mainlanes to add one lane in each direction from SH 1604 to I-410 | $74.0 | | San Antonio |
| 7 | 9 | FM 791 Freight (MP 90.4) | • Replace FM 791 bridge to provide additional clearance | $2.3 | | San Antonio |
| **Recommended Mid-Term Solutions (2025 – 2035)** | | | | | | |
| 10 | 18 | Pleasanton Mobility (MP 109-118) | • Add one mainlane lane in each direction from SH 97 to FM 536 | $42.2 | | San Antonio |
| 12 | 23 | Floresville Safety (MP 117-125) | • Install continuous lighting from FM 536 to SH 1604 | $5.6 | | San Antonio |
| 13 | 25 | Mathis Rd TI (MP 122.7) | • Construct intersection improvements | $0.9 | | San Antonio |
| 14 | 15 | Coughran Rd Freight (MP 106.4) | • Replace Coughran Road bridge to provide additional clearance | $2.0 | | San Antonio |
| 15 | 19 | SH 97 TI (MP 109.8) | • Construct intersection improvements | $1.7 | ● | San Antonio |
| 16 | 28 | Southton Rd TI (MP 130) | • Construct intersection improvements | $0.9 | ● | San Antonio |
| 17 | 30 | Spur 122 TI (MP 132.6) | • Construct intersection improvements | $0.9 | ● | San Antonio |
| 18 | 20 | FM 536 TI (MP 117.6) | • Construct intersection improvements | $0.9 | | San Antonio |
| 19 | 16 | SH 97 Freight (MP 109.8) | • Replace SH 97 bridges to provide additional clearance | $5.1 | | San Antonio |
| 20 | 10 | Cambellton Access (MP 90 -91) | • Construct NB & SB exit and entrance ramps at grade separation near MP 90.5 | $4.1 | | San Antonio |
| 21 | 21 | Verdi TI (MP 114) | • Construct intersection improvements | $0.9 | | San Antonio |
| 22 | 26 | Floresville Frontage (MP 118-125) | • Construct northbound and southbound frontage roads | $23.4 | | San Antonio |
| 23 | 22 | North Pleasanton Frontage & Access (MP 110-118) | • Construct SB exit and entrance ramps to new or existing frontage roads near MP 112 & 115.5<br>• Construct northbound and southbound frontage roads | $26.8 | | San Antonio |
| 24 | 13 | Pullin Dr Access (MP 101.5-102.5) | • Construct NB exit and entrance ramps near MP 102 | $2.0 | | San Antonio |
| 26 | 11 | Cambellton Frontage (MP 84-91) | • Construct northbound and southbound frontage roads | $63.1 | ● | San Antonio |
| 27 | 29 | San Antonio Frontage & Access (MP 130-133.5) | • Construct NB & SB frontage roads<br>• Construct SB exit ramp and NB entrance ramp near MP 127.5 | $30.1 | | San Antonio |
| 28 | 17 | South Pleasanton Frontage & Access (MP 103-110) | • Construct NB & SB exit and entrance ramps to new frontage roads near MP 107.5<br>• Construct northbound and southbound frontage roads | $51.1 | ● | San Antonio |
| **Recommended Long-Term Solutions (Beyond 2035)** | | | | | | |
| 30 | Separate project limits TBD | | • Add one mainlane lane in each direction from US 77 to SH 97 (MP 17 -110) | N/A | | Corpus Christi & San Antonio |
| 34 | N/A | N/A | • Construct frontage roads MP 90 – 92 | N/A | | San Antonio |
| 35 | Separate project limits TBD | | • Replace underpass bridges to provide 18.5' vertical clearance | N/A | | Corpus Christi & San Antonio |

All recommended improvements will require further engineering and environmental study. The cost estimates shown are planning-level estimates based on standardized unit prices for the purposes of conducting a comparative analysis and will require further refinement for future programming.

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