

**LONG-RANGE STRATEGIES TO IMPROVE TRAFFIC CONDITIONS
ON FM 1472 (MINES ROAD)**

TTI Project 409218
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Interagency Cooperation Agreement – Technology Transfer & Technical Support Services for
the Laredo District – Transportation Planning

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EXECUTIVE SUMMARY

The Texas Department of Transportation (TxDOT) Laredo District requested that the Texas A&M Transportation Institute (TTI) conduct an analysis on FM 1472 (Mines Road) to identify potential strategies to improve mobility and safety along the corridor. The focus of the analysis includes short-term, medium-range, and long-range improvement strategies. This document summarizes TTI's analysis of long-term improvements to the transportation system within the area bound by FM 1472, IH 35, and SH 255. TxDOT also requested TTI to analyze this area to determine the impacts to state roads in response to projects being considered by the City of Laredo between FM 1472 and IH 35. TTI evaluated potential roadway improvements and the possibility of adding interchanges to improve mobility in the long-range study area.

The 2040 travel demand model for the area expects much of FM 1472 to be oversaturated, resulting in the need to upgrade capacity and/or provide alternative routing options. Potential strategies to upgrade FM 1472 include adding lanes, creating an expressway, or creating a freeway with frontage roads. Adding lanes would remove bottlenecks at locations where the number of lanes drops from three to two. Upgrading FM 1472 to an expressway would increase mobility by adding grade separation at intersections. Upgrading FM 1472 to a full freeway configuration would control access by adding frontage roads with ramps. The amount of right-of-way required varies for each option, which may affect the feasibility of implementation. FM 1472 should be upgraded to Las Tiendas Road. The area north of this location is expected to remain sparsely developed in the long-range, according to planning documents reviewed by TTI. However, developments may be influenced by international regulations and commerce, which are difficult to forecast.

To increase mobility, several existing roadways could be extended, including Aquero Boulevard, Milo Road (FM 3464), River Bank Drive, and Sara Road. Aquero Boulevard could provide increased access to La Bota Ranch community by bypassing FM 1472. FM 3464 could be extended west of FM 1472 to River Bank Drive. River Bank Drive could be extended south of Loop 20/IH 69W to connect two existing residential areas without having to use FM 1472 as currently required. Sara Road should be extended north as new developments are built to provide another north-south arterial between FM 1472 and IH 35.

Interchange spacing would need to be evaluated on FM 1472 and IH 35. In general, interchanges that are too closely spaced have negative mobility and safety impacts. Interchange spacing on FM 1472 and IH 35 could affect the alignments of existing or proposed adjacent roadways, including roadways such as Hachar Parkway, Vallecillo Road, and Verde Road. If upgrades are made to increase capacity on FM 1472, access might need to be controlled. To improve mobility and facilitate future growth east of IH 35, Killam Industrial Boulevard should be realigned to connect with the existing overpass on IH 35 near Killam Industrial Boulevard's current location.

A number of traffic management strategies could improve traffic operations in the study area in the long-range. For example, intelligent transportation system (ITS) technologies could include network-wide congestion and incident monitoring and management, traveler information, railroad crossing blockage notification, and vehicle classification and counting capabilities. Connected vehicle technologies are still emerging, but some type of connected vehicle

technology might emerge that could be applied in the study area, including a combination of vehicle-to-vehicle communications as well as communications between trucks and infrastructure-based sensors. There are a large number of closely spaced commercial driveways along FM 1472. In the future, some driveways could be realigned or consolidated to minimize their negative impacts on operations and safety on FM 1472.

LONG-RANGE STRATEGIES TO IMPROVE TRAFFIC CONDITIONS ON FM 1472 (MINES ROAD)

INTRODUCTION

The Texas Department of Transportation (TxDOT) Laredo District requested that the Texas A&M Transportation Institute (TTI) conduct an analysis along the FM 1472 (Mines Road) corridor from Loop 20 (now called IH 69W) to FM 3338, Las Tiendas Road. TxDOT requested TTI to analyze this area to determine the impacts to TxDOT roads in response to projects being considered by the City of Laredo between FM 1472 and IH 35. TTI's involvement was necessary to capitalize on the following research initiatives in which TTI researchers have been involved with in recent years:

- Recent involvement in the development of a Highway Capacity Manual-styled analytical methodology for investigating vehicle trajectory data for signal control delay calculations¹, including analyzing different levels of simulation outputs.
- Extensive experience supporting and assisting public agencies in Texas in the implementation and application of emerging travel forecasting modeling techniques.
- Leading-edge research experience developing and implementing algorithms for performing travel time studies using GPS and GIS techniques,² as well as recent research using archived travel time data from various data sources such as INRIX, Google Maps, and other data aggregators.
- Recent research experience on the benefits of raised median access management techniques^{3,4} including delay and crash reductions compared to two-way-left-turn lanes.
- Recent research prioritizing interchange and bridge construction to improve mobility^{5,6}.
- Recent research estimating benefits and costs of high-priority congestion-reducing transportation projects⁷.
- Recent research assessing potential impacts of international projects on Texas freight transportation⁸.

¹ Li, J., & Washburn, S. S. (2014). Improved operational performance assessment for two-lane highway facilities. *Journal of Transportation Engineering*.

² Quiroga, C. A., & Bullock, D. (1998). Travel time studies with global positioning and geographic information systems: an integrated methodology. *Transportation Research Part C: Emerging Technologies*, 6(1), 101-127.

³ Frawley, W. E., & Eisele, W. L. (2004). *Investigation of access point density and raised medians: Crash analysis and micro-simulation* (No. FHWA/TX-05/0-4221-P1).

⁴ Eisele, W. L., Schrank, D. L. & Lomax, T. J. (2005, January). Incorporating Access Management into the Texas Transportation Institute's Urban Mobility Report. In *Presented at the Transportation Research Board's 84th Meeting*.

⁵ Li, Y., Quiroga, C. (2013). *Final Analysis of McPherson Bridge Improvement Project – Draft*. College Station, Texas: Texas A&M Transportation Institute.

⁶ San Antonio Research and Implementation. (2006). *Grade-Separated Interchange Benefits for Loop 20 at International and McPherson*. College Station, Texas: Texas A&M Transportation Institute.

⁷ Ellis, D., Glover, B., Norboge, N., Weldon, A., Larson, G., Arnett, B. (2013). *Establishing Mobility Investment Priorities Under TxDOT Rider 42: Economic and Congestion Benefit Evaluation*. Texas Transportation Commission and 83rd Texas Legislature.

⁸ Turnbull, K.F. (2013). *Report from the Panama Canal Stakeholder Working Group*. (No. FHWA/TX-12-6800-1).

The focus of the analysis includes short-term, medium-range, and long-range improvement strategies. Separate technical memoranda describe the analysis results for short-term and medium-range improvement strategies. This document summarizes the analysis of long-term improvements to the transportation system within the area bound by FM 1472, IH 35, and SH 255. TxDOT also requested TTI to analyze this area to determine the impacts to state roads in response to projects being considered by the City of Laredo between FM 1472 and IH 35. The analysis includes planned future developments, such as Hachar Parkway, Verde Road, and Vallecillo Road which will connect FM 1472 and IH 35. Figure 1 shows the limits for the short-term, medium-range, and long-range analyses.



Figure 1. Study Limits along FM 1472 Corridor.

FUTURE TRAVEL DEMAND ESTIMATES

TTI gathered information pertaining to developments in the study area from TxDOT, the City of Laredo Metropolitan Planning Organization (MPO), and consultants. These data sources included roadway alignments, site layouts, and projected traffic volumes.

The City of Laredo Thoroughfare Plan⁹ shows preliminary locations of roadways and interchanges based on projected population growth and land use. The Thoroughfare Plan forecasts future growth and expansion, and assumes that, in addition to the existing road network, a grid-like pattern of roads will be required to accommodate the projected growth. Within the Thoroughfare Plan, roads that are funded or will be funded in the near future have more defined alignments, however. Several developments within the study area have been funded or are likely to be funded in the near future, including Hachar Parkway, Vallecillo Road, and Verde Road. These developments connect FM 1472 and IH 35. Figure 2 shows the location of major existing (blue) and proposed (red) roadways influencing long-range improvements in the study area.

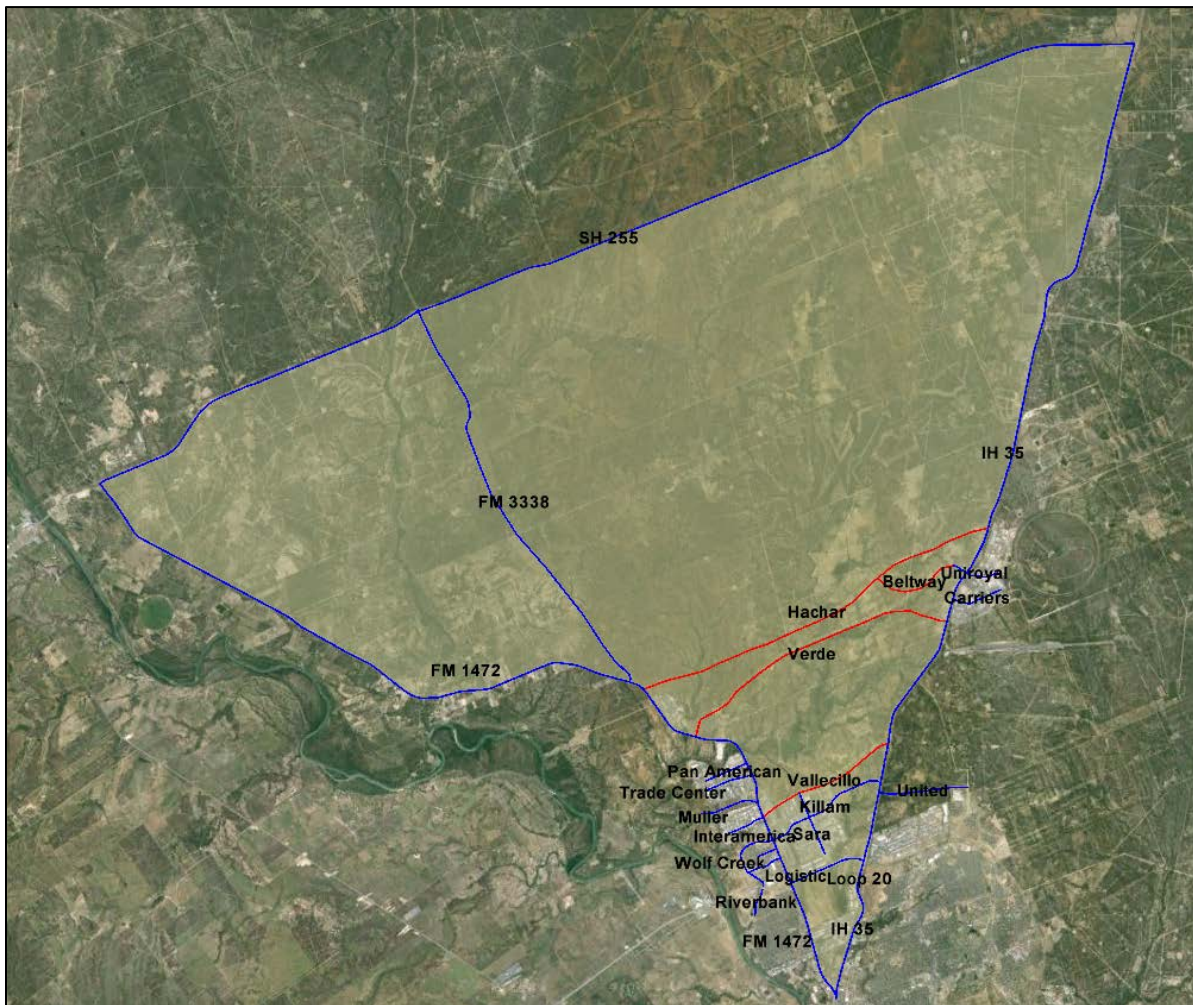


Figure 2. Current and Future Roadways Influencing the Long-Range Study Area.

⁹ http://www.ci.laredo.tx.us/Maps/GIS_MAPS/maps/Thoroughfare.pdf

The City of Laredo MPO updates the Laredo Metropolitan Transportation Plan¹⁰ (MTP) every five years. This plan provides background context on Laredo, socioeconomic data, roadway infrastructure, multimodal transportation, freight, congestion, safety and security, financial plans, and the benefits of implementing the plan. Within these sections, information relating to planned roadway projects and future developments are discussed. However, Hachar Parkway and Verde Road are not included in the Laredo MTP. After conversations with the MPO, TxDOT, and the consultant that produced the MTP, the aforementioned roadways as well as Vallecillo Road were included in this long-range analysis.

TTI received the outputs of travel demand models for 2008 (base year) and 2040 from staff working on the Laredo Urban Transportation Study. Figure 3 and Figure 4 show projected 2040 annual average daily traffic (AADT) and annual average daily truck traffic (AADTT), respectively.

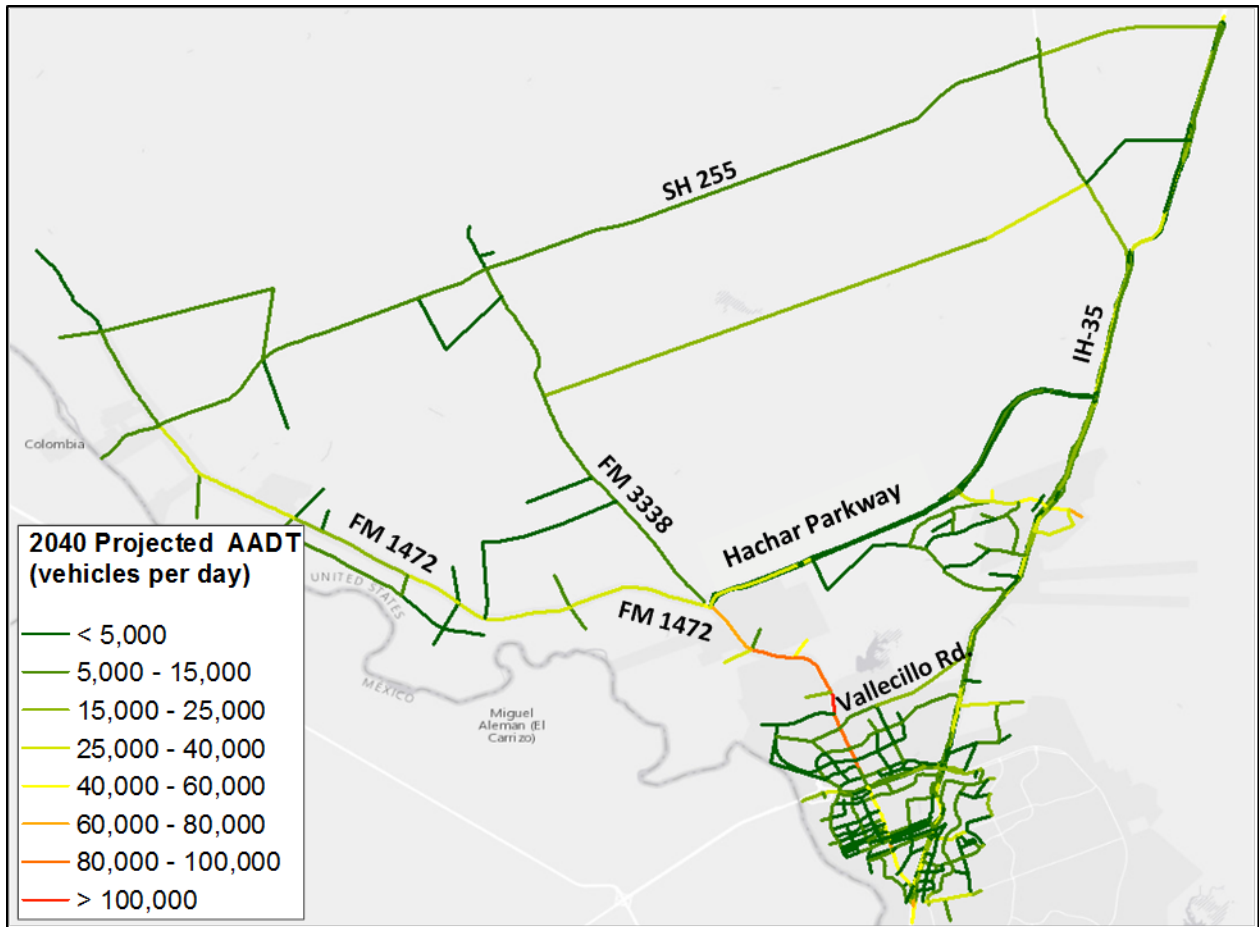


Figure 3. Projected AADT in 2040 Based on Travel Demand Model.

¹⁰ Narayanasamy, M., Sullivan, C., Chen, S., Gunter, R. Laredo Metropolitan Transportation Plan 2015-2040.

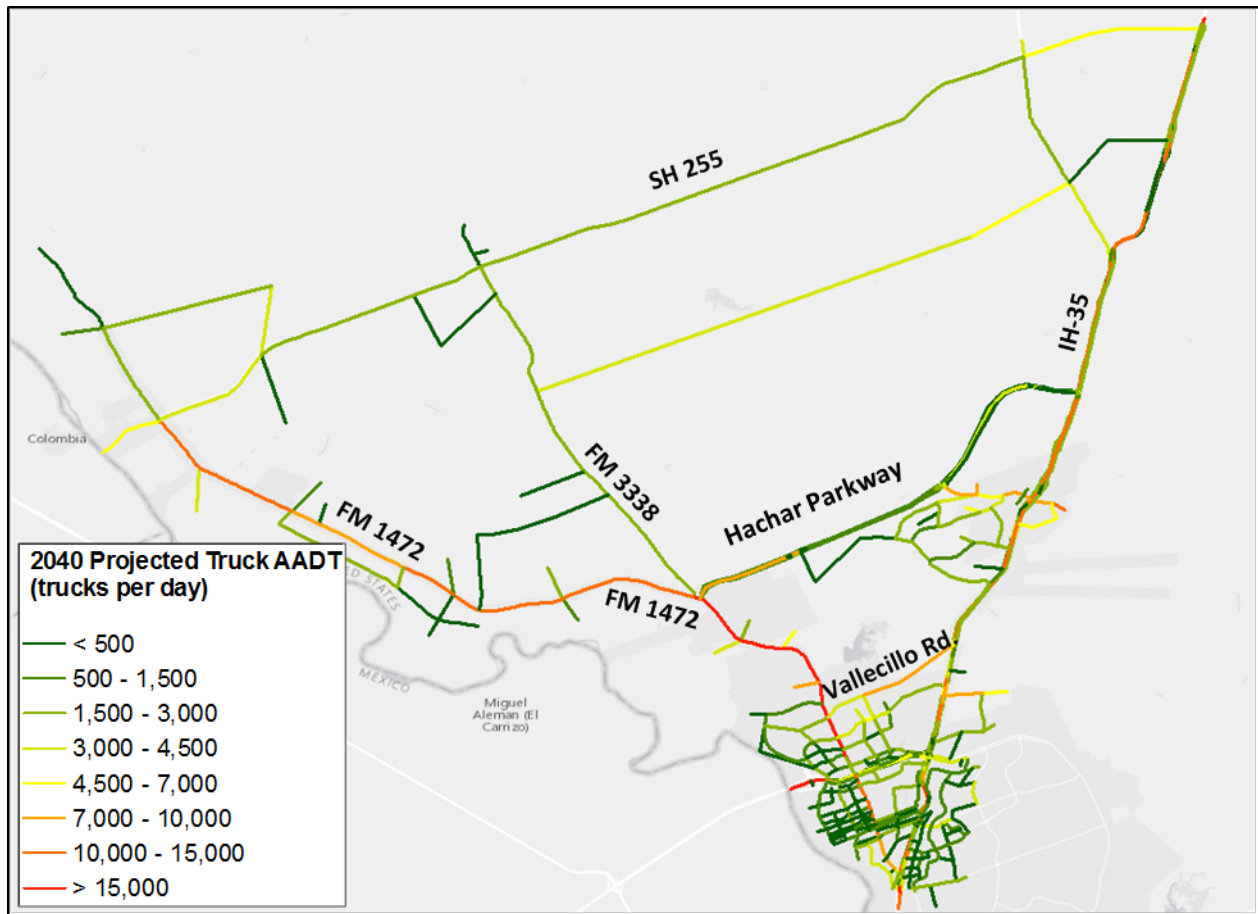


Figure 4. Projected AADTT in 2040 Based on Travel Demand Model.

A review of anticipated AADT trends in 2040 (Figure 3) indicates the following:

- FM 1472 between Loop 20/IH 69W and FM 3338 will face higher demand (i.e., greater than 60,000 vehicles per day in both directions) than other roads in the study area, especially the section immediately north of A F Muller Boulevard with an expected AADT greater than 100,000 vehicles per day.
- FM 1472 south of Loop 20/IH 69W will face moderately high demand (i.e., 40,000 to 60,000 vehicles per day in both directions). AADT between Bristol Road and Las Cruces Drive is expected to exceed 60,000 vehicles per day.
- For IH 35 north of Loop 20/IH 69W, most sections will have an AADT ranging from 25,000 to 40,000 vehicles per day in each direction. The northbound section between Killam Industrial Boulevard and Vallecillo Road will likely experience more than 40,000 vehicles per day.
- For IH 35 south of Loop 20/IH 69W, most sections will have a higher AADT (i.e., 40,000 to 60,000 vehicles per day in each direction) than the sections north of Loop 20. Specifically, the southbound sections will more likely experience high traffic volumes than the northbound sections.

- Beltway Parkway, Uniroyal Drive, and Verde Road will likely carry more traffic (i.e., 40,000 to 60,000 vehicles per day in both directions) than other crossing roads.
- Hachar Parkway will face more demand volume than Vallecillo Road, while Vallecillo Road will have more demand volume than Killam Industrial Boulevard.

A review of anticipated AADTT trends in 2040 (Figure 4) indicates the following:

- FM 1472 will remain a major truck corridor, with most sections carrying more than 10,000 trucks per day in both directions. The section between Loop 20/IH 69W and FM 3338 will likely carry more than 15,000 trucks per day in both directions.
- For IH 35, most sections will have more than 10,000 trucks per day in each direction. The sections south of Hachar Parkway will likely carry more than 15,000 trucks per day in each direction.
- Loop 20/IH 69W west of River Bank Drive will likely have more than 15,000 trucks per day in both directions.
- Hachar Parkway will have a similar amount of AADTT as Vallecillo Road, i.e., 7,000 to 10,000 trucks per day in both directions. Both arterials will likely have more truck traffic than Killam Industrial Boulevard.

Figure 5 shows projected volume/capacity (V/C) ratios in the study area in 2040. A review of the anticipated V/C trends indicates the following:

- Most roadway segments in the study area will likely remain in under-saturated conditions (green segments), including FM 1472 north of the World Trade Center Loop, IH 35 main lanes, Loop 20/IH 69W, and most crossing roads near Loop 20/IH 69W.
- A few roadway segments in the study area will likely experience demand volumes that exceed capacity (yellow segments). Examples of roadway segments include SH 255, FM 3338, FM 1472 south of Interamerica Boulevard, and several crossing roads near Loop 20/IH 69W.
- Some roadway segments in the study area will likely experience demand volumes that are larger than three times their capacities (red segments). This includes FM 1472 between Interamerica Boulevard and Verde Road and a loop that includes Uniroyal Drive, Port Drive, and Carriers Drive. Readers should note that Figure 5 also shows a red segment south SH 255 connecting FM 3338 and US 83. This segment does not exist in the real world. It is a centroid connector used in the travel demand model environment as a placeholder to connect the corresponding zone to the existing roadway network if no existing roads serve that purpose.

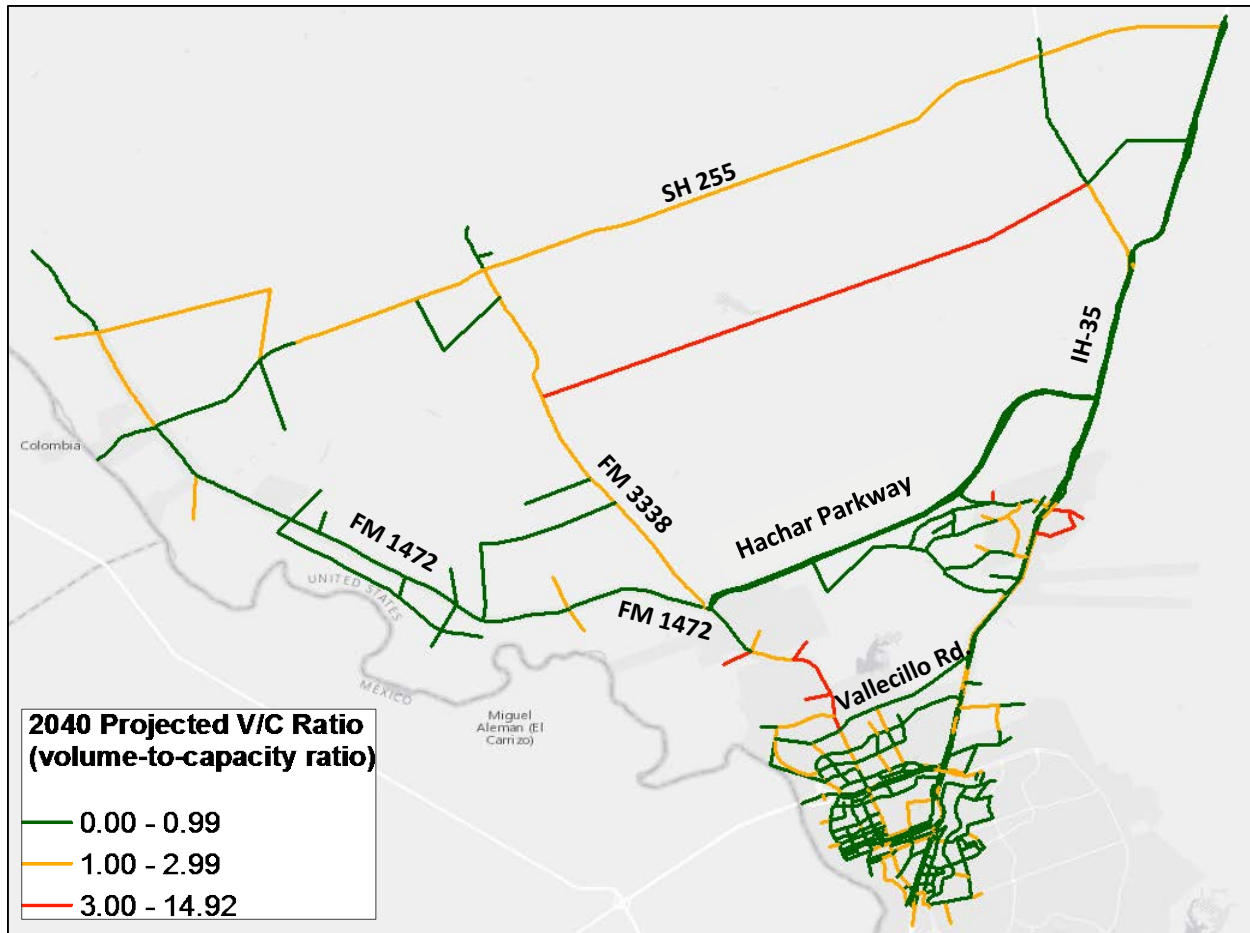


Figure 5. Projected V/C Ratio in 2040 Based on Travel Demand Model.

POTENTIAL LONG-RANGE STRATEGIES

TTI analyzed a selected list of potential long-range strategies based on the information gathered from TxDOT, the Laredo MPO, and consultants. The strategies are grouped into three main categories: new and expanded roadways, new and expanded interchanges, and traffic management strategies. For each location, the analysis includes a general description of the roadway or interchange and a discussion of the potential improvements.

NEW AND EXPANDED ROADWAYS

The analysis included the following new/expanded roadway segments:

- Sara Road
- Killam Industrial Boulevard
- River Bank Drive
- A F Muller Boulevard

- Vallecillo Road
- United Avenue
- FM 1472 North of Loop 20/IH 69W and South of Las Tiendas Road
- FM 1472 North of Las Tiendas Road
- FM 1472 South of Loop 20/IH 69W
- IH 35

Sara Road

Sara Road is a north-south 1.25 mile long road with two travel lanes per direction and a two-way left turn lane between Milo Road (FM 3464) and Killam Industrial Boulevard (Figure 6). North of Killam Industrial Boulevard, Sara Road continues as a two-lane road before coming to a dead end. The width of Sara Road north of Killam Industrial Boulevard is sufficient to allow for the same five-lane configuration that exists south of Killam Industrial Boulevard, without acquiring additional right-of-way. Currently, there are four intersections on Sara Road. The intersection with Killam Industrial Boulevard is a four-way stop controlled intersection, while the other three intersections have stop control for the minor streets and no traffic control for Sara Road.

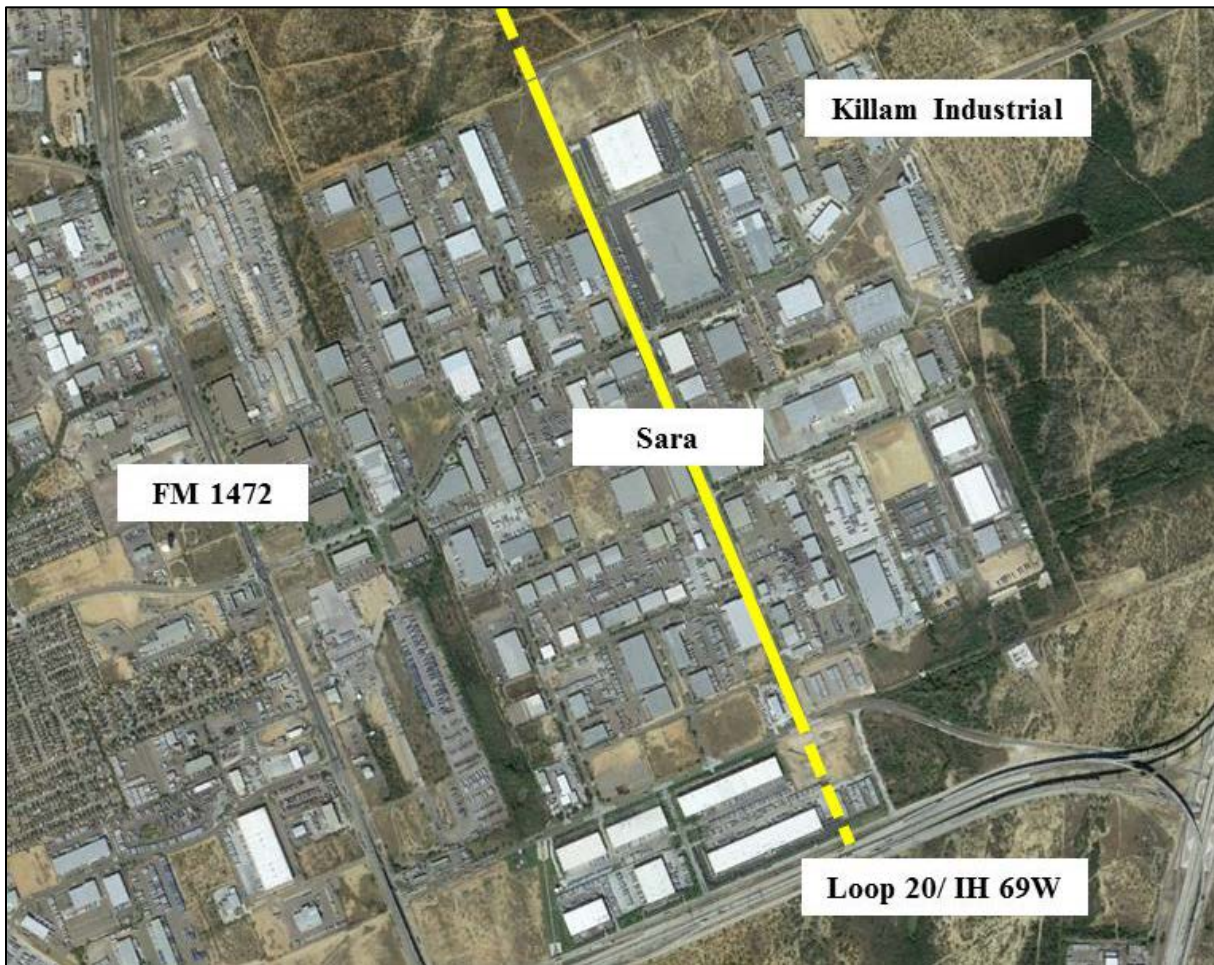


Figure 6. Sara Road.

Sara Road is strategically important to the study area because it is the only continuous north-south corridor parallel to FM 1472 and IH 35 that connects FM 3464 and Killam Industrial Boulevard. As a result, Sara Road may provide congestion relief along FM 1472 if its capacity is increased and extended north to the planned developments between FM 1472 and IH 35. Several potential long-range improvements to Sara Road have been identified, including:

- Extending Sara Road north as new developments are constructed.
- Realigning the southern end of Sara Road.
- Adding traffic control and pavement markings.

As new developments such as Verde and Hachar are built, Sara Road could be extended north. This would provide an additional north-south route, which would relieve some traffic congestion on FM 1472. Extending Sara Road would also provide connectivity for traffic movements in the study area, which could divert a portion of traffic from FM 1472 and IH 35.

The south end of Sara Road dead-ends into FM 3464, requiring traffic to travel west to FM 1472 or east to the Loop 20/IH 69W frontage road, which only allows travel in the westbound direction. Two current options for traveling east from this location are shown in red and yellow in Figure 7 (depending on the final destination, there are other routes vehicles may use).

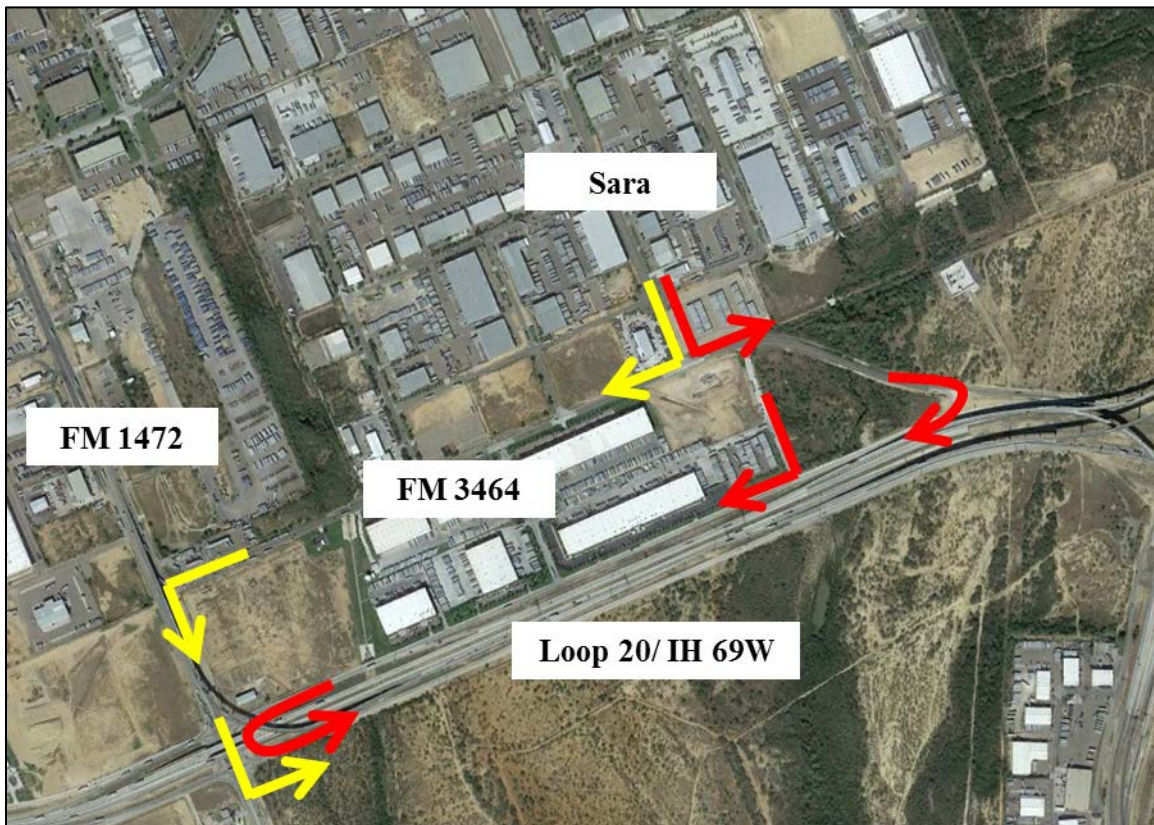


Figure 7. Current Options for Traveling East from Sara Road and FM 3464 Area.

Connecting Sara Road to the frontage road at Loop 20/IH 69W would reduce the number of left turning vehicles at the intersection of FM 3464 and FM 1472, as well as the intersection of FM 1472 and the frontage road at Loop 20/IH 69W. Traffic that needs to travel east from Sara Road would be able to use the turnaround at the intersection of Loop 20/IH 69W frontage road and FM 1472. An interchange to connect Sara Road with Loop 20/IH 69W is not feasible because of the close proximity of the nearby interchanges with IH 35 and FM 1472. Extending Sara Road to the frontage road would require the purchase of additional right-of-way. If this is not feasible, a potential alternative is to connect Sara Road to the frontage road east of the Expeditors facility.

Adding capacity to Sara Road would help alleviate congestion on FM 1472 by providing an alternate north south corridor. In addition to realigning the southern portion of Sara Road, capacity may be increased by including lane designations north of Killam Industrial Boulevard when Vallecillo Road is constructed and as Sara Road is extended further north. In addition, the intersection of Sara Road and Killam Industrial Boulevard should be evaluated to determine if a traffic signal is needed to improve level of service and mobility.

Killam Industrial Boulevard

Killam Industrial Boulevard is a 2.5 mile road located north of Loop 20/IH 69W and provides east-west connectivity between IH 35 and FM 1472, as shown in Figure 8.

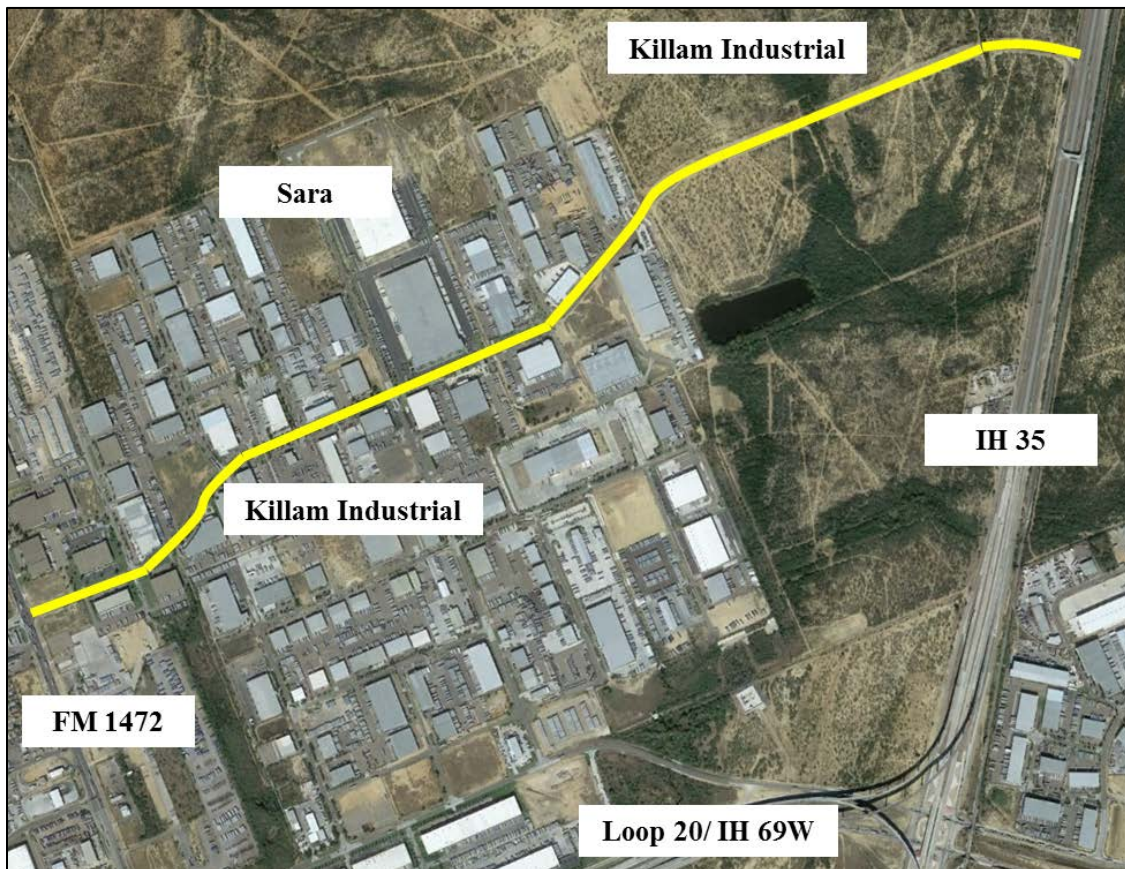


Figure 8. Location of Killam Industrial Boulevard.

Killam Industrial Park contains many warehouses that generate a large amount of traffic along Killam Industrial Boulevard and the surrounding areas. The industrial park has room for expansion in the direction of IH 35 and is expected to add additional businesses in the future. Although Killam Industrial Boulevard maintains the same width throughout, the road has four lanes plus a two-way left turn lane west of Sara Road and two lanes east of Sara Road. Currently, there are seven intersections on Killam Industrial Boulevard and several access driveways. All intersections are stop controlled on the minor road with no stop control for Killam Industrial Boulevard, with the exception of the intersection with Sara Road which is four-way stop controlled.

A potential improvement considered in the long-range planning area is the addition of lane designations east of Sara Road to match the striping west of Sara Road. When adding lane designations, truck parking would no longer be allowed on Killam Industrial Boulevard because the full width of the roadway would be allocated for travel and turning lanes.

River Bank Drive

River Bank Drive is a 1.5-mile road that connects the Loop 20/IH 69W frontage roads with FM 1472 (Figure 9). Mescalero Drive is located near the middle of River Bank Drive and divides the area into residential developments to the north and industrial developments to the south. North of Mescalero Drive, River Bank Drive has four lanes with a center turn lane. South of Mescalero Drive, River Bank Drive has two lanes. River Bank Drive has a mix of residential and industrial land uses, and is currently being developed with single-family and multi-family residences nearby. There are five intersections on River Bank Drive, all with stop control on the minor streets and no traffic control on River Bank Drive.

Potential strategies to improve River Bank Drive include:

- Extending River Bank Drive south of Loop 20/IH 69W.
- Add lanes on River Bank Drive south of Mescalero Drive.
- Extend FM 3464 west of FM 1472 to River Bank Drive.
- Construct a north-south corridor from River Bank Drive to Loop 20/IH 69W.

To improve the connectivity of the residential areas, the south end of River Bank Drive could be extended to connect with Riverbank Drive, located in the residential area south of Loop 20/IH 69W. Connecting to Riverbank Drive would create an opportunity for trucks to enter the residential neighborhood, although with no industrial areas, it is likely that trucks would travel on the Loop 20/IH 69W frontage roads. There is currently a property being developed south of Loop 20/IH 69W, which could preclude River Bank Drive from connecting with Riverbank Drive. The specific use of the property is unknown at this point. However, the property is zoned as vacant commercial and industrial.

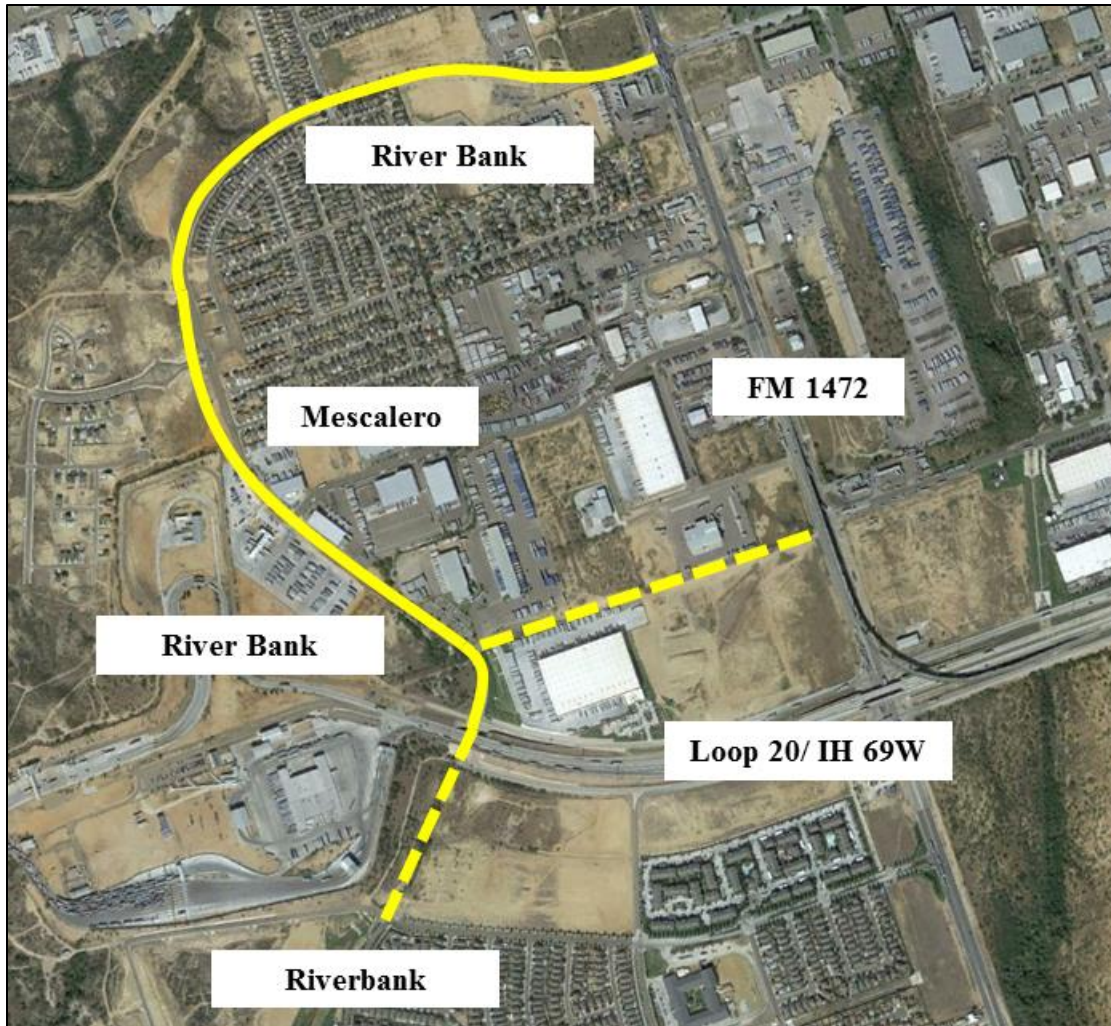


Figure 9. River Bank Drive.

In addition, as suggested by the projected V/C ratio based on the travel demand model, the section of River Bank Drive south of Mescalero Drive will be in an oversaturated condition in 2040 (Figure 10). To increase capacity, River Bank Drive may need to be expanded to four lanes with a center turn lane south of Mescalero Drive to match the alignment north of Mescalero Drive.

Currently, trucks use the shoulders of River Bank Drive near the industrial complexes for parking, which is a safety concern for motorists. The trucks parked on both sides reduce the effective width of the road and reduce sight distance at horizontal curves and intersections, which reduces capacity and safety (Figure 11). The parking situation should be evaluated more in-depth to determine its impacts on mobility in the area.

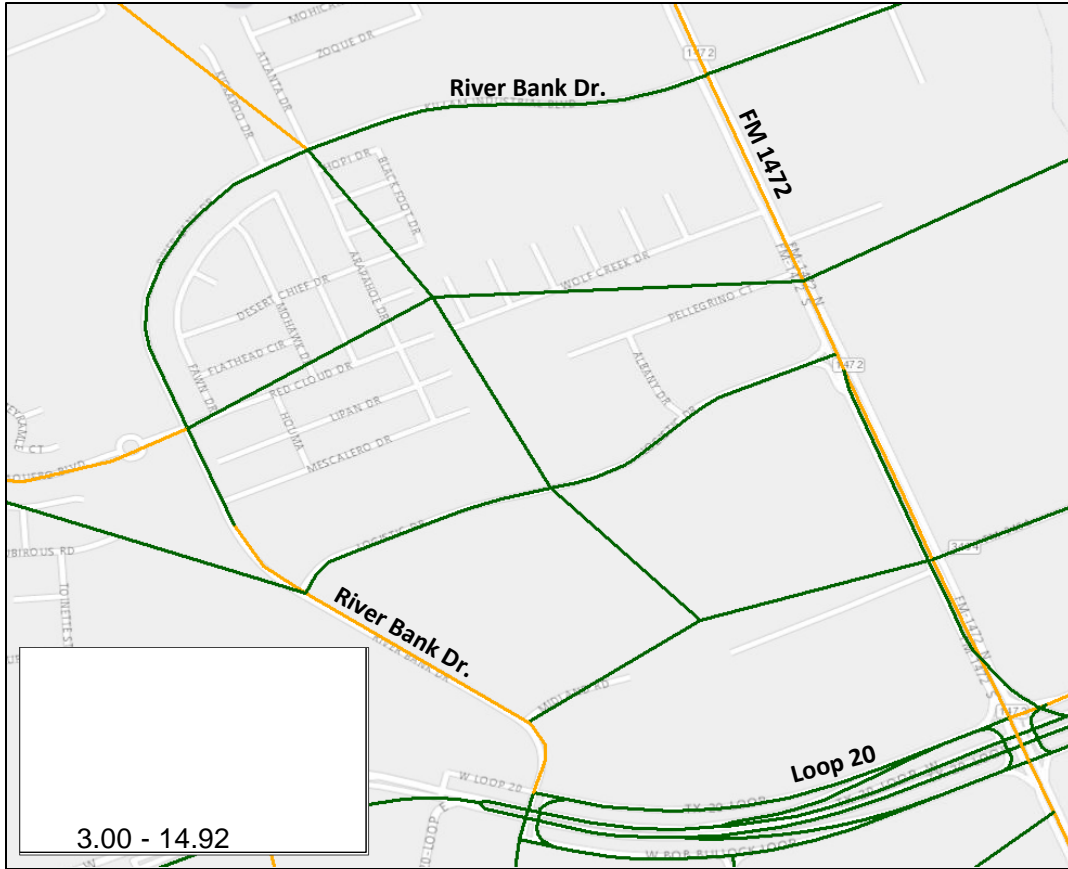


Figure 10. Projected V/C Ratio in 2040 at River Bank Drive.



Figure 11. Trucks Parked Along River Bank Drive.

The travel demand model shows FM 3464 extending west from FM 1472 and connecting with River Bank Drive. There is vacant land that could be acquired to accommodate FM 3464 in this area. However, there are two locations where a portion of the properties would need to be acquired. This potential road extension could accommodate the flow of traffic from FM 3464 and the warehouses east of FM 1472 with those near River Bank Drive and Loop 20/IH 69W without requiring traffic to travel on FM 1472.

The travel demand model also shows a north-south road connecting River Bank Drive with the FM 3464 extension. Such a road would be feasible, but a number of residential properties would need to be acquired. Also, putting a road in this location would substantially alter the residential area, as the road would likely be used by truck traffic as well as residential traffic.

A F Muller Boulevard

A F Muller Boulevard is a one-mile long road that travels west from FM 1472 to Julia Bird Jones Elementary School and the La Bota Ranch residential community, as shown in Figure 12.

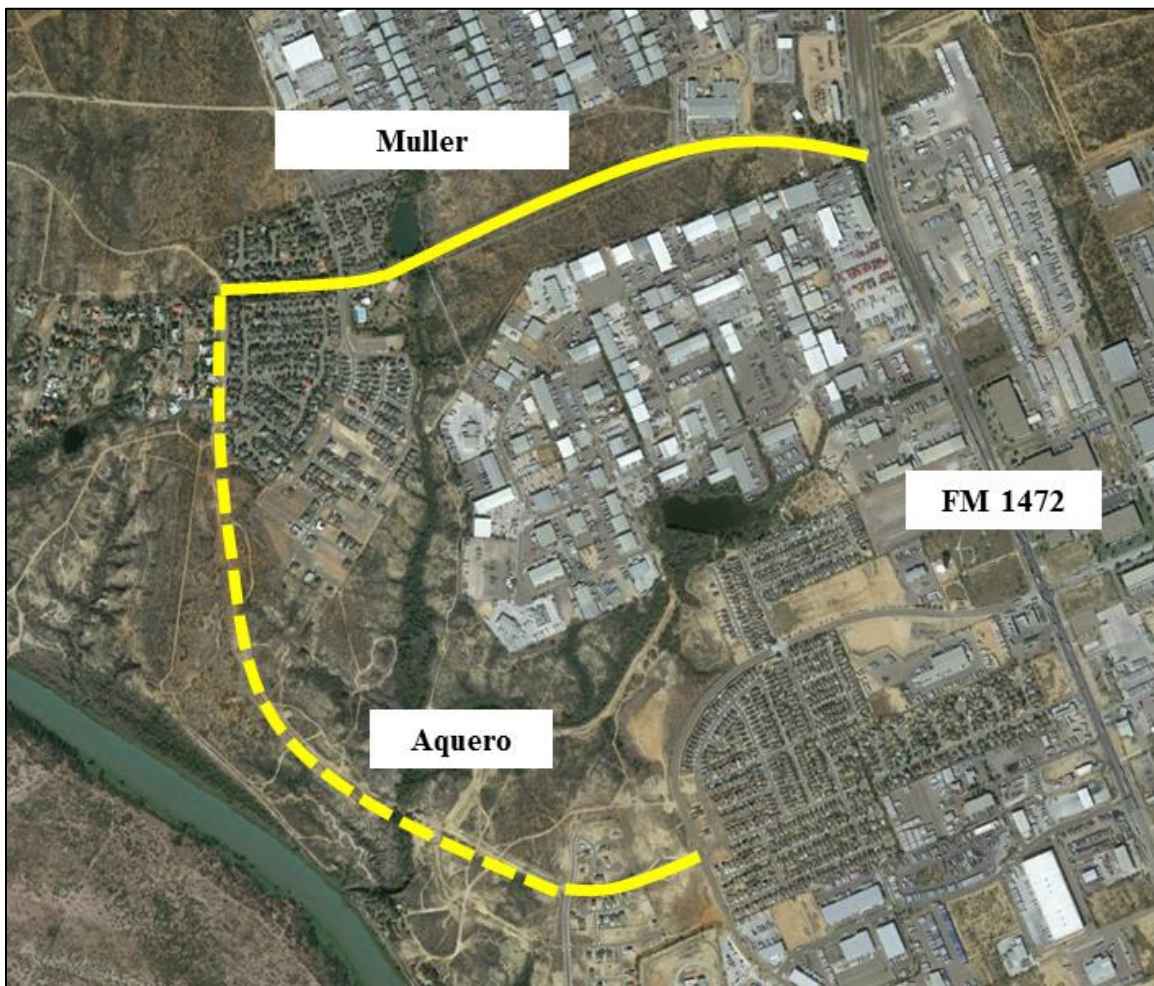


Figure 12. A F Muller Boulevard.

A F Muller Boulevard is mostly a two-lane road, with additional lanes near the elementary school to accommodate turning traffic. West of the elementary school, the road is gated to control access to the private La Bota Ranch community. On the public side, the road is named A F Muller Boulevard, and on the private side, the road is named Muller Memorial Boulevard. On A F Muller Boulevard, there are four intersections with access driveways to the elementary school. On Muller Memorial Boulevard, there are two intersections with private residential streets. Currently, traffic generated from the school on A F Muller Boulevard and residential area on Muller Memorial Boulevard only has one route out of the neighborhood, which sends the traffic to FM 1472. Having only one route in or out of the residential area allows for easier control of access, but it may be difficult for emergency responders to arrive in a timely manner if there is an incident during peak travel times on FM 1472. When schools are in session, the traffic generated by buses and passenger cars dropping off and picking up students at the elementary school adds additional congestion to FM 1472 during peak periods.

Potential long-range improvements to increase connectivity to La Bota Ranch residential area include extending Aquero Boulevard to Muller Memorial Boulevard as planned in the travel demand model (Figure 12). The travel demand model indicates that the extended Aquero Boulevard could expect 3,457 vehicles per day in both directions in 2040. Currently, Aquero Boulevard extends approximately 0.25 miles west from River Bank Drive where it dead ends. The current developments along Aquero Boulevard are single-family and multi-family residential. If Aquero Boulevard is extended to La Bota Ranch neighborhood, access control could be maintained on Aquero Boulevard. Limiting access would result in two distinct outcomes: first, it would maintain the current conditions and allow for only residential developments and second, it would eliminate a possible north-south corridor that parallels FM 1472 to the west. There is little room for a parallel corridor to the west of FM 1472, and this would occupy the available land west of the current industrial areas. Connecting Aquero Boulevard and Muller Memorial Boulevard could reduce the commuter traffic on FM 1472, but would not reduce large truck and bus traffic.

Vallecillo Road

Vallecillo Road is a proposed road north of Killam Industrial Boulevard that will connect FM 1472 and IH 35. Currently, a 1,100-foot section of Vallecillo Road has been built. Two alignments have been proposed in the thoroughfare plan and Killam Industrial Park master plan for intersecting with FM 1472. Figure 13 shows the approximate proposed alignment of Vallecillo Road in yellow and the two alignments for intersecting with FM 1472 in red. No information is available about the number of lanes or anticipated traffic pattern in connection with Vallecillo Road. The west end of Vallecillo Road could intersect with FM 1472 across from A F Muller Boulevard. If Vallecillo Road is aligned with A F Muller Boulevard, there is a truck parking area and building that would need to be relocated, whereas at Interamerica, a truck parking area would need to be relocated.

In the long-range, Vallecillo Road will provide an alternate route between FM 1472 and IH 35. Vallecillo Road could divert some traffic from Killam Industrial Boulevard and, as new developments are built, Vallecillo Road would generate additional traffic. The most recent

master plan TTI has received for Vallecillo Road (dated August 20, 2015¹¹) shows developments between Killam Industrial Boulevard and Vallecillo Road, but few developments north of Vallecillo Road. As growth occurs in the area, new developments will likely occur north of Vallecillo Road, which should be taken into account when determining capacity and alignment for this road. In addition, further evaluation will be needed to determine the appropriate design and signal timing at the intersection of Vallecillo Road with FM 1472.

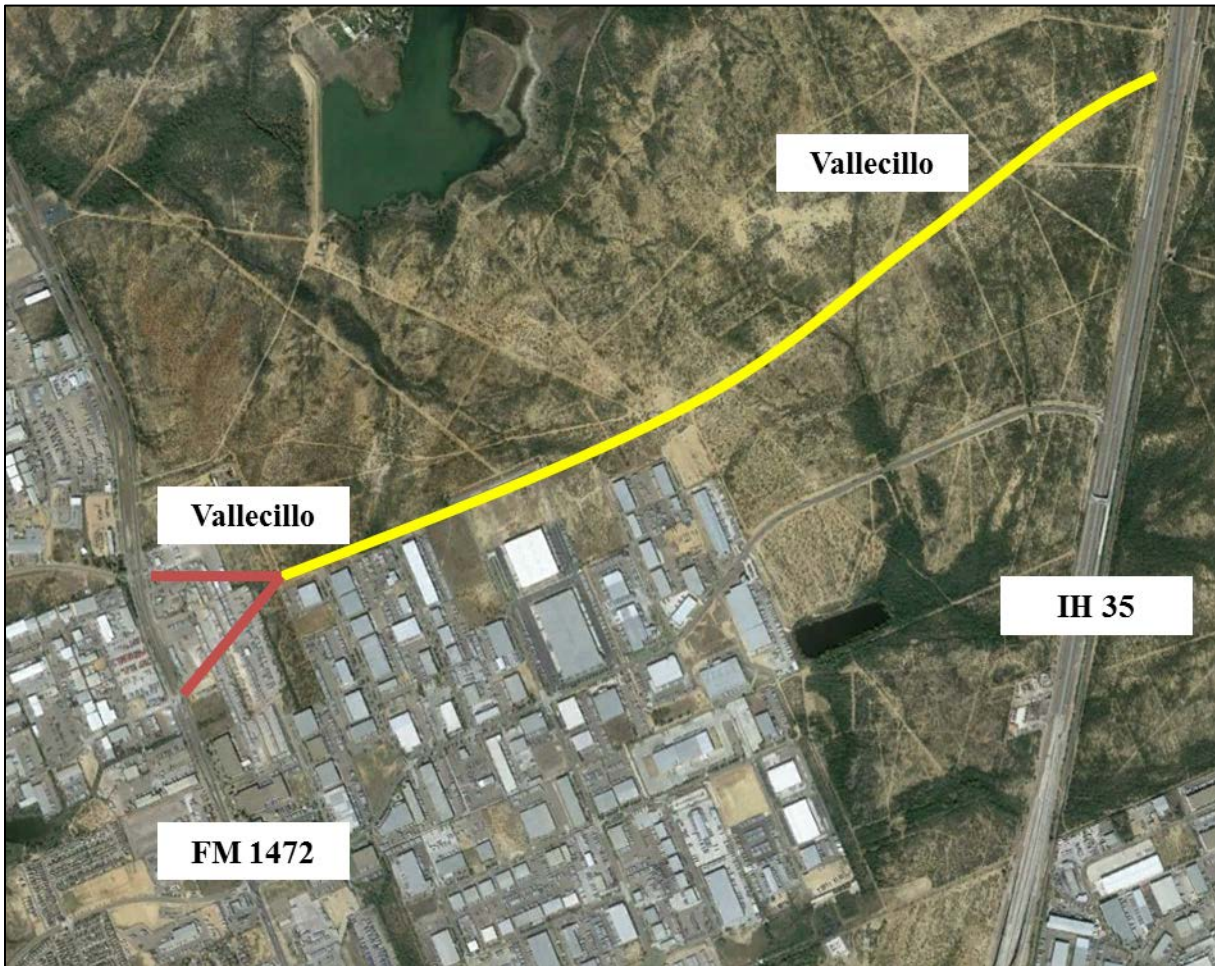


Figure 13. Approximate Location of Vallecillo Road as Proposed in the Thoroughfare Plan and Killam Industrial Park Master Plan.

United Avenue

United Avenue is a 1,600 foot long road north of United High School. This road could be extended to the west to connect with the IH 35 overpass south of Killam Industrial Boulevard as shown in Figure 14. Currently, United Avenue is a four lane divided road. With the amount of

¹¹ Killam Industrial Park Master Plan Showing Vallecillo Road – 120' ROW. Howland Engineering and Surveying Co. August 20, 2015.

available right-of-way, United Avenue could be designed with many configurations and alignments to accommodate the expected traffic, if extended.

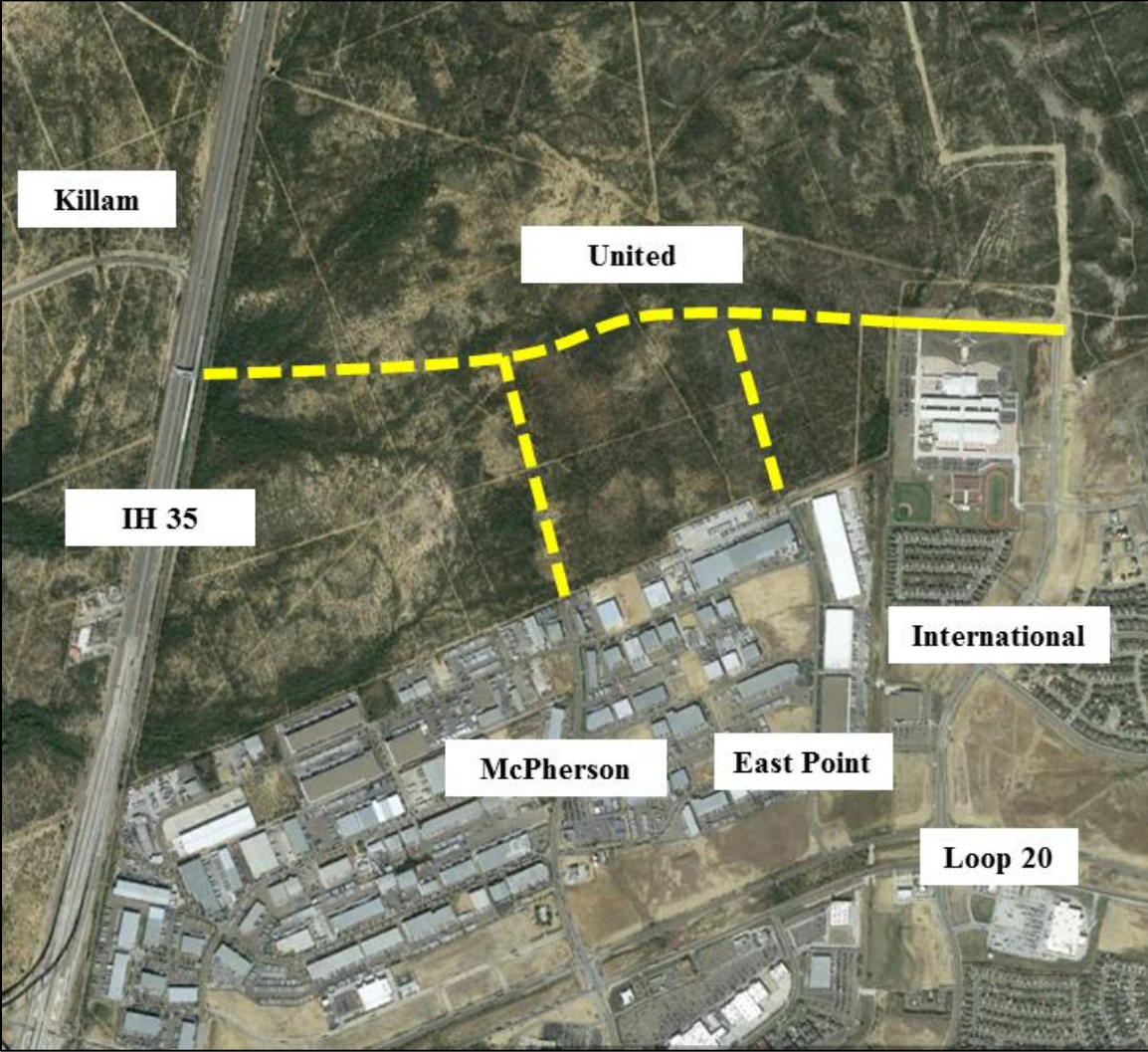


Figure 14. Potential Alignment of Expanded United Avenue.

Potential long-range improvements include extending United Avenue to increase the connectivity of the San Isidro Business Park, which in turn could lead to new facilities constructed in this area. If United Avenue were extended to IH 35, McPherson Road and East Point Drive could follow their current alignment north to intersect with United Avenue. According to the 2040 travel demand model, if built, United Avenue would carry around 35,000 vehicles per day in both directions, of which 23 percent would be trucks. Potential alignments with IH 35 are discussed in the Interchanges section (see United Avenue). Railroad vertical clearances will need to be maintained east of IH 35.

FM 1472 North of Loop 20/IH 69W and South of Las Tiendas Road

This section of FM 1472 is 5.2 miles long from Las Tiendas Road in the north to Loop 20/IH 69W in the south, as shown in Figure 15. FM 1472 is a six-lane facility from Loop 20/IH 69W until 700 feet north of Killam Industrial Boulevard. From this point, FM 1472 has four lanes until it reaches Las Tiendas Road. FM 1472 is divided by a median starting 0.25 miles north of Killam Industrial Boulevard, and is divided by a raised median south of this location until Killam Industrial Boulevard. Between Killam Industrial Boulevard and Pellegrino Court, FM 1472 has a shared center turn lane. South of Pellegrino Court, FM 1472 has a raised median until Loop 20/IH 69W. Between Las Tiendas Road and Loop 20/IH 69W, there are six signalized intersections and six intersections with stop control for the minor street. There are numerous driveways, mainly for warehouses and other commercial businesses, along this stretch of FM 1472.

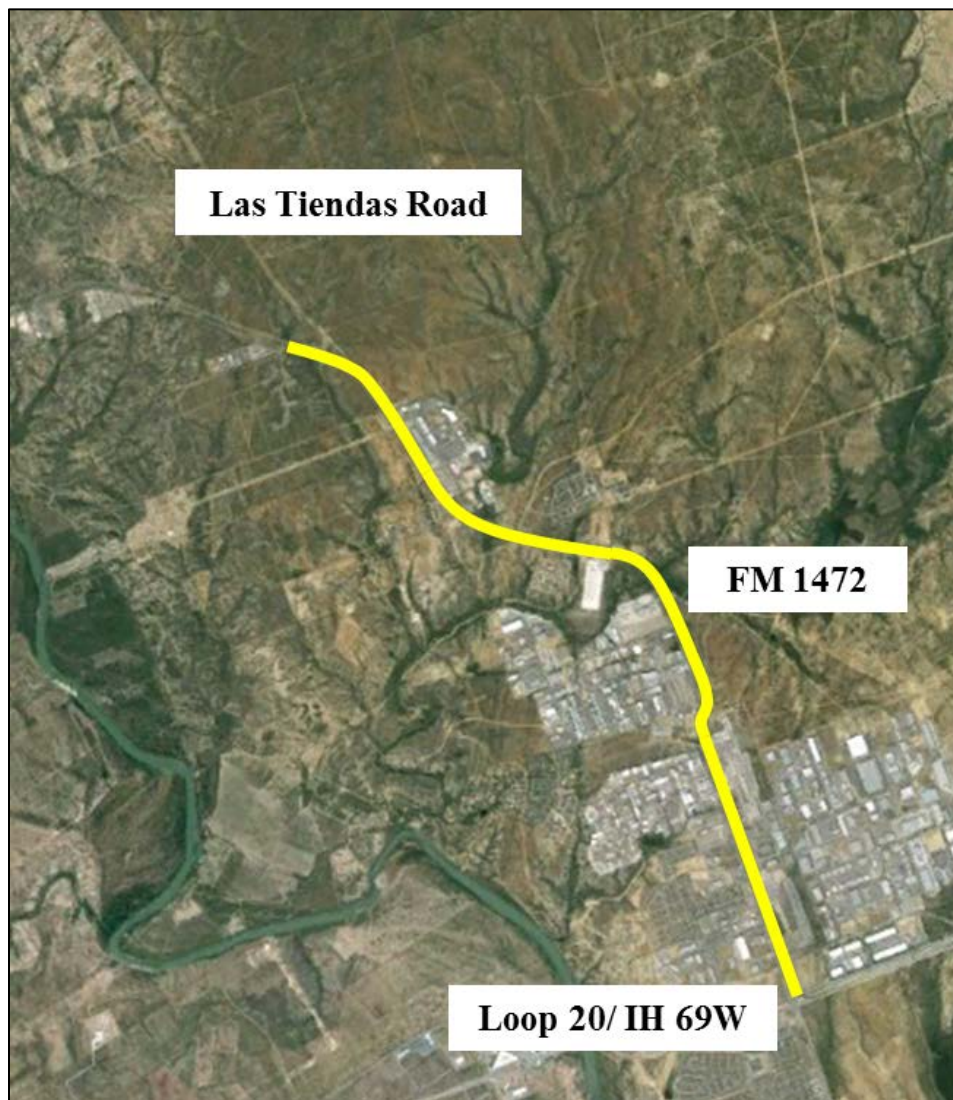


Figure 15. FM 1472 North of Loop 20/IH 69W and South of Las Tiendas Road.

Projected year 2040 AADT, AADTT, and V/C ratio on FM 1472 based on the travel demand model indicate that FM 1472 will remain the busiest corridor in the study area in the future. Specifically, the section between World Trade Center Loop and Loop 20/IH 69W will likely be oversaturated. Finding solutions to relieve congestion on FM 1472 will be critical. With limited options for parallel routes to relieve traffic on FM 1472, increasing capacity on FM 1472 would be a feasible strategy. Methods to increase capacity on FM 1472 include the following, each one involving different capacity levels and implementation cost:

- Increasing the number of through lanes.
- Converting FM 1472 to an expressway by adding overpasses at critical intersections.
- Converting FM 1472 to a standard freeway with frontage roads and interchanges.
- Converting unsignalized intersections north of Con-way to signalized intersections.

Increasing the number of through lanes on FM 1472 is the cheapest option, but would increase capacity the least. Having a consistent number of lanes along FM 1472 would help remove bottlenecks to improve mobility. South of Killam Industrial Boulevard, the right-of-way width is approximately 200 feet. North of Killam Industrial Boulevard, the right-of-way width widens to approximately 300 feet. Given the current right-of-way width, the maximum number of lanes that could be added is one lane in each direction north of Killam Industrial Boulevard. South of Killam Industrial Boulevard, additional lanes could be added, but the clear zone might be affected.

Converting FM 1472 to an expressway by adding overpasses would improve mobility. Grade separations would be used at intersections to enable through traffic to travel unimpeded. Converting FM 1472 to an expressway would require TxDOT to acquire additional right-of-way to build entrance and exit ramps at the grade-separated interchanges. Based on similar TxDOT roadways, the main lanes of an expressway might require roughly 200 feet of right-of-way, depending on the number of lanes. However, the interchanges would require approximately 300 feet of right-of-way depending on the configuration.

Converting FM 1472 to a standard freeway would increase capacity more than the previous two options, but would reduce access, potentially require the acquisition of right-of-way to add frontage roads and wider shoulders on the FM 1472 main lanes, and relocate businesses. The cost would be considerably higher than for the previous two options. Interchange spacing would become critical to maintain adequate distance for free flow conditions. Roads could still intersect with FM 1472 frontage roads. Approximately 300 feet of right-of-way would be required for main lanes and frontage roads, while interchanges may require considerably more right-of-way depending on the type of interchange.

In the medium-range strategy technical memorandum, TTI identified the need to convert some unsignalized intersections on FM 1472 north of the Con-way truckload facility. One of the analyses was to evaluate the benefits of medium-range strategies using the travel demand model projected traffic volumes. The travel demand model indicated that in 2040, Verde Road would

have 51,000 vehicles per day in both directions. In this case, high left turning volumes from FM 1472 to Verde Road would cause severe spillback on the FM 1472 through lanes. Adding traffic signals would improve intersection efficiency and safety. However, appropriate signal design should rely on actual traffic conditions (i.e., traffic counts for each movement at an intersection) instead of high-level AADT projections. Ideally, signal timings should be updated when traffic conditions significantly change in the field.

FM 1472 North of Las Tiendas Road

This section of FM 1472 is 11.5 miles long from Las Tiendas Road to SH 255, as shown in Figure 16. In this location, FM 1472 is a four-lane highway divided by a grassy median. There are nine intersections on FM 1472 with stop control for the minor roads. Additionally, there are several driveways that connect to FM 1472.

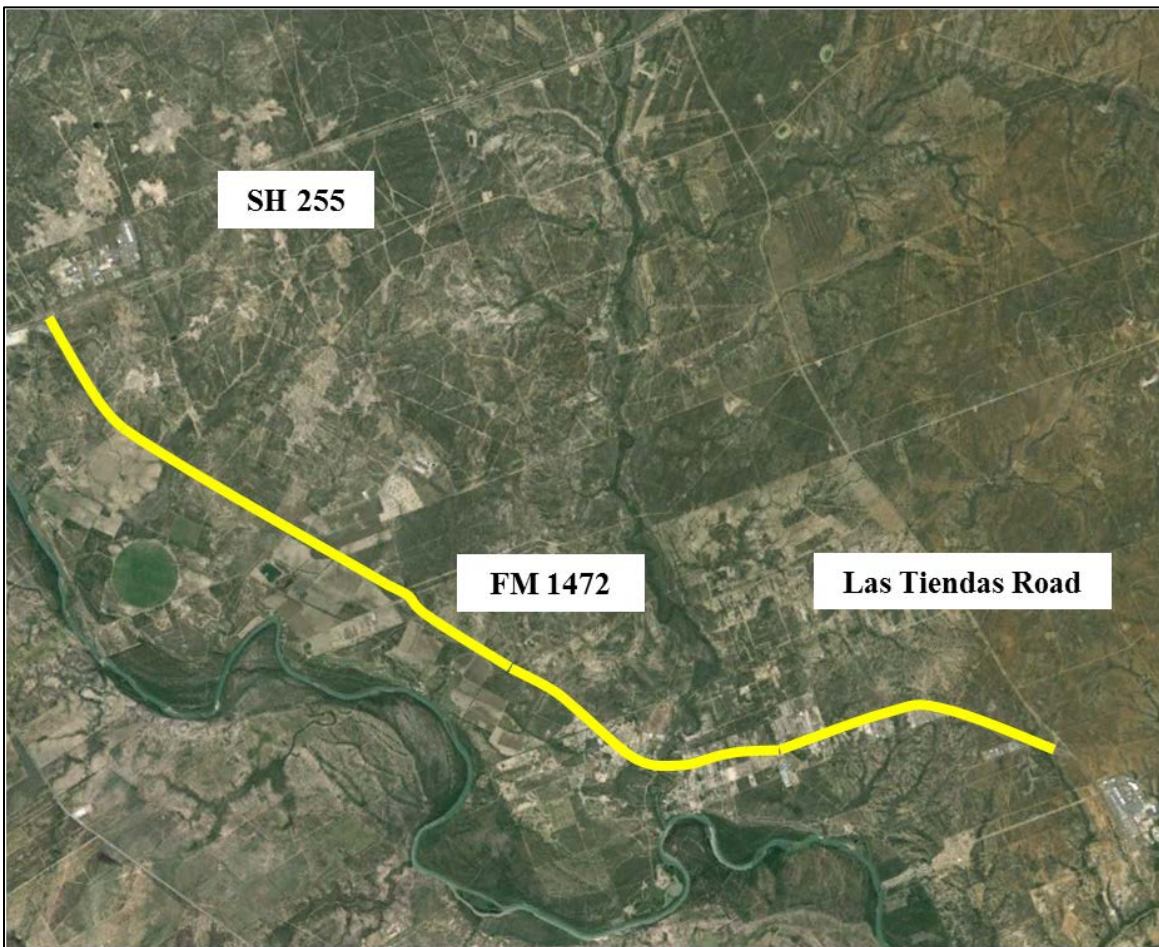


Figure 16. Location of FM 1472 North of Las Tiendas Road in the Long-Range Study Area.

In the previous section, potential upgrades to FM 1472 were discussed between Loop 20/IH 69W and Las Tiendas Road. According to the various data sources reviewed, FM 1472 is expected to remain sparsely developed north of Las Tiendas Road. As a result, potential upgrades on FM

1472 between Loop 20/IH 69W and Las Tiendas Road do not necessarily apply north of Las Tiendas. Nevertheless, the Mexican State of Nuevo León is developing a highway from the manufacturing hub Monterrey, which will connect with the Columbia Solidarity Bridge at the northwest end of the long-range study area. Building this highway could have a number of impacts in Laredo, including the possibility that some warehouses might be located further north on FM 1472 than what is currently the practice. It is possible that this shift could also result in some traffic relief on FM 1472. In any case, if significant developments occur north of Las Tiendas, the need for and scope of any potential upgrades on FM 1472 would have to be revised.

FM 1472 South of Loop 20/IH 69W

FM 1472 is 2.5 miles long from Loop 20/IH 69W to IH 35 and is shown in Figure 17. FM 1472 is six lanes from Loop 20/IH 69W to 0.4 miles south of Flecha Lane, where it becomes four lanes until it reaches IH 35. South of Loop 20/IH 69W, FM 1472 is a mix of residential and industrial developments, which contribute to a mixed traffic makeup.

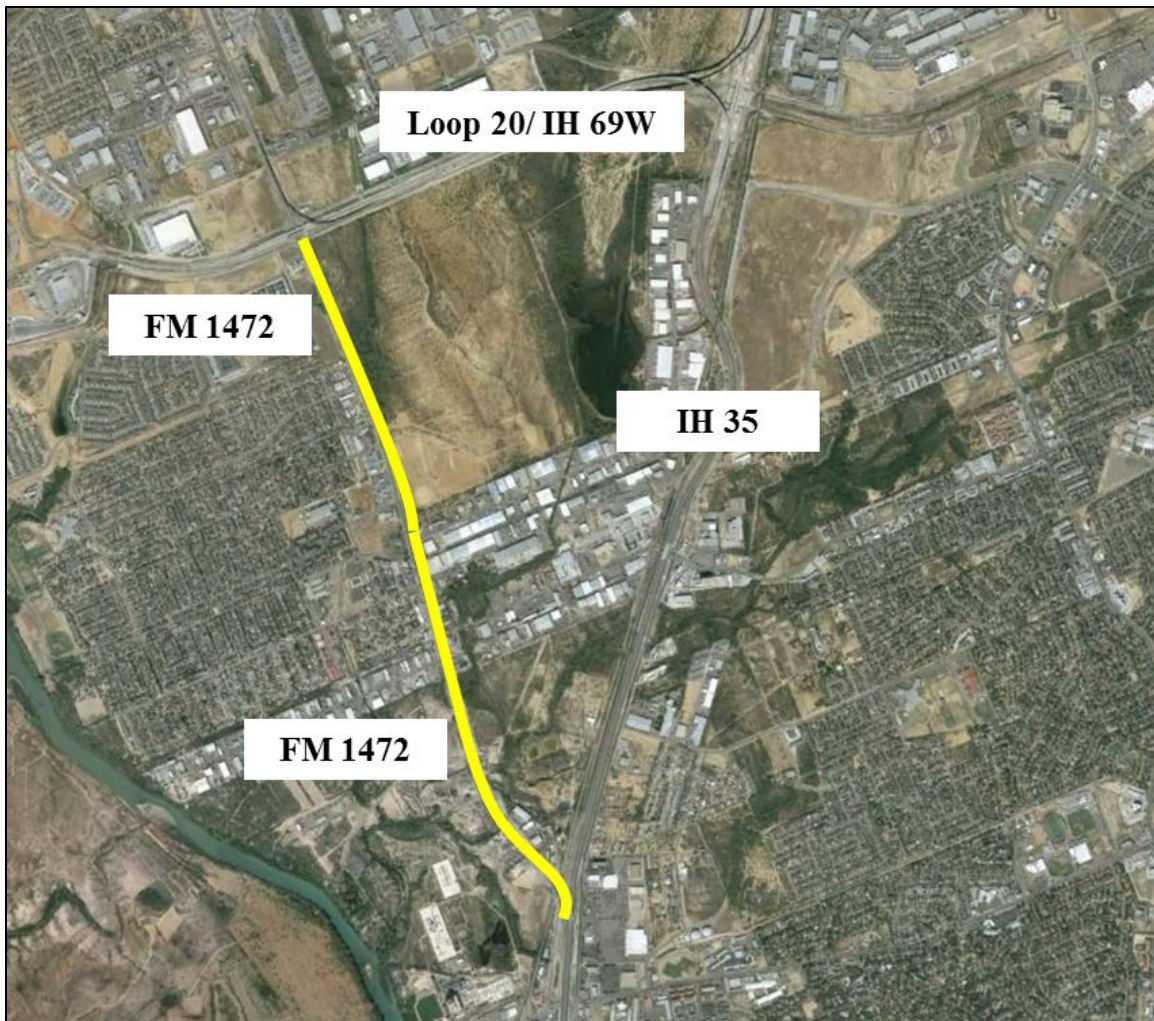


Figure 17. FM 1472 South of Loop 20/IH 69W.

Because FM 1472 has six lanes south of Loop 20/IH 69W almost all the way to IH 35, FM 1472 could be upgraded to an expressway or a full freeway segment to increase capacity if the updates are warranted. In this case, it would be appropriate to consider the feasibility of similar upgrades on FM 1472 north and south of Loop 20/IH 69W. This strategy would facilitate traffic flow continuity along the entire FM 1472 corridor.

IH 35

The section of IH 35 within the study area is 19 miles long between FM 1472 and SH 255, as shown in Figure 18. The current configuration of IH 35 in the northbound direction includes three lanes north of Loop 20/IH 69W and two lanes at Carriers Drive. IH 35 southbound has three lanes south of Uniroyal Drive and narrows to two lanes north of Loop 20/IH 69W.

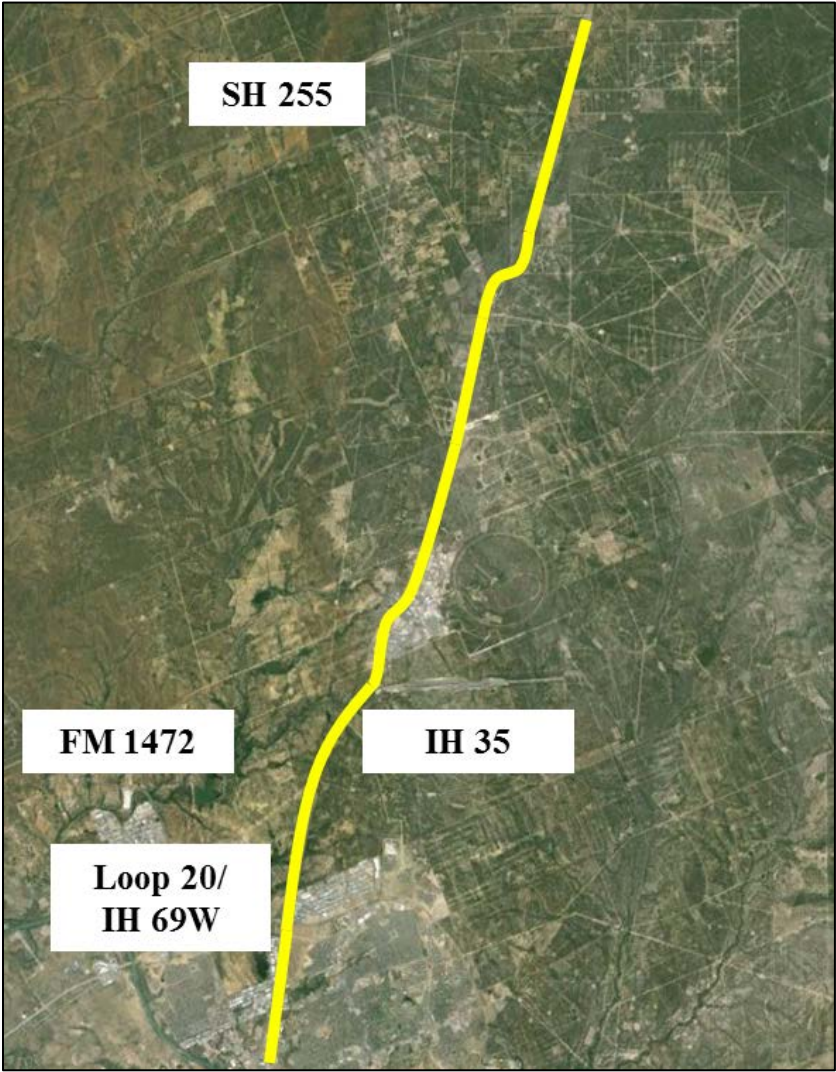


Figure 18. IH 35.

Long-range improvements include expanding IH 35 to three lanes north of Uniroyal when Hachar Parkway is constructed. This will enable IH 35 to accommodate additional truck traffic and remove bottlenecks. The entrance to the Union Pacific railyard, located east of IH 35 and south of Carriers Drive, may also need to be grade separated to accommodate increased truck and train traffic. Currently, the access road to the railyard has an at-grade intersection with the railroad track. As train traffic increases, trucks waiting to turn into the railyard could spill back onto the frontage road. A grade-separated rail crossing at the railyard entrance would resolve this issue.

NEW AND EXPANDED INTERCHANGES

The analysis included existing or potential interchanges at the following corridors:

- Loop 20/IH 69W
- United Avenue
- Killam Industrial Boulevard
- Vallecillo Road
- Verde Road, Carriers, Drive, and Uniroyal Drive
- Hachar Parkway

Loop 20/IH 69W

The section of Loop 20/IH 69W within the study area is a 1.5-mile long four lane divided highway, as shown in Figure 19. Interchange locations along this corridor include FM 1472 and IH 35.

- **FM 1472.** Currently, there is a one-lane direct connector from southbound FM 1472 to eastbound Loop 20/IH 69W. Geometrically, it appears that an all-directional four-leg interchange is feasible. Other types of interchanges might also be possible. In any case, at some point in the future, an analysis may be necessary to determine possible phases for direct connector implementation. At this point, it is not clear if TxDOT already owns the necessary right-of-way for a full-fledged interchange.
- **IH 35.** Currently, there are three single-lane direct connectors constructed between IH 35 and Loop 20/IH 69W: southbound IH 35 to westbound Loop 20/IH 69W, northbound IH 35 to westbound Loop 20/IH 69W, and eastbound Loop 20/IH 69W to northbound IH 35. Constructing the remaining direct connectors would provide relief from congestion on Loop 20/IH 69W and IH 35. Clearance for the railroad east of IH 35 must be maintained when building additional direct connectors. Due to the railroad tracks and buildings on the northeast side of the intersection, direct connectors are a feasible option for the interchange between IH 35 and Loop 20/IH 69W. Currently, TxDOT is evaluating the prioritization schedule for building the remaining direct connectors.



Figure 19. Loop 20/IH 69W Interchanges with FM 1472 and IH 35.

United Avenue

Extending United Avenue to the IH 35 overpass south of Killam Industrial Boulevard would enable for the use of the existing overpass to travel north or south on IH 35 (Figure 14). However, for vehicles wishing to travel to the World Trade Bridge, the existing entrance ramp to IH 35 is located after the direct connector to Loop 20/IH 69W. Without building an entrance ramp, this traffic would need to travel south on the IH 35 frontage road and then west on the Loop 20/IH 69W frontage road. A diamond interchange at United Avenue might be possible, but the spacing between this interchange and the existing interchange at Loop 20/IH 69W would only be about 1.3 miles.

As mentioned previously, Killam Industrial Boulevard should be realigned to connect with the IH 35 overpass to improve traffic circulation on both sides of IH 35. If realigning Killam Industrial Boulevard is not feasible, a connecting roadway could be built from the overpass to Killam Industrial Boulevard. This would allow traffic east of IH 35 to travel west of IH 35 directly and potentially reduce traffic on IH 35, Loop 20/IH 69W, and FM 1472 if the business park east of IH 35 is expanded. If Killam Industrial Boulevard is not realigned, the interchange

could be designed in such a way to use direct connectors at the offset intersection. However, this may be less efficient and more expensive than realigning Killam Industrial Boulevard.

Killam Industrial Boulevard

Potential interchange locations along this corridor include FM 1472 and IH 35:

- **FM 1472.** Potential interchange options for the intersection of Killam Industrial Boulevard and FM 1472 depend on what kind of capacity upgrade is selected for FM 1472 in the future. If FM 1472 is upgraded to an access-controlled facility, Killam Industrial Boulevard will likely require a diamond interchange. At this point, it is not clear whether direct connectors to and from Killam Industrial Boulevard would be warranted. Depending on the type of upgrade, additional right-of-way might need to be acquired and buildings and businesses would need to be relocated.
- **IH 35.** Killam Industrial Boulevard connects to IH 35 1.5 miles north of Loop 20/IH 69W. An overpass 1,000 feet south of where Killam Industrial Boulevard connects to IH 35 enables traffic to cross IH 35 and turn north (Figure 20). Killam Industrial Boulevard could be realigned to connect with the overpass and the potential United Avenue extension to improve mobility. A diamond interchange with entrance and exit ramps at this location might be possible, but the spacing between this interchange and the existing interchange at Loop 20/IH 69W would only be about 1.3 miles. If Killam Industrial Boulevard is not realigned, the interchange could be designed in such a way to use ramps at the offset intersection. However, this solution would be less efficient and more expensive than realigning Killam Industrial Boulevard.

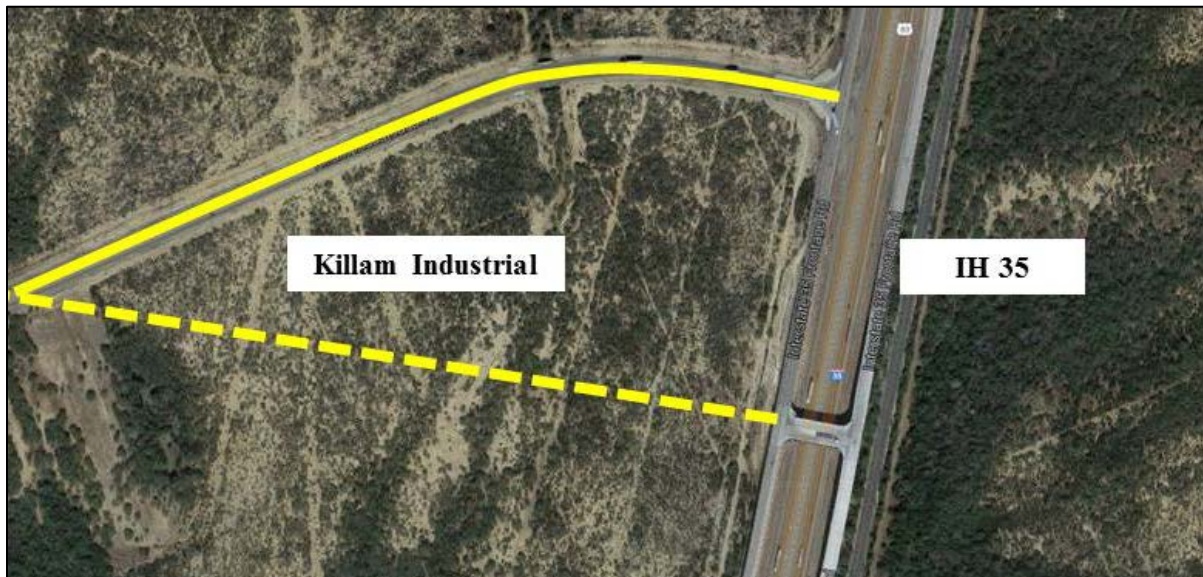


Figure 20. Killam Industrial Boulevard Alignment and IH 35 Overpass.

Vallecillo Road

Potential interchange locations along this corridor include FM 1472 and IH 35 (Figure 13):

- **FM 1472.** In the Thoroughfare Plan and Killam Industrial Park master plan, Vallecillo Road has two proposed alignments to connect with FM 1472: the first one at A F Muller Boulevard and the second one at Interamerica Boulevard. If FM 1472 is upgraded to an access-controlled facility, aligning Vallecillo Road with A F Muller Boulevard would provide more adequate spacing for a diamond interchange. Currently, there are several buildings at the intersection of FM 1472 and Vallecillo Road/A F Muller Boulevard. Some of these properties might be affected in order to acquire the necessary right-of-way for the project.
- **IH 35.** According to the Thoroughfare Plan, Vallecillo Road will connect to the IH 35 frontage roads via a grade separation. Without entrance or exit ramps to connect to the IH 35 main lanes, traffic heading east on Vallecillo Road that intends to travel south on IH 35 would drive 1.5 miles to the nearest entrance ramp, which is located south of the IH 35 and Loop 20/IH 69W interchange. This means that traffic on Vallecillo Road traveling to the World Trade Bridge would have to stay on the frontage roads or travel south on FM 1472. Eastbound traffic on Vallecillo Road traveling north on IH 35 would have two options. The first option is to travel on the northbound frontage road for three miles to enter IH 35 north of Carriers Drive. The second option is to travel on the southbound frontage road for one mile, make a turnaround at the grade separation south of Killam Industrial Boulevard, and then travel 0.25 miles on the northbound frontage roads to the nearest entrance ramp. Given the location of where Vallecillo Road would intersect IH 35, a diamond interchange appears feasible, taking into account clearance requirements for the railroad track on the east side of IH 35.

Verde Road, Carriers Drive, and Uniroyal Drive

Uniroyal Drive, Carriers Drive, and Verde Road are located within one mile of one another. Currently, there is a southbound entrance ramp and a northbound exit ramp south of Carriers Drive, near where Verde Road might intersect. There are northbound entrance ramps between Carriers Drive and Uniroyal Drive and north of Uniroyal Drive. There are southbound exit ramps north of Uniroyal Drive and between Uniroyal Drive and Carriers Drive, as shown in Figure 21.

Based on the current entrance and exit ramp locations, Verde Road would not have sufficient spacing for an interchange at the proposed location according to the Thoroughfare Plan. However, Verde Road could connect to the frontage roads via a grade separation. A grade separation would require elevating the frontage roads similar to the current configuration at Carriers Drive. Another possibility would be to realign Verde Road so that it connects with the grade separation at Carriers Drive. A third possibility would be to relocate the ramps south of Carriers Drive further south to provide adequate spacing for Verde Road. However, this option would result in traffic inefficiencies because of the short distance between the ramps and the Union Pacific railyard.

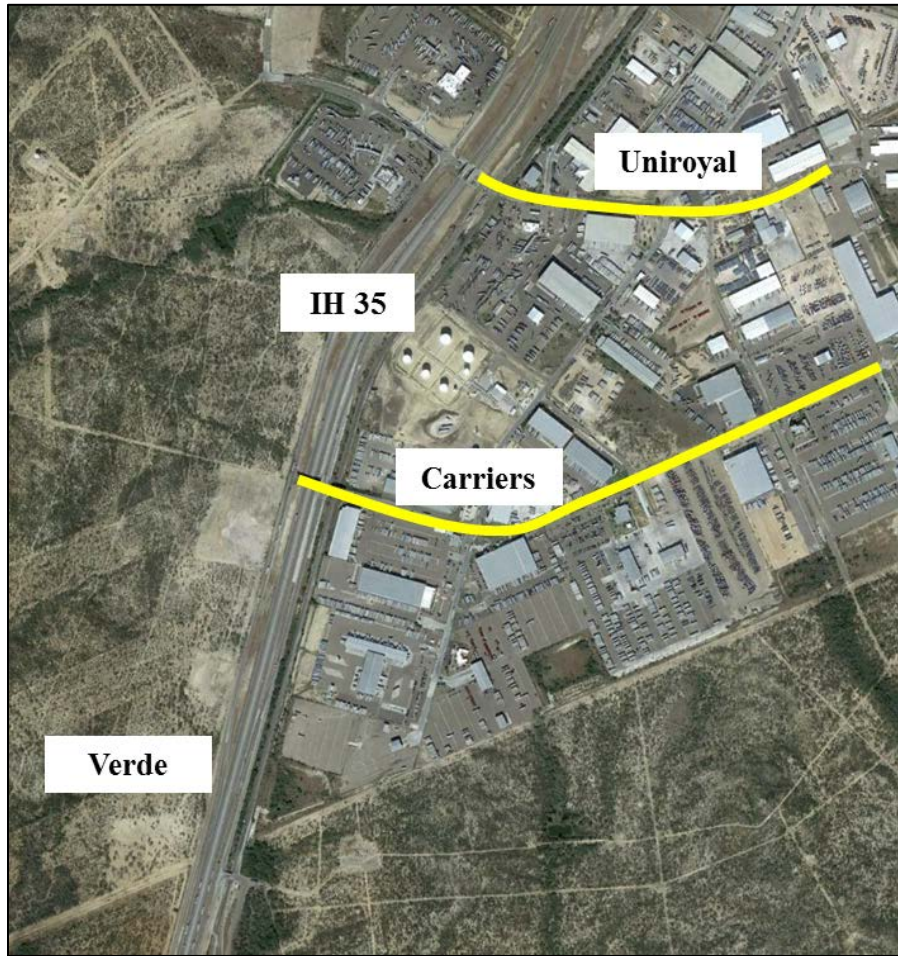


Figure 21. Potential Location of Verde Road and Existing Locations of Carriers Drive and Uniroyal Drive.

Beltway Parkway is currently being expanded and will connect to Hachar Parkway once finished. Beltway Parkway connects on the west side of IH 35 across from Uniroyal Drive, and is anticipated to result in increased traffic as construction advances. Uniroyal Drive should include a grade separation similar to Carriers Drive to accommodate the railroad. Currently, when trains pass through the area, many vehicles, particularly trucks, make a U-turn and travel to Carriers Drive rather than wait for the train to finish passing. Given the spacing of Verde, Carriers, and Uniroyal, ramps should be placed north of Uniroyal and south of Verde to accommodate traffic for all three roads in a coordinated, coherent way rather than having separate ramps for each road.

Hachar Parkway

Hachar Parkway is an east-west corridor to be constructed between FM 1472 and IH 35 approximately four to five miles north of Loop 20/IH 69W. Hachar Parkway is being proposed as a six-lane facility with two-lane frontage roads in both directions. Potential interchange locations along this corridor include FM 1472 and IH 35:

- **FM 1472.** According to the Laredo Thoroughfare Plan, Hachar Parkway will connect with FM 1472 via an interchange. The final location of the interchange is not yet known. However, there are several factors to take into consideration in the long-range. The proposed location of the interchange in the Hachar master plan is near a curve on FM 1472 and Las Tiendas Road, which might result in some challenges for a traditional diamond interchange configuration. The skew angle of Las Tiendas Road could be problematic in the long-term. Although this could be handled during the design, realigning Las Tiendas Road or the point where Hachar Parkway intersects FM 1472 might be reasonable alternatives.
- **IH 35.** The proposed location of the Hachar Parkway interchange in the Hachar master plan is roughly 2.5 miles north of the Uniroyal Drive interchange. There is a truck parking area approximately one mile south of the Hachar Parkway interchange, which should be accounted for to avoid operational issues with the ramps. There are no other developments in this area. However, clearance for the railroad east of IH 35 will need to be maintained.

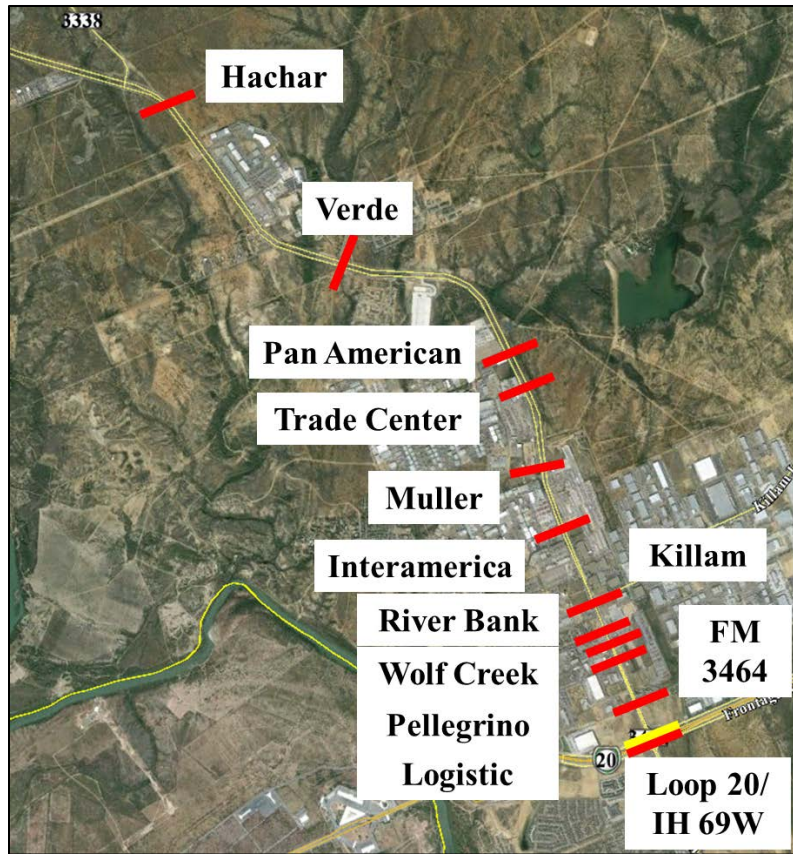
Interchange Spacing

As growth occurs and major corridors are upgraded to add capacity, interchanges will likely be built. Interchange spacing will be a factor for controlling corridor access. On FM 1472, based on current estimates, much of the corridor will be oversaturated by 2040, therefore increasing capacity or providing alternate route options will be critical to facilitate the movement of goods and people. If FM 1472 is upgraded to an access-controlled facility, limiting the number of interchanges will be crucial to improve capacity and maintain mobility.

Figure 22 shows the location of all existing and potential intersections on FM 1472 (in red) based on current and planned roadways, as well as the spacing between adjacent intersections. Figure 22 also shows a current interchange at Loop 20/IH 69W (in yellow), which includes overpasses on Loop 20 and one southbound to eastbound direct connector.

All intersections between Loop 20/IH 69W and Pan American Boulevard are less than 0.53 miles apart. AASHTO recommends interchange spacing of at least one mile in urban areas¹². Most intersecting roads along FM 1472 should not have interchanges if FM 1472 is upgraded. At this point, the intersections that most likely could include interchanges are River Bank Drive/Killam Industrial Boulevard, A F Muller Boulevard (or Interamerica Boulevard depending on the final alignment of Vallecillo Road), Pan American Boulevard, and Hachar Parkway. For other intersecting roads, the treatment to consider depends on the type of upgrade selected for FM 1472. For an expressway configuration, those roads would form T-intersections with FM 1472. For a freeway configuration, the intersecting roads would form T-intersections with the frontage roads.

¹² American Association of State Highway and Transportation Officials. *A Policy on Geometric Design of Highways and Streets*. 2004.



Road	Distance between Roads (miles)
Hachar Parkway	1.35
Verde Road	1.22
Pan American Boulevard	0.23
Trade Center Boulevard	0.53
A F Muller Boulevard	0.31
Interamerica Boulevard	0.46
River Bank Drive/Killam Industrial Boulevard	0.17
Wolf Creek Drive	0.08
Pellegrino Court	0.11
Logistic Drive	0.26
FM 3464	0.21
Loop 20/IH 69W	

Figure 22. Current and Potential Intersections along FM 1472 (Existing Interchange Shown in Yellow).

On IH 35, the location of all current and potential interchanges is shown in Figure 23 (in yellow and red, respectively). The figure also shows the spacing between adjacent interchanges.

The potential location of United Avenue and the existing location of Killam Industrial Boulevard are 0.2 miles apart. This distance is too close to have separate interchanges, and one solution is to realign Killam Industrial Boulevard with the existing grade separation on IH 35. This would allow United Avenue to connect east of IH 35 and a full interchange to be constructed.

Vallecillo Road is proposed in the Killam Industrial Park master plan to intersect with IH 35 less than a mile north of Killam Industrial Boulevard, but could be aligned further north on IH 35 to allow additional spacing between interchanges. In addition, if Killam Industrial Boulevard is realigned to the existing grade separation to the south, additional spacing will be available.

Verde Road, Carriers Drive, and Uniroyal Drive have a spacing of less than a mile between all three locations. One interchange could be built for this area integrating all three roads in such a way that the three roads intersect with the frontage roads.

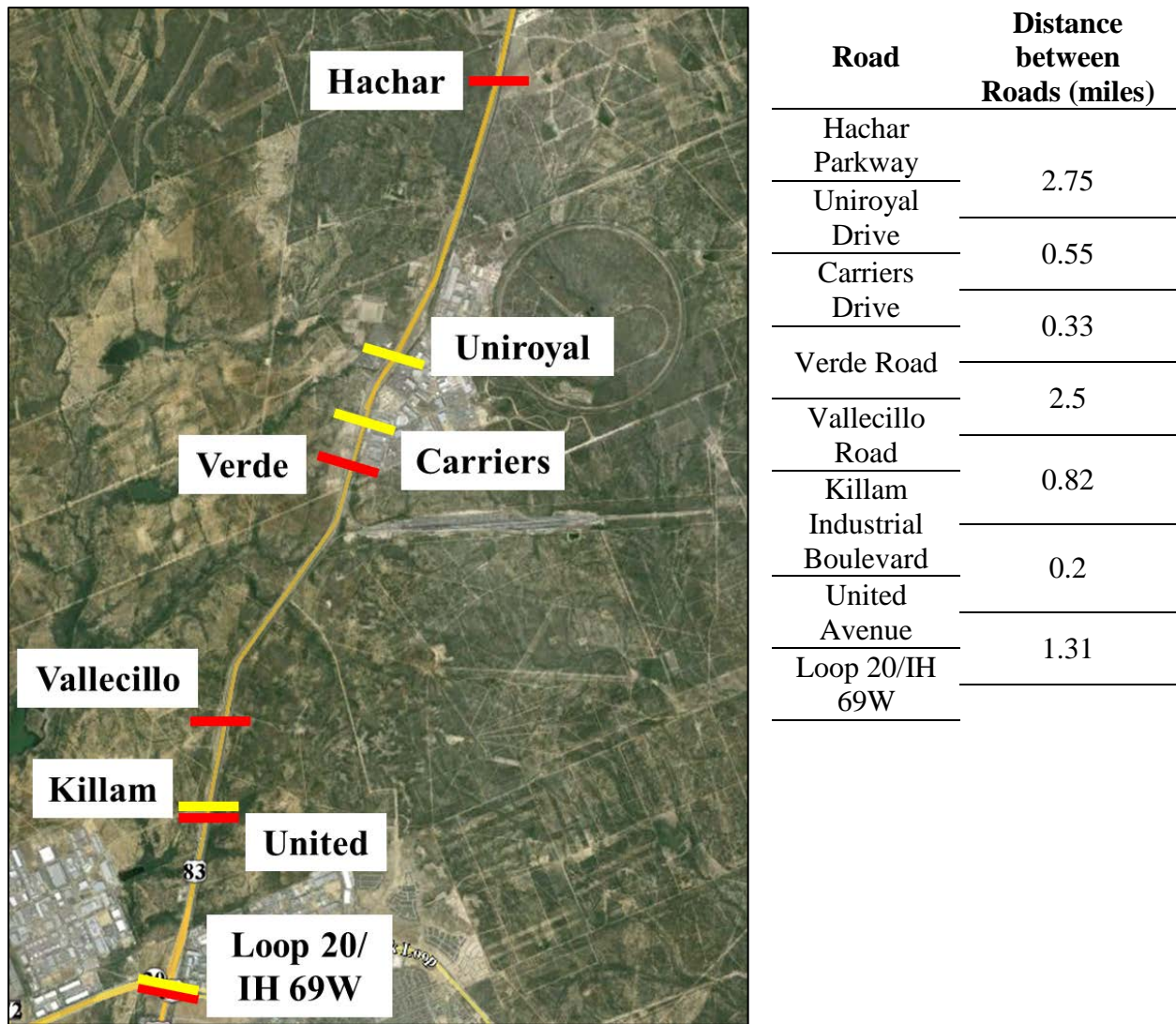


Figure 23. Current and Potential Interchanges along IH 35.

TRAFFIC MANAGEMENT STRATEGIES

Building or expanding highways are not necessarily the only available solution to address congestion issues. As travel demand increases, optimizing the operational efficiency of the existing transportation system becomes increasingly important. This section describes a few traffic management strategies that could improve traffic operations in the study area in the long-range.

Intelligent Transportation System Technologies

Existing Intelligent Transportation System (ITS) infrastructure in the Laredo Region is managed by a number of public agencies, including TxDOT, the City of Laredo (Traffic Operations/Safety, Police, and Fire), the Texas Department of Public Safety (DPS), Webb County Sheriff's Office, and local school districts. Most TxDOT-managed ITS infrastructure is found along IH 35, US 83, US 59, FM 1472 and Loop 20/IH 69W corridors, while the City of Laredo equipment focuses on the downtown area and DPS monitors border crossings. A data sharing agreement exists between TxDOT and stakeholder agencies, including DPS and the City of Laredo.

The 2003 Laredo Regional ITS Deployment Plan¹³, the 2005 City of Laredo ITS Master Plan¹⁴ and the Laredo region components of a 2013 TxDOT ITS Strategic Plan¹⁵ identified future ITS investment needs to improve mobility, safety, and commercial freight movement in the Laredo area. Specific strategies for the study area include the following:

- Network-wide congestion and incident monitoring and management.
- Traffic information dissemination/broadcast traveler information (especially for commercial vehicles and motorists).
- Railroad crossing blockage notification for emergency medical service (EMS) vehicles, buses, commercial vehicles, and passenger cars.
- Vehicle classification and counting capabilities through video data.

Connected Vehicle Technologies

Ongoing research is developing the means for heavy vehicles to participate in linked platoons using connected vehicle technologies. Sensors and communication systems between trucks would allow vehicles to travel in two-vehicle platoons, with the lead vehicle acting as the control unit for both vehicles. The following vehicle would respond to communications from the lead vehicle pertaining to braking, acceleration, and lane choice and would have additional sensors to

¹³ Kimley-Horn, and Associates, Inc. (2003). *Laredo Regional ITS Deployment Plan*. Retrieved from <http://www.consystec.com/texas/web/laredo/files/laredoregionalITSdeploymentplan.pdf>.

¹⁴ Kimley-Horn, and Associates, Inc. (2005). *City of Laredo ITS Master Plan*. Retrieved from http://www.cityoflaredo.com/traffic/laredo_its_master_plan.pdf

¹⁵ Seymour, E., Kuhn, B., Balke, K., Chaudhary, N., Jasek, D., Rajbhandar, R., et al. (2014). *TxDOT ITS Strategic Plan 2013*. College Station, Texas: Texas A&M Transportation Institute.

ensure safe operation. Early testing¹⁶ of platooned truck operations reveals average fuel reductions of 10 percent, with additional benefits in the form of increased safety, labor cost (because fewer drivers would be needed in the long-term), and more efficient equipment utilization.

It is not clear at this point the degree to which connected vehicle technologies could be used on a corridor such as FM 1472. The reason is that most freight applications under development focus on long-distance travel. However, some form of connected vehicle technology might evolve that could be applied to the form of short-haul transportation that characterizes a significant amount of truck traffic in the Laredo area. It is possible that this type of technology could include a combination of vehicle-to-vehicle communications as well as communications between trucks and infrastructure-based sensors. An example of this type of application could be the detection of incidents along FM 1472 or long queues at certain signalized intersections and communication of this situation to a wide range of trucks that normally would take this route so that they plan a detour.

Driveway Access Management

According to NCHRP Report 420, roadway speeds can decrease an average of 2.5 miles per hour for every ten access points per mile on a single side of a road (up to a maximum reduction of 10 miles per hour). According to the AASHTO Green Book¹⁷, the number of crashes at driveways is higher than at other types of intersections. The number of driveways along FM 1472 is significant. For example, for a 0.4-mile section south of Killam Industrial Boulevard, there are eight driveways along the northbound lanes, which translate to 20 access points per mile (Figure 24). Although these driveways provide convenient access to warehouses and other businesses, the high density of driveways may cause traffic delay and increase safety risks. According to the TxDOT Access Management Manual, access connections spacing should vary from 200 feet to 510 feet depending on the functional classification and speed limit of the road¹⁸. In practice, for most driveways in Figure 24, the spacing between adjacent driveways is less than 200 ft. In the future, some driveways could be realigned or consolidated to minimize their negative impacts on operations and safety on FM 1472.

¹⁶ Janssen, R., Zwijnenberg, H., Blankers, I., & de Kruijff, J. (2015). *Truck platooning: Driving the future of transportation*. Netherlands Organization for Applied Scientific Research.

¹⁷ American Association of State Highway, and Transportation Officials. *A Policy on Geometric Design of Highways and Streets*, 2011. AASHTO, 2011.

¹⁸ Texas Department of Transportation. *Access Management Manual*. July 2011.

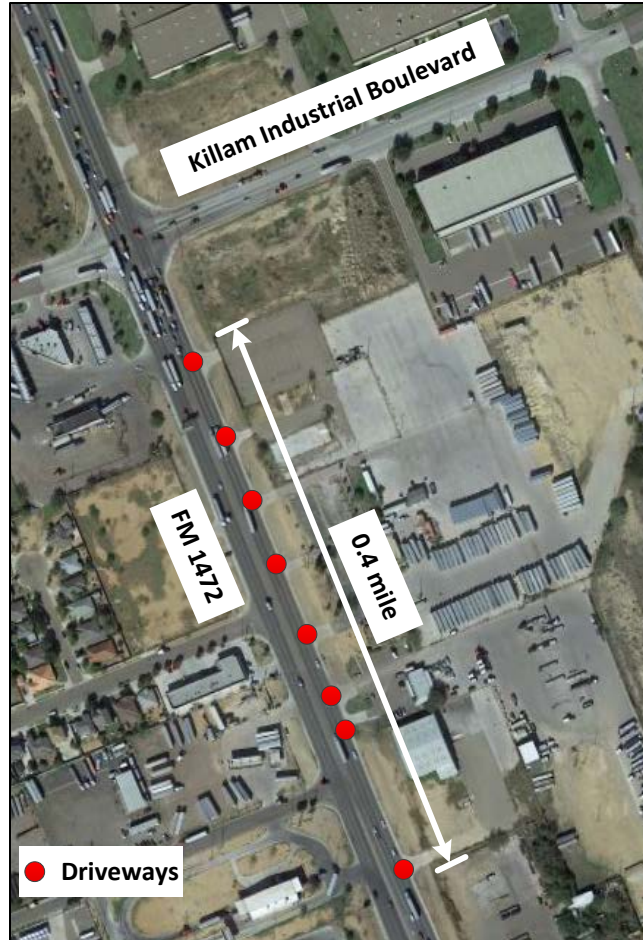


Figure 24. Driveways on FM 1472.

CONCLUSIONS

The TxDOT Laredo District requested that TTI conduct an analysis to identify potential strategies to improve mobility and safety in the area bounded by IH 35, FM 1472, and SH 255. TTI evaluated potential roadway improvements and the possibility of adding interchanges to improve mobility in the long-range study area. To develop the recommendations, TTI reviewed information pertaining to current and projected roadway alignments, site layouts and projected traffic volumes from TxDOT, the Laredo MPO, and consultants.

The 2040 travel demand model for the area expects much of FM 1472 to be oversaturated, resulting in the need to upgrade capacity and/or provide alternative routing options. Potential strategies to upgrade FM 1472 include adding lanes, creating an expressway, or creating a freeway with frontage roads. Adding lanes would remove bottlenecks at locations where the number of lanes drops from three to two. Upgrading FM 1472 to an expressway would increase mobility by adding grade separation at intersections. Upgrading FM 1472 to a full freeway configuration would control access by adding frontage roads with ramps. The amount of right-of-way required varies for each option, which may affect the feasibility of implementation. FM 1472 should be upgraded to Las Tiendas Road. The area north of this location is expected to

remain sparsely developed in the long-range, according to planning documents reviewed by TTI. However, developments may be influenced by international regulations and commerce, which are difficult to forecast.

To increase mobility, several existing roadways could be extended, including Aquero Boulevard, Milo Road (FM 3464), River Bank Drive, and Sara Road. Aquero Boulevard could provide increased access to La Bota Ranch community by bypassing FM 1472. FM 3464 could be extended west of FM 1472 to River Bank Drive. River Bank Drive could be extended south of Loop 20/IH 69W to connect two existing residential areas without having to use FM 1472 as currently required. Sara Road should be extended north as new developments are built to provide another north-south arterial between FM 1472 and IH 35.

Interchange spacing would need to be evaluated on FM 1472 and IH 35. In general, interchanges that are too closely spaced have negative mobility and safety impacts. Interchange spacing on FM 1472 and IH 35 could affect the alignments of existing or proposed adjacent roadways, including roadways such as Hachar Parkway, Vallecillo Road, and Verde Road. If upgrades are made to increase capacity on FM 1472, access might need to be controlled. To improve mobility and facilitate future growth east of IH 35, Killam Industrial Boulevard should be realigned to connect with the existing overpass on IH 35 near Killam Industrial Boulevard's current location.

As travel demand increases, optimizing the operational efficiency of the existing transportation system becomes increasingly important. A number of traffic management strategies could improve traffic operations in the study area in the long-range. For example, ITS technologies could include network-wide congestion and incident monitoring and management, traveler information, railroad crossing blockage notification, and vehicle classification and counting capabilities. Connected vehicle technologies are still emerging, but some type of connected vehicle technology might emerge that could be applied in the study area, including a combination of vehicle-to-vehicle communications as well as communications between trucks and infrastructure-based sensors. There are a large number of closely spaced commercial driveways along FM 1472. In the future, some driveways could be realigned or consolidated to minimize their negative impacts on operations and safety on FM 1472.