



Appendix D

Traffic Analysis

River Road Route Alternatives Study

Webb County-City of Laredo Regional Mobility Authority
Laredo & Webb County Area Metropolitan Planning Authority
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Overview

Traffic operations analysis was conducted for the Opening Year (2028) and Future Year (2045) Build and No-Build scenarios as part of the River Road project in the northwest portion of Laredo, Texas. The study area of the River Road project includes Mines Road from I-69 at the south end to Las Tiendas Road at the north end.

Several factors were included in the traffic operations analysis:

- Review existing turning movement count and AADT spot count data
- Balance existing AM and PM peak hour traffic volumes
- Develop background traffic growth and baseline traffic projections
- Conduct opening and future year traffic operational analysis

This technical memorandum will describe the traffic operations analysis in detail.

Review Existing Traffic Data

Existing traffic counts were provided from a recent study in the vicinity of the River Road project. As part of a city-wide traffic synchronization study conducted by the City of Laredo, 15-minute turning movement counts along Mines Road from Pan American Boulevard to the I-69 Frontage Roads were completed in 2018. Additional peak hour counts at spot locations not included in the above study were pulled from the TxDOT Traffic Count Database System (TCDS). The traffic count data along Mines Road included both car and truck volumes for all intersection approaches, including turning movement aggregation.

The existing counts were used to determine the appropriate AM and PM peak hour. In the AM, the peak hour best suited for this analysis was determined to be between 8:15 and 9:15 AM. Similarly, 5:00 to 6:00 PM was determined to be the PM peak hour best suited for this analysis. These peak hours correlate well to the peak hours at the Mines Road/Killam Industrial Boulevard and Mines Road/Vallecillo Road intersections, and match the peak hours selected for the previous Traffic Operations Analysis conducted as part of the recent Vallecillo Road project. The count volumes from the selected AM and PM peak hours were compiled to be input into the base Synchro models, representing unbalanced 2018 AM and PM conditions.

Balance Existing Counts

The unbalanced 2018 volumes were then balanced throughout the system with the assumption that the Mines study counts were more accurate data than the counts pulled from the TCDS due to the Mines study counts all taking place on the same day(s), the consultant responsible for the counts having already reviewed and verified the results, and the consistency of the counts having been used as the basis for several other recent projects and analyses. Due to the numerous businesses with driveway access to and from Mines Road and Killam Industrial Boulevard, some links were not fully balanced as the difference in volumes between intersections is most likely accounted for by the driveway access points which do not appear in the Synchro models. All other locations assumed volume balancing.

Develop Background Growth and Baseline Projections

The Laredo TransCAD 2008 Travel Demand Model (TDM) was recently updated in 2022; the updated model files were provided for utilization as part of the traffic operations analysis. As part of that update, a 2018 Baseline TDM which accounted for growth, development, and network changes that had occurred since the last update in 2008 to the Laredo TDM was established. To avoid duplicating the effort that went into that analysis, and to match the previous analysis conducted for the Vallecillo Road project which also used 2018 as the base year, the updated Laredo 2018 TDM was assumed

to be the appropriate Base Year model for the River Road project. The TDM also included a 2045 scenario which was assumed to be the appropriate Future Year model. 2028 vehicle trip tables were developed by interpolating between the established 2018 and 2045 trip tables. The 2028 and 2045 TDM's were developed by creating new model files based on the 2018 and 2045 TDM networks provided and adding roadways needed for the analysis that were not included in the base files to the network within the project area based on input provided by the project team.

Each roadway link in the TDM has its own background growth rate, which was calculated using the 2018 and 2045 volumes obtained from traffic counts as inputs in the compound annual growth rate (CAGR) formula: $CAGR = (2045 \text{ Volume} / 2018 \text{ Volume})^{(1/10)} - 1$. The calculated CAGR values for all links ranged from -0.05% to 8%. A minimum of 2% growth was assumed for any link with lower (or negative) CAGR values in accordance with TxDOT standards. These CAGR values were applied to the 2018 volumes to obtain Opening Year (2028) and Future Year (2045) volume sets. One exception to this is the intersection of Mines Road/Vallecillo Road. Due to the Vallecillo Road project having a scheduled opening year of 2025, the 2025 volumes from that intersection were taken from the previous Vallecillo Road analysis. Growth rates were applied to the 2025 volumes at that intersection to obtain Opening Year (2028) and Future Year (2045) volumes. Because the calculated Opening and Future Year Volume sets were unbalanced due to the various growth rates used for different links, the volume sets were balanced again following the same balancing procedure described earlier.

The TDM was then used for comparing traffic outputs for two networks that are exactly the same, except that one includes River Road (the Build scenario), and one does not (the No Build scenario). Trucking was assumed to be prohibited on River Road per the project team. The 2028 TDM was run without the addition of River Road to obtain the No Build scenario traffic volume outputs. The network was then updated to include River Road and run again with no other input changes to obtain the Build scenario traffic volume outputs. The TDM was also run for two specific Build scenarios analyzing River Road with two lanes each direction and with three lanes each direction. The outputs from these scenarios were compared to determine the percentage of existing trips that would divert to River Road without adding any new trips to the system. This same process was carried out for the 2045 TDM scenarios.

When reviewing the results of the 2028 and 2045 TDM's, it was observed that the volume increase on River Road in the Build scenario was larger than the volume decrease on Mines Road, especially on segments of those roadways further north in the project area. By investigating this issue further, it was revealed that in the 2028 scenario and even more significantly in the 2045 scenario, so much development and additional traffic is forecasted to occur along Mines Road between the northern project limit (Las Tiendas Road) and FM255 (over 10 miles north of the project area), that Mines Road operates significantly over capacity between I-69 and FM 255. In the No Build scenario, congestion and delay is so impactful that the TDM indicated a percentage of traffic volume utilizing FM255 and I-35 as an alternate route to Mines Road, with the two routes having nearly identical travel times despite the FM255 and I-35 route being approximately 20 miles longer. This explains why River Road had higher volume increases than Mines Road volume decreases in the Build scenarios, as vehicles using the FM255 to I-35 route in the No Build scenarios were expected to utilize the more reasonable route (in terms of distance and travel time) of Mines Road to River Road in the Build scenarios. The project team confirmed that it is their experience that this lengthy alternate route is already being used today and would be expected to continue to be used until River Road is built.

Opening and Future Year Operational Analysis

Synchro models were developed for the study area for the Base Year (2018), Opening Year (2025) No Build, and Future Year (2045) No Build scenarios. At this time, only the Mines Road corridor was included in the Synchro models. Should the project require additional traffic analysis at a later stage of planning/design, larger Synchro networks can be developed. Signal timings obtained from TxDOT and the City of Laredo were coded in at the signalized intersections in the models. The balanced Base Year, Opening Year, and Future Year volume sets were input into the AM and PM No Build models.

Opening Year and Future Year Build models were developed by copying the Opening Year and Future Year No Build models and redistributing volume along Mines Road. The volume diversion patterns from the TDM analysis were applied to the Opening Year and Future Year No Build volume sets to obtain the Build volume sets which were input into the Build models. Complete Delay and Level of Service information for each intersection in the network was extracted from the Synchro model outputs.

Summarized results, comparisons between the No Build and Build scenarios, and recommendations are provided below.

Opening Year (2028) Laredo TDM

- In the 2-lane River Road Build scenario, the percentage of diversion off of Mines Road to River Road ranged from 22-34% for various segments of Mines Road
- The daily volume on River Road in the 2-lane Build scenario varied from 10,000-15,000 vehicles for various segments of River Road
- The truck percentage on Mines Road increases from 32-37% in the No Build to 39-54% in the 2-lane River Road Build scenario (this is a product of total volume on Mines Road being reduced and not additional trucks being added to the system)
- The travel time on Mines Road from Las Tiendas Road to I-69 drops from 34 minutes in the No Build scenario to 15 minutes (using either Mines Road or River Road) in the 2-lane Build scenario
- In the 3-lane River Road Build scenario, the percentage of diversion off of Mines Road to River Road ranged from 38-42% for various segments of Mines Road
- The daily volume on River Road in the 3-lane Build scenario varied from 12,000-25,000 vehicles for various segments of River Road
- The truck percentage on Mines Road increases from 32-37% in the No Build to 51-64% in the 3-lane River Road Build scenario (this is a product of total volume on Mines Road being reduced and not additional trucks being added to the system)
- The travel time on Mines Road from Las Tiendas Road to I-69 drops from 34 minutes in the No Build scenario to 13 minutes (using Mines Road) and 12 minutes (using River Road) in the 3-lane Build scenario

Future Year (2045) Laredo TDM

- In the 2-lane River Road Build scenario, the percentage of diversion off of Mines Road to River Road ranged from 4-25% for various segments of Mines Road
 - Because there is so much additional volume projected in the 2045 scenario due to the developments and growth north of the project area, the diversion percentage away from Mines Road is smaller in 2045 than in 2028 because so much of that additional traffic simply has few to no other viable routes to utilize
- The daily volume on River Road in the 2-lane Build scenario varied from 10,000-19,000 vehicles for various segments of River Road

- The truck percentage on Mines Road increases from 31-36% in the No Build to 40-56% in the 2-lane River Road Build scenario (this is a product of total volume on Mines Road being reduced and not additional trucks being added to the system)
- The travel time on Mines Road from Las Tiendas Road to I-69 drops from 40 minutes in the No Build scenario to 28 minutes (using either Mines Road or River Road) in the 2-lane Build scenario
- In the 3-lane River Road Build scenario, the percentage of diversion off of Mines Road to River Road ranged from 23-41% for various segments of Mines Road
- The daily volume on River Road in the 3-lane Build scenario varied from 12,000-40,000 vehicles for various segments of River Road
- The truck percentage on Mines Road increases from 31-36% in the No Build to 53-77% in the 3-lane River Road Build scenario (this is a product of total volume on Mines Road being reduced and not additional trucks being added to the system)
- The travel time on Mines Road from Las Tiendas Road to I-69 drops from 40 minutes in the No Build scenario to 23 minutes (using Mines Road) and 16 minutes (using River Road) in the 3-lane Build scenario

Opening Year (2028) Synchro Models

- In the AM Peak hour, the volume diverting from Mines Road to River Road varied from 710-900 vehicles in the NB and SB directions combined.
- In the AM Peak hour, NB and SB volume on Mines Road decreased from 2130-3230 vehicles in the No Build scenario to 1420-2640 vehicles for various segments on Mines Road
- In the PM Peak hour, the volume diverting from Mines Road to River Road varied from 750-970 vehicles in the NB and SB directions combined.
- In the PM Peak hour, NB and SB volume on Mines Road decreased from 2030-3270 vehicles in the No Build scenario to 1280-2380 vehicles for various segments on Mines Road
- In general, the NB and SB intersection movements and the EB and WB turning movements to/from NB and SB saw slight improvements in LOS and delay in the Build scenario versus the No Build
- Optimizing the signal timings in the Build scenario resulted in slight improvements to LOS and delay for the majority of movements in the network, but in most cases the LOS value did not change

Future Year (2045) Synchro Models

- The majority of intersections along Mines Road operate at LOS F in both the No Build and Build scenarios due to the significantly higher volumes that are forecasted.
- In the 2-lane Build scenario AM Peak hour, the volume diverting from Mines Road to River Road varied from 410-920 vehicles in the NB and SB directions combined.
- In the 2-lane Build scenario AM Peak hour, NB and SB volume on Mines Road decreased from 3810-5510 vehicles in the No Build scenario to 3070-5060 vehicles for various segments on Mines Road
- In the 2-lane Build scenario PM Peak hour, the volume diverting from Mines Road to River Road varied from 430-880 vehicles in the NB and SB directions combined.
- In the 2-lane Build scenario PM Peak hour, NB and SB volume on Mines Road decreased from 3360-5460 vehicles in the No Build scenario to 2690-5010 vehicles for various segments on Mines Road
- In the 3-lane Build scenario AM Peak hour, the volume diverting from Mines Road to River Road varied from 1310-1750 vehicles in the NB and SB directions combined.

- In the 3-lane Build scenario AM Peak hour, NB and SB volume on Mines Road decreased from 3810-5510 vehicles in the No Build scenario to 2500-3820 vehicles for various segments on Mines Road
- In the 3-lane Build scenario PM Peak hour, the volume diverting from Mines Road to River Road varied from 750-970 vehicles in the NB and SB directions combined.
- In the 3-lane Build scenario PM Peak hour, NB and SB volume on Mines Road decreased from 3360-5460 vehicles in the No Build scenario to 2030-3640 vehicles for various segments on Mines Road
- In general, the NB and SB intersection movements and the EB and WB turning movements to/from NB and SB saw slight improvements in LOS and delay in the Build scenario versus the No Build
- Signal timing optimization was not investigated in the Future Year scenario due to the significantly higher volumes that are forecasted and the majority of intersections operating at LOS F

General

- The TDM and Synchro results indicate significant travel time and delay reduction/LOS benefits should River Road be designed to be expanded to three lanes between the Opening Year (2028) and the Future Year (2045). The benefits of a 3rd lane are present in the 2028 scenario as well, but not as significant as in the 2045 scenario.
- No geometric or signal timing/phasing improvements were evaluated along Mines Road (apart from simple signal timing optimization). Improvements to Mines Road should be evaluated as part of a separate study to investigate evaluate potential options for improving operations given the magnitude of volume projected and the relatively poor operational performance of the Mines Road corridor in the Future Year scenario
- In the 2028 scenario, travel time on Mines Road between Las Tiendas Road and I-69 decreases from 34 minutes to 15 minutes (using either Mines Road or River Road) in the No Build versus Build scenario
- In the 2045 scenario, travel time on Mines Road between Las Tiendas Road and I-69 decreases from 40 minutes to 28 minutes (using either Mines Road or River Road) in the No Build versus Build scenario, and drops to 23 minutes (using Mines Road) or 16 minutes (using River Road) if River Road expanded to three lanes each direction instead of two lanes each direction

Appendix D: Traffic Analysis

- The intersection LOS values in the AM Peak Hour for each scenario are shown below:

Mines Road Intersection LOS	2018 Existing	2028 No Build	2028 Build (Existing Signal Timings)	2028 Build (Optimized Signal Timings)	2045 No Build	2045 Build (2 lanes)	2045 Build (3 lanes)
I-69 EB Frontage	C	D	C	C	F	F	F
I-69 WB Frontage	D	F	C	D	F	F	F
Milo Road	B	C	C	B	F	F	E
Riverbank/Killam Industrial	F	F	F	E	F	F	F
Interamerica	B	C	C	B	D	C	C
AF Muller/Vallecillo	B	C	C	C	F	F	F
Trade Center	C	C	C	B	F	D	C
Pan American	B	B	C	B	E	D	D

- The intersection LOS values in the PM Peak Hour for each scenario are shown below:

Mines Road Intersection LOS	2018 Existing	2028 No Build	2028 Build (Existing Signal Timings)	2028 Build (Optimized Signal Timings)	2045 No Build	2045 Build (2 lanes)	2045 Build (3 lanes)
I-69 EB Frontage	D	E	F	F	F	F	F
I-69 WB Frontage	D	F	F	E	F	F	F
Milo Road	C	C	C	B	C	C	C
Riverbank/Killam Industrial	D	F	D	D	F	F	F
Interamerica	B	B	B	B	F	F	E
AF Muller/Vallecillo	C	F	F	F	F	F	F
Trade Center	C	D	C	C	F	F	F
Pan American	B	B	B	B	D	D	D