Lafayette Regional Xpressway (LRX)- Level I Traffic and Revenue Study- FINAL

Stantec

Prepared for:

HNTB

and LMEC

June 21, 2016

Contents

1.0 INTRODUCTION 1
1.1 STUDY AREA 1
1.2 ALTERNATIVE CORRIDORS 2
1.3 TOLL COLLECTION 3

2.0 MODELING METHODOLOGY 4
2.1 BACKGROUND 4
2.2 TDM BASE YEAR MODEL ASSUMPTIONS AND MODEL RESULTS REVIEW 6
2.2.1 Review of Base Year Results 7
2.2.2 Commercial Vehicle Review 10
2.2.3 Toll Diversion Component 12

3.0 FUTURE DEVELOPMENT 14
3.1 POPULATION AND EMPLOYMENT ASSUMPTIONS 14
3.2 FUTURE NETWORK CHANGES 15

4.0 TRAFFIC AND TOLL REVENUE ANALYSIS 18
4.1 TOLL COLLECTION SYSTEM 18
4.2 TOLL RATES 19
4.3 ASSUMPTIONS 20
4.3.1 Toll Technology 20
4.3.2 Truck Tolls 21
4.3.3 Annualization 21
4.3.4 Ramp up 21
4.4 TRAFFIC AND TOLL REVENUE 22
4.4.1 Scenario 1 22
4.4.2 Scenario 2 26

APPENDIX A - LEVEL OF SERVICE ANALYSES 30

List of Figures

Figure 1 Study Area 2
Figure 2 Expanded Model Extents 5
Figure 3 TransCad Model Estimated Volumes vs ADT 7
Figure 4 Screenlines in Study Area 8
Figure 5 Cube Model Estimated Volumes vs ADT 9
Figure 6 LADOTD Vehicle Classification Counts 11
Figure 7 Sensitivity to Time Savings 12
Figure 8 Sensitivity to Toll 13
Figure 9 Sensitivity to Trip Distance 13
Figure 10 Existing and Commited Projects 16
Figure 11 Vision Projects 17
Figure 12 Proposed Paypoints 18
Figure 13 Comparable Toll Rates 19
Figure 14 Scenario 1 Forecasted Tolled Daily Traffic Volumes for 2030 and 2040 23
Figure 15 Scenario 1 Forecasted Toll-Free Daily Traffic Volumes for 2030 and 2040 24
Figure 16 Scenario 2 Forecasted Tolled Daily Traffic Volumes for 2030 and 2040 27
Figure 17 Scenario 2 Forecasted Toll-Free Daily Traffic Volumes for 2030 and 2040 28

List of Tables

Table 1 System Scenarios 3
Table 2 Base Year Population Estimates by Parish 6
Table 3 Base Year Employment Estimates by Parish 7
Table 4 Screenline Totals 9
Table 5 Screenline Totals after adjustments 9
Table 6 Future Year Population and Employment Forecasts 14
Table 7 Regional Network Improvements 15
Table 8 Proposed Toll Schedule Scenario 1 and Scenario 2 20
Table 9 Summary of Ramp up factors 21
Table 10 Traffic Volumes for Scenario 1 Toll-Free and Tolled 22
Table 11 Scenario 1 Revenue Projections 2030-2050 25
Table 12 Traffic Volumes for Scenario 2 Toll-Free and Tolled 26
Table 13 Scenario 2 Revenue Projections 2030-2050 29

1.0 INTRODUCTION

The Lafayette Metropolitan Expressway Commission (LMEC) and HNTB Corporation (prime consultant) retained Stantec Consulting in March of 2016 as a sub consultant to perform a Level 1 Traffic and Revenue Study for the Lafayette Regional Xpressway (LRX). This study is to inform the Tier 1 Draft Environmental Impact Statement for the proposed toll facility.

Several prior studies have been prepared. In 2004 Wilbur Smith Associates prepared a Level 1 Traffic and Revenue Study. In 2010 Stantec prepared a Level 2 Traffic and Revenue Study in which six alternative alignments and tolling scenarios were evaluated for their toll revenue potential, as well impacts on regional mobility. Since the completion of that study six years have passed and the regional model maintained by the MPO has been updated. Regional socioeconomic trends have stabilized post Katrina and recovery from the 2008 recession has occurred. Thus the current study integrates all available current data and produces updated forecasts for the toll facility. The current study is a Level 1 Study as it relies on the current existing regional model with minimal modifications reflecting the study's assumption; it uses only publicly available LADOTD annual average daily counts.

There are typically three levels of a toll road studies. The first, a Level 1 Study, is a preliminary review of the potential for traffic to be attracted to a new project. This type of study generally relies on existing traffic information available in the project study area and its intent is to provide a general indication of the revenue potential of a proposed project. This level of study is appropriate for a Tier 1 Environmental Study.

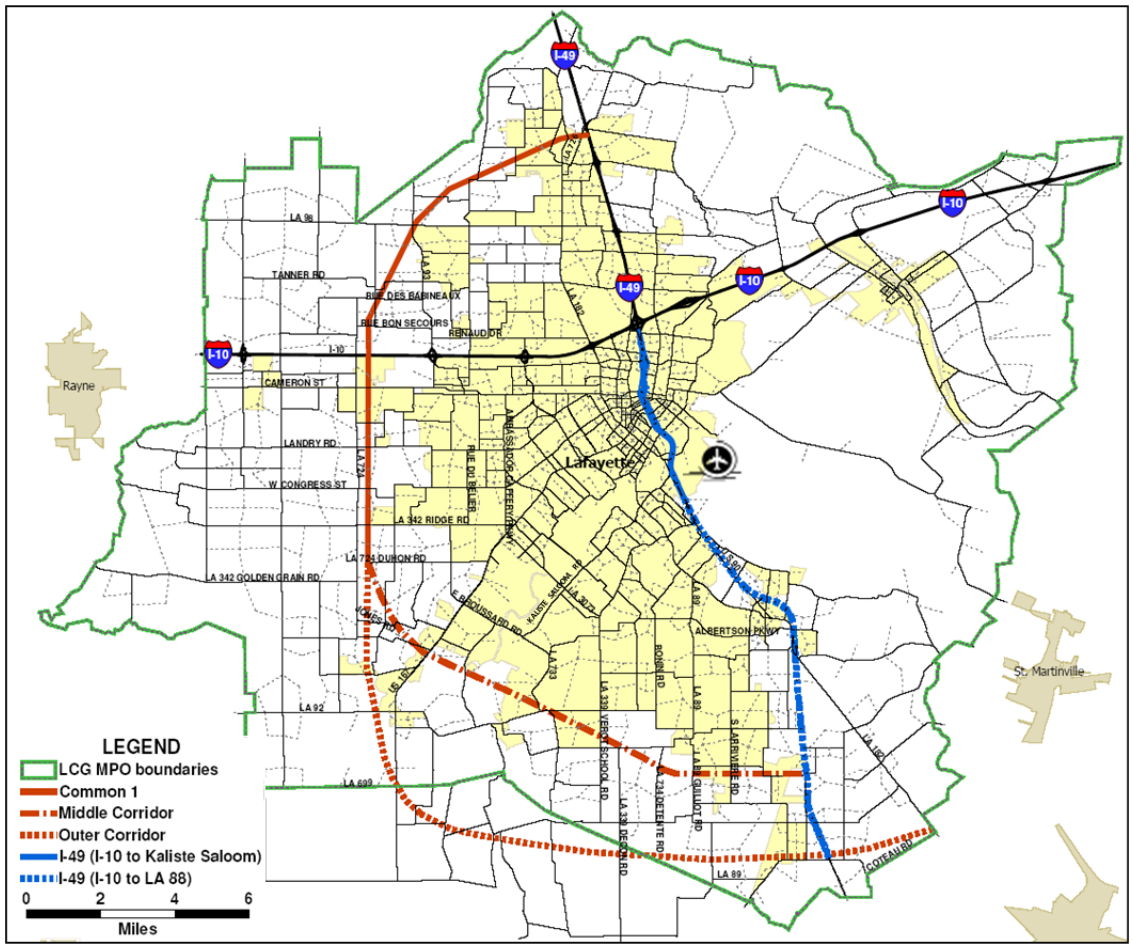
A Level 2 Study is the next level of complexity and is often undertaken when the project appears to have some potential for further study but may not yet warrant the time and expense of an investment grade study because of where the project is in the planning process. A Level 2 study would include a traffic count program and limited calibration and validation of the existing regional traffic model.

Level 3 or Investment Grade Study would require in-depth traffic counts, detailed information on origin-destination patterns, a detailed review of socio-economic factors and a more rigorous traffic forecasting model calibration effort. An Investment Grade study would provide the level of detail expected by rating agencies when considering an Investment Grade bond rating.

1.1 STUDY AREA

Figure 1 shows the study area for the project and the outlines of the proposed corridors including the future I-49 corridor. The study area is defined by the boundaries of the Lafayette MPO which includes all of Lafayette Parish and portions of St. Martin, Iberia, Vermilion, and Acadia Parishes. The LRX Toll Road is proposed as a partial beltway scribing a half-circle that circumvents, to the west, downtown Lafayette from US 90 South (Future I-49), crossing I-10, and then to I-49 north of Lafayette.

Figure 1 Study Area



1.2 ALTERNATIVE CORRIDORS

In the previous Stantec study three corridors were examined for the Lafayette Regional Xpressway: the Common 1 Corridor in the northwest quadrant between I-10 and I-49; the Middle Corridor and the Outer Corridor as alternatives for the southeast quadrant alignment. Combining the Common 1 Corridor with the Middle Corridor or the Common 1 Corridor with the Outer Corridor provided the bases for the six scenarios evaluated in the 2010 Level 2 Traffic and Revenue Report.

For this study the evaluation will focus only on the Common 1 Corridor and the Outer Corridor alignments. The opening year considered for the Project is 2030.

The proposed Common 1 Corridor has a southern terminus at Duhon Road-LA 724 approximately 3.3 miles west of the intersection of LA 724 and US 167. The alignment proceeds north through diamond interchanges with LA 342 and Landry Road and passes west of the City of Scott through a multi-level interchange at I-10. Then the alignment extends north through the Village of Vatican. The proposed roadway passes a diamond interchange with LA 98 Gloria Switch Road and continues northwesterly through a half-diamond interchange with LA 182. The Common 1 Segment terminates at I-49 near the

existing LA 726 interchange for the City of Carencro. The Common 1 Segment total distance is approximately 15.1 miles. Proposed frontage roads for this segment will extend from US 90 Cameron Street to I-10 and from LA 182 to I-49 North.

The Outer Corridor has an eastern terminus at West Old Spanish Trail Highway-LA 182 near its intersection with Coteau Road-LA 88. It progresses westward through a multi-level interchange at US 90 and through diamond interchanges at LA 89 and Decon Rd-LA 339. The Vermilion River crossing is located approximately 11.9 mi from the eastern terminus and is followed by a change in the alignment's direction from westerly to northwesterly. The alignment continues through a diamond interchange at Placide Road, a multi level interchange at US 167 and diamond interchanges at LA 92 and Bourque Road. The Outer Corridor ends at an overpass at Duhon Road-LA 724. The Outer Segment total distance is approximately 21.1 miles from the eastern terminus. Frontage roads are proposed from West Old Spanish Trail Highway-LA 182 to Placide Road and from Bourque Road to US 167.

In the current study US 90/ Future I-49 is assumed to be improved to interstate standards as envisioned in the I-49 Connector Project by year 2025. It will be operated as a toll-free facility.

Table 1 below lists the scenarios evaluated for the current study. Two alignment scenarios were studied under toll and toll-free operation, along with a baseline no build scenario.

Table 1 System Scenarios

System Scenario	Toll Assumption	Description
1	Tolled	LRX only Outer Alignment in southwest quadrant
	Toll-Free	LRX only Outer Alignment in southwest quadrant
2	Tolled	LRX Outer Alignment in southwest quadrant and Common I alignment in northwest quadrant
	Toll-Free	LRX Outer Alignment in southwest quadrant and Common I alignment in northwest quadrant
3	na	No Build LRX

1.3 TOLL COLLECTION

Toll collection on the proposed LRX is being considered to be fully electronic with cashless collection to minimize operating costs. This will be accomplished via sticker tags issued to registered customers as well as by pay-by-plate identification. Toll charges will be mileage based with trucks paying a traditionally higher rate based on the number of axles. With a fully electronic collection system, pay-by-plate tolls may be set higher than sticker tags to account for system losses due to poor images or the inability to identify and/or ultimately collect from some of the drivers.

2.0 MODELING METHODOLOGY

This section summarizes the modeling methodology, toll diversion procedures, and the application of the models to forecast tolled and toll-free traffic in the LRX study area. Model runs were carried out for the base year, 2010 and the future years 2030 and 2040.

Similar to the work completed for the 2010 Level 2 Traffic and Revenue Study, the current forecasts of future traffic for the Lafayette Regional Xpressway were prepared by employing the existing travel demand model for the Acadiana Metropolitan Planning Organization (MPO), which is a TransCad (software) based model. This was followed with a supplemental model within which a customized toll diversion assignment process was carried out using Cube Voyager (TP+) software.

The modeling process used for the estimation of traffic and revenue associated with the LRX corridor consisted of reviewing the LPM TransCad model, converting it to the TP+ software format and then imposing tolling algorithms in accordance to the scenario's toll assumptions. Since this Traffic and Revenue Study is of Level 1 caliber it does not include in-depth calibration and validation procedures; instead it relies on the regional model inputs and their accuracy.

2.1 BACKGROUND

The Acadiana Metropolitan Planning Organization (MPO), formerly known as Lafayette MPO, is an active division of the Acadiana Planning Commission which was organized to plan for the future development in the Louisiana Parishes of Acadia, Evangeline, Iberia, Lafayette, St. Landry, St. Martin, and Vermilion. The current Travel Demand Model (TDM) maintained by the MPO was updated in December of 2014 to support the MPO's Metropolitan Transportation Plan 2040.

Model changes between the version used in the Stantec 2010 study and the current version include:

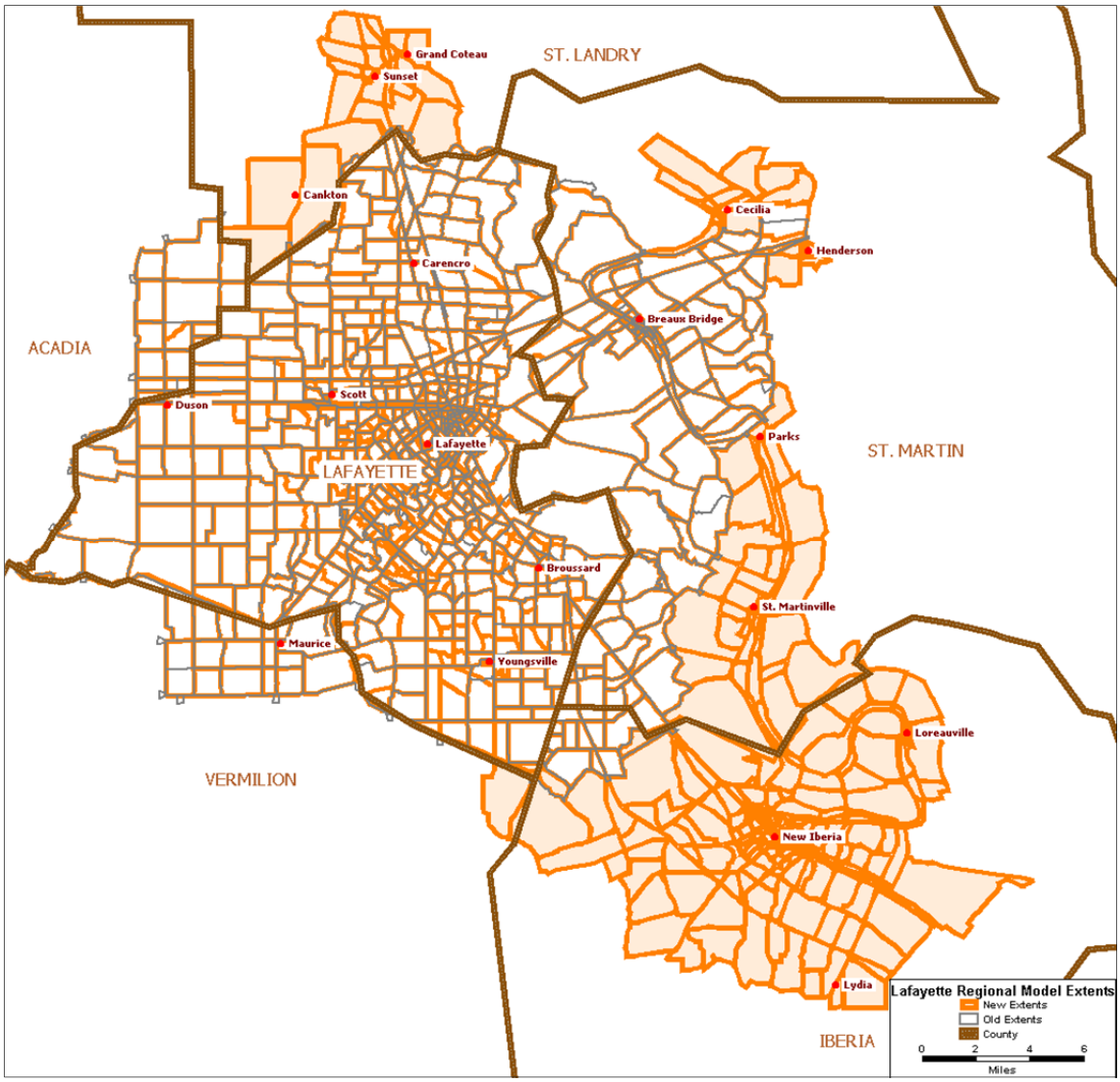
- The area covered by the model was expanded to include Iberia Parish, portions of St. Landry Parish and portions of St. Martin Parish. The new model extents were devised based on changes in the Metropolitan Statistical Area geographic delineation updated by the Office of Management and Budget of the federal government. Figure 2 shows, shaded in orange, the new areas added to the model.

- Additional zonal and network details were added. Transportation Analysis Zones were split, new centroids and centroid connectors added to the highway networks. Figure 2 shows in grey outline the old zonal structure overlaid on top of the new zonal structure with orange outline. It can be seen that within Lafayette Parish the new zones are smaller and often contained within the old zones. The old model included 600 internal zones whereas the new one contains 986. The number of external zones also increased from 30 to 42.

- The population and employment forecasts were updated and extended to future year 2040.

- The new model version adds details in the time of day distribution and incorporates four time periods.
- The model networks were updated to reflect currently completed highway improvement projects as well as changes in the planned highway projects.

Figure 2 Expanded Model Extents



The TDM has distinct components utilized to estimate different elements of travel. The first component of the model is trip generation, which estimates the number of trips generated by discrete zones within the study area based on socioeconomic characteristics such as population, households and employment. These estimated trips are then distributed in the second model step based on the attractiveness of destination activities and the degree of spatial separation between trip-producing and trip-attracting zones. The model does not have a transit component and thus models only auto trips. Commercial vehicle traffic is introduced as an additional trip purpose. The final step of the model is the highway assignment process which loads the trips onto the

highway network. The MPO's TransCad-based regional model assigns trips on a route choice / travel time basis; it does not reflect the cost basis associated with tolled routes.

The model has a well-developed user interface that allows execution of the entire process or the individual steps of trip generation, trip distribution and trip assignment.

2.2 TDM BASE YEAR MODEL ASSUMPTIONS AND MODEL RESULTS REVIEW

The current TDM base year is 2010 and it is used as a base year for this study. Population and employment estimates for the base year in the current model are listed in Table 2 and Table 3. These tables also list Stantec's estimates for population and employments from the study carried out in 2010 along with estimates by Woods and Poole an independent socioeconomic data provider. It should be noted that when the previous study was underway the regional model included pre-recession socioeconomic inputs; as part of the 2010 effort Stantec carried out updates to bring them in line with current trends.

The increase of the geographic area covered in the current model adds 91,000 residents and 36,000 jobs. The larger area aims to represent in more detail the travel patterns in the region.

Lafayette Parish is the only parish fully included in both the current and the old model; all other counties were only fractionally included in the old model and have somewhat expanded coverage in the new model. For Lafayette Parish the new model shows slightly higher population (4%) and employment (2%) when compared to Stantec's assumptions in the 2010 study.

Table 2 Base Year Population Estimates by Parish

Population Totals						
Parish	Lafayette	Iberia[1]	St Martin[1]	St Landry[1]	Vermilion[1]	Total
Current Model	220,033	60,368	41,233	7,690	4,851	334,175
Old Model	212,088	4,322	22,985	-	2,810	242,205
Woods & Poole	222,107	73,260	52,259	83,503	58,086	489,215
Population Differences						
Current Model	-	-	-	-	-	-
Old Model	7,945	56,046	18,248	7,690	2,041	91,970
Woods & Poole	(2,074)	(12,892)	(11,026)	(75,813)	(53,235)	(155,040)
Population Percent Difference						
Current Model	-	-	-	-	-	-
Old Model	4%	93%	44%	100%	42%	28%
Woods & Poole	-1%	-21%	-27%	-986%	-1097%	-46%

NOTES: (1) The Parishes Iberia, St Martin, St Landry and Vermilion had only fractions of these parish areas included in the new model. Woods & Poole estimates are for the full parishes.

Table 3 Base Year Employment Estimates by Parish

Employment Totals						
Parish	Lafayette	Iberia[1]	St Martin[1]	St Landry[1]	Vermilion[1]	Total
Current Model	123,422	27,173	13,610	1,358	860	166,423
Old Model	121,303	583	7,437	-	552	129,875
Woods & Poole	174,373	42,856	18,207	34,894	20,921	291,251
Employment Differences						
Current Model	-	-	-	-	-	-
Old Model	2,119	26,590	6,173	1,358	308	36,548
Woods & Poole	(50,951)	(15,683)	(4,597)	(33,536)	(20,061)	(124,828)
Employment Percent Differences						
Current Model	-	-	-	-	-	-
Old Model	2%	98%	45%	100%	36%	22%
Woods & Poole	-41%	-58%	-34%	-2470%	-2333%	-75%

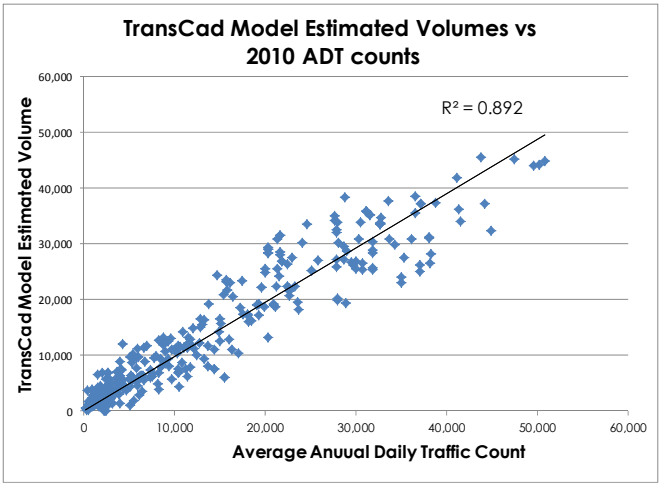
NOTES: (1) The Parishes Iberia, St Martin, St Landry and Vermilion had only fractions of these parish areas included in the new model. Woods & Poole estimates are for the full parishes.

2.2.1 Review of Base Year Results

The model review process involved comparison of regional TransCad model outputs against available ground counts. The review included selection of screenlines capturing the major traffic on corridors of interest for the study as well as a comparison to available state and local counts.

The regional model network has coded in 340 annual daily traffic counts from the year 2010. The overall performance of the TransCad regional model vs these counts is shown in Figure 3, the model replicates the counts with R^2 of 0.892 indicating overall a reasonable fit between predicted volumes and actual counts.

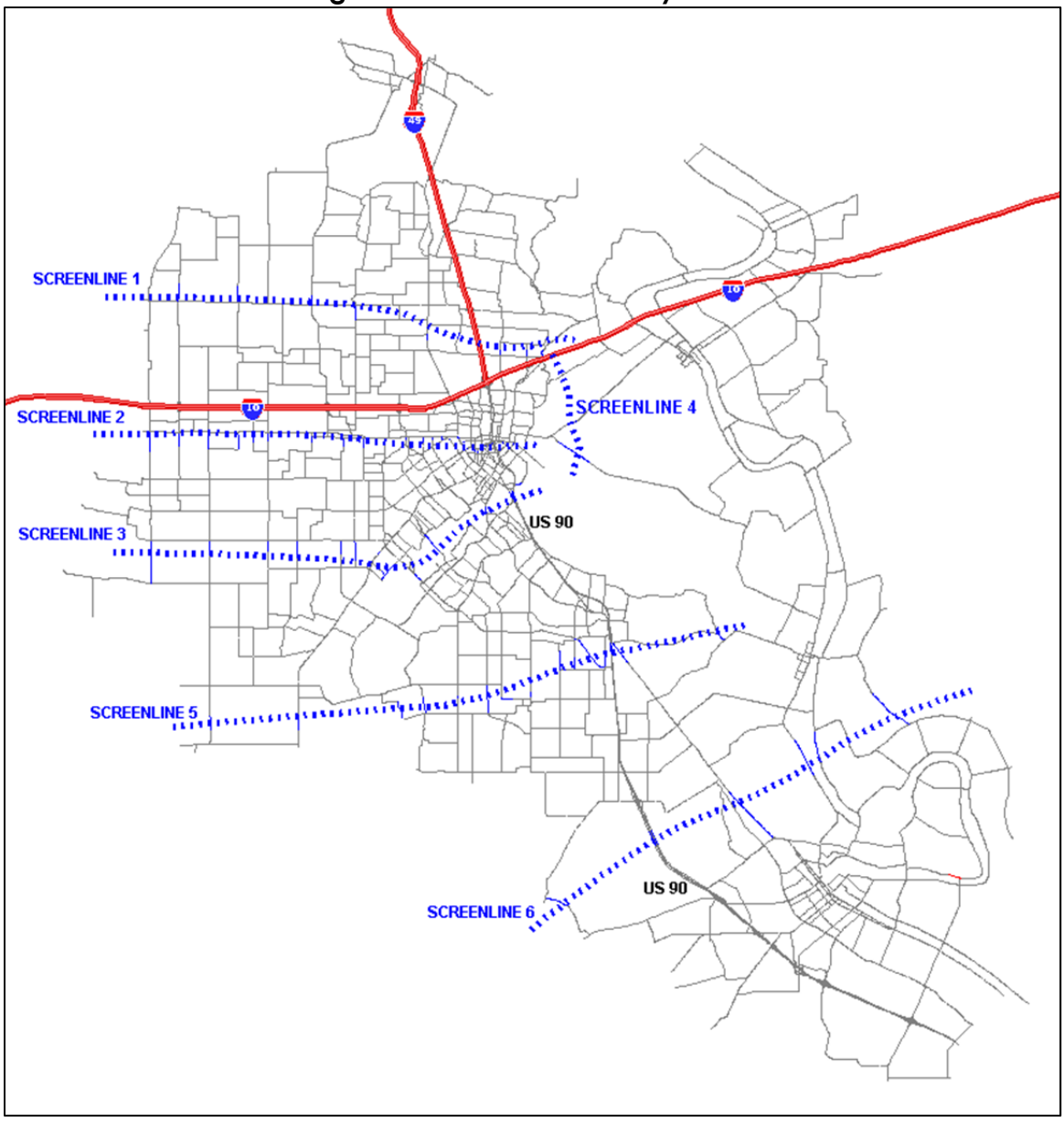
Figure 3 TransCad Model Estimated Volumes vs ADT



The screenlines selected for the study are shown in Figure 4; they capture traffic flows parallel or potentially feeding into the proposed toll road. The regional model accuracy was within 15 percent on the screenline totals within Lafayette Parish but showed higher

discrepancies at the border of Lafayette and Iberia Parish at screenline 6, where the model was expanded in its most recent update. Results are shown in Table 4.

Figure 4 Screenlines in Study Area



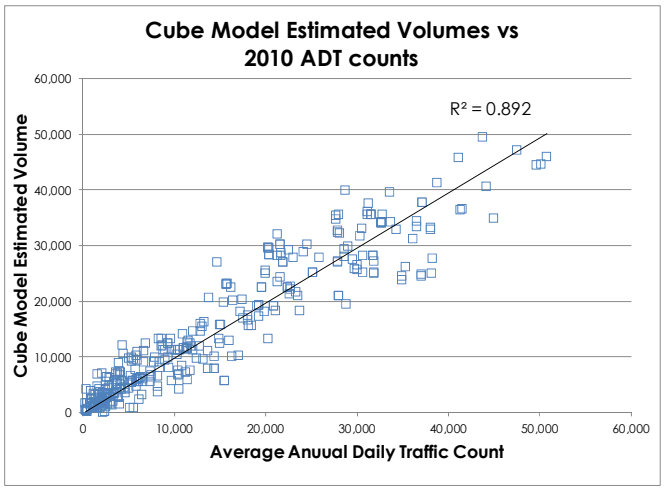
Cube (TP+) transportation planning software was selected for use in the toll diversion modeling. This software was selected because of its ease of use and versatility. The second step in the process involved converting the TransCad model into TP+ and then comparing screenline totals to assure that it replicated total trips in the MPO district. Table 4 shows the regional TransCad output along with Cube's screenline results.

Figure 5 provides a graphical comparison of the Cube model estimated volumes vs. the available 2010 average annual daily counts. These comparisons show that a valid replication and successful conversion of the TransCad model into TP+ was made.

Table 4 Screenline Totals

Screenlines		Count	TCAD Two-Way Volumes	% Diff w Counts	Cube Two-Way Volume	% Diff w Counts
ID	Name					
1	North of I-10	88,428	103,125	17%	100,772	14%
2	East West through CBD	222,468	251,921	13%	245,310	10%
3	East West through Vermilion river	252,522	282,354	12%	277,179	10%
4	US90 to I-10 southeast quadrant	88,647	95,381	8%	90,182	2%
5	East West through Youngsville	124,275	121,356	-2%	118,257	-5%
6	Border of Lafayette and Iberia	46,192	93,870	103%	89,942	95%

Figure 5 Cube Model Estimated Volumes vs ADT



The LRX loop crosses US 90 just north of the border of Lafayette and Iberia Parishes. The modeled volume estimates are poor in that area (+95%) as reflected in screenline 6 results. Since the TransCad regional model is overestimating volumes on that screenline, and this could lead to overestimating LRX volumes, Stantec undertook modest model adjustments to improve the agreement between model output and ground counts. Table 5 shows the model results after these adjustments.

Table 5 Screenline Totals after adjustments

Screenlines		Count	Cube Two-Way Volume after Mod	% Diff w Counts
ID	Name			
1	North of I-10	88,428	98,602	12%
2	East West through CBD	222,468	240,575	8%
3	East West through Vermilion river	252,522	257,063	2%
4	US90 to I-10 southeast quadrant	88,647	88,803	0%
5	East West through Youngsville	124,275	99,813	-20%
6	Border of Lafayette and Iberia	46,192	61,969	34%

While additional adjustments can be carried out under a calibration process, no further adjustments were made due to the limited scope of this study.

2.2.2 Commercial Vehicle Review

The representation of commercial vehicle activity in the model was evaluated. The regional TransCad model has a separate class for commercial vehicles, but the split between autos (personal vehicles) and commercial vehicles has been developed based on general industry standards rather than local data.

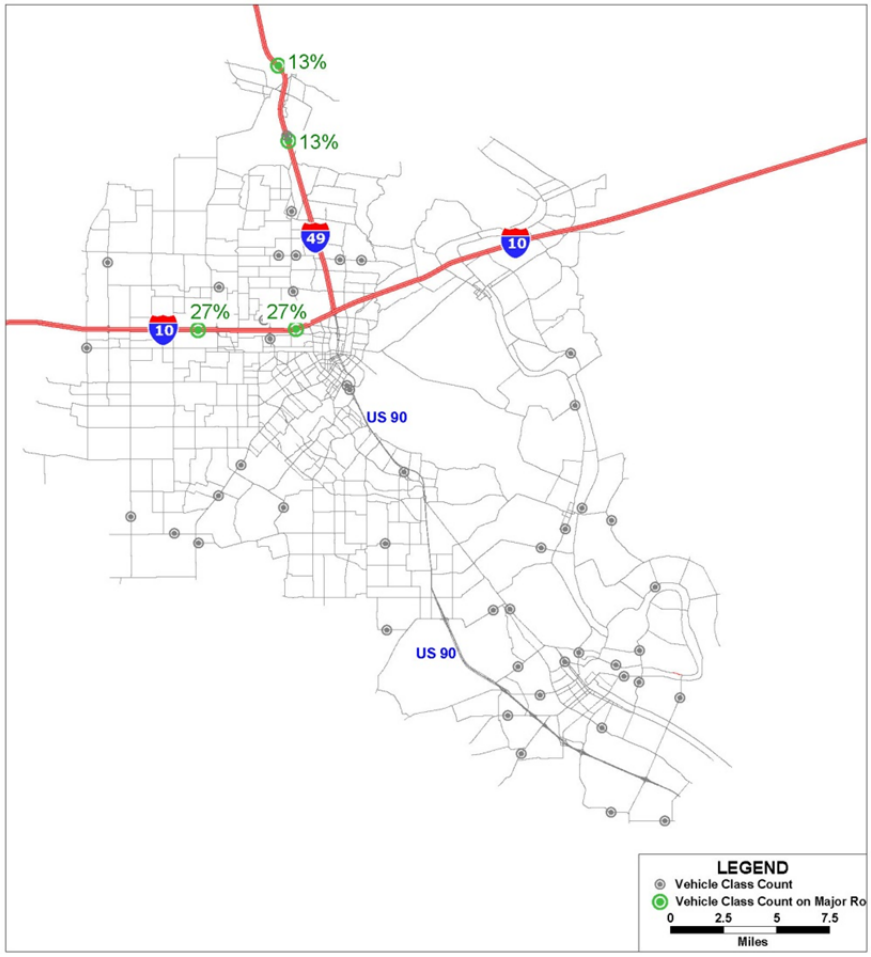
Vehicle classification count data received from the LADOTD for this study is shown in Figure 6. The vehicle classification data contained counts carried out between 2013 and 2015 and while geographically spread-out, the data did not contain comprehensive coverage on major roads. From counts covering the parishes of Lafayette, Iberia, St Martin, St Landry and Vermilion there were only 2 counts along I-10, 2 counts along I-49, and no counts along US90.

From the 2010 study count data along US 90 were available for two locations, the first just south of Lafayette in Iberia Parish and the second approaching the CBD (just past the airport). Both showed a truck share at 20%. With current ongoing construction along US 90 and construction related heavy vehicle traffic, the current observed truck share is expected to be temporarily higher than normal pre-construction levels.

The truck share along I-49 heading north of the Lafayette central business district was 15% based on counts used in the 2010 study. The new counts along I-49 obtained from LADOTD show a similar share of truck activity at 13% in 2015.

The overall observations of truck traffic along US 90 indicate that there is not strong north-south trucking movement through Lafayette. Our observations are that the predominant truck movements are east –west along I-10 as well as truck movements to/from the south and east.

Figure 6 LADOTD Vehicle Classification Counts



Truck activity along I-10 is stronger. Just west of the I-49 interchange the truck share on I-10 is 26% according to counts used in the previous study. The share increases heading west as local Lafayette traffic diminishes. Outside Lafayette to the west, the share of trucks on I-10 reaches about 35%. It appears that I-10 as a major route connecting New Orleans and Baton Rouge with Houston carries a significant share of through truck traffic. The newest counts along I-10 west of N University Ave and west of LA 93 indicate truck share level at 27% in 2015.

In lieu of better data on truck patterns, and because of the level of detail in this study, (substantially less than an investment grade effort), estimates of trucks were made using the truck share volumes found in the available count data.

2.2.3 Toll Diversion Component

Toll diversion models include "route choice" algorithms permitting travelers to select between the best toll and non-toll routes. The inputs used for this are the future networks and trip tables. For the LRX study a time-period based model was created by examining the purpose-stratified models from previous work completed by Stantec and with adjustments made to reflect the Lafayette area.

The completed model essentially determines the "probability" of selecting a toll road based on travel time and cost tradeoffs. This probability reflects the share of trips between a given origin-destination zonal pair that will utilize the toll facility.

The value of time (VOT) assumptions were kept the same as in the 2010 study. Users of the toll road in the night and midday period were assumed have an average value of time of 9.10[$/hr], whereas users in the AM and PM peak hours were assumed to have average value of time of 13.33[$/hr] and $12.13[$/hr] correspondingly. These values are a blend of the values of time for various trip purposes by time period. Since the AM and PM periods have higher share of work related trips, more users are likely to pay a higher toll in order to save time compared to discretionary non-work related trips during midday.

The sensitivity of time, toll and distance are presented graphically in Figure 7, Figure 8 Figure 9. Each figure has the AM, PM and Off peak (Midday and Night) period behavior plotted.

Figure 7 Sensitivity to Time Savings

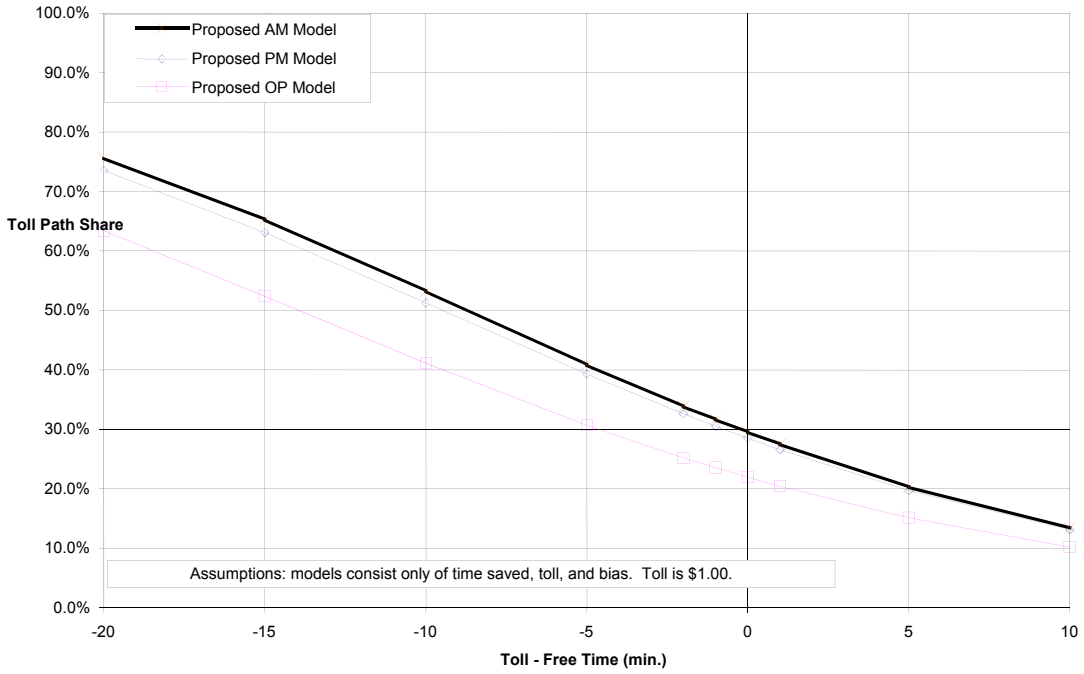


Figure 8 Sensitivity to Toll

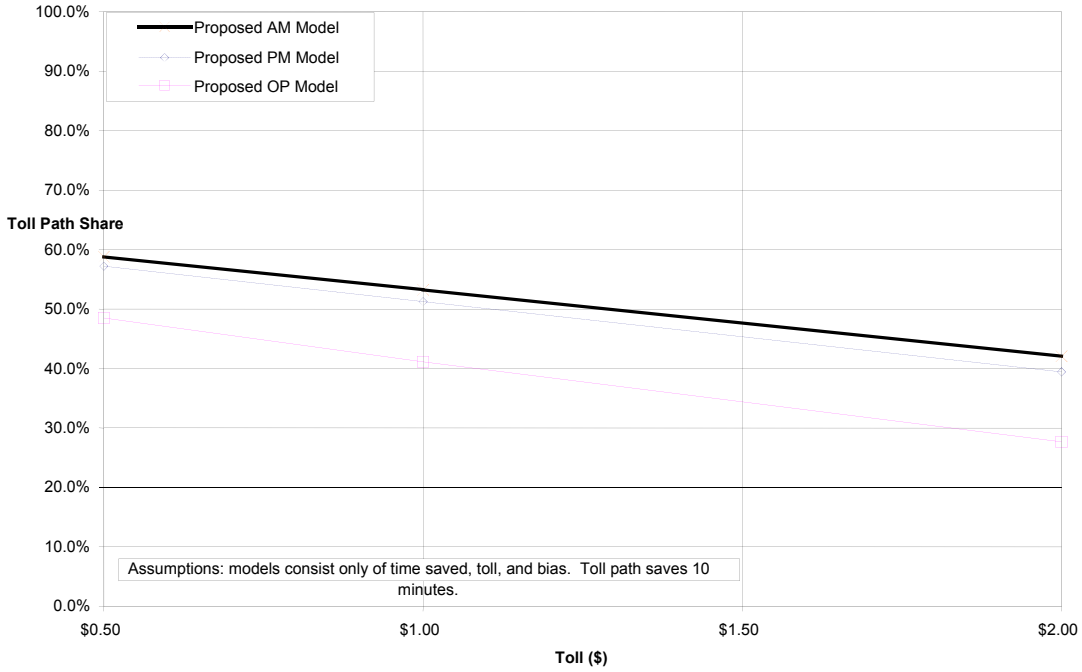
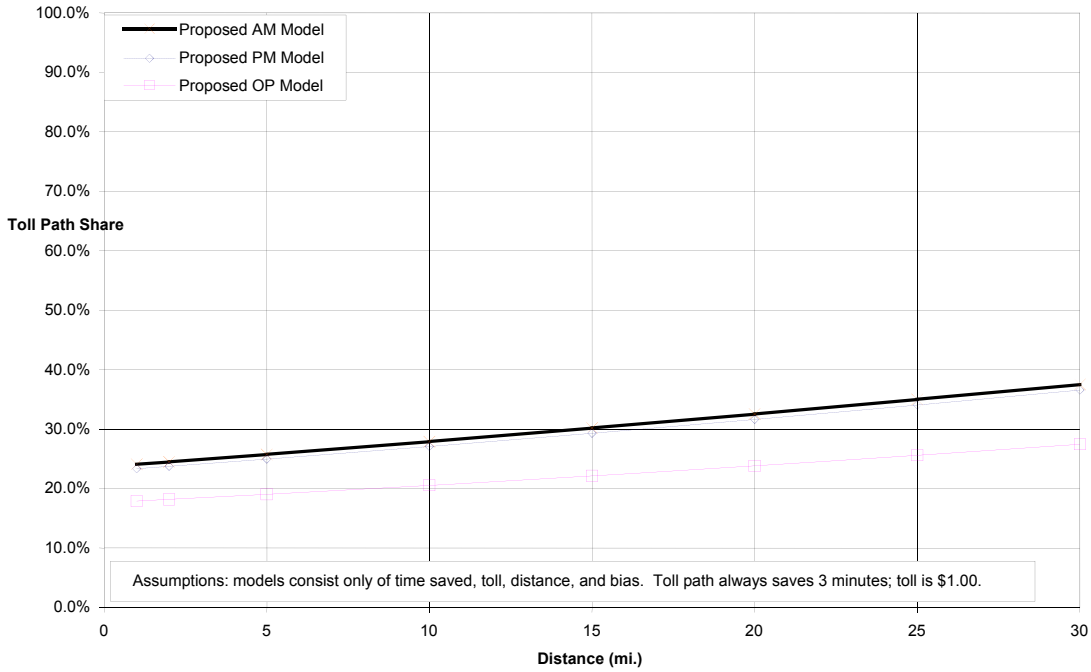


Figure 9 Sensitivity to Trip Distance



3.0 FUTURE DEVELOPMENT

To prepare estimates of future traffic conditions, estimates are needed of the future population, employment and changes in the transportation network. The following describes each of these areas.

3.1 POPULATION AND EMPLOYMENT ASSUMPTIONS

The most recent forecasts of population and employment made by the Lafayette MPO for the Metropolitan Transportation Plan 2040 are reflected in the regional model dated December 2014. The base year for these forecasts is 2010, the future years are 2020, 2030 and 2040.

Population and employment forecasts for the future years used in the current model are listed in Table 6. For comparison, the table also list Stantec's forecasts for population and employment from the 2010 study; these had been adjusted for recession trends. The independent forecasts from Woods and Poole are listed alongside the model forecasts for a general reference. While Woods and Poole forecasts are for the full parishes, the model totals include only the population and employment falling within the model boundary.

Table 6 Future Year Population and Employment Forecasts

Population Forecast Totals New Model			
Parish	2010	2030	2040
Lafayette	220,033	272,645	293,862
Iberia	60,368	70,335	74,753
St Martin	41,233	51,381	56,041
St Landry	7,690	10,405	11,898
Vermilion	4,851	7,495	8,969
Acadia	2,659	4,093	4,845
Total	336,834	416,354	450,368

Employment Forecast Totals New Model		
2010	2030	2040
123,422	166,862	187,364
27,173	35,475	39,597
13,610	18,537	21,196
1,358	1,944	2,252
860	1,316	1,511
447	659	748
166,870	224,794	252,669

Population Forecast Annual Growth Rates			
	New Model	Old Model	Woods & Poole
Parish	'10-'40	'10-'30	'10-'40
Lafayette	1.0%	0.9%	1.8%
Iberia	0.7%	1.8%	0.8%
St Martin	1.0%	1.3%	1.4%
St Landry	1.5%	na	0.4%
Vermilion	2.1%	1.2%	0.9%
Acadia	2.0%	1.4%	0.7%

Employment Forecast Annual Growth Rates		
New Model	Old Model	Woods & Poole
'10-'40	'10-'30	'10-'40
1.4%	1.0%	1.7%
1.3%	2.4%	1.6%
1.5%	1.5%	2.1%
1.7%	na	1.3%
1.9%	1.1%	1.1%
1.7%	1.0%	1.5%

Lafayette Parish represents about 65% of the population and 75% of the jobs reflected in the model. Lafayette's growth rate for population in the new model is consistent with the assumptions of the previous study, but the new model has a slightly faster rate of growth for employment at 1.4% average annual growth compared to the previous annual rate of 1.0%.

3.2 FUTURE NETWORK CHANGES

The Lafayette Planning model includes in its interface a list of all proposed future improvements included in the Transportation Improvement Plan (TIP) and the Financially Constrained Transportation Plan FCTP for the region. Representatives of the Lafayette MPO identified six projects from the Vision list likely to be advanced and built by 2030, the opening year of the LRX. These projects along with the existing and committed projects are listed in Table 7 below and shown in Figure 10 and Figure 11. The I-49 Connector was also assumed to be built by 2025. While the I-49 Connector project does not have committed funding at this time it has wide public support and is included on the statewide long range plan; currently I-49 is in its conceptual design phase.

Table 7 Regional Network Improvements

Plan	Future Improvement Project	Build Year	NETWORK PROJECT_ID		
E+C	Duhon Rd -Center Turn Lane , Rue Du Belier to Southcity Pkwy	2020	1		
E+C	Dulles Dr -Center Turn Lane , Westgate Rd to Ambassador Caffery Pwky	2020	2		
E+C	Louisiana Ave -Widen to 5 Lanes , Mayview Farm Rd to E Butcher Switch Rd	2020	3		
E+C	N Saint Antoine St Ext -New 3 Lane , I-10 to W Pont Des Mouton Rd	2020	4		
E+C	Verot School Rd -Widen to 4 Lane Blvd , Vincent Rd to Feu Follet Rd	2020	5		
E+C	US 90 -Widen to 6 Lanes , Pinhook Rd to Saint Nazaire Rd	2020	6		
E+C	Chemin Metairie Pkwy Ext -New 2 Lane Blvd , Guillot Rd to US 90	2020	7		
E+C	Rue Du Belier Ext -New 4 Lane Blvd , Dulles Dr to Old Spanish Trl	2020	8		
E+C	Kaliste Saloom Rd -Widen to 5 Lanes , E Broussard Rd to Ambassador Caffery Pkwy	2020	9		
E+C	N University Ave -Widen to 4 Lane Blvd , Renaud Dr to W Pont Des Mounton Rd	2020	10		
E+C	S Bernard Rd Ext -New 3 Lane , Fortune Rd to Main St	2020	11		
E+C	I-10 -Widen to 6 Lanes , I-49 to Eastern Study Area Boundary	2020	12		
E+C	US 90 -Widen to 6 Lanes , Albertson Pkwy to Ambassador Caffery Pkwy	2020	13		
E+C	E Pont Des Mouton -Widen to 4 Lane Blvd , I-49 to Louisiana Ave	2020	14		
E+C	US 90 Frontage Roads -Remove from network , 0.7 Miles East of Darnall Rd to College Rd	2020	15		
E+C	US 90 Access Management -US 90 Intersection Improvements , Various Locations from Tower Dr to Hughes Rd	2020	16		
Vision	I-49 Connector	2030	402		
Vision	E Broussard Rd –widen to 4 lane boulevard Johnston St to Kaliste Saloom Rd	2040	492		
Vision	Southcity Parkway- New 4 lane Boulevard +bridge Robley Dr to Vincent Rd	2030	477	405	404
Vision	Youngsville Hwy - widen to 4 lane boulevard –Amb. Caffery Pkwy South Ext to Youngsville Pkwy	2040	406		
Vision	Pinhook Rd- widen to 3 lane boulevard from Southpark Rd to S Morgan	2040	427		
Vision	Ambassador Caffery North- new four lane boulevard Renaud to I-49	2040	441	421	
Vision	N University Ave-widen to 4 lane boulevard Renaud to I-49	2040	484	485	493

Figure 10 Existing and Commited Projects

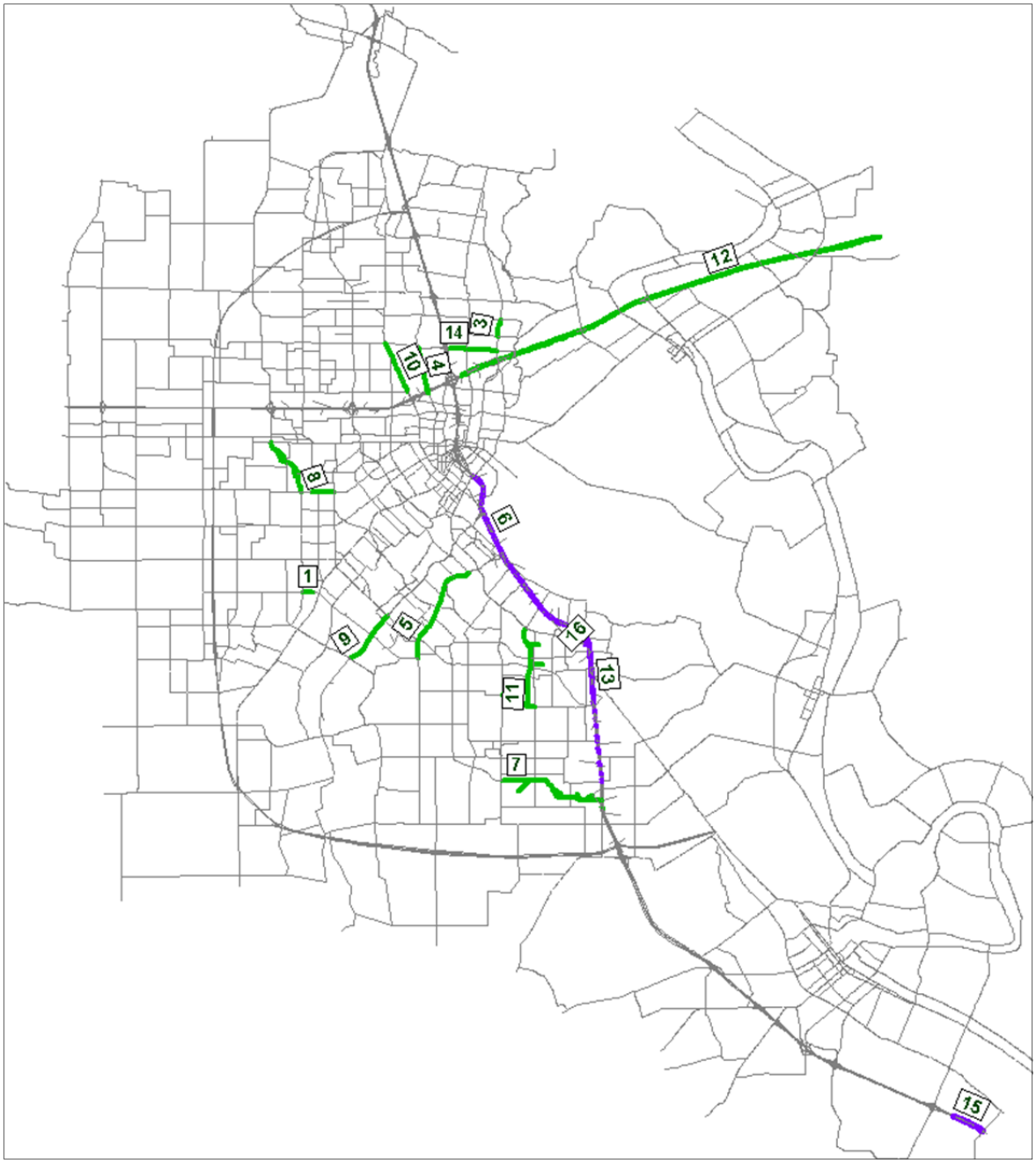
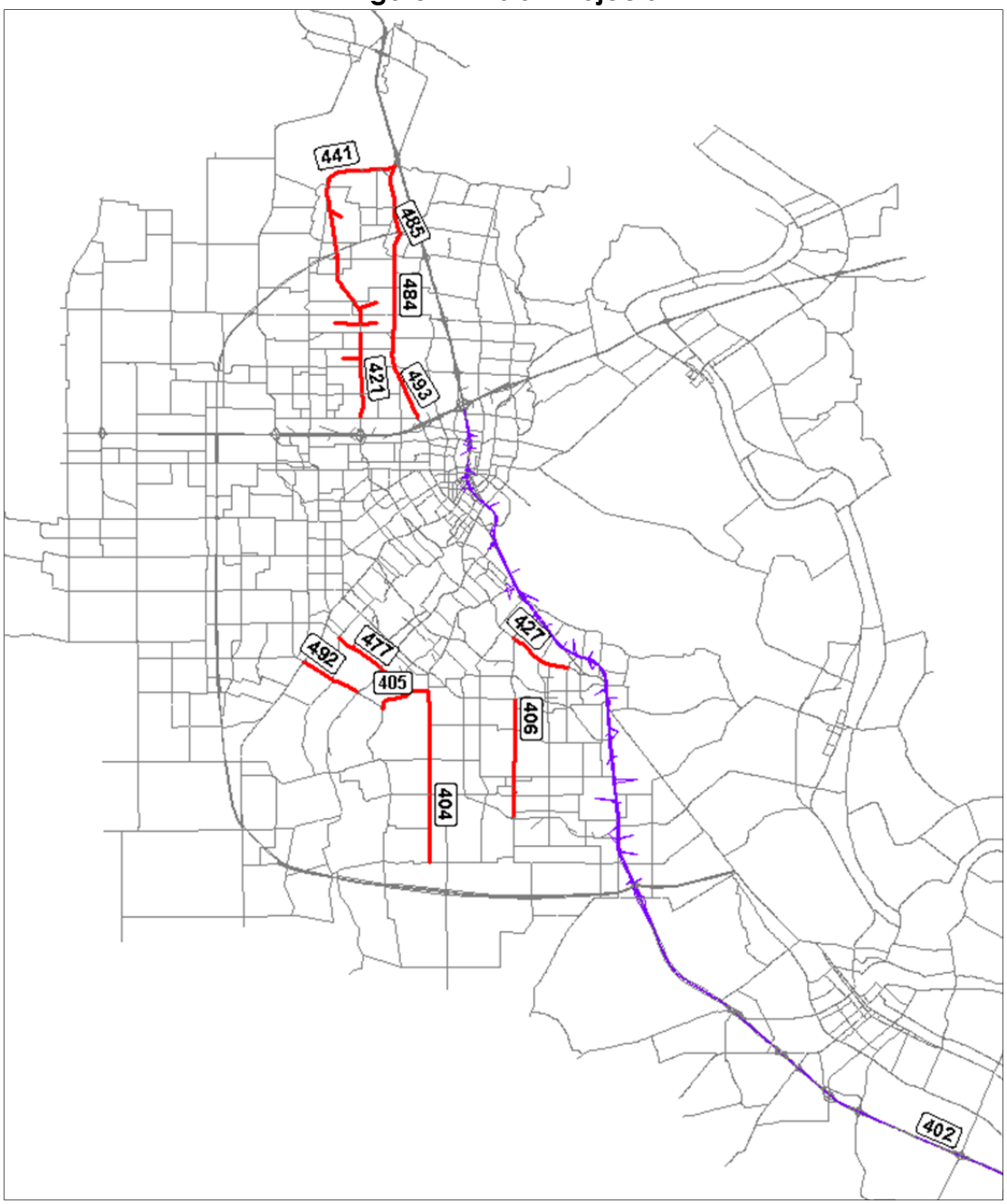


Figure 11 Vision Projects

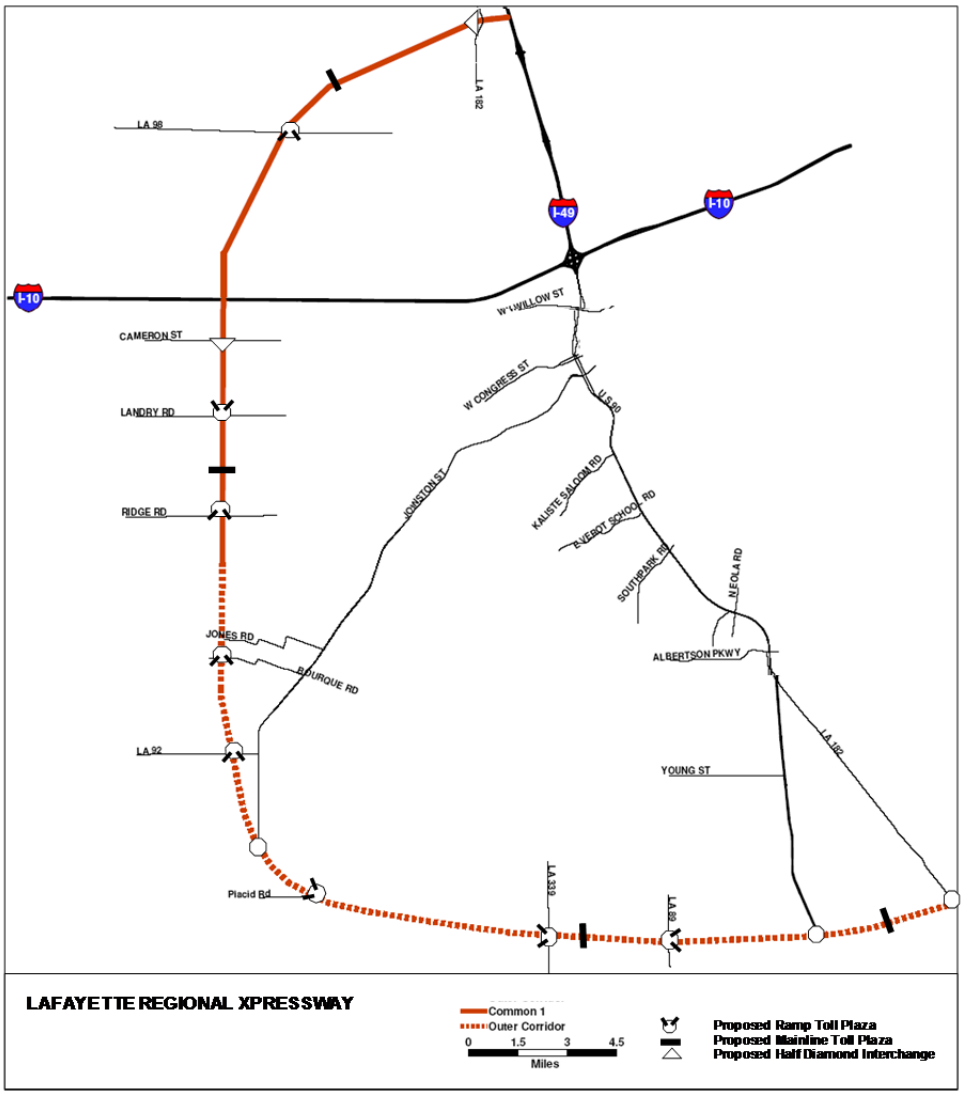


4.0 TRAFFIC AND TOLL REVENUE ANALYSIS

4.1 TOLL COLLECTION SYSTEM

There are several toll collection system options that are available: either a closed barrier system or a true on-off closed system. For assumed cost savings of infrastructure, a Closed Barrier System with Electronic Toll Collection (ETC) at all pay points was selected for analysis. In a closed barrier system, a series of mainline and ramp toll collection facilities are constructed. At each of the toll plaza locations, a fixed toll amount (for a given vehicle class) is collected, regardless of points of entry or exit. All tolls are collected at the fixed collection locations. Ramp tolls are typically provided to "close the system" and prohibit "toll-free" travel between mainline barriers. The selected tolling locations are shown in Figure 12.

Figure 12 Proposed Paypoints



4.2 TOLL RATES

For purposes of this analysis, the study assumes that the end–to-end tolls on the LRX will be at a rate of $0.13 per mile in 2016 dollars. That assumption is consistent with the toll rate assumed at $0.12 in the 2010 traffic and revenue study, grown at the consumer price index for urban consumers in the south.

The rate favorably compares with the toll rates on other existing toll facilities with similar suburban character. Figure 13 provides information on toll rates charged for various facilities around the country. The proposed toll schedule for the LRX scenarios is presented in the Table 8.

Figure 13 Comparable Toll Rates

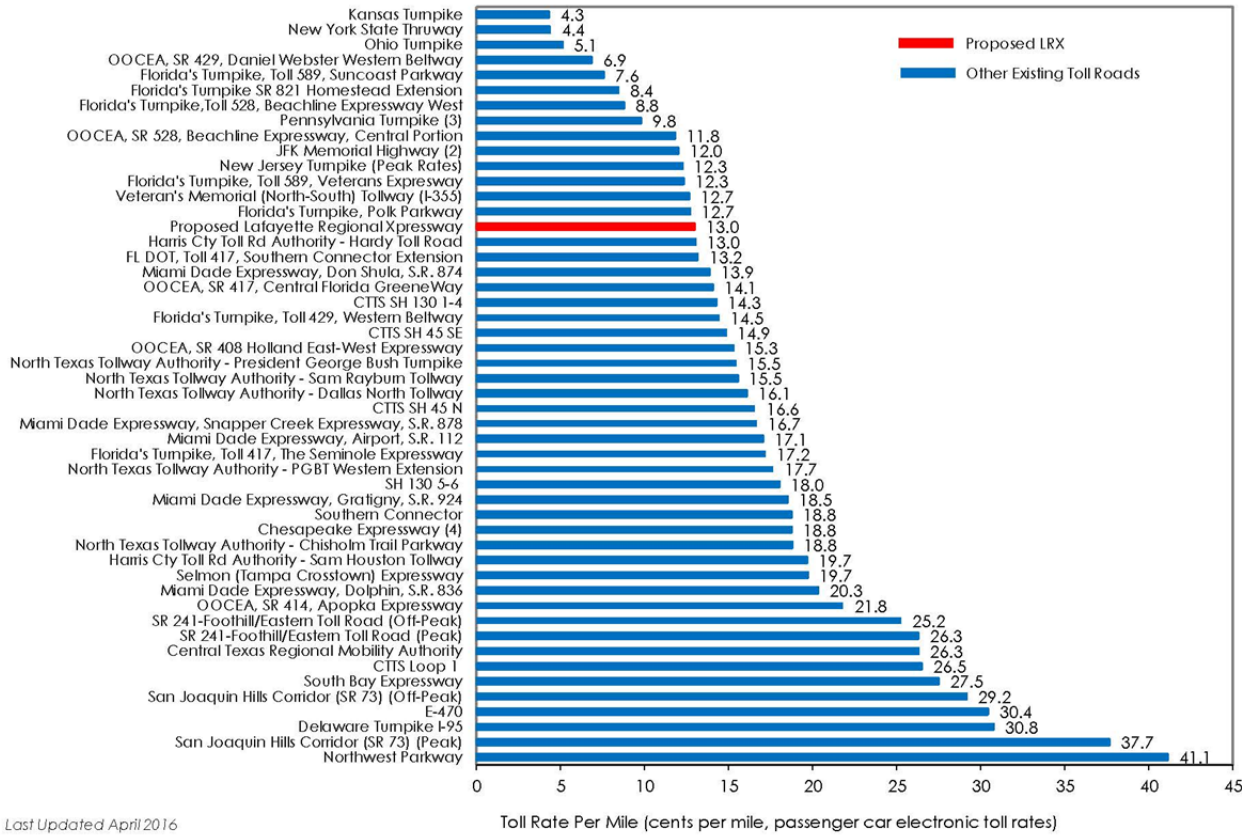
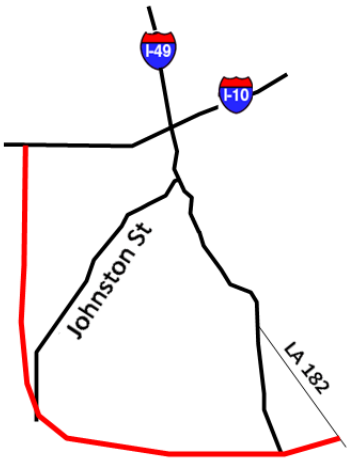
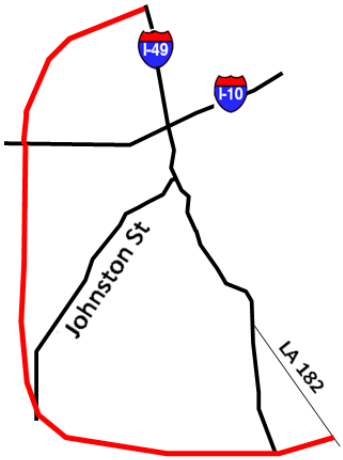


Table 8 Proposed Toll Schedule Scenario 1 and Scenario 2

Location of Toll Plaza	Scenario 1	Scenario 2
ML North	na	1.25
LA 98 Gloria Switch Rd	na	0.50
Landry Rd	0.50	0.50
ML West	1.50	1.50
LA 342	1.00	1.00
Bourque Rd	0.50	0.50
LA 92	0.25	0.25
LA 339	1.00	1.00
ML South	1.50	1.50
LA 89	0.50	0.50
ML South 2	0.50	0.50
Scenario Schematic Legend: Lafayette Regional Xpressway Toll Facility Regional Highways		

4.3 ASSUMPTIONS

4.3.1 Toll Technology

As discussed earlier, toll collection is assumed to be fully electronic. The closed system, which does not allow for any free trips, would collect tolls via either sticker tags read by roadside/overhead readers and by pay-by-plate photo. Pay-by-plate user's vehicles would be read by camera equipment overhead and plates would be matched to DMV addresses. An invoice would be sent to the owner of the vehicle. Pay-by-plate toll amount would be set at a rate which compensates fully for any revenue leakage that might occur such as no readable image and non-payment.

4.3.2 Truck Tolls

Truck tolls proposed follow traditional practice and use the formula below.

Truck toll = passenger car toll * (N-1), where N is the number of truck axles

Thus, for example, a 5 axle truck's toll would be 4 times that of a passenger car. It is estimated that the average size truck passing through the study, has 3.8 axles and therefore the average toll for trucks would be 2.8 times the passenger car toll.

4.3.3 Annualization

The annualization factor is the number by which the average weekday traffic (from the model) is multiplied to obtain an annual volume. If no traffic were traveling on the weekend, the average factor would be 260 (52 weeks times 5 days). If the average weekday traffic was the same as the average weekend day the factor would be 365. Since weekend travel is lower than weekday travel, congestion is lower and the average trip type is less oriented to business and travel to/from work, the reasonable value of 300 has been used for annualization.

4.3.4 Ramp up

When preparing a traffic and revenue forecast using modeling information, adjustments must be made in the early years of the project to account for the behavioral changes to occur. The model, by design, assumes that all population and employment increases are in place, all improvements are completed and that drivers make informed decisions regarding travel being aware of all the choices and options. Ramp-up accounts for the reality that it takes time for users to become aware of the road, break old travel habits and become aware of the potential habits of the road. Map data bases also need updating so that unfamiliar drivers are aware of the option. Additionally, users need to get accustomed to paying a toll, especially in an area where tolls do not currently exist.

The Lafayette Xpressway has been assumed to have a five year ramp up period. This is consistent with data Stantec has available from a variety of toll road projects nationwide. The table below summarizes the factors that have been applied.

Table 9 Summary of Ramp up factors

Year from Opening	Factor
1	0.41
2	0.63
3	0.80
4	0.93
5	1.00

4.4 TRAFFIC AND TOLL REVENUE

Traffic and toll revenue estimates have been prepared for the two toll scenarios and are presented below, using the factors determined earlier. Traffic volumes in the intermediate years from 2030 to 2040 are calculated by interpolating between the model results for 2030 and 2040. The average annual growth rate (AAGR) of traffic was estimated to be 1.5% for 2040-2050. Beyond 2050 growth is estimated to be 1% for the period 2050 to 2060.

Revenues were calculated by multiplying average weekday traffic projected at toll locations by the effective toll for each location and then totaled over the entire project corridor. Transactions and revenue are then adjusted to account for the presence of commercial vehicles, which will pay higher tolls. An annualization factor of 300 was used to convert average weekday traffic and revenues to annual traffic and revenues.

4.4.1 Scenario 1

Scenario 1 includes a portion of Common 1 Segment south of I-10 and the Outer Corridor for a total length of 26.7mi. Under this scenario the Lafayette Regional Xpressway is the only toll facility in the study area. The estimated year for start of operations is 2030.Figure 14 presents the forecasted tolled traffic volumes for the years 2030 and 2040 at all pay points along the alignment. Figure 15 shows the results for Scenario 1 alignment but assuming toll-free operations. The toll traffic retained in the toll scenario versus the traffic attracted in a toll free scenario is 58% in 2030 and 62% in 2040 when comparing the total traffic volumes at pay points. Table 10 shows details by ramp and plaza location for the tolled and toll-free assignment results from the two modeled years 2030 and 2040. As congestion in the region grows in 2040 more drivers are willing to pay a toll and save time by opting to use the LRX.

The average annual toll transactions and revenue are presented in Table 11 for the period from 2030 through 2050. As shown in the table, revenues are estimated to increase from $10.0 million in 2030 to $27.1 million in 2034, the last year of ramp up effects.

Table 10 Traffic Volumes for Scenario 1 Toll-Free and Tolled

Scenario 1	2030		2040	
	Toll-Free	Tolled	Toll-Free	Tolled
Landry Rd	6.1	4.2	5.9	4.3
ML West	43.2	21.9	52.2	28.5
LA 342	4.8	3.3	4.8	4.6
Bourque Rd	2.4	1.2	4.5	1.9
LA 92	2.8	4.1	4.4	6.0
Placid Rd	0.8	0.3	1.2	0.4
LA 339	2.2	1.6	3.2	2.1
ML South	32.9	17.1	39.7	22.3
LA 89	3.5	2.2	4.2	2.6
ML South 2	14.1	9.3	15.7	11.3
Total	112.9	65.1	135.7	84.1
		58%		62%

Figure 14 Scenario 1 Forecasted Tolled Daily Traffic Volumes for 2030 and 2040

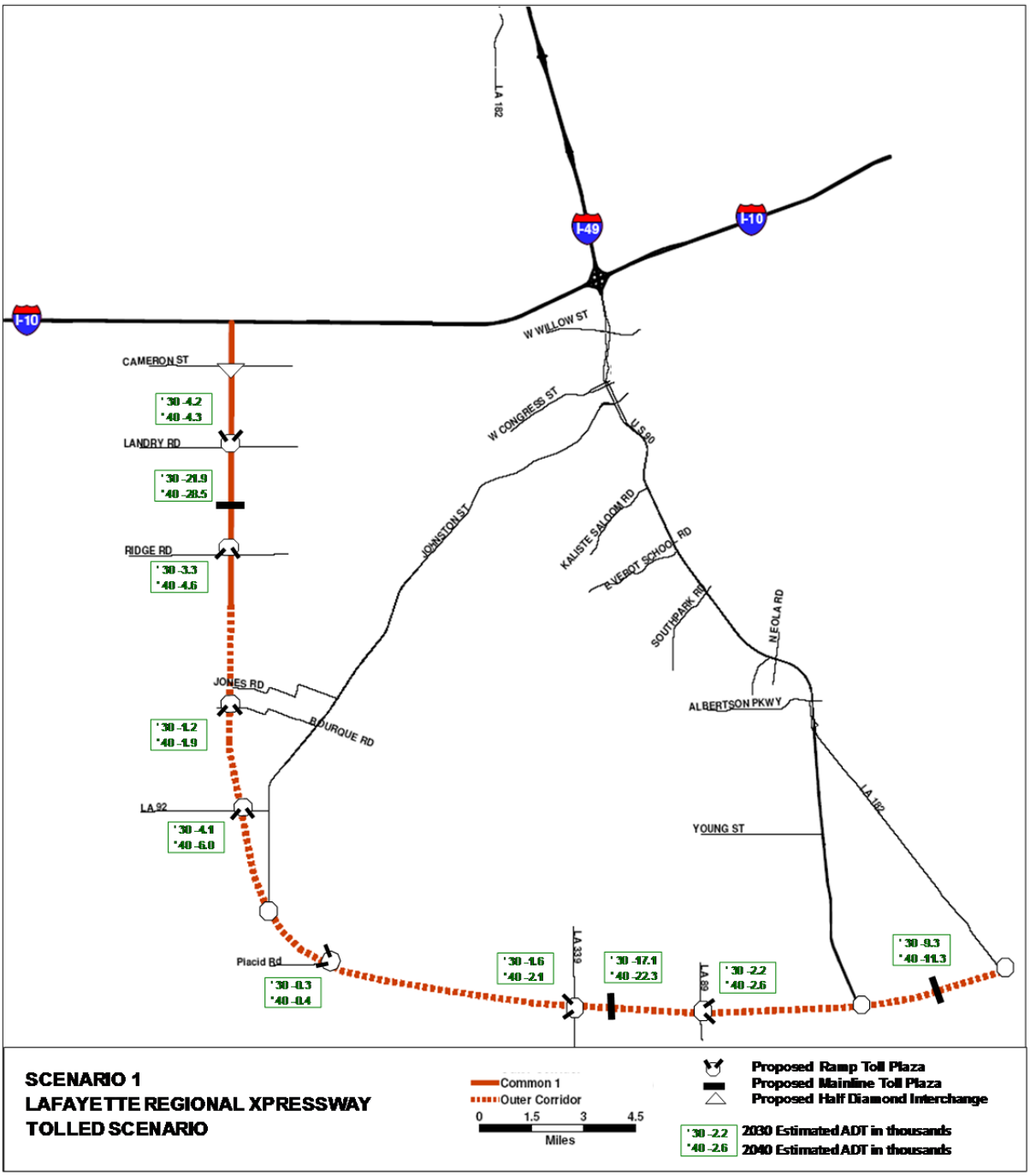


Figure 15 Scenario 1 Forecasted Toll-Free Daily Traffic Volumes for 2030 and 2040

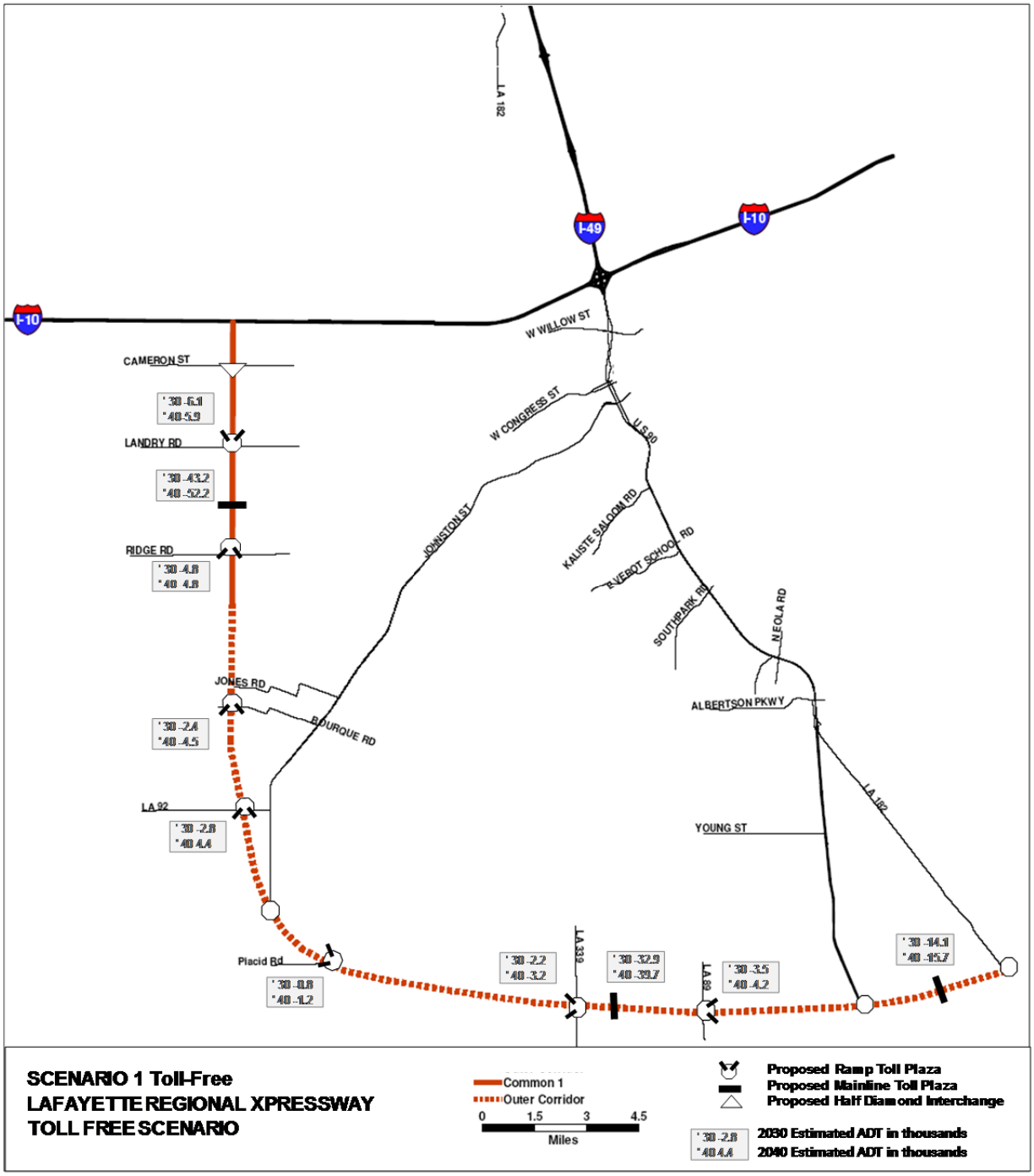


Table 11 Scenario 1 Revenue Projections 2030-2050

Year	PC Toll Transactions	CV Toll Transactions	Total Toll Transactions	PC Toll Revenue	CV Toll Revenue	Total Toll Revenue
2030	7,437,992	571,829	8,009,822	$8,986,169	$1,948,640	$10,934,810
2031	11,729,852	897,260	12,627,111	$14,180,478	$3,058,370	$17,238,848
2032	15,286,993	1,163,490	16,450,483	$18,492,682	$3,966,807	$22,459,489
2033	18,238,753	1,188,112	16,877,362	$18,991,510	$4,051,751	$23,043,261
2034	20,127,615	1,516,570	21,644,184	$24,379,742	$5,173,141	$29,552,883
2035	20,657,246	1,548,664	22,205,910	$25,037,370	$5,283,917	$30,321,286
2036	21,200,814	1,581,438	22,782,252	$25,712,736	$5,397,064	$31,109,801
2037	21,758,685	1,614,906	23,373,591	$26,406,320	$5,512,635	$31,918,955
2038	22,331,236	1,649,082	23,980,318	$27,118,614	$5,630,680	$32,749,294
2039	22,918,853	1,683,980	24,602,833	$27,850,120	$5,751,253	$33,601,373
2040	23,521,932	1,719,618	25,241,550	$28,601,359	$5,874,408	$34,475,767
2041	23,874,761	1,745,412	25,620,173	$29,030,379	$5,962,524	$34,992,903
2042	24,232,882	1,771,593	26,004,476	$29,465,835	$6,051,962	$35,517,797
2043	24,596,376	1,798,167	26,394,543	$29,907,823	$6,142,741	$36,050,564
2044	24,965,321	1,825,140	26,790,461	$30,356,440	$6,234,882	$36,591,322
2045	25,339,801	1,852,517	27,192,318	$30,811,787	$6,328,406	$37,140,192
2046	25,719,898	1,880,305	27,600,203	$31,273,963	$6,423,332	$37,697,295
2047	26,105,697	1,908,509	28,014,206	$31,743,073	$6,519,682	$38,262,755
2048	26,497,282	1,937,137	28,434,419	$32,219,219	$6,617,477	$38,836,696
2049	26,894,741	1,966,194	28,860,935	$32,702,507	$6,716,739	$39,419,246
2050	27,298,162	1,995,687	29,293,849	$33,193,045	$6,817,490	$40,010,535

4.4.2 Scenario 2

Scenario 2 includes the full length of the Common 1 Segment and the Outer Corridor for a total length of 36.2 miles. The estimated year for start of operations for the full LRX alignment is 2030.Figure 16 presents the forecasted traffic volumes for the years 2030 and 2040 at all pay points along the alignment. Figure 15 shows the results for Scenario 1 assuming toll-free operations. The toll traffic retained in the toll scenario versus the traffic attracted in a toll-free scenario is 61% in 2030 and 66% in 2040 when comparing the total traffic volumes at pay points. Table 12 shows details by ramp and plaza location for the tolled and toll-free assignment results from the two modeled years 2030 and 2040. As congestion in the region grows in 2040 more drivers are willing to pay a toll and save time by opting to use the LRX.

The average annual toll transactions and revenue are presented in Table 13 for the period from 2030 through 2050. As shown in the table, revenues are estimated to increase from $11.6 million in 2030 to $31.4 million in 2034 the last year of ramp up effects.

Table 12 Traffic Volumes for Scenario 2 Toll-Free and Tolled

Scenario 2	2030		2040	
	Toll-Free	Tolled	Toll-Free	Tolled
ML North	22.7	12.6	23.0	14.9
LA 98 Gloria S	10.3	7.2	12.5	8.8
Landry Rd	7.4	6.6	6.7	6.3
ML West	49.9	28.5	58.8	36.6
LA 342	4.9	2.7	5.0	4.2
Bourque Rd	2.4	1.1	4.5	1.9
LA 92	2.7	4.0	4.0	5.8
Placid Rd	0.9	0.3	1.3	0.4
LA 339	2.4	1.7	3.5	2.2
ML South	32.8	18.1	40.5	24.0
LA 89	3.4	2.1	4.0	2.5
ML South 2	14.2	9.1	15.7	11.1
	154	94	180	119
		61%		66%

Figure 16 Scenario 2 Forecasted Tolled Daily Traffic Volumes for 2030 and 2040

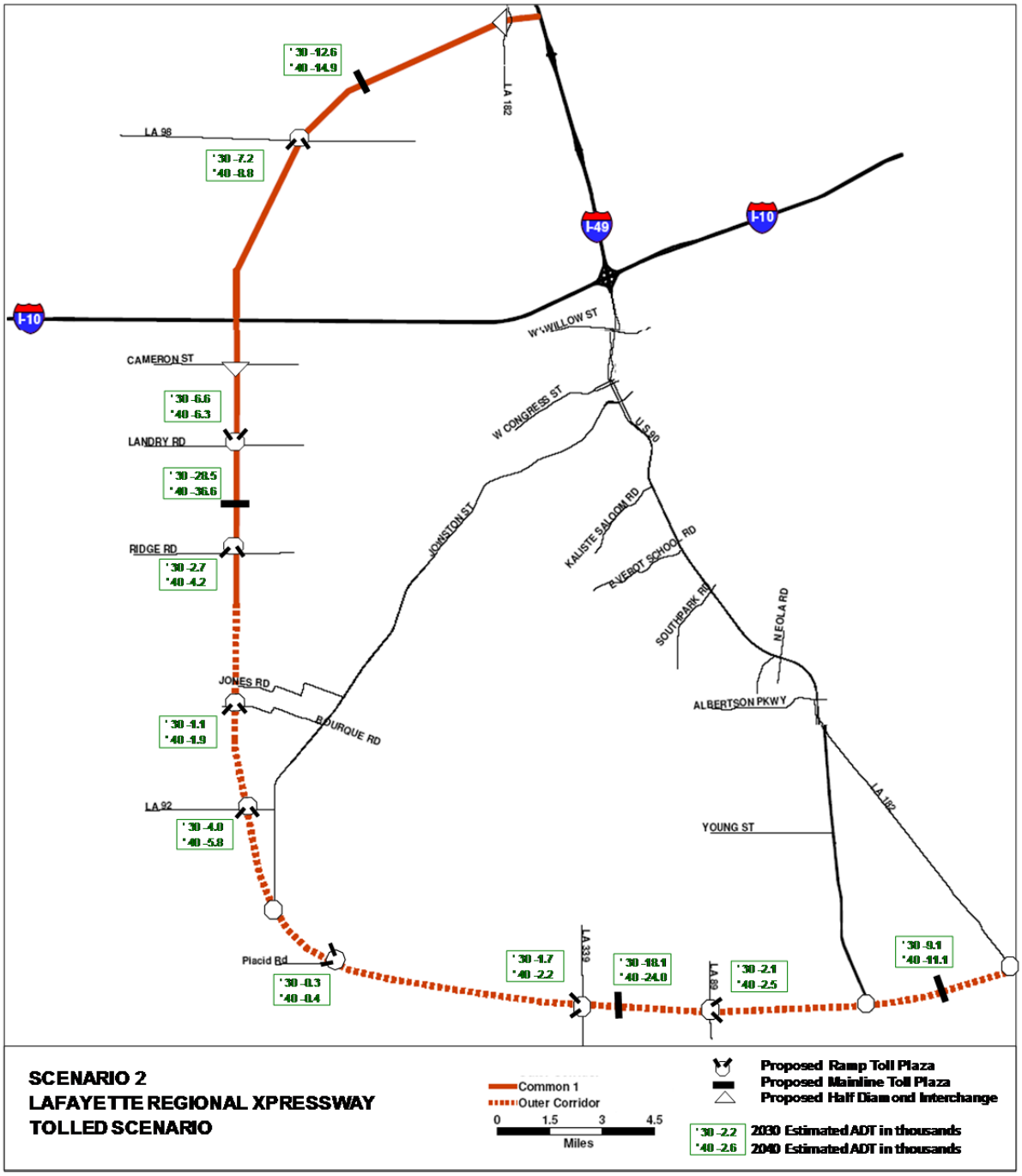


Figure 17 Scenario 2 Forecasted Toll-Free Daily Traffic Volumes for 2030 and 2040

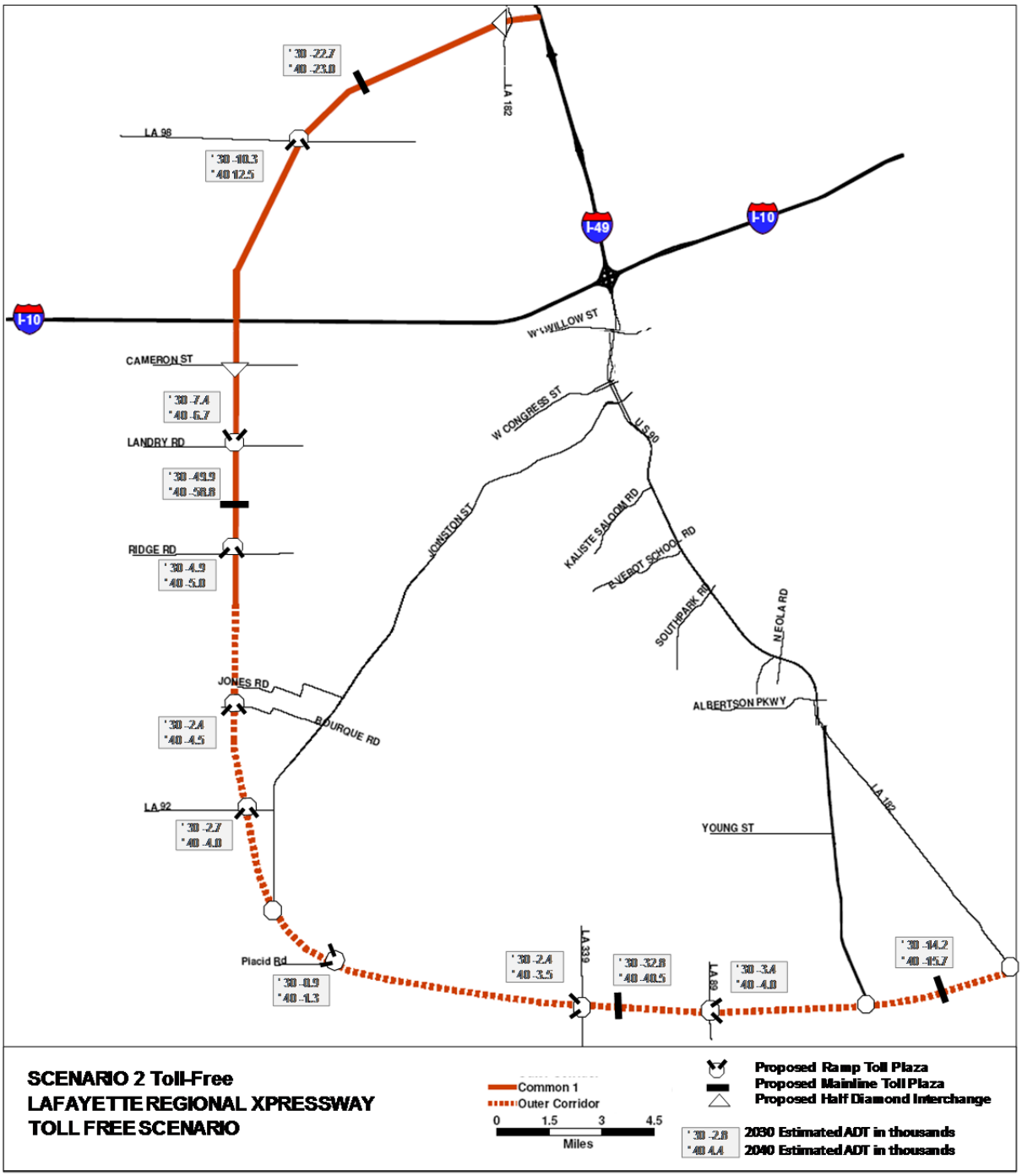


Table 13 Scenario 2 Revenue Projections 2030-2050

Year	PC Toll Transactions	CV Toll Transactions	Total Toll Transactions	PC Toll Revenue	CV Toll Revenue	Total Toll Revenue
2030	10,966,018	623,349	11,589,368	$10,532,334	$2,135,661	$12,667,995
2031	17,247,407	978,267	18,225,674	$16,611,678	$3,353,927	$19,965,605
2032	22,417,718	1,268,750	23,686,469	$21,651,855	$4,352,789	$26,004,644
2033	26,674,883	1,295,822	24,241,958	$22,224,259	$4,448,690	$26,672,949
2034	29,358,762	1,654,339	31,013,101	$28,514,744	$5,683,380	$34,198,124
2035	30,050,790	1,689,639	31,740,429	$29,268,580	$5,808,596	$35,077,177
2036	30,759,131	1,725,691	32,484,822	$30,042,345	$5,936,572	$35,978,917
2037	31,484,168	1,762,513	33,246,681	$30,836,566	$6,067,367	$36,903,933
2038	32,226,295	1,800,121	34,026,415	$31,651,784	$6,201,044	$37,852,828
2039	32,985,915	1,838,530	34,824,445	$32,488,553	$6,337,666	$38,826,219
2040	33,763,440	1,877,760	35,641,200	$33,347,444	$6,477,298	$39,824,741
2041	34,269,892	1,905,926	36,175,818	$33,847,655	$6,574,457	$40,422,113
2042	34,783,940	1,934,515	36,718,455	$34,355,370	$6,673,074	$41,028,444
2043	35,305,699	1,963,533	37,269,232	$34,870,701	$6,773,170	$41,643,871
2044	35,835,285	1,992,986	37,828,271	$35,393,761	$6,874,768	$42,268,529
2045	36,372,814	2,022,881	38,395,695	$35,924,668	$6,977,889	$42,902,557
2046	36,918,406	2,053,224	38,971,630	$36,463,538	$7,082,558	$43,546,095
2047	37,472,182	2,084,022	39,556,205	$37,010,491	$7,188,796	$44,199,287
2048	38,034,265	2,115,283	40,149,548	$37,565,648	$7,296,628	$44,862,276
2049	38,604,779	2,147,012	40,751,791	$38,129,133	$7,406,077	$45,535,210
2050	39,183,851	2,179,217	41,363,068	$38,701,070	$7,517,168	$46,218,238

APPENDIX A - LEVEL OF SERVICE ANALYSES

As part of the modeling effort, and associated with the ongoing environmental impact studies, comparative levels of service for representative links within the study area have been estimated. The model's volume to capacity outputs has formed the bases for estimating level of service.

Ten major corridors and the proposed toll facility in the study area were evaluated for level of service under the no build alternative and each of the build scenarios. Along these corridors major intersections were selected. For these intersections the volume to capacity ratio at the approach links (direct output from the model) was tabulated. The corridors selected have facility class urban arterial with the exception of the proposed toll roads which would function as freeways. The following criteria were used to convert the model volume to capacity ratios into level of service.

A	B	C	D	E	F
<0.33	<0.62	<0.81	<1.13	<1.34	>=1.34

The Lafayette Regional Model network has arterials coded with capacities varying from 550 vehicles per hour per lane up to 637 vehicles per hour per lane depending on type of median and the provision of left turning lanes. These capacities are generally lower than capacities at LOS E used in the modeling practice. The criteria listed above accounts for the low capacities coded in the network.

Summary of Level of Service (LOS) 2030 No Build and Scenarios 1 and 2 Tolled and Toll-Free

Corridor	Selected Major Intersections in the Corridor	LOS at approches to major intersections	No Build	Scenario1 LRX Tolled	Scenario2 LRX Tolled
			NB/EB	NB/EB	SB/WB
Johnston St	6	LOS E or F	4	3	3
		LOS D	7	7	7
		LOS C or better	1	2	2
University Ave.	7	LOS E or F	1	1	1
		LOS D	4	4	4
		LOS C or better	9	9	9
Ambassador Caffery Pkwy.	7	LOS E or F	7	7	7
		LOS D	7	7	6
		LOS C or better	0	0	1
Kaliste Saloom Rd.	4	LOS E or F	3	2	2
		LOS D	3	4	4
		LOS C or better	2	2	2
Fielfdspan Rd. (LA724)	5	LOS E or F	1	1	0
		LOS D	4	0	1
		LOS C or better	5	9	9
Milton Rd.	4	LOS E or F	0	1	1
		LOS D	3	1	1
		LOS C or better	5	6	6
Verot School Rd.	5	LOS E or F	0	0	0
		LOS D	6	5	5
		LOS C or better	4	5	5
LA 93	6	LOS E or F	3	3	3
		LOS D	5	5	4
		LOS C or better	4	4	5
LA 89	5	LOS E or F	1	1	1
		LOS D	2	2	2
		LOS C or better	7	7	7
US 90/ I-49	11	LOS E or F	7	6	4
		LOS D	9	9	9
		LOS C or better	6	7	9
Lafayette Regional Expressway[1]	5-8	LOS E or F	0	0	0
		LOS D	0	0	0
		LOS C or better	0	12	16

NOTE:

(1) For Scenario 1 five locations along the Lafayette Regional Xpressway were evaluted for level of service and for Scenario 2 eight locations were evaluted.

12 LOS estimate for toll road segments