
LA 447 Corridor Study

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Walker, Louisiana

Livingston Parish

ALTERNATIVE ANALYSIS REPORT

Prepared for:

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Conducted by:



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1. INTRODUCTION

The purpose of this study is to determine the best mobility and safety alternative for the LA 447 corridor in Livingston Parish, Louisiana. This study includes evaluation of various alternatives along LA 447 corridor and identifies potential concepts to improve the corridor mobility and safety.

The limits of the study area on LA 447 are from the railroad tracks near Keith Street to LA 16 (approximately 10.2 miles) in Walker, Livingston Parrish. The study area location map is shown in **Figure 1**.

The software selected for evaluating the various alternatives was VISSIM, Version 5.40. VISSIM is a microscopic, time step and behavior based simulation model developed to model urban traffic and public transit operations. The program can analyze corridor traffic operations under constraints such as lane configuration, vehicle composition, traffic signals, etc., thus making it a useful tool for the evaluation of various alternatives based on transportation engineering and planning measures of effectiveness¹. In VISSIM, every driver has specific behavior characteristics and is assigned to a specific vehicle. Therefore, a vehicle corresponds to its driver's behavior. This microscopic simulation software is recognized as being a very useful tool for modeling existing and future conditions of roadway networks.

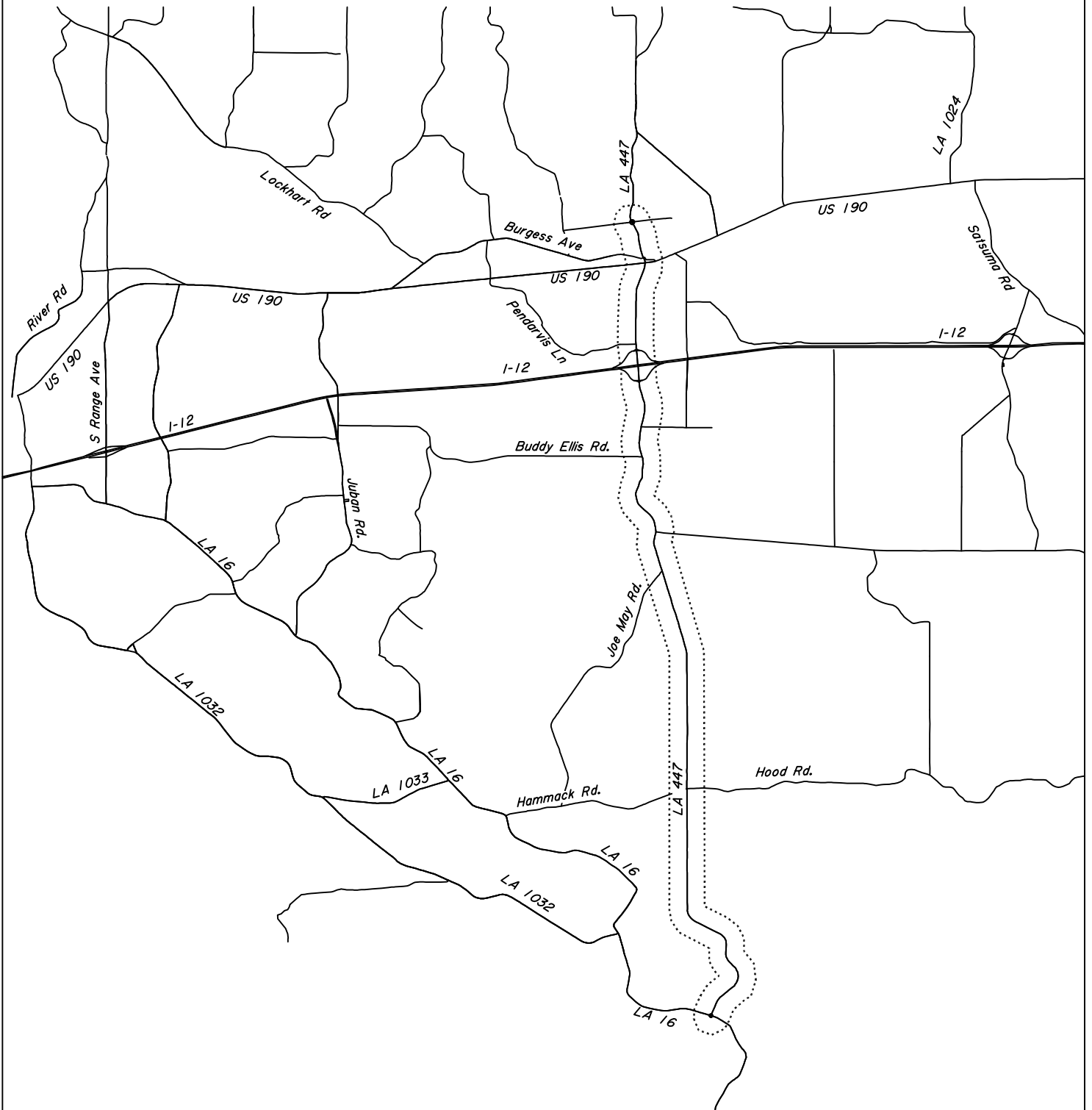
The methodology utilized in performing this study included the following elements:

- Collection of Existing Traffic Data
- Development of Existing Base Models
- Calibration of Existing Base Models
- Development of Proposed Alternatives
- Alternatives Analysis
- Development of an Implementation Plan

Each of these elements are discussed in more detailed in the following sections.

1. PTV Vision VISSIM User Manual Version 5.40

LA 447 STUDY AREA MAP



 Study Area

2. EXISTING CONDITIONS

2.1 Data Collection

The study area along LA 447 includes sixty-four (64) driveways and sixty (60) intersections. The turning movement counts and corridor travel time runs were performed by Neel-Schaffer, Inc personnel's in February 2011. The twenty-four (24) tube counts were collected by Reliable Traffic Data Services, LLC.

As per the scope of services, the turning movement counts were collected for twelve (12) driveways and twenty-four (24) intersections. The twenty-four (24) approach counts were collected for twenty-five (25) intersections. The travel time runs and peak hour observations were performed along the corridor during AM, Noon and PM peak periods. The data collected was previously submitted to the Louisiana Department of Transportation and Development on May 2011 (Data Collection Report). A copy of this report is included in the CD provided with this report.

The turning movement volumes for the remaining driveways and intersections of the study area were estimated based on the land use, existing travel patterns and engineering judgment. For better VISSIM model outputs, the vehicle volumes between the adjacent intersections are recommended to be balanced. Therefore, the existing and the estimated vehicle volumes are balanced between the study area intersections. The summary of balanced intersection volumes during the AM, NOON and PM peak are included in the CD provided with this report.

2.2 Crash Data

The main objective when designing intersections is to decrease the amount of crashes at those given locations. Increasing capacity and storage lengths, adding/removing signals, limiting conflicting movements and/or recommending roundabouts all play key roles in the reduction or increase of crashes. In general, the least amount of conflict points at an intersection, results in lower number of crashes. Crash data along the corridors within the study area were provided by LADOTD for the years of 2010-2012. A summary of this crash data can be seen in **Table 1**.

Table 1: Crash Summary along LA 447

Description	Year		
	2010	2011	2012
	<i>Location</i>		
LA 16 to Buddy Ellis Rd (~7.2 miles)	81	74	63
Buddy Ellis Rd to I-12 Interchange (~0.9 miles)	37	25	33
I-12 Interchange to Railroad Tracks (~2.2 miles)	182	180	197
Total	300	279	293
	<i>Severity</i>		
Property Damage Only	222	198	200
Injury	78	80	91
Fatality	0	1	2
Total	300	279	293
	<i>Type of Accident</i>		
Collision with Vehicle	248	225	250
Run-Off Roadway	40	39	32
Other	12	15	11
Total	300	279	293
	<i>Type of Collision</i>		
Rear End	126	111	119
Head on	2	7	4
Right Angle	53	49	48
Right Turn	0	2	1
Left Turn	19	22	28
Side Swipe	45	35	42
Other	55	53	51
Total	300	279	293

2.3 Field Observations

Neel-Schaffer, Inc. personnel performed field observations in early 2011 during the time frame when all other data was being collected. At this time, several problem areas were observed along LA 447. These field observations, measurements and notes were included in the “*Data Collection Report*.” A copy of the “*Data Collection Report*” is included in the CD provided with this report.

Based on field observations, the PM peak was observed to experience more delays when compared to AM and Noon peak periods. Following key areas along the corridor were observed to experience congestions issues.

- During PM peak, the intersection LA 447 at LA 16 experiences significant delays for the westbound approach on LA 16. The vehicles queues on this approach is observed to be more than 7,000 ft.
- During PM peak, the intersection LA 477 at I-12 Eastbound Ramp experiences significant queues on all approaches. The most vehicles entering the intersection on the ramp and the southbound approach on LA 447 can clear in one cycle. A significant vehicle queues of more than 2,500 ft was observed on the northbound approach.
- During PM peak, the intersection LA 477 at US 190 experiences significant queues for the northbound approach on LA 447. The vehicles queues on the northbound left turn lanes extends in to the northbound through lanes, causing backup for both northbound left and through movements.
- All day, the northbound and southbound movements on LA 447, between 1-12 Westbound Ramp and US 190, were observed to have slow moving vehicles on outside lane due to the significant number of vehicles making turns to and from driveways located on LA 447.
- Considerable midblock delays were observed on LA 447 due to these movements.
- Milton Lane is one of the existing accesses to South Walker Elementary School. The intersection LA 447 at Miller Road / Milton Lane is 300 feet south of the signalized intersection LA 447 at 1-12 Eastbound Ramp. During the school peak hours, a volunteer controls the intersection and allows vehicles to enter and exit Milton Lane.
- A significant volume of traffic on LA 447 was observed making turns to and from South Fork Elementary School. These turning movements on LA 447 northbound and southbound approached were observed to interrupt the continuous flow on LA 447.

3. DEVELOPMENT OF VISSIM BASE MODEL

3.1 Methodology and Data Input

A VISSIM network model was built using scaled aerial images and maps. Each of the network attributes were developed to include the existing driving behavior, roadway types and speed zones. Based on the twenty-four (24) hour classification counts along the corridor, the vehicle composition on LA 447 within the study area was determined to be 5% heavy vehicles and 95% passenger cars. These compositions were assigned to each link based on the link classification. Using the balance peak hour turning movement volumes, the volumes for each entry link are defined.

There are a total of five signalized intersections along the LA 447 corridor within the study area. Using existing TSI's, a Ring Barrier Controller (RBC) was programmed for each intersection. The signal heads and detectors were assigned with a respective Signal Controller and Signal Group. Unsignalized intersections and driveways were coded into the model by using a combination of stop signs and conflict areas. There is an existing Two-Way Left Turn Lane (TWLTL) along LA 447 between Pendarvis Lane and US 190. This section of roadway network was built with multiple overlapping connectors. Therefore, unsignalized intersections within this section are coded using a series of priority rules and stop signs.

3.2 Model Calibration

Calibration is the adjustment of model parameters to improve the model's ability to reproduce local driver behavior and traffic performance characteristics². Calibration is necessary because no single model can be expected to be equally accurate for all possible traffic conditions. The objective of calibration is to find the set of user-adjustable parameter values for the VISSIM model that best reproduces local traffic conditions.

Based on field observations, the PM peak period was observed to experience more delays when compared to AM and Noon peak periods. Therefore, the initial VISSIM model was built for the PM peak hour conditions.

The initial PM peak VISSIM model was checked for any errors and warnings. The error free model was used for the calibration. The following model outputs were collected and compared with the field data collected.

- Volume
- Travel Time

These comparisons tables and the methodology followed are discussed in detail in the *VISSIM Calibration Report* submitted in October 2012. A copy of this report is included in the CD provided with this report.

2. Federal Highway Administration "Analysis Toolbox Volume III: Guidelines for Applying Traffic Micro-Simulation Modeling Software" U.S. Department of Transportation, July 2004

4. DEVELOPMENT OF CORRIDOR ALTERNATIVES

4.1 Description

The objective of the study was to develop concept alternatives to improve the mobility and safety of vehicle, pedestrian and bicycle traffic along the LA 447 corridor between LA 16 and Keith St / Dawn St, a distance of about 10.2 miles. LADOTD supplemented an additional task to evaluate the interchange of I-12 at LA 447 individually.

4.2 I-12 at LA 447 Interchange Study

The objective of this study was to develop two (2) build interchange alternatives for the interchange of I-12 at LA 447 that will meet the future traffic demand needs at this location. In addition, the proposed interchange alternatives should also be compatible with the widening of I-12 as well as the of LA 447 alternatives north and south of I-12.

A tier process was utilized to evaluate various interchange concepts. From this process, multiple interchange concepts were generally evaluated based on traffic operations, Right of Way, Environmental/Social Impacts and Cost. From the initial evaluation, several interchanges recommended for further evaluation. However, the ultimate goal is to reduce the number of interchange concepts to two (2) to evaluate further.

Based on preliminary evaluation, the following three (3) interchange concepts were selected for evaluation.

1. No Build
2. PAR CLO-A w/signalized intersections
3. PAR CLO-A w/roundabout intersections

Conceptual geometry was developed for the two (2) build alternatives. The conceptual geometric layouts are included in the **Appendix**. These two (2) build interchange concepts were evaluated based on Level of Service (LOS) based on forecasted 2038 traffic demands and estimated opinions of probable construction cost. In addition, LOS for the No Build condition was also determined. A summary of the LOS are shown in **Table 2**.

Table 2: Summary of Level of Service – I-12 at LA 447 Interchange

Alternative	LA 447 at EB Ramps				LA 447 at WB Ramps			
	EB	SB	NB	Int.	WB	SB	NB	Int.
<i>AM Peak</i>								
No Build	F	F	F	F	F	N/A	F	N/A
PAR CLO-A w/Signals	C	A	B	B	C	A	A	A
PAR CLO-A w/Roundabouts	B	A	B	B	B	A	A	A
<i>PM Peak</i>								
No Build	F	F	F	F	F	N/A	D	N/A
PAR CLO-A w/Signals	D	B	B	C	C	A	A	B
PAR CLO-A w/Roundabouts	B	A	B	B	B	A	A	A

A summary of the probable construction cost estimates are shown in **Table 3**.

Table 3: Summary of Estimated Opinions of Probable Construction Costs - I-12 at LA 447 Interchange

Alternative	Estimated Opinions of Probable Construction Costs
PAR CLO-A w/Signals	\$23,400,965.00
PAR CLO-A w/Roundabouts	\$22,490,079.00

Based on the anticipated LOS and estimated opinions of probable construction costs of the two (2) proposed alternatives, the recommended interchange alternative is the PAR CLO-A w/Roundabouts. In addition to providing a better LOS and lower estimated opinion of probable construction costs, the PAR CLO-A w/Roundabouts can be constructed in phases.

Based on the analyses results and LADOTD review, the PAR CLO-A w/Roundabout is considered the preferred alternative for the interchange on I-12 at LA 447. This interchange alternative is consistent for the overall LA 447 alternatives.

4.3 LA 447 Corridor Alternatives

To improve the mobility and safety of vehicle, pedestrian and bicycle traffic along the LA 447 corridor, multiple alternative concepts were evaluated. The proposed alternatives were established using but not limited to the following concepts:

- Adding lanes
- Roundabouts
- RCUT intersections
- U-turns (signalized or unsignalized)
- Closing/limiting or sharing access points including driveways, signals and median openings
- Signal Optimization

The proposed concepts were evaluated based on traffic operations, ROW, Environmental/Social Impacts, safety and cost. From the initial concepts evaluation, two (2) alternatives were considered along with the No-Build alternative. The No-Build alternative does

not modify LA 447. The Build alternatives would modify the LA 447 corridor as described below and as shown on the exhibits provided in the **Appendix**.

Both Alternatives 1&2 include following improvements

- PAR CLO-A w/Roundabouts at LA 447 and I-12
- The existing two (2) lane roadway between LA 16 and Buddy Ellis Rd will be widened to a three (3) lane roadway with a center two way left turn lane.
- The existing two (2) lane roadway between Buddy Ellis Rd and I-12 westbound ramps will be widened to a four (4) lane divided roadway.
- The existing five (5) lane roadway between I-12 westbound ramps and Burgess Ave will be converted to a four (4) lane divided roadway.
- The existing two (2) lane roadway between Burgess Ave and Keith St remains the same.
- A single lane roundabout at the intersection of LA 16.
- A multilane roundabout at the intersections of Buddy Ellis Rd, Hospital Driveway, I-12 eastbound ramps, I-12 westbound ramps, US 190 (Florida Blvd), LA 1027 (Burgess Ave).
- Existing full access intersection at Milton Ln / Miller Ln will be converted to a RCUT intersection and relocated 400' south of existing location.

Additional improvements for Alternative 1 (Roundabout)

- A multilane roundabout at the intersections of Walmart / Winn-Dixie Driveway and Fern St / Aydell Ln.
- A new roadway connecting Brian Park Dr and Cambre Ln will intersect LA 447, north of Village Dr. A multilane roundabout is proposed at this intersection.
- A southbound left turn lane on LA 447 for the Walmart north driveway.
- A southbound U-turn lane, south of Brian Park Dr.

Additional improvements for Alternative 2 (RCUT)

- Existing full access intersections at Walmart / Winn-Dixie Driveway, Brian Park Dr, Stein Driveway and Fern St / Aydell Ln will be converted to RCUT intersections.
- A northbound left turn lane on LA 447 for Pendarvis Ln.

The layout maps for the proposed Alternative 1 (Roundabout) and Alternative 2 (RCUT) concepts are provided in the **Appendix**. As per LADOTD's request, the proposed concepts were evaluated for an 80' mobile home design vehicle. The single lane roundabout at the intersection LA 447 at LA 16 may require few design exceptions to accommodate this design vehicle. The proposed concepts for the remaining study area can accommodate this design vehicle. The auto turn templates at the critical intersections for the critical movements are provided in the **Appendix**.

5. TRAFFIC FORECASTING

The 10.2 mile long study area along LA 447 includes sixty-four (64) driveways and sixty (60) intersections. The existing turning movement counts were collected for twelve (12) driveways and twenty-four (24) intersections. The twenty-four (24) approach counts were collected for twenty-five (25) intersections. The data collected was previously submitted to the Louisiana Department of Transportation and Development on May 2011 (Data Collection Report). A copy of this report is included in the CD provided with this report.

The turning movement volumes for the remaining driveways and intersections of the study area were estimated based on the land use, existing travel patterns and engineering judgment. For a better VISSIM model outputs, the vehicle volumes between the adjacent intersections are recommended to be balanced. The summary of balanced intersection volumes during the AM, NOON and PM peak are provided in the **Appendix**.

The Capital Region Planning Commission (CRPC) Regional Travel Demand Model network and data files were obtained from CRPC. The CRPC Travel Demand Model, which was calibrated and validated to year 2004 conditions, has the capability to forecast ADT volumes for future years. All planned financially constrained projects as well as updated Traffic Analysis Zones (TAZ) data were included in the future forecasted networks. This travel demand model was utilized to forecast ADT volumes for the future year 2038.

The travel demand model output includes 24-hour roadway volumes and turning movement volumes for each intersection. The daily turning movement volumes were divided in to four (4) periods, AM (3-hours), Midday (6-hour), PM (3-hours) and Night (12-hours). From existing turning movement counts it was observed that an average of 38% of the three hour AM period volumes occurs during one (1) hour AM peak. Similarly, an average of 37% of the three hour PM period volumes occurs during one (1) hour PM peak. Therefore, the AM and PM peak hour volumes for following intersections in the study area were determined for each scenario from travel demand output volumes for the AM and PM peak periods utilizing these percentages.

- LA 447 at LA 16
- LA 447 at I-12 Eastbound Ramp
- LA 447 at I-12 Westbound Ramp
- LA 447 at US 190
- LA 447 at Burgess Avenue

In addition, using the CRPC Travel Demand Model, the growth rate for the study area along LA 447 was determined to be 2.5 % (south of I-12) and 1% (north of I-12). Using the determined growth rate and existing counts, 2038 AM and 2038 PM peak hour turning movement counts were forecasted for the remaining study area intersections. For a better VISSIM model outputs, the estimated 2038 peak hour vehicle volumes between the adjacent intersections were balanced.

Using the 2011 peak hour balanced volumes and 2038 peak hour balanced volumes, AM and PM peak hour volumes for the analysis years 2015 and 2030 were interpolated. These forecasted peak hour volumes for years 2015 and 2030 were used as the basis of all analyses performed in this study. AM and PM peak hour balanced volumes for years 2015 and 2030 are provided in the **Appendix**. AM and PM peak hour balanced volumes for years 2011 and 2038 are included in the CD provided with this report..

6. DEVELOPMENT OF VISSIM MODELS FOR ALTERNATIVES

The analysis years for this study were determined to be 2015 and 2030. Using the calibrated VISSIM base model, the alternative models were developed for the following three (3) alternatives for each of the analysis years.

- No-Build
- Alternative 1 (Roundabout)
- Alternative 2 (RCUT)

6.1 *No-Build Model (2015 and 2030)*

The No Build model is an existing conditions model with no modifications, the calibrated base model. The forecasted traffic volumes for the years 2015 and 2030 were used to build the future No Build models. The purpose of developing 2015 and 2030 No Build models was to establish a baseline for MOEs comparison of the proposed alternative models to the “do nothing” alternative for each of the analysis years. The MOEs comparison can be used to quantify each of the proposed alternatives improvement to the traffic mobility within the study area.

6.2 *2015 Alternative 1 (Roundabout)*

Using the calibrated VISSIM base model, a VISSIM model was built for the 2015 Alternative 1 (Roundabout) scenario. Based on the preliminary concept evaluations, the forecasted 2015 volumes may not require the implementation of the full build Alternative 1 (Roundabout) concept. Some of the network modifications may be implemented at later stages. The following network modifications were considered for the 2015 Alternative 1 (Roundabout) model.

- The existing two (2) lane roadway between LA 16 and Hospital Driveway will remain the same.
- The existing two (2) lane roadway between Hospital Driveway and I-12 eastbound ramps will be widened to a four (4) lane divided roadway.
- The existing two (2) lane overpass bridge between I-12 ramps will remain the same.
- The existing five (5) lane roadway between I-12 westbound ramps and Burgess Ave will be modified as a four (4) lane divided roadway.
- The existing two (2) lane roadway between Burgess Ave and Keith St remain the same.
- A single lane roundabout at the intersection of LA 16.
- A multilane roundabout at the intersections of Hospital Driveway, I-12 eastbound ramps, I-12 westbound ramps, Walmart / Winn-Dixie Driveway, Fern St / Aydell Ln. and US 190 (Florida Blvd).
- Existing full access intersection at Milton Ln / Miller Ln will be converted to a RCUT intersection and relocated 400' south of existing location.

- A new roadway connecting Brian Park Dr and Cambre Ln will intersect LA 447, north of Village Dr. A multilane roundabout is proposed at this intersection.

Using the proposed network changes and the forecasted traffic volumes, the 2015 Alternative 1(Roundabout) VISSIM model was developed for the AM, Noon and PM peaks.

6.3 2030 Alternative 1 (Roundabout)

Using the 2015 Alternative 1 (Roundabout) VISSIM model, a full build roundabout concept model for the year 2030 was developed. The following additional network modifications were considered for developing the 2030 Alternative 1 (Roundabout) VISSIM model.

- The existing two (2) lane roadway between LA 16 and Buddy Ellis Rd will be widened to a three (3) lane roadway with a center two way left turn lane.
- The existing two (2) lane roadway between Buddy Ellis Rd and Ray Milton Road will be widened to a four (4) lane divided roadway.
- The existing two (2) lane overpass bridge between I-12 ramps will be widened to a four (4) lane divided roadway.
- The existing diamond interchange concept on I-12 at LA 447 will be converted to a Partial Cloverleaf Interchange (PAR CLO-A) with widened overpass.
- A multilane roundabout at the intersections of Buddy Ellis Rd and LA 1027 (Burgess Ave).
- A southbound left turn lane on LA 447 for Walmart north driveway.
- A southbound U-turn lane, south of Brian Park Dr.

Using the proposed additional network changes and the forecasted traffic volumes, the 2030 Alternative 1(Roundabout) VISSIM model was developed for the AM, Noon and PM peaks.

6.4 2015 Alternative 2 (RCUT)

Using the calibrated VISSIM base model, a VISSIM model was built for the 2015 Alternative 2 (RCUT) scenario. Based on the preliminary concept evaluations, the forecasted 2015 volumes may not require the implementation of the complete Alternative 2 (RCUT) concept. Some of the network modifications may be implemented at later stages. The following network modifications were considered for the 2015 Alternative 2 (RCUT) model.

- The existing two (2) lane roadway between LA 16 and Hospital Driveway will remain the same.
- The existing two (2) lane roadway between Hospital Driveway and I-12 eastbound ramps will be widened to a four (4) lane divided roadway.
- The existing two (2) lane overpass bridge between I-12 ramps will remain the same.
- The existing five (5) lane roadway between I-12 westbound ramps and Burgess Ave will be modified as a four (4) lane divided roadway.
- The existing two (2) lane roadway between Burgess Ave and Keith St remain the same.
- A single lane roundabout at the intersection of LA 16.
- A multilane roundabout at the intersections of Hospital Driveway, I-12 eastbound ramps, I-12 westbound ramps and US 190 (Florida Blvd).
- Existing full access intersections at Walmart / Winn-Dixie Driveway, Brian Park Dr, Stein Driveway and Fern St / Aydell Ln will be converted to RCUT intersections.
- Existing full access intersection at Milton Ln / Miller Ln will be converted to a RCUT intersection and relocated 400' south of existing location.
- A northbound left turn lane on LA 447 for Pendarvis Ln.

Using the proposed network changes and the forecasted traffic volumes, the 2015 Alternative 2(RCUT) VISSIM model was developed for AM, Noon and PM peaks.

6.5 2030 Alternative 2 (RCUT)

Using the 2015 Alternative 2 (RCUT) VISSIM model, a full build Alternative 2 (RCUT) concept model for the year 2030 was developed. The following additional network modification were considered for developing the 2030 Alternative 2 (RCUT) VISSIM model.

- The existing two (2) lane roadway between LA 16 and Buddy Ellis Rd will be widened to a three (3) lane roadway with a center two way left turn lane.
- The existing two (2) lane roadway between Buddy Ellis Rd and Ray Milton Road will be widened to a four (4) lane divided roadway.
- The existing two (2) lane overpass bridge between I-12 ramps will be widened to a four (4) lane divided roadway.
- The existing diamond interchange concept on I-12 at LA 447 will be converted to a Partial Cloverleaf Interchange (PAR CLO-A) with widened overpass.
- A multilane roundabout at the intersections of Buddy Ellis Rd and LA 1027 (Burgess Ave).

Using the proposed additional network changes and the forecasted traffic volumes, the 2030 Alternative 2(RCUT) VISSIM model was developed for the AM, Noon and PM peaks.

7. Alternatives Analysis

7.1 VISSIM model comparisons

VISSIM models for each of the analysis years were compared for MOEs during the AM, Noon and PM peak periods for quantifying the mobility improvements along the corridor. Network performance, travel time along the corridor, and queue length at critical intersections were the MOEs considered for the alternative analysis.

The overall network performance and corridor travel time comparisons between the alternative models for the analysis year 2015 are shown in **Table 4**.

Table 4: Over all Network Performance Comparisons - 2015

	No-Build	Alt 1	% Diff	Alt 2	%Diff
	<i>AM Peak</i>				
Average delay time per vehicle (sec)	31.6	16.5	-48%	17.6	-44%
Average stopped delay per vehicle (sec)	11.2	1.0	-91%	2.2	-81%
Average Travel Time - Northbound (sec)	851.9	851.4	0%	820.1	-4%
Average Travel Time - Southbound (sec)	830.1	837.8	1%	815.6	-2%
Number of vehicles that have left the network (Veh)	9968	9965	0%	9990	0%
	<i>Noon Peak</i>				
Average delay time per vehicle (sec)	23.4	14.8	-37%	19.1	-18%
Average stopped delay per vehicle (sec)	8.4	0.9	-89%	4.1	-51%
Average Travel Time - Northbound (sec)	802.3	850.8	6%	823.2	3%
Average Travel Time - Southbound (sec)	807.8	830.1	3%	812.1	1%
Number of vehicles that have left the network (Veh)	10042	10044	0%	10058	0%
	<i>PM Peak</i>				
Average delay time per vehicle (sec)	124.5	27.4	-78%	29.0	-77%
Average stopped delay per vehicle (sec)	36.1	3.7	-90%	6.1	-83%
Average Travel Time - Northbound (sec)	1265.2	886.3	-30%	856.4	-32%
Average Travel Time - Southbound (sec)	858.0	857.6	0%	831.3	-3%
Number of vehicles that have left the network (Veh)	11413	11636	2%	11675	2%

%Diff – Alternative compared to No-Build scenario

%Diff – negative value represents % reduction in value

The network performance and the travel time comparisons between the alternatives indicate that for 2015 forecasted volumes, both the alternatives provide better corridor mobility compared to the No-Build scenario.

The vehicle queue length comparisons at the critical intersections between the alternative models for the analysis year 2015 are shown in **Table 5**.

Table 5: Vehicle Queue Length Comparisons - 2015

Intersection LA 447 at	Approach	2015 AM Peak			2015 Noon Peak			2015 PM Peak		
		NB	Alt 1	Alt 2	NB	Alt 1	Alt 2	NB	Alt 1	Alt 2
LA 16	Eastbound	47	37	39	38	27	27	115	36	66
	Westbound	117	17	15	61	16	17	7169	43	34
	Southbound	127	55	89	47	26	29	113	70	47
US 190	Eastbound	129	32	41	102	29	33	175	61	88
	Westbound	346	155	67	227	51	65	399	173	137
	Northbound	162	65	81	136	36	51	420	134	163
	Southbound	226	203	170	100	40	130	204	72	148
I-12 EB Ramp	Eastbound	175	38	30	197	41	57	2081	302	91
	Northbound	1043	74	63	244	44	38	3591	76	88
	Southbound	283	51	27	184	35	34	554	66	19

The vehicle queue length comparisons between the alternatives indicate that for 2015 forecasted volumes, both the alternatives are anticipated to have reduction in approach vehicle queues at critical intersections compared to the No-Build scenario.

The overall network performance and corridor travel time comparisons between the alternative models for the analysis year 2030 are shown in **Table 6**.

Table 6: Over all Network Performance Comparisons - 2030

	No-Build	Alt 1	% Diff	Alt 2	%Diff
	<i>AM Peak</i>				
Average delay time per vehicle (sec)	215.4	19.6	-91%	18.2	-92%
Average stopped delay per vehicle (sec)	82.5	1.1	-99%	2.4	-97%
Average Travel Time - Northbound (sec)	2115.6	917.8	-57%	885.2	-58%
Average Travel Time - Southbound (sec)	1038.0	922.9	-11%	889.6	-14%
Number of vehicles that have left the network (Veh)	12478	13522	8%	13522.3	8%
	<i>Noon Peak</i>				
Average delay time per vehicle (sec)	61.4	16.4	-73%	20.0	-67%
Average stopped delay per vehicle (sec)	24.0	1.2	-95%	4.6	-81%
Average Travel Time - Northbound (sec)	1322.2	917.3	-31%	891.6	-33%
Average Travel Time - Southbound (sec)	897.6	918.0	2%	890.4	-1%
Number of vehicles that have left the network (Veh)	13158	13484	2%	13486.3	2%
	<i>PM Peak</i>				
Average delay time per vehicle (sec)	214.2	33.4	-84%	40.1	-81%
Average stopped delay per vehicle (sec)	68.5	6.0	-91%	10.2	-85%
Average Travel Time - Northbound (sec)	1948.4	950.9	-51%	921.8	-53%
Average Travel Time - Southbound (sec)	997.1	953.6	-4%	920.9	-8%
Number of vehicles that have left the network (Veh)	14003	15503	11%	15494.7	11%

%Diff – Alternative compared to No-Build scenario

%Diff – negative value represents % reduction in value

The network performance and the travel time comparisons between the alternatives indicate that for 2030 forecasted volumes, both the alternatives provide better corridor mobility compared to No-Build scenario. Alternative 2 (RCUT) is anticipated to experience higher average delay per vehicle because of the traffic signals along the corridor. Alternative 1 (Roundabout) has uninterrupted flow conditions along the roundabouts but at slower speeds thus reducing the average travel time along the corridor.

The vehicle queue length comparisons at the critical intersections between the alternative models for the analysis year 2015 are shown in **Table 7**.

Table 7: Vehicle Queue Length Comparisons - 2030

Intersection LA 447 at	Approach	2015 AM Peak			2015 Noon Peak			2015 PM Peak		
		NB	Alt 1	Alt 2	NB	Alt 1	Alt 2	NB	Alt 1	Alt 2
LA 16	Eastbound	107	64	58	52	43	46	1132	92	91
	Westbound	3923	64	17	353	43	19	8438	92	58
	Southbound	122	102	76	60	53	73	165	89	58
US 190	Eastbound	171	168	53	160	115	70	297	349	214
	Westbound	563	155	145	458	115	153	316	263	1195
	Northbound	249	85	72	147	101	85	1086	112	180
	Southbound	1933	168	229	238	115	185	4492	349	734
I-12 EB Ramp	Eastbound	341	41	36	376	35	39	4100	117	92
	Northbound	9782	65	56	4523	40	51	9209	90	109
	Southbound	846	22	20	325	12	6	2333	24	20

The vehicle queue length comparisons between the alternatives indicate that for 2030 forecasted volumes, both the alternatives are anticipated to have a significant reduction in approach vehicle queues at critical intersections compared to the No-Build scenario.

7.2 Safety Analysis

The potential effects of the alternatives on crashes along LA 447 corridor can be determined using the tools and techniques provided in the Highway Safety Manual (HSM). This manual provides Crash Modification Factors (CMF) which represent the relative change in crash frequency due to a change in one specific condition. CMFs may serve as an estimate of the effect of a particular geometric design or traffic control feature or the effectiveness of a particular treatment or condition³.

The HSM provides the best available researched based CMFs. The CMF Clearing House is an additional source for obtaining CMFs. This is a web-based database of CMFs which includes comprehensive listing of all available CMFs, including CMFs listed in the HSM. The latest publication of HSM is 2010 and the CMF Clearing House database is updated periodically. For this study, the HSM is the preferred source for CMFs and if a CMF is not available in HSM, then the CMF Clearing House database was used.

³ Highway Safety Manual (HSM), 1st Edition, Volume 1 2010

Both alternatives have similar geometric changes along LA 447 from LA 16 to I-12 westbound ramp and also for the intersections on LA 447 at US 190 and Burgess Avenue. Based on the CMFs for each of the specified conditions, the following effects on crash frequency were determined

- Adding a two-way left turn lane to a two-lane roadway between LA 16 and Buddy Ellis Road can result in a reduction of overall crashes by 20% and injury/fatal crashes by 26%.
- Adding a left turn lane to a 3-legged unsignalized intersections between LA 16 and Buddy Ellis Road can result in a reduction of overall crashes by 33% and injury crashes by 35%.
- Adding a left turn lane to a 4-legged unsignalized intersections between LA 16 and Buddy Ellis Road will result in reduction of overall crashes by 47% and injury crashes by 50%.
- Conversion of all-way stop control intersection at LA 16 to a single-lane roundabout can result in an increase of overall crashes by 3% but a decrease in injury crashes by 45%.
- Conversion of two-way stop controlled intersections at Buddy Ellis Road, Hospital Driveway and I-12 Westbound Ramp to a multi-lane roundabout can result in a reduction of overall crashes by 32% and injury/fatal crashes by 71%.
- Conversion of signalized intersections at I-12 Eastbound Ramp, US 190 and Burgess Avenue to a multi-lane roundabout can result in a reduction of overall crashes by 67%.
- Replacing two-way left turn lane with a raised median along LA 447 from Pendarvis Lane to US 190 can result in a reduction of overall crashes by 23% and injury crashes by 21%.

The effects on crash frequency due to the additional improvements along LA 447 for Alternative 1 (Roundabout):

- Conversion of two-way stop controlled intersections at Stein Driveway and Fern Street / Aydell Lane to a multi-lane roundabout can result in a reduction of overall crashes by 32% and injury/fatal crashes by 71%.
- Conversion of the signalized intersection at Walmart / Winn-Dixie Driveway to a multi-lane roundabout can result in a reduction of overall crashes by 67%.

The effects on crash frequency due to the additional improvements along LA 447 for Alternative 2 (RCUT):

- Conversion of two-way stop controlled intersections at Brian Park Drive, Stein Driveway and Fern Street / Aydell Lane to a RCUT intersection can result in a reduction of overall crashes by 20% and injury/fatal crashes by 36%.

- Conversion of signalized intersection at Walmart / Winn-Dixie Driveway to a RCUT intersection can result in a reduction of overall crashes by 10%.

7.3 Cost Estimates

The opinions of probable construction costs were estimated for each of the alternatives. These cost estimates were determined from estimated costs incurred for removal of existing structures, construction of new proposed structures, right of way acquisition, utility relocations and the other costs incurred for construction related services. The summary of the estimated opinions of probable construction costs are shown in **Table 8**. Detailed estimates for each of the alternatives are provided in the **Appendix**.

Table 8: Summary of Estimated Opinions of Probable Construction Costs – LA 447 Preferred Alternatives

Description	Estimated Opinions of Probable Construction Costs	
	Alternative 1 (Roundabout)	Alternative 2 (RCUT)
<i>LA 447 from Burgess Avenue to I-12 Interchange</i>		
Construction Cost	\$12,050,018	\$7,064,500
Right-of-Way Acquisition	\$4,000,000	\$2,000,000
Utility Relocation	\$800,000	\$500,000
Other Services	\$2,810,004	\$1,612,900
Total	\$19,660,021	\$11,177,400
<i>LA 447 at I-12 Interchange</i>		
Construction Cost	\$22,490,079	\$22,490,079
Right-of-Way Acquisition	\$2,500,000	\$2,500,000
Utility Relocation	\$350,000	\$350,000
Other Services	\$4,748,016	\$4,748,016
Total	\$30,088,094	\$30,088,094
<i>LA 447 from I-12 Interchange to Buddy Ellis Road</i>		
Construction Cost	\$11,472,460	\$11,472,460
Right-of-Way Acquisition	\$2,600,000	\$2,600,000
Utility Relocation	\$600,000	\$600,000
Other Services	\$2,554,492	\$2,554,492
Total	\$17,226,952	\$17,226,952
<i>LA 447 from Buddy Ellis Road to LA 16</i>		
Construction Cost	\$19,228,901	\$19,228,901
Right-of-Way Acquisition	\$3,000,000	\$3,000,000
Utility Relocation	\$2,000,000	\$2,000,000
Other Services	\$4,145,780	\$4,145,780
Total	\$28,374,682	\$28,374,682
LA 447 Corridor Total	\$95,349,749	\$86,867,128

The summary of the estimated opinions of probable construction costs indicates that Alternative 1 (Roundabout) costs approximately \$8.5 million more than Alternative 2 (RCUT).

7.4 *Alternative Analysis Summary*

Both alternatives, Alternative 1 (Roundabout) and Alternative 2 (RCUT), were compared for reduction in MOE's, benefits in safety and total construction costs. These comparisons are summarized in **Table 9**.

Table 9: Summary of Alternative Analysis

Description	Alternative 1 (Roundabout)	Alternative 2 (RCUT)
MOE Reduction	√	√
Safety Benefits	√	
Estimated Construction Cost		√

8. STAKEHOLDERS AND PUBLIC MEETING

Several meetings were held with the Mayor of Walker and other stakeholders to present the proposed alternatives prior to the public meeting. These meetings were held on the following dates.

- Meeting with Mayor of Walker on 10/2/2013.
- Meeting with Mayor of Walker and additional stakeholders on 10/8/2013.

The Louisiana Department of Transportation and Development (LADOTD) conducted an open house public meeting for the proposed LA 447/I-12 Interchange and LA 447 Corridor Study. The meeting was conducted on Monday December 9, 2013 at Livingston Literacy and Technology Center, 9261 Florida Blvd, Walker, LA 70726 from 4:00 PM – 7:00 PM. The purpose of the meeting was to provide information about the projects and to obtain input from interested parties. The project alternatives, environmental concerns, and socioeconomic issues were among the key topics addressed at the meeting. Aerial maps with project alternatives layout and animation videos of the alternatives were presented at the meeting. All the attendees were given an opportunity to submit their comments or concerns regarding the project. To date no public comments have been received by LADOTD.

9. IMPLEMENTATION PLAN

Based on the existing field observation, VISSIM analysis of future models and also considering the project immediate needs, the alternatives can be implemented in multiple stages. The prioritization of the project sections along the LA 447 corridor can be considered the same for both proposed alternatives. A preliminary implementation plan may consists of the following.

- Phase 1: Multi-lane roundabouts at I-12 Interchange Ramps at future vertical grade and single-lane roundabout at LA 16 intersection.
- Phase 2: Widening of existing two (2) lane bridge over I-12 to a four (4) lane bridge.
- Phase 3: Multi-lane roundabout at US 190 Intersection.
- Phase 4a: Widening of existing two (2) lane roadway between Hospital Driveway and I-12 Eastbound Ramp to four (4) lane divided roadway. Converting / relocating existing full access intersection at Milton Ln / Miller Ln to an RCUT intersection. Multi-lane roundabout at Hospital Driveway
- Phase 4b: Construction of partial cloverleaf ramps at the I-12 interchange.
- Phase 4c: Preferred Alternative 1 (Roundabout) or Alternative 2 (RCUT) to be implemented between I-12 westbound Ramp and US 190.
- Phase 5: Widening of existing two (2) lane roadway between Buddy Ellis Road and Hospital Driveway. Multi-lane roundabout at Buddy Ellis Road intersection.
- Phase 6: Multi-lane Roundabout at Burgess Avenue intersection.
- Phase 7: Widening of existing two (2) lane roadway between LA 16 and Buddy Ellis Rd to a three (3) lane roadway with a center two way left turn lane.