

**REPORT  
ON  
AIR QUALITY EMISSION ANALYSIS  
FOR  
Rushing Road (Chantulane Ave. – Home Depot Dr. )  
Denham Springs, LA, Livingston Parish**



*Parish of*  
**LIVINGSTON, LOUISIANA**

Prepared By

**Capital Region Planning Commission**

**October 2008**

**Air Quality Analysis of  
Rushing Road  
Chantulane Avenue to the Home Depot Drive  
Road Section Improvement  
Baton Rouge, Louisiana  
September, 2008**

**1. General**

This report addresses the air quality analysis of a short 2-lane road section of Rushing Road from Chantulane Avenue to the Home Depot Drive in Denham Springs, Louisiana. Air quality analysis for road section improvement projects is a requirement for the use of Congestion Mitigation and Air Quality (CMAQ) funds.

The major source of procedures used for the analysis of individual intersection analysis was based on the 1997 Highway Capacity Manual (HCM), the Highway Capacity Software (HCS) Release 3.1b. Chapter 9 of the HCM manual was particularly useful in the analysis. The other primary source of procedures and techniques used in this analysis was The EPA Mobile Source Emission Factor Model (MOBILE6.2). Additionally, the ITE Trip Generation Handbook, 7<sup>th</sup> Edition was used by Neel-Schaffer to estimate trip increase.

The existing two-lane road section would be unable to meet the traffic demand over the next three years.

A retail development is planned just to the south of Rushing Road in the study area. There will be approximately 347,375 square feet of retail shopping center space, as well as an 80-room hotel. This development would raise the roadway demand from 8,263 VPD caps to about 12,000 VPD caps near Chantulane and near 15,400 VPD caps near the Home Depot intersection in 2011, which is much beyond the roadway capacity. To solve this problem, a two-way center-turn lane is prepared to be added along this road section, as shown in Fig. 2. This retail development plans to access Rushing Road at four points, as shown in Fig.1. Driveways #1, #2, and #4 are to be 3-legged, unsignalized intersections and Driveway #3 will tie into the Home Depot Drive necessitating an upgraded fully-actuated, isolated signal system.

The above mentioned road section is analyzed for the reduction in emissions that would result from the proposed geometric improvements. Peak period traffic counts (AM 7:30-8:30 and PM 5:00-6:00) were collected by Neel-Schaffer, Inc. personnel by a twenty-four-hour machine count. This information was made available to CRPC, as well as the turning movement counts at the intersections of Rushing Road at Chantulane Avenue and Rushing Road at the Home Depot Drive. Existing traffic volumes are presented in Fig.1. Traffic volume count data is shown in the Appendix.

## 2. Method of Analysis

The procedures for the emission reduction analysis are explained in detail below.

- a. Weekday roadway volume was obtained on Rushing Road just west of the Home Depot Drive by a twenty-four hour machine count, conducted by Neel-Schaffer, Inc. personnel on Feb. 13, 2008. In addition, turning movement counts were conducted by the same company at the intersections of Rushing Road at Chantulane Avenue and Rushing Road at the Home Depot on Feb. 13 – 14, 2008. The AM (7:30-8:30) AND PM (5:00-6:00) peak hours were determined using this count data.
- b. Trips generated from the new retail development were determined using ITE Trip Generation Handbook, 7<sup>th</sup> Edition.
- c. The generated trips were distributed onto adjacent roadways and intersections for both AM and PM hours.
- d. The delay of unsignalized intersections was estimated by using HCS, before and after the improvement.
- e. The delay of the signalized intersection was estimated by using Synchro 7 Software, before and after the improvement. The calculations performed in Synchro 7 and HCS are as shown below.

$$\text{Total Delay (in veh-hours per peak hour)} = \text{Peak Hour Volume} * \text{Avg. Delay in sec/veh}/3600$$

- f. After calculating the delay, EPAs Mobile Source Emission Factor Model (MOBILE6.2) was used to obtain VOC and NOx emission factors for the different functional classifications. The MOBILE6.2 model was run using the 2.5 mph speed, which gives idling emission factors. The VOC and NOx emission factors were generated in the units of gm/mile (6.310 and 1.513). These were multiplied by 2.5 to convert to gm/hr. These values were then converted to kg/hr and multiplied by the total delay in veh-hrs to obtain total emissions.

For example, using MOBILE6.2 procedures, it is convenient to generate the following:

$$\text{Total emission in Kg/hr} = \text{VOC emission factor} * 2.5 * \text{delay in veh-hours} / 1000$$

The analysis showed that the proposed improvement would significantly reduce traffic delay through the network during the morning and the evening peak hours. Actually, the improvement will enhance traffic flow and reduce emissions during off-peak times as well, but the greatest benefits were observed to be during the peak hours.

### 3. Description of Road Section Conditions and Improvements

The roadway system identified for investigation includes Rushing Road between Chantulane Avenue and the Home Depot Drive, in Denham Springs, LA. In this road section, Rushing Road is an asphalt two-lane (2-lane) roadway utilizing single through lanes in each direction. The posted speed limit is 40 miles per hour. Two existing intersections and three new ones developed by the new retail service were studied in detail. They include:

<b>Name</b>	<b>Signal Control</b>	<b>Status</b>
Rushing Road @ Chantulane Ave.	Unsignalized	Existing
Rushing Road @ Driveway #1	Unsignalized	New
Rushing Road @ Driveway #2	Unsignalized	New
Rushing Road @ Driveway #3 (the Home Depot)	Signalized	Existing
Rushing Road @ Driveway #4	Unsignalized	New

The Chantulane Avenue and the Home Depot Drive are classified as local roads with posted speed of 25 mph. Chantulane Avenue is a center-divided two-lane (2-lane) road at the intersection with separate entrance and exit lane. There is a stop sign at the exit for both left-turn and right-turn vehicles. Home Depot Drive is a two-lane road, but widening to three lanes at the intersection, one for entrance, one for left turn and the other one for right turn.

In order to meet the urging demand increase from the new business in 2011, a two-way center-turn lane would be added on Rushing Road in this short road section. And the intersection of Rushing Road and the Home Depot would be upgraded with a fully-actuated, isolated signal system.

The LOS at the signalized intersection was improved from Level C to Level B; and the delay was reduced from 42.1 to 23.5 seconds per vehicle (sec/veh). The LOS at the four unsignalized intersections were all Level A; and the average delay of 1.34 seconds per vehicle (sec/veh), decreased by 29.5%. Emission of VOC and NO<sub>x</sub> were both decreased by 42.7% at all the intersections. The proposed improvements would also enhance the through capacity by around 65% on Rushing Road; while the estimated cost is only \$1,000,000.

### 4. Summary

The above information can be summarized as follows. To serve the new retail development, improvements were analyzed to include a signal system upgrade and adding a two-way center-turn lane.

In this analysis, the total delay and emission calculations assume that the improvements will help traffic flow through these intersections at least five hours a day (two-hour

morning peak and three-hour afternoon peak), and 260 days a year (only weekdays considered).

The emission reduction of Volatile Organic Compounds (VOC) and Nitrogen Oxide (NOx) is summarized below.

### **Rushing Rd Emission Analysis Summary**

**Critical Peak: PM Peak**

<b>Intersection Location</b>	<b>VOC</b>	<b>NOx</b>
Chantulane	0.00056	0.00013
Driveway #1	0.00056	0.00013
Driveway #2	0.012	0.0028
Driveway #3 (the Home Depot)	0.214	0.051
Driveway #4	0.0022	0.00054
<b>Total</b>	<b>0.22932</b>	<b>0.055</b>
<b>Decrease (%)</b>	<b>42.7</b>	<b>42.7</b>

The implementation cost of the geometric improvements is very minimal while the emission benefits are very significant. This project is highly recommended based on the results of analysis.

### **5. Attachments**

Considerable information is provided in the attachments following this narrative. The titles to these attachments are as follows.

- a. Attachment A - Total Delay and Emission Calculation Analysis
- b. Attachment B - Intersection-specific Delay and Emission Calculation Analysis
- c. Attachment C - Traffic Count Information (provided by NSI)
- d. HCS Output
- e. MOBILE 6.2 Output Files

FUTURE 2011 AM(PM) PEAK HOUR  
TRAFFIC VOLUMES

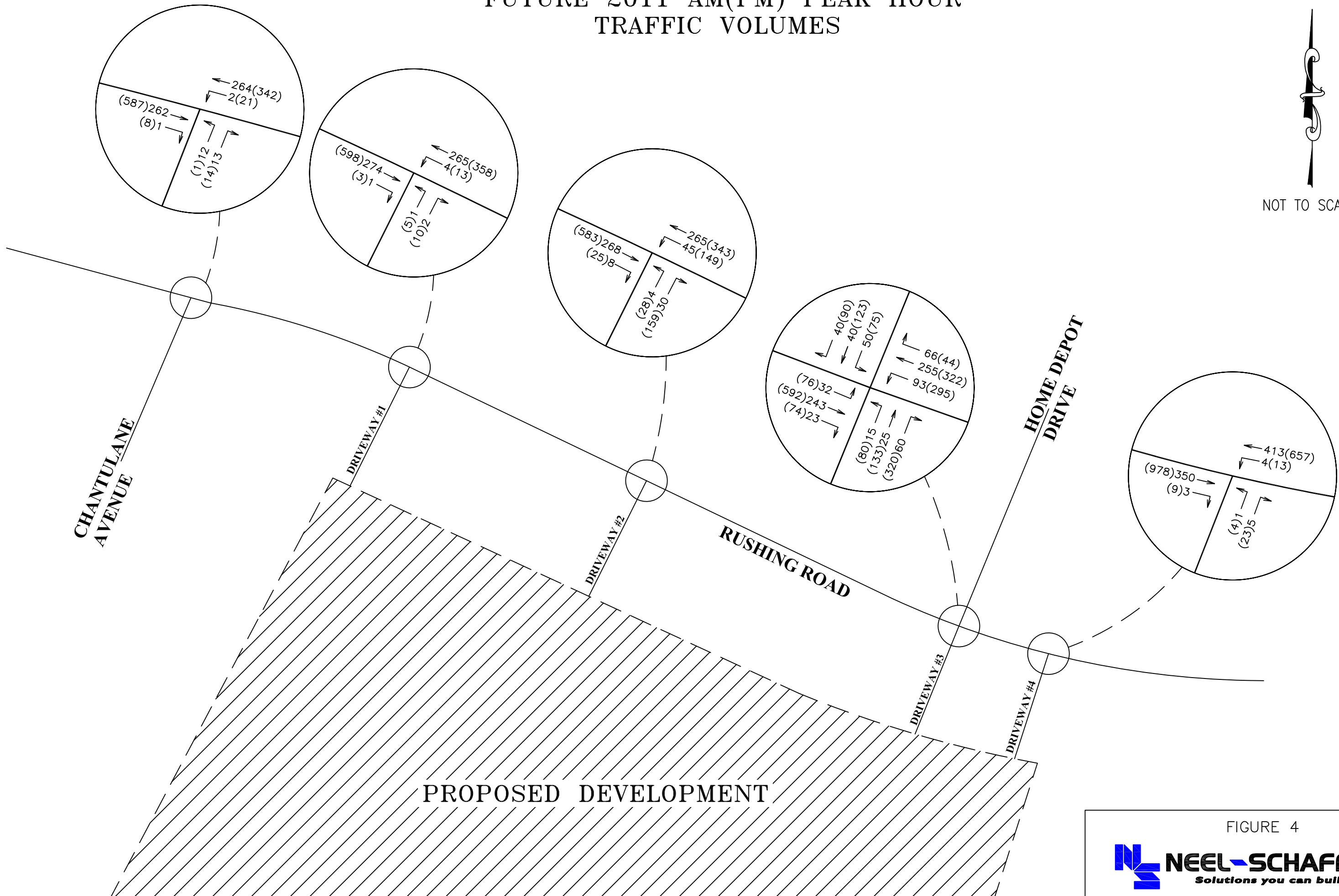
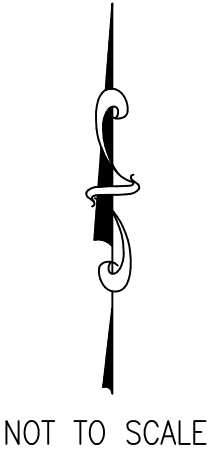


FIGURE 4





**Fig. 2 Improvement Design**

				DESIGNED CHECKED		PARISH	Livingston	SHEET 100833
				DETAILED CHECKED		FEDERAL PROJECT		
				DATE		STATE PROJECT	832-33	
				SHEET				
NO.	DATE	REVISION DESCRIPTION	BY	Left Turn Lane				



**Attachment: A**

**Total Delay and Emission Calculation Analysis**



*Signalized Intersection Names:*

- Rushing Road at Home Depot / Commercial Drwy. #3

**Peak-hour Delay Improvement Analysis**

**Critical Peak: PM**

<u>PM Peak</u>	Avg. Delay s/veh	
Existing Conditions	42.10	C
With Improvements	23.50	B

*Unsignalized Intersection Names:*

- Rushing Road at Chantulane Avenue
- Rushing Road at Commerical Drwy. #1
- Rushing Road at Commerical Drwy. #2
- Rushing Road at Home Depot / Commercial Drwy. #4

**Peak-hour Delay Improvement Analysis**

**Critical Peak: PM**

<u>PM Peak</u>	Avg. Delay s/veh	
Existing Conditions	1.90	A
With Improvements	1.34	A

## Capital Region Planning Commission (CRPC) Intersection Emission Calculation

### *Names of Intersections:*

- Rushing Road at Chantulane Avenue
- Rushing Road at Commerical Drwy. #1
- Rushing Road at Commerical Drwy. #2
- Rushing Road at Home Depot / Commercial Drwy. #3
- Rushing Road at Home Depot / Commercial Drwy. #4

### **Total Delay Calculations of the five (5) intersections**

Critical Peak: PM

#### **PM Peak**

	Avg. Delay (s/veh)	Volume (VPH)	Total Delay (h-Hr/Peak Hr)
Existing Conditions	13.70	7572	28.82
With Improvements	7.85	7572	16.51
<b>Reduction in Delay</b>			<b>12.31</b>

*Note: The analysis showed the proposed improvements will enhance traffic flow through the intersection, two hours during the morning peak hours and three hours during the evening peak hours. The total delay and emission calculations were performed assuming the improvements will help traffic going through the intersection five hours a day, and 260 days a year.*

### **Emission Calculations**

#### **Volatile Organic Compounds (VOC)**

VOC Emission Factor: 6.310

Formula = Delay in h-hours/hour × VOC Emission Factor  
× 2.5 (to convert gm/mile to gm/hour)

Hourly emission reductions = Reduction in delay × VOC Emission Factor × 2.5  
 = 194.19 grams/hour  
 = 970.95 grams/day  
 = **0.97 kilograms/day**  
 = 252,447.32 grams/year  
 = 0.252 metric tons/year  
 = 0.229 U.S.tons/year

#### **Nitrogen Oxides (NO<sub>x</sub>)**

NO<sub>x</sub> Emission Factor: 1.513

Formula = Delay in h-hours/hour  $\times$   $NO_x$  Emission Factor  
 $\times$  2.5 (to convert gm/mile to gm/hour)

Hourly emission reductions = Reduction in delay  $\times$   $NO_x$  Emission Factor  $\times$  2.5  
= 46.56 grams/hour  
= 232.81 grams/day  
= **0.233 kilograms/day**  
= 60,531.35 grams/year  
= 0.061 metric tons/year  
= 0.055 U.S.tons/year

**Attachment: B**  
**Intersection-specific**  
**Delay and Emission Calculation Analysis**

*Note: The analysis showed the proposed improvements will enhance traffic flow through the intersection, two hours during the morning peak hours and three hours during the evening peak hours. The total delay and emission calculations were performed assuming the improvements will help traffic going through the intersection five hours a day, and 260 days a year.*



*Intersection Names:*

- Rushing Road at Chantulane Avenue

**Peak-hour Delay Improvement Analysis**

**Critical Peak: PM**

<b><u>PM Peak</u></b>	Avg. Delay s/veh	
Existing Conditions	0.49	A
With Improvements	0.38	A

**Capital Region Planning Commission (CRPC)**  
**Intersection Emission Calculation**

*Names of Intersections:*

- Rushing Road at Chantulane Avenue

**Total Delay Calculations of the five (5) intersections**

Critical Peak: PM

**PM Peak**

	Avg. Delay (s/veh)	Volume (VPH)	Total Delay (h-Hr/Peak Hr)
Existing Conditions	0.49	1055	0.14
With Improvements	0.38	1055	0.11
<b>Reduction in Delay</b>			0.03

**Emission Calculations**

**Volatile Organic Compounds (VOC)**

VOC Emission Factor: 6.310

Formula = Delay in h-hours/hour × VOC Emission Factor  
× 2.5 (to convert gm/mile to gm/hour)

Hourly emission reductions = Reduction in delay × VOC Emission Factor × 2.5  
= 0.473 grams/hour  
= 2.366 grams/day  
= **0.002 kilograms/day**  
= 615.212 grams/year  
= 0.6E-3 metric tons/year  
= 0.56E-3 U.S.tons/year

**Nitrogen Oxides (  $NO_x$  )**

$NO_x$  Emission Factor: 1.513

Formula = Delay in h-hours/hour ×  $NO_x$  Emission Factor  
× 2.5 (to convert gm/mile to gm/hour)

Hourly emission reductions = Reduction in delay ×  $NO_x$  Emission Factor × 2.5  
= 0.113 grams/hour  
= 0.567 grams/day  
= 147.52 grams/year  
= 0.15E-3 metric tons/year  
= 0.13E-3 U.S.tons/year

*Intersection Names:*

- Rushing Road at Commercial Drwy. #1

**Peak-hour Delay Improvement Analysis**

**Critical Peak: PM**

<b><u>PM Peak</u></b>	Avg. Delay s/veh	
Existing Conditions	0.41	A
With Improvements	0.31	A

## Capital Region Planning Commission (CRPC) Intersection Emission Calculation

*Names of Intersections:*

- Rushing Road at Commercial Drwy. #1

### Total Delay Calculations of the five (5) intersections

Critical Peak: PM

#### PM Peak

	Avg. Delay (s/veh)	Volume (VPH)	Total Delay (h-Hr/Peak Hr)
Existing Conditions	0.41	1070	0.12
With Improvements	0.31	1070	0.09
<b>Reduction in Delay</b>			0.03

### Emission Calculations

#### Volatile Organic Compounds (VOC)

VOC Emission Factor: 6.310

Formula = Delay in h-hours/hour × VOC Emission Factor  
× 2.5 (to convert gm/mile to gm/hour)

Hourly emission reductions = Reduction in delay × VOC Emission Factor × 2.5  
 = 0.473 grams/hour  
 = 2.366 grams/day  
 = **0.002 kilograms/day**  
 = 615.212 grams/year  
 = 0.6E-3 metric tons/year  
 = 0.56E-3 U.S.tons/year

#### Nitrogen Oxides ( $NO_x$ )

$NO_x$  Emission Factor: 1.513

Formula = Delay in h-hours/hour ×  $NO_x$  Emission Factor  
× 2.5 (to convert gm/mile to gm/hour)

Hourly emission reductions = Reduction in delay ×  $NO_x$  Emission Factor × 2.5  
 = 0.113 grams/hour  
 = 0.567 grams/day  
 = 147.52 grams/year  
 = 0.15E-3 metric tons/year  
 = 0.13E-3 U.S.tons/year



*Intersection Names:*

- Rushing Road at Commercial Drwy. #2

**Peak-hour Delay Improvement Analysis**

**Critical Peak: PM**

<u>PM Peak</u>	Avg. Delay s/veh	
Existing Conditions	5.77	A
With Improvements	4.11	A

## Capital Region Planning Commission (CRPC) Intersection Emission Calculation

*Names of Intersections:*

- Rushing Road at Commercial Drwy. #2

### Total Delay Calculations of the five (5) intersections

Critical Peak: PM

#### PM Peak

	Avg. Delay (s/veh)	Volume (VPH)	Total Delay (h-Hr/Peak Hr)
Existing Conditions	5.77	1395	2.24
With Improvements	4.11	1395	1.59
<b>Reduction in Delay</b>			<b>0.64</b>

### Emission Calculations

#### Volatile Organic Compounds (VOC)

VOC Emission Factor: 6.310

Formula = Delay in h-hours/hour × VOC Emission Factor  
× 2.5 (to convert gm/mile to gm/hour)

Hourly emission reductions = Reduction in delay × VOC Emission Factor × 2.5  
 = 10.096 grams/hour  
 = 50.48 grams/day  
 = **0.050 kilograms/day**  
 = 13124.8 grams/year  
 = 0.013 metric tons/year  
 = 0.012 U.S.tons/year

#### Nitrogen Oxides ( $NO_x$ )

$NO_x$  Emission Factor: 1.513

Formula = Delay in h-hours/hour ×  $NO_x$  Emission Factor  
× 2.5 (to convert gm/mile to gm/hour)

Hourly emission reductions = Reduction in delay ×  $NO_x$  Emission Factor × 2.5  
 = 2.421 grams/hour  
 = 12.104 grams/day  
 = 3147.04 grams/year  
 = 0.003 metric tons/year  
 = 0.0029 U.S.tons/year

*Intersection Names:*

- Rushing Road at Home Depot / Commercial Drwy. #3

**Peak-hour Delay Improvement Analysis**

**Critical Peak: PM**

<u>PM Peak</u>	Avg. Delay s/veh	
Existing Conditions	42.10	C
With Improvements	23.50	B

## Capital Region Planning Commission (CRPC) Intersection Emission Calculation

*Names of Intersections:*

- Rushing Road at Home Depot / Commercial Drwy. #3

### Total Delay Calculations of the five (5) intersections

Critical Peak: PM

#### PM Peak

	Avg. Delay (s/veh)	Volume (VPH)	Total Delay (h-Hr/Peak Hr)
Existing Conditions	42.10	2224	26.01
With Improvements	23.50	2224	14.52
<b>Reduction in Delay</b>			<b>11.49</b>

### Emission Calculations

#### Volatile Organic Compounds (VOC)

VOC Emission Factor: 6.310

Formula = Delay in h-hours/hour × VOC Emission Factor  
× 2.5 (to convert gm/mile to gm/hour)

Hourly emission reductions = Reduction in delay × VOC Emission Factor × 2.5  
 = 181.255 grams/hour  
 = 906.27 grams/day  
 = **0.906 kilograms/day**  
 = 235631.16 grams/year  
 = 0.236 metric tons/year  
 = 0.214 U.S.tons/year

#### Nitrogen Oxides ( $NO_x$ )

$NO_x$  Emission Factor: 1.513

Formula = Delay in h-hours/hour ×  $NO_x$  Emission Factor  
× 2.5 (to convert gm/mile to gm/hour)

Hourly emission reductions = Reduction in delay ×  $NO_x$  Emission Factor × 2.5  
 = 43.461 grams/hour  
 = 217.30 grams/day  
 = **0.217 kilograms/day**  
 = 56499.2 grams/year  
 = 0.056 metric tons/year  
 = 0.051 U.S.tons/year



*Intersection Names:*

- Rushing Road at Commercial Drwy. #4

**Peak-hour Delay Improvement Analysis**

**Critical Peak: PM**

<b><u>PM Peak</u></b>	Avg. Delay s/veh	
Existing Conditions	0.62	A
With Improvements	0.39	A

## Capital Region Planning Commission (CRPC) Intersection Emission Calculation

*Names of Intersections:*

- Rushing Road at Commercial Drwy. #4

### Total Delay Calculations of the five (5) intersections

Critical Peak: PM

#### PM Peak

	Avg. Delay (s/veh)	Volume (VPH)	Total Delay (h-Hr/Peak Hr)
Existing Conditions	0.62	1828	0.31
With Improvements	0.39	1828	0.20
<b>Reduction in Delay</b>			<b>0.12</b>

### Emission Calculations

#### Volatile Organic Compounds (VOC)

VOC Emission Factor: 6.310

Formula = Delay in h-hours/hour × VOC Emission Factor  
× 2.5 (to convert gm/mile to gm/hour)

Hourly emission reductions = Reduction in delay × VOC Emission Factor × 2.5  
 = 1.893 grams/hour  
 = 9.465 grams/day  
 = **0.009 kilograms/day**  
 = 2460.9 grams/year  
 = 0.0025 metric tons/year  
 = 0.0022 U.S.tons/year

#### Nitrogen Oxides ( $NO_x$ )

$NO_x$  Emission Factor: 1.513

Formula = Delay in h-hours/hour ×  $NO_x$  Emission Factor  
× 2.5 (to convert gm/mile to gm/hour)

Hourly emission reductions = Reduction in delay ×  $NO_x$  Emission Factor × 2.5  
 = 0.454 grams/hour  
 = 2.270 grams/day  
 = **0.002 kilograms/day**  
 = 590.07 grams/year  
 = 0.59E-3 metric tons/year  
 = 0.54E-3 U.S.tons/year

**Attachment: C**

**Traffic Count Information (provided by NSI)**

Analyst: GPO  
 Agency:  
 Date: 9/15/2008  
 Period: 2011 AM Peak  
 Project ID: Build+: With development, LT lns on Rushing Rd, NB LT ln  
 E/W St: Rushing Rd

Inter.: Rushing Rd & Home Depot Dr  
 Area Type: All other areas  
 Jurisd: Delham Springs, LA  
 Year :  
 N/S St: Home Depot Dr / Futr Dwy #3

## SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	1	1	0	1	1	1	1	1	0
LGConfig	L	TR		L	TR		L	T	R	L	TR	
Volume	32	243	23	93	255	66	15	25	60	50	40	40
Lane Width	12.0	12.0		12.0	12.0		12.0	12.0	12.0	12.0	12.0	
RTOR Vol			3			9			54			30

Duration 0.25 Area Type: All other areas

## Signal Operations

Phase Combination		1	2	3	4	5	6	7	8
EB	Left	A	A			NB Left	A		
	Thru		A			Thru	A		
	Right		A			Right	A		
	Peds					Peds			
WB	Left	A	A			SB Left	A		
	Thru		A			Thru	A		
	Right		A			Right	A		
	Peds					Peds			
NB	Right					EB Right			
SB	Right					WB Right			
Green		5.0	35.0	0.0			4.0	0.0	
Yellow		4.0	6.0				6.0		
All Red		0.0	0.0				0.0		

Cycle Length: 60.0 secs

## Intersection Performance Summary

Intersection Performance Summary								
Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
L	770	1805	0.05	0.77	2.0	A		
TR	1095	1878	0.26	0.58	6.3	A	5.8	A
Westbound								
L	822	1805	0.12	0.77	2.0	A		
TR	1078	1848	0.31	0.58	6.5	A	5.5	A
Northbound								
L	127	1900	0.13	0.07	26.8	C		
T	127	1900	0.21	0.07	27.3	C	27.1	C
R	108	1615	0.06	0.07	26.5	C		
Southbound								
L	127	1900	0.43	0.07	29.2	C		
TR	123	1842	0.44	0.07	29.4	C	29.3	C

Intersection Delay = 9.6 (sec/veh) Intersection LOS = A

Analyst: GPO  
 Agency:  
 Date: 9/15/2008  
 Period: 2011 PM Peak  
 Project ID: Build+: With development, LT lns on Rushing Rd, NB LT ln  
 E/W St: Rushing Rd  
 Inter.: Rushing Rd & Home Depot Dr  
 Area Type: All other areas  
 Jurisd: Delham Springs, LA  
 Year :  
 N/S St: Home Depot Dr / Futr Dwy #3

## SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	1	1	0	1	1	1	1	1	0
LGConfig	L	TR		L	TR		L	T	R	L	TR	
Volume	76	592	74	295	322	44	80	133	320	75	123	90
Lane Width	12.0	12.0		12.0	12.0		12.0	12.0	12.0	12.0	12.0	
RTOR Vol			3			9			261			20

Duration 0.25 Area Type: All other areas

## Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	A	A	A		NB Left	A		
Thru			A		Thru	A		
Right			A		Right	A		
Peds					Peds			
WB Left	A	A	A		SB Left	A		
Thru		A	A		Thru	A		
Right		A	A		Right	A		
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	6.0	5.0	49.0	0.0		20.0	0.0	
Yellow	4.0	4.0	6.0			6.0		
All Red	0.0	0.0	0.0			0.0		

Cycle Length: 100.0 secs

## Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
L	675	1805	0.12	0.72	4.9	A		
TR	916	1870	0.79	0.49	25.7	C	23.6	C
Westbound								
L	427	1805	0.75	0.70	25.2	C		
TR	1086	1872	0.36	0.58	11.3	B	17.6	B
Northbound								
L	184	919	0.47	0.20	37.3	D		
T	380	1900	0.38	0.20	35.3	D	35.5	D
R	323	1615	0.20	0.20	33.6	C		
Southbound								
L	240	1199	0.34	0.20	35.2	D		
TR	359	1797	0.58	0.20	38.7	D	37.7	D

Intersection Delay = 25.2 (sec/veh) Intersection LOS = C

Analyst: GPO

Agency:

Date: 9/15/2008

Period: 2011 AM Peak

Project ID: No Build+: With develm't, no LT lns on Rushing Rd, NB LT ln

E/W St: Rushing Rd

Inter.: Rushing Rd &amp; Home Depot Dr

Area Type: All other areas

Jurisd: Delham Springs, LA

Year :

N/S St: Home Depot Dr / Futr Dwy #3

## SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	1	1	1	1	1	0
LGConfig	LTR			LTR			L	T	R	L	TR	
Volume	32	243	23	93	255	66	15	25	60	50	40	40
Lane Width	12.0			12.0			12.0	12.0	12.0	12.0	12.0	
RTOR Vol	3			9			54			30		

Duration 0.25 Area Type: All other areas

## Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	P				NB Left	P		
Thru	P				Thru	P		
Right	P				Right	P		
Peds					Peds			
WB Left	P				SB Left	P		
Thru	P				Thru	P		
Right	P				Right	P		
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	44.0	0.0			4.0	0.0		
Yellow	6.0				6.0			
All Red	0.0				0.0			

Cycle Length: 60.0 secs

## Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS

## Eastbound

LTR	1288	1756	0.25	0.73	3.1	A	3.1	A
-----	------	------	------	------	-----	---	-----	---

## Westbound

LTR	1168	1593	0.38	0.73	3.9	A	3.9	A
-----	------	------	------	------	-----	---	-----	---

## Northbound

L	127	1900	0.13	0.07	28.4	C		
T	127	1900	0.21	0.07	30.3	C	29.3	C
R	108	1615	0.06	0.07	27.4	C		

## Southbound

L	127	1900	0.43	0.07	37.0	D		
TR	123	1842	0.44	0.07	37.9	D	37.4	D

Intersection Delay = 8.9 (sec/veh) Intersection LOS = A

Analyst: GPO Inter.: Rushing Rd & Home Depot Dr  
 Agency: Area Type: All other areas  
 Date: 9/17/2008 Jurisd: Delham Springs, LA  
 Period: 2011 PM Peak Year :  
 Project ID: No Build+: With develm't, no LT lns on Rushing Rd, NB LT ln  
 E/W St: Rushing Rd N/S St: Home Depot Dr / Futr Dwy #3

## SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	1	1	1	1	1	0
LGConfig	LTR			LTR			L	T	R	L	TR	
Volume	76	592	74	295	322	44	80	133	320	75	123	90
Lane Width	12.0			12.0			12.0	12.0	12.0	12.0	12.0	
RTOR Vol	3			9			261			20		

Duration 0.25 Area Type: All other areas

## Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	P				NB Left	P		
Thru	P				Thru	P		
Right	P				Right	P		
Peds					Peds			
WB Left	P				SB Left	P		
Thru	P				Thru	P		
Right	P				Right	P		
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	69.0	0.0			19.0	0.0		
Yellow	6.0				6.0			
All Red	0.0				0.0			

Cycle Length: 100.0 secs

## Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS

## Eastbound

LTR 1119 1622 0.72 0.69 13.5 B 13.5 B

## Westbound

LTR 656 951 1.08 0.69 74.5 E 74.5 E

## Northbound

L 170 896 0.51 0.19 46.9 D  
 T 361 1900 0.40 0.19 38.8 D 40.5 D  
 R 307 1615 0.21 0.19 35.7 D

## Southbound

L 226 1190 0.36 0.19 39.7 D  
 TR 341 1797 0.62 0.19 45.2 D 43.7 D

Intersection Delay = 42.1 (sec/veh) Intersection LOS = D

**Attachment: D**

**HCS Output**



## TWO-WAY STOP CONTROL SUMMARY

### General Information

Analyst	NJF
Agency/Co.	NSI
Date Performed	2/22/2008
Analysis Time Period	AM Peak

### Site Information

Intersection	Rushing Rd. at Chantulane
Jurisdiction	Livingston Parish
Analysis Year	2011 No Build

### Project Description

East/West Street: <i>Rushing Road</i>	North/South Street: <i>Chantulane</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		262	1	2	264	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	284	1	2	286	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	12	0	13			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	13	0	14	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	0	0
Configuration		LTR				

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LTR				
v (veh/h)		2		27				
C (m) (veh/h)		1289		596				
v/c		0.00		0.05				
95% queue length		0.00		0.14				
Control Delay (s/veh)		7.8		11.3				
LOS		A		B				
Approach Delay (s/veh)	--	--	11.3					
Approach LOS	--	--	B					

## TWO-WAY STOP CONTROL SUMMARY

### General Information

Analyst	NJF
Agency/Co.	NSI
Date Performed	2/22/2008
Analysis Time Period	AM Peak

### Site Information

Intersection	Rushing Rd. at Chantulane
Jurisdiction	Livingston Parish
Analysis Year	2011 Build

### Project Description

East/West Street: <i>Rushing Road</i>	North/South Street: <i>Chantulane</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		262	1	2	264	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	284	1	2	286	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	1	1	0
Configuration			TR	L	T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	12	0	13			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	13	0	14	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	0	0
Configuration		LTR				

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L		LTR				
v (veh/h)		2		27				
C (m) (veh/h)		1289		596				
v/c		0.00		0.05				
95% queue length		0.00		0.14				
Control Delay (s/veh)		7.8		11.3				
LOS		A		B				
Approach Delay (s/veh)	--	--	11.3					
Approach LOS	--	--	B					

## TWO-WAY STOP CONTROL SUMMARY

### General Information

Analyst	NJF
Agency/Co.	NSI
Date Performed	2/22/2008
Analysis Time Period	PM Peak

### Site Information

Intersection	Rushing Rd. at Chantulane
Jurisdiction	Livingston Parish
Analysis Year	2011 No Build

### Project Description

East/West Street: <i>Rushing Road</i>	North/South Street: <i>Chantulane</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		587	8	21	342	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	638	8	22	371	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	1	0	14			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	1	0	15	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	0	0
Configuration		LTR				

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LTR				
v (veh/h)		22		16				
C (m) (veh/h)		949		451				
v/c		0.02		0.04				
95% queue length		0.07		0.11				
Control Delay (s/veh)		8.9		13.3				
LOS		A		B				
Approach Delay (s/veh)	--	--	13.3					
Approach LOS	--	--	B					

## TWO-WAY STOP CONTROL SUMMARY

### General Information

Analyst	NJF
Agency/Co.	NSI
Date Performed	2/22/2008
Analysis Time Period	PM Peak

### Site Information

Intersection	Rushing Rd. at Chantulane
Jurisdiction	Livingston Parish
Analysis Year	2011 Build

### Project Description

East/West Street: <i>Rushing Road</i>	North/South Street: <i>Chantulane</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		587	8	21	342	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	638	8	22	371	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	0	1	0	1	1	0
Configuration			TR	L	T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	1	0	14			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	1	0	15	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	0	0
Configuration		LTR				

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L		LTR				
v (veh/h)		22		16				
C (m) (veh/h)		949		470				
v/c		0.02		0.03				
95% queue length		0.07		0.11				
Control Delay (s/veh)		8.9		12.9				
LOS		A		B				
Approach Delay (s/veh)	--	--	12.9					
Approach LOS	--	--	B					

## TWO-WAY STOP CONTROL SUMMARY

### General Information

Analyst	NJF
Agency/Co.	NSI
Date Performed	2/22/2008
Analysis Time Period	AM Peak

### Site Information

Intersection	Rushing Rd. at Drive #1
Jurisdiction	Livingston Parish
Analysis Year	2011 No Build

### Project Description

East/West Street: <i>Rushing Road</i>	North/South Street: <i>Drive #1</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		274	1	4	265	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	297	1	4	288	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	1	0	2			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	1	0	2	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	0	0
Configuration		LTR				

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LTR				
v (veh/h)		4		3				
C (m) (veh/h)		1275		624				
v/c		0.00		0.00				
95% queue length		0.01		0.01				
Control Delay (s/veh)		7.8		10.8				
LOS		A		B				
Approach Delay (s/veh)	--	--	10.8					
Approach LOS	--	--	B					

## TWO-WAY STOP CONTROL SUMMARY

### General Information

Analyst	NJF
Agency/Co.	NSI
Date Performed	2/22/2008
Analysis Time Period	AM Peak

### Site Information

Intersection	Rushing Rd. at Drive #1
Jurisdiction	Livingston Parish
Analysis Year	2011 Build

### Project Description

East/West Street: <i>Rushing Road</i>	North/South Street: <i>Drive #1</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		274	1	4	265	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	297	1	4	288	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	0	1	0	1	1	0
Configuration			TR	L	T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	1	0	2			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	1	0	2	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	0	0
Configuration		LTR				

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L		LTR				
v (veh/h)		4		3				
C (m) (veh/h)		1275		672				
v/c		0.00		0.00				
95% queue length		0.01		0.01				
Control Delay (s/veh)		7.8		10.4				
LOS		A		B				
Approach Delay (s/veh)	--	--	10.4					
Approach LOS	--	--	B					

## TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	NJF		Intersection	Rushing Rd. at Drive #1
Agency/Co.	NSI		Jurisdiction	Livingston Parish
Date Performed	2/22/2008		Analysis Year	2011 No Build
Analysis Time Period	PM Peak			

### Project Description

East/West Street: *Rushing Road*

North/South Street: *Drive #1*

Intersection Orientation: *East-West*

Study Period (hrs): *0.25*

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		598	3	13	358	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	649	3	14	389	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	5	0	10			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	5	0	10	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	0	0
Configuration		LTR				

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LTR				
v (veh/h)		14		15				
C (m) (veh/h)		944		360				
v/c		0.01		0.04				
95% queue length		0.05		0.13				
Control Delay (s/veh)		8.9		15.4				
LOS		A		C				
Approach Delay (s/veh)	--	--	15.4					
Approach LOS	--	--	C					

## TWO-WAY STOP CONTROL SUMMARY

### General Information

Analyst	NJF
Agency/Co.	NSI
Date Performed	2/22/2008
Analysis Time Period	PM Peak

### Site Information

Intersection	Rushing Rd. at Drive #1
Jurisdiction	Livingston Parish
Analysis Year	2011 Build

### Project Description

East/West Street: <i>Rushing Road</i>	North/South Street: <i>Drive #1</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		598	3	13	358	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	649	3	14	389	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	0	1	0	1	1	0
Configuration			TR	L	T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	5	0	10			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	5	0	10	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	0	0
Configuration		LTR				

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L		LTR				
v (veh/h)		14		15				
C (m) (veh/h)		944		435				
v/c		0.01		0.03				
95% queue length		0.05		0.11				
Control Delay (s/veh)		8.9		13.6				
LOS		A		B				
Approach Delay (s/veh)	--	--	13.6					
Approach LOS	--	--	B					



## TWO-WAY STOP CONTROL SUMMARY

### General Information

Analyst	NJF
Agency/Co.	NSI
Date Performed	2/22/2008
Analysis Time Period	AM Peak

### Site Information

Intersection	Rushing Rd. at Drive #2
Jurisdiction	Livingston Parish
Analysis Year	2011 No Build

### Project Description

East/West Street: <i>Rushing Road</i>	North/South Street: <i>Drive #2</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		268	8	45	265	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	291	8	48	288	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	4	0	30			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	4	0	32	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	0	0
Configuration		LTR				

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LTR				
v (veh/h)		48		36				
C (m) (veh/h)		1274		684				
v/c		0.04		0.05				
95% queue length		0.12		0.17				
Control Delay (s/veh)		7.9		10.6				
LOS		A		B				
Approach Delay (s/veh)	--	--	10.6					
Approach LOS	--	--	B					

## TWO-WAY STOP CONTROL SUMMARY

### General Information

Analyst	NJF
Agency/Co.	NSI
Date Performed	2/22/2008
Analysis Time Period	AM Peak

### Site Information

Intersection	Rushing Rd. at Drive #2
Jurisdiction	Livingston Parish
Analysis Year	2011 Build

### Project Description

East/West Street: <i>Rushing Road</i>	North/South Street: <i>Drive #2</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		268	8	45	265	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	291	8	48	288	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	0	1	0	1	1	0
Configuration			TR	L	T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	4	0	30			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	4	0	32	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	0	0
Configuration		LTR				

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L		LTR				
v (veh/h)		48		36				
C (m) (veh/h)		1274		711				
v/c		0.04		0.05				
95% queue length		0.12		0.16				
Control Delay (s/veh)		7.9		10.3				
LOS		A		B				
Approach Delay (s/veh)	--	--	10.3					
Approach LOS	--	--	B					

## TWO-WAY STOP CONTROL SUMMARY

### General Information

Analyst	NJF
Agency/Co.	NSI
Date Performed	2/22/2008
Analysis Time Period	PM Peak

### Site Information

Intersection	Rushing Rd. at Drive #2
Jurisdiction	Livingston Parish
Analysis Year	2011 No Build

### Project Description

East/West Street: <i>Rushing Road</i>	North/South Street: <i>Drive #2</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		583	25	149	343	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	633	27	161	372	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	28	0	159			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	30	0	172	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	0	0
Configuration		LTR				

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LTR				
v (veh/h)		161		202				
C (m) (veh/h)		938		351				
v/c		0.17		0.58				
95% queue length		0.62		3.43				
Control Delay (s/veh)		9.6		28.3				
LOS		A		D				
Approach Delay (s/veh)	--	--	28.3					
Approach LOS	--	--	D					

## TWO-WAY STOP CONTROL SUMMARY

### General Information

Analyst	NJF
Agency/Co.	NSI
Date Performed	2/22/2008
Analysis Time Period	PM Peak

### Site Information

Intersection	Rushing Rd. at Drive #2
Jurisdiction	Livingston Parish
Analysis Year	2011 Build

### Project Description

East/West Street: <i>Rushing Road</i>	North/South Street: <i>Drive #2</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		583	25	149	343	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	633	27	161	372	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	0	1	0	1	1	0
Configuration			TR	L	T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	28	0	159			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	30	0	172	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	0	0
Configuration		LTR				

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L		LTR				
v (veh/h)		161		202				
C (m) (veh/h)		938		428				
v/c		0.17		0.47				
95% queue length		0.62		2.47				
Control Delay (s/veh)		9.6		20.7				
LOS		A		C				
Approach Delay (s/veh)	--	--	20.7					
Approach LOS	--	--	C					

## TWO-WAY STOP CONTROL SUMMARY

### General Information

Analyst	NJF
Agency/Co.	NSI
Date Performed	2/22/2008
Analysis Time Period	AM Peak

### Site Information

Intersection	Rushing Rd. at Drive #4
Jurisdiction	Livingston Parish
Analysis Year	2011 No Build

### Project Description

East/West Street: <i>Rushing Road</i>	North/South Street: <i>Drive #4</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		350	3	4	413	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	380	3	4	448	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	1	0	5			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	1	0	5	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	0	0
Configuration		LTR				

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LTR				
v (veh/h)		4		6				
C (m) (veh/h)		1187		576				
v/c		0.00		0.01				
95% queue length		0.01		0.03				
Control Delay (s/veh)		8.0		11.3				
LOS		A		B				
Approach Delay (s/veh)	--	--	11.3					
Approach LOS	--	--	B					

## TWO-WAY STOP CONTROL SUMMARY

### General Information

Analyst	NJF
Agency/Co.	NSI
Date Performed	2/22/2008
Analysis Time Period	AM Peak

### Site Information

Intersection	Rushing Rd. at Drive #4
Jurisdiction	Livingston Parish
Analysis Year	2011 Build

### Project Description

East/West Street: *Rushing Road*

North/South Street: *Drive #4*

Intersection Orientation: *East-West*

Study Period (hrs): *0.25*

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		350	3	4	413	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	380	3	4	448	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	0	1	0	1	1	0
Configuration			TR	L	T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	1	0	5			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	1	0	5	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	0	0
Configuration		LTR				

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L		LTR				
v (veh/h)		4		6				
C (m) (veh/h)		1187		622				
v/c		0.00		0.01				
95% queue length		0.01		0.03				
Control Delay (s/veh)		8.0		10.8				
LOS		A		B				
Approach Delay (s/veh)	--	--	10.8					
Approach LOS	--	--	B					

## TWO-WAY STOP CONTROL SUMMARY

### General Information

Analyst	NJF
Agency/Co.	NSI
Date Performed	2/22/2008
Analysis Time Period	PM Peak

### Site Information

Intersection	Rushing Rd. at Drive #4
Jurisdiction	Livingston Parish
Analysis Year	2011 No Build

### Project Description

East/West Street: <i>Rushing Road</i>	North/South Street: <i>Drive #4</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		978	9	13	657	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	1063	9	14	714	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	4	0	23			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	4	0	24	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	0	0
Configuration		LTR				

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LTR				
v (veh/h)		14		28				
C (m) (veh/h)		658		208				
v/c		0.02		0.13				
95% queue length		0.07		0.46				
Control Delay (s/veh)		10.6		25.0				
LOS		B		C				
Approach Delay (s/veh)	--	--	25.0					
Approach LOS	--	--	C					

## TWO-WAY STOP CONTROL SUMMARY

### General Information

Analyst	NJF
Agency/Co.	NSI
Date Performed	2/22/2008
Analysis Time Period	PM Peak

### Site Information

Intersection	Rushing Rd. at Drive #4
Jurisdiction	Livingston Parish
Analysis Year	2011 Build

### Project Description

East/West Street: <i>Rushing Road</i>	North/South Street: <i>Drive #4</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		978	9	13	657	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	1063	9	14	714	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	0	1	0	1	1	0
Configuration			TR	L	T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	4	0	23			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	4	0	24	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	0	0
Configuration		LTR				

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L		LTR				
v (veh/h)		14		28				
C (m) (veh/h)		658		262				
v/c		0.02		0.11				
95% queue length		0.07		0.35				
Control Delay (s/veh)		10.6		20.4				
LOS		B		C				
Approach Delay (s/veh)	--	--	20.4					
Approach LOS	--	--	C					























# HCM Signalized Intersection Capacity Analysis

## 3: Rushing Road & Home Depot Drive

AM NO Build Year 2011

2/26/2008





















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	243	23	93	255	66	15	25	60	50	40	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0			4.0	4.0	6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.97			1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1839		1770	1805			1829	1583	1770	1723	
Flt Permitted	0.55	1.00		0.51	1.00			0.88	1.00	0.73	1.00	
Satd. Flow (perm)	1028	1839		942	1805			1637	1583	1358	1723	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	264	25	101	277	72	16	27	65	54	43	43
RTOR Reduction (vph)	0	3	0	0	9	0	0	0	54	0	31	0
Lane Group Flow (vph)	35	286	0	101	340	0	0	43	11	54	55	0
Turn Type	pm+pt			pm+pt			Perm		Perm	Perm		
Protected Phases	5	2		1	6			8				4
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	23.3	20.9		29.7	24.1			8.3	8.3	6.3	6.3	
Effective Green, g (s)	23.3	20.9		29.7	24.1			8.3	8.3	6.3	6.3	
Actuated g/C Ratio	0.48	0.43		0.61	0.49			0.17	0.17	0.13	0.13	
Clearance Time (s)	4.0	6.0		4.0	6.0			4.0	4.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	527	788		668	891			278	269	175	222	
v/s Ratio Prot	0.00	0.16		c0.02	c0.19							0.03
v/s Ratio Perm	0.03			0.07				0.03	0.01	c0.04		
v/c Ratio	0.07	0.36		0.15	0.38			0.15	0.04	0.31	0.25	
Uniform Delay, d1	6.8	9.4		4.1	7.7			17.3	16.9	19.3	19.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.3		0.1	0.3			0.3	0.1	1.0	0.6	
Delay (s)	6.9	9.7		4.2	8.0			17.5	17.0	20.3	19.7	
Level of Service	A	A		A	A			B	B	C	B	
Approach Delay (s)		9.4			7.1			17.2			19.9	
Approach LOS		A			A			B			B	
Intersection Summary												
HCM Average Control Delay	10.7			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.34											
Actuated Cycle Length (s)	48.8			Sum of lost time (s)			14.0					
Intersection Capacity Utilization	43.5%			ICU Level of Service			A					
Analysis Period (min)	15											
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 3: Rushing Road & Home Depot Drive

AM Build Year 2011

2/26/2008





















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	243	23	93	255	66	15	25	60	50	40	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0			4.0	4.0	6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.97			1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1839		1770	1805			1829	1583	1770	1723	
Flt Permitted	0.55	1.00		0.51	1.00			0.88	1.00	0.73	1.00	
Satd. Flow (perm)	1028	1839		944	1805			1636	1583	1358	1723	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	264	25	101	277	72	16	27	65	54	43	43
RTOR Reduction (vph)	0	3	0	0	9	0	0	0	54	0	30	0
Lane Group Flow (vph)	35	286	0	101	340	0	0	43	11	54	56	0
Turn Type	pm+pt			pm+pt			Perm			Perm		Perm
Protected Phases	5	2		1	6			8				4
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	23.1	20.7		29.3	23.8			8.2	8.2	6.2	6.2	
Effective Green, g (s)	23.1	20.7		29.3	23.8			8.2	8.2	6.2	6.2	
Actuated g/C Ratio	0.48	0.43		0.61	0.49			0.17	0.17	0.13	0.13	
Clearance Time (s)	4.0	6.0		4.0	6.0			4.0	4.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	527	787		665	888			277	268	174	221	
v/s Ratio Prot	0.00	0.16		c0.02	c0.19							0.03
v/s Ratio Perm	0.03			0.07				0.03	0.01	c0.04		
v/c Ratio	0.07	0.36		0.15	0.38			0.16	0.04	0.31	0.26	
Uniform Delay, d1	6.7	9.4		4.1	7.7			17.1	16.8	19.2	19.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.3		0.1	0.3			0.3	0.1	1.0	0.6	
Delay (s)	6.8	9.7		4.2	8.0			17.4	16.9	20.2	19.6	
Level of Service	A	A		A	A			B	B	C	B	
Approach Delay (s)		9.4			7.1			17.1			19.8	
Approach LOS		A			A			B			B	
Intersection Summary												
HCM Average Control Delay	10.6			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.34											
Actuated Cycle Length (s)	48.4			Sum of lost time (s)			14.0					
Intersection Capacity Utilization	43.5%			ICU Level of Service			A					
Analysis Period (min)	15											
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 3: Rushing Road & Home Depot Drive

PM NO Build Year 2011





















2/26/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	76	592	74	295	322	44	80	133	320	75	123	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0			4.0	4.0	6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.98			1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1832		1770	1829			1828	1583	1770	1745	
Flt Permitted	0.53	1.00		0.12	1.00			0.65	1.00	0.42	1.00	
Satd. Flow (perm)	983	1832		229	1829			1216	1583	774	1745	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	83	643	80	321	350	48	87	145	348	82	134	98
RTOR Reduction (vph)	0	3	0	0	4	0	0	0	261	0	20	0
Lane Group Flow (vph)	83	720	0	321	394	0	0	232	87	82	212	0
Turn Type	pm+pt			pm+pt			Perm			Perm		Perm
Protected Phases	5	2		1	6			8				4
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	53.6	50.6		72.1	65.1			27.2	27.2	25.2	25.2	
Effective Green, g (s)	53.6	50.6		72.1	65.1			27.2	27.2	25.2	25.2	
Actuated g/C Ratio	0.49	0.46		0.66	0.60			0.25	0.25	0.23	0.23	
Clearance Time (s)	4.0	6.0		4.0	6.0			4.0	4.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	504	848		398	1089			303	394	178	402	
v/s Ratio Prot	0.00	c0.39		c0.13	0.22							0.12
v/s Ratio Perm	0.08			0.40				c0.19	0.05	0.11		
v/c Ratio	0.16	0.85		0.81	0.36			0.77	0.22	0.46	0.53	
Uniform Delay, d1	14.9	26.0		25.1	11.4			38.1	32.6	36.2	36.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	7.9		11.3	0.2			11.0	0.3	1.9	1.3	
Delay (s)	15.0	33.9		36.4	11.6			49.1	32.9	38.1	38.1	
Level of Service	B	C		D	B			D	C	D	D	
Approach Delay (s)		32.0			22.7			39.4			38.1	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM Average Control Delay	31.8			HCM Level of Service			C					
HCM Volume to Capacity ratio	0.82											
Actuated Cycle Length (s)	109.3			Sum of lost time (s)			14.0					
Intersection Capacity Utilization	92.1%			ICU Level of Service			F					
Analysis Period (min)	15											
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 3: Rushing Road & Home Depot Drive

PM Build Year 2011  
2/26/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	76	592	74	295	322	44	80	133	320	75	123	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0			4.0	4.0	6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.98			1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1832		1770	1829			1828	1583	1770	1745	
Flt Permitted	0.53	1.00		0.12	1.00			0.65	1.00	0.42	1.00	
Satd. Flow (perm)	983	1832		229	1829			1216	1583	774	1745	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	83	643	80	321	350	48	87	145	348	82	134	98
RTOR Reduction (vph)	0	3	0	0	4	0	0	0	261	0	20	0
Lane Group Flow (vph)	83	720	0	321	394	0	0	232	87	82	212	0
Turn Type	pm+pt			pm+pt			Perm			Perm		Perm
Protected Phases	5	2		1	6			8		8		4
Permitted Phases	2			6			8		8		4	
Actuated Green, G (s)	53.6	50.6		72.1	65.1			27.2	27.2	25.2	25.2	
Effective Green, g (s)	53.6	50.6		72.1	65.1			27.2	27.2	25.2	25.2	
Actuated g/C Ratio	0.49	0.46		0.66	0.60			0.25	0.25	0.23	0.23	
Clearance Time (s)	4.0	6.0		4.0	6.0			4.0	4.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	504	848		398	1089			303	394	178	402	
v/s Ratio Prot	0.00	c0.39		c0.13	0.22							0.12
v/s Ratio Perm	0.08			0.40				c0.19	0.05	0.11		
v/c Ratio	0.16	0.85		0.81	0.36			0.77	0.22	0.46	0.53	
Uniform Delay, d1	14.9	26.0		25.1	11.4			38.1	32.6	36.2	36.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	7.9		11.3	0.2			11.0	0.3	1.9	1.3	
Delay (s)	15.0	33.9		36.4	11.6			49.1	32.9	38.1	38.1	
Level of Service	B	C		D	B			D	C	D	D	
Approach Delay (s)		32.0			22.7			39.4			38.1	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM Average Control Delay	31.8			HCM Level of Service			C					
HCM Volume to Capacity ratio	0.82											
Actuated Cycle Length (s)	109.3			Sum of lost time (s)			14.0					
Intersection Capacity Utilization	92.1%			ICU Level of Service			F					
Analysis Period (min)	15											
c Critical Lane Group												

**Attachment: E**

**MOBILE 6.2 Input & Output Files**

```
*****
* MOBILE6.2 (31-Oct-2002) *
* Input file: M6INPUT.IN (file 1, run 1). *
*****
```

M603 Comment: User has disabled the calculation of REFUELING emissions.

```
* Reading Registration Distributions from the following external
* data file: LA_REGD.D
```

```
* Reading I/M program description records from the following external
* data file: BTR IM.D
```

\* Average speed 2.5 mph

\* #

$$* [02 \ 0001] \ 14$$

\* File 1, Run 1, Scenario 2.

\* #

M615 Comment: User supplied VMT mix.

```
* Reading Hourly Roadway VMT distribution from the following external
* data file: V000102F.DEF
```

### Reading User Supplied ROADWAY VMT Factors

```
* Reading Hourly VMT distribution from the following external
* data file: V000102H.DEF
```

```
* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: V000102S.DEF
```

```
M 48 Warning:
      there are no sales for vehicle class HDGV8b
```

Exhaust I/M Program:	Yes
Evap I/M Program:	Yes
ATP Program:	Yes
Reformulated Gas:	No

Vehicle Type: GVWR:	LDGV	LDGT12 <6000	LDGT34 >6000	LDGT (All)	HDGV	LDDV	LDDT	HDDV	MC	All Veh
VMT Distribution:	0.6007	0.2712	0.0562		0.0207	0.0006	0.0009	0.0482	0.0014	1.0000
Composite Emission Factors (g/mi):										
Composite VOC :	6.831	6.117	3.423	5.655	8.521	0.677	0.718	1.304	10.43	6.210
Composite NOX :	1.168	1.119	1.079	1.112	1.923	0.990	0.843	12.334	0.88	1.703

```
* #####
*[03 0001] 6 16
* File 1, Run 1, Scenario 3.
* #####
  M615 Comment:
      User supplied VMT mix.
```

```
* Reading Hourly Roadway VMT distribution from the following external
* data file: V000103F.DEF
```

### Reading User Supplied ROADWAY VMT Factors

```
* Reading Hourly VMT distribution from the following external
* data file: V000103H.DEF
```

```
* Reading Hourly, Roadway, and Speed VMT dist. from the following external
* data file: V000103S.DEF
  M 48 Warning:
        there are no sales for vehicle class HDGV8b
```

vvf sd

Calendar Year: 2009  
 Month: July  
 Altitude: Low  
 Minimum Temperature: 72.3 (F)  
 Maximum Temperature: 94.8 (F)  
 Absolute Humidity: 123. grains/lb  
 Nominal Fuel RVP: 7.8 psi  
 Weathered RVP: 7.4 psi  
 Fuel Sulfur Content: 30. ppm

Exhaust I/M Program: Yes  
 Evap I/M Program: Yes  
 ATP Program: Yes  
 Reformulated Gas: No

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
VMT Distribution:	0.6125	0.2924	0.0465		0.0136	0.0006	0.0007	0.0317	0.0019	1.0000
-----										
Composite Emission Factors (g/mi):										
Composite VOC :	6.831	6.117	3.423	5.748	8.521	0.677	0.731	1.304	10.43	6.310
Composite NOX :	1.168	1.119	1.079	1.113	1.923	0.990	0.854	12.334	0.88	1.513
-----										