TRAFFIC IMPACT STUDY
FOR
LAURELWOOD APARTMENTS
CHEROKEE COUNTY, GEORGIA

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March 15, 2012

A & R Project # 12-003

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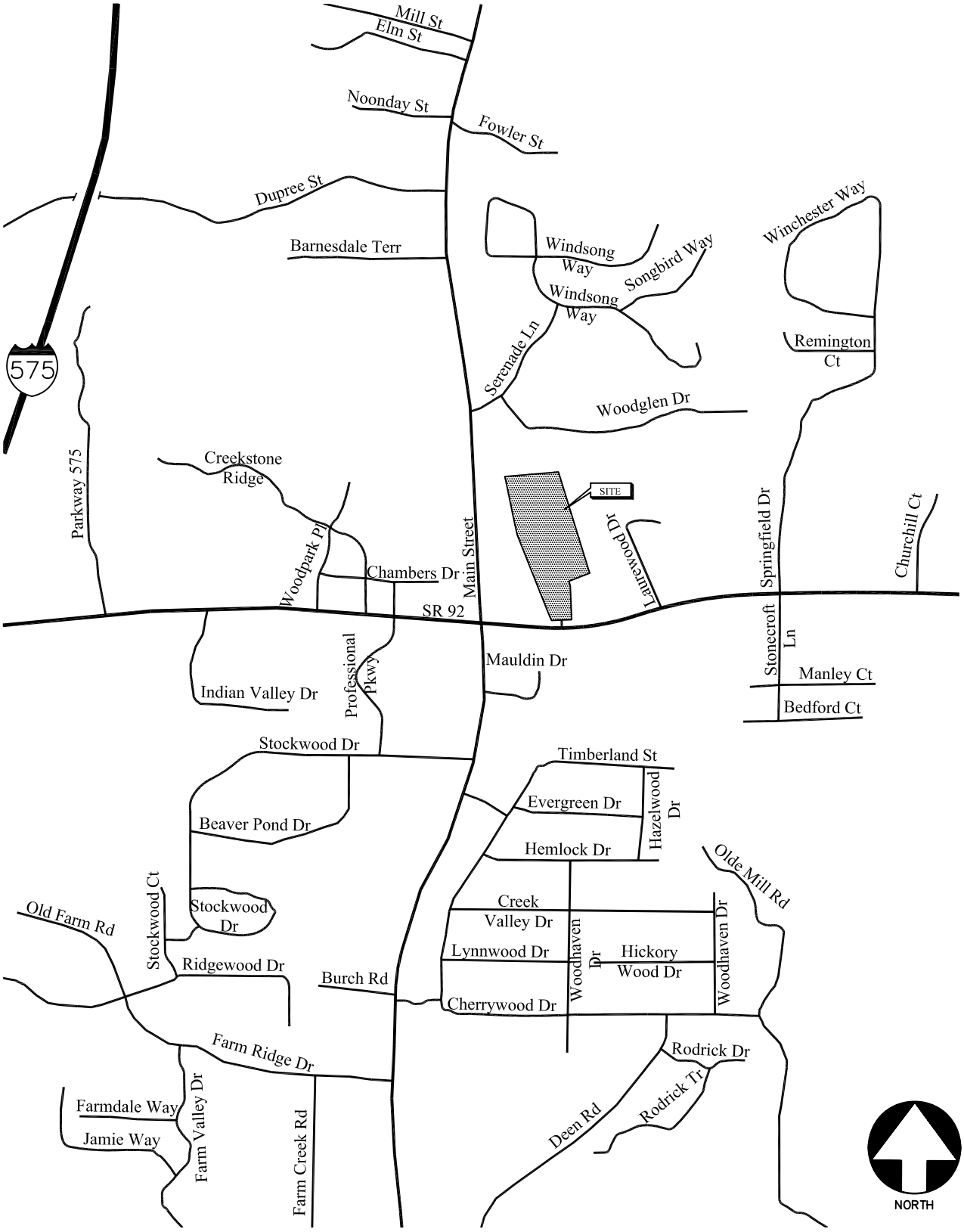
INTRODUCTION

The purpose of this study is to evaluate the traffic impact that will result from the proposed apartment complex in Woodstock, Cherokee County, Georgia. The Laurelwood Apartment complex is a 286 unit development. The location of the proposed development and the surrounding roadway network is shown in Figure 1.

The development is proposed to have one full access driveway at an existing median break on SR 92 (Alabama Highway), approximately 740' east of Main Street (centerline-to-centerline). In this study, the AM and PM peak hours have been analyzed. This study includes the evaluation of the existing and future traffic operations at the intersection of SR 92 (Alabama Highway) / Main Street along with site driveway intersection. Recommendations to improve traffic operations have been identified, where appropriate.



LOCATION MAP

FIGURE 1

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EXISTING FACILITIES

An inventory was performed of the major roadways in the area surrounding the site. The following is a brief description of each of these facilities.

SR 92 (Alabama Highway)

SR 92 is an east-west, six-lane, divided roadway with a posted speed limit of 45 mph in the vicinity of the site.

Main Street / Canton Rd

Main Street is a north-south, four-lane, divided roadway with a posted speed limit of 40 mph in the vicinity of the site.

STUDY METHODOLOGY

In this study, the methodology used for evaluating traffic operations at each of the subject intersections is based on the criteria set forth in the Transportation Research Board's Highway Capacity Manual, 2000 edition (HCM 2000). Synchro software, which utilizes the HCM 2000 methodology, was used for the analysis. The following is a description of the methodology employed for the analysis of unsignalized and signalized intersections.

Unsignalized Intersections

For unsignalized intersections at which the side street or minor street is controlled by a stop sign, the criteria for evaluating traffic operations are the level of service (LOS) for the turning movements at the intersection and the level of service for the overall intersection. Level of service is based on the average controlled delay incurred at the intersection. Controlled delay for unsignalized intersections includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Several factors affect the controlled delay for unsignalized intersections, such as the availability and distribution of gaps in the conflicting traffic stream, critical gaps, and follow-up time for a vehicle in the queue.

Level of service is assigned a letter designation from A through F. Level of service A indicates excellent operations with little delay to motorists, while level of service F exists when there are insufficient gaps of acceptable size to allow vehicles on the side street to cross safely, resulting in extremely long total delays and long queues. The level of service criteria for two-way stop-controlled and all-way stop-controlled (unsignalized) intersections is given in Table 1.

TABLE 1
LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

Level of Service	Average Controlled Delay (sec/veh)
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

Source: 2000 Highway Capacity Manual

Signalized Intersections

For signalized intersections, it is necessary to evaluate both capacity and level of service in order to evaluate the overall operation of the intersection. The capacity analysis of an intersection is performed by comparing the volume of traffic using the various lane groups at the intersection to the capacity of those lane groups. This results in a volume/capacity (v/c) ratio for each lane group. A v/c ratio greater than 1.0 indicates that the volume of traffic has exceeded the capacity available, resulting in a temporary excess of demand. Although the capacity of the entire intersection is not defined, a composite v/c ratio for the sum of the critical lane groups within the intersection is computed. This composite v/c ratio is an indication of the overall intersection sufficiency.

Level of service for a signalized intersection is defined in terms of average controlled delay per vehicle, which is composed of initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The levels of service criteria for signalized intersections, based on average controlled delay, are shown in Table 2. Level of service A indicates operations with very low controlled delay, while level of service F describes operations with extremely high average controlled delay. Level of service E is typically considered to be the limit of acceptable delay, and level of service F is considered unacceptable by most drivers.

Table 2
Level of Service Criteria for Signalized Intersections

Level of Service	Controlled Delay Per Vehicle (sec)
A	≤ 10.0
B	> 10.0 and ≤20.0
C	> 20.0 and ≤35.0
D	> 35.0 and ≤55.0
E	> 55.0 and ≤80.0
F	> 80.0

Source: 2000 Highway Capacity Manual

EXISTING TRAFFIC OPERATIONS

Existing peak hour traffic counts and intersection geometric data were collected at the intersection of SR 92 (Alabama Highway) / Main Street and the future driveway intersection to analyze traffic operations prior to the addition of site generated traffic. Turning movement counts were collected on Thursday, February 23rd 2012. All turning movement counts were recorded during the AM and PM peak hours between 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m., respectively. The four consecutive 15-minute interval volumes that summed to produce the highest volume at the intersection was then determined. These volumes make up the peak hour traffic volumes for the intersection and are shown in Figure 2.

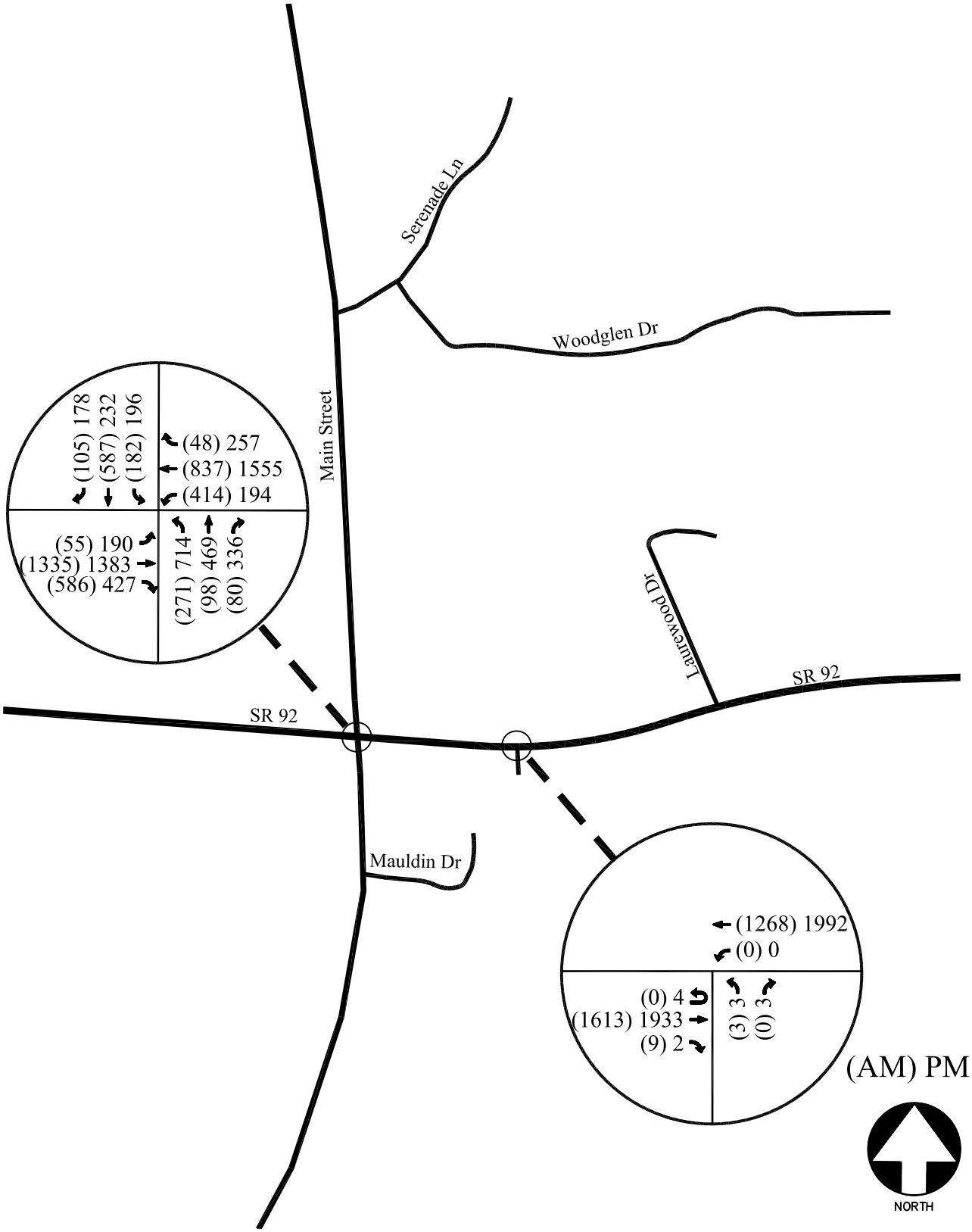
Existing traffic operations were analyzed at the study intersections in accordance with the HCM methodology. The results of the analyses are shown in Table 3. The existing traffic control and lane geometry for the intersections are shown in Figure 3.

TABLE 3
EXISTING INTERSECTION OPERATIONS

Intersection	Traffic Control	A.M. Peak Hour		P.M. Peak Hour	
		LOS (Delay)	v/c ratio*	LOS (Delay)	v/c ratio*
SR 92 / Main Street	Signalized	D (42.1)	0.82	D(40.6)	0.78
SR 92 / Commercial Driveway	Stop Controlled				
-Northbound Approach	on Commercial	C (22.3)	-	C (22.4)	-
-Westbound Left	Drwy	A (0.0)	-	A (0.0)	-

* v/c ratio is not calculated for unsignalized intersections

The results of the existing conditions analysis indicate that the intersection of SR 92 / Main Street / Main Street operates at level-of-service "D" in both the AM and PM peak hours. The northbound approach from the commercial driveway at the future driveway location is also currently operating at an acceptable level-of-service.



EXISTING WEEKDAY PEAK-HOUR VOLUMES FIGURE 2

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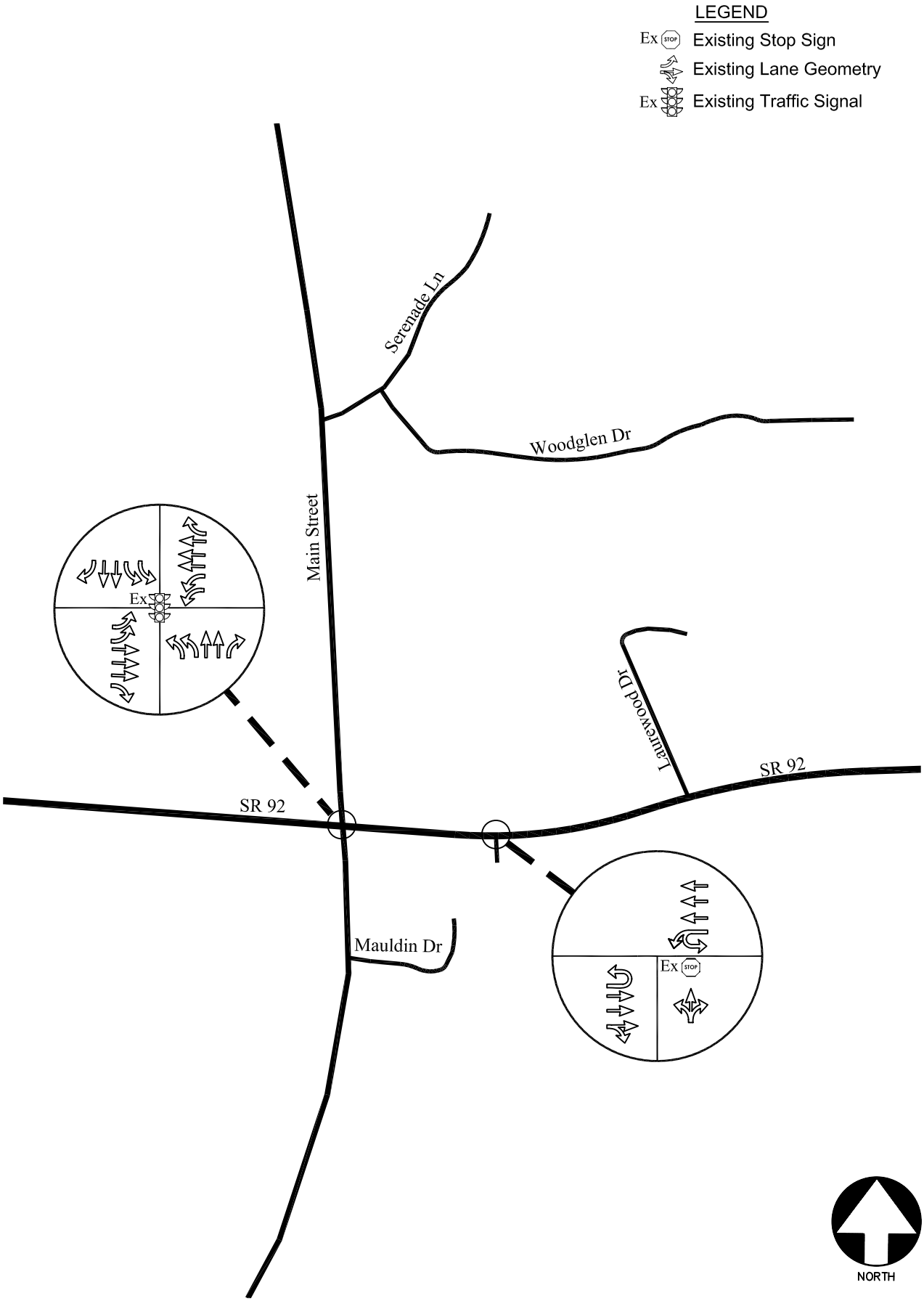

EXISTING TRAFFIC CONTROL AND LANE GEOMETRY FIGURE 3

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PROPOSED DEVELOPMENT

The proposed development will include a full access driveway as the southbound approach to an existing median break on SR 92. The northbound approach to the driveway intersection is a driveway for a commercial property. The median break is located approximately 740' east of Main Street (centerline-to-centerline). A site plan is shown in Figure 4.

Trip Generation

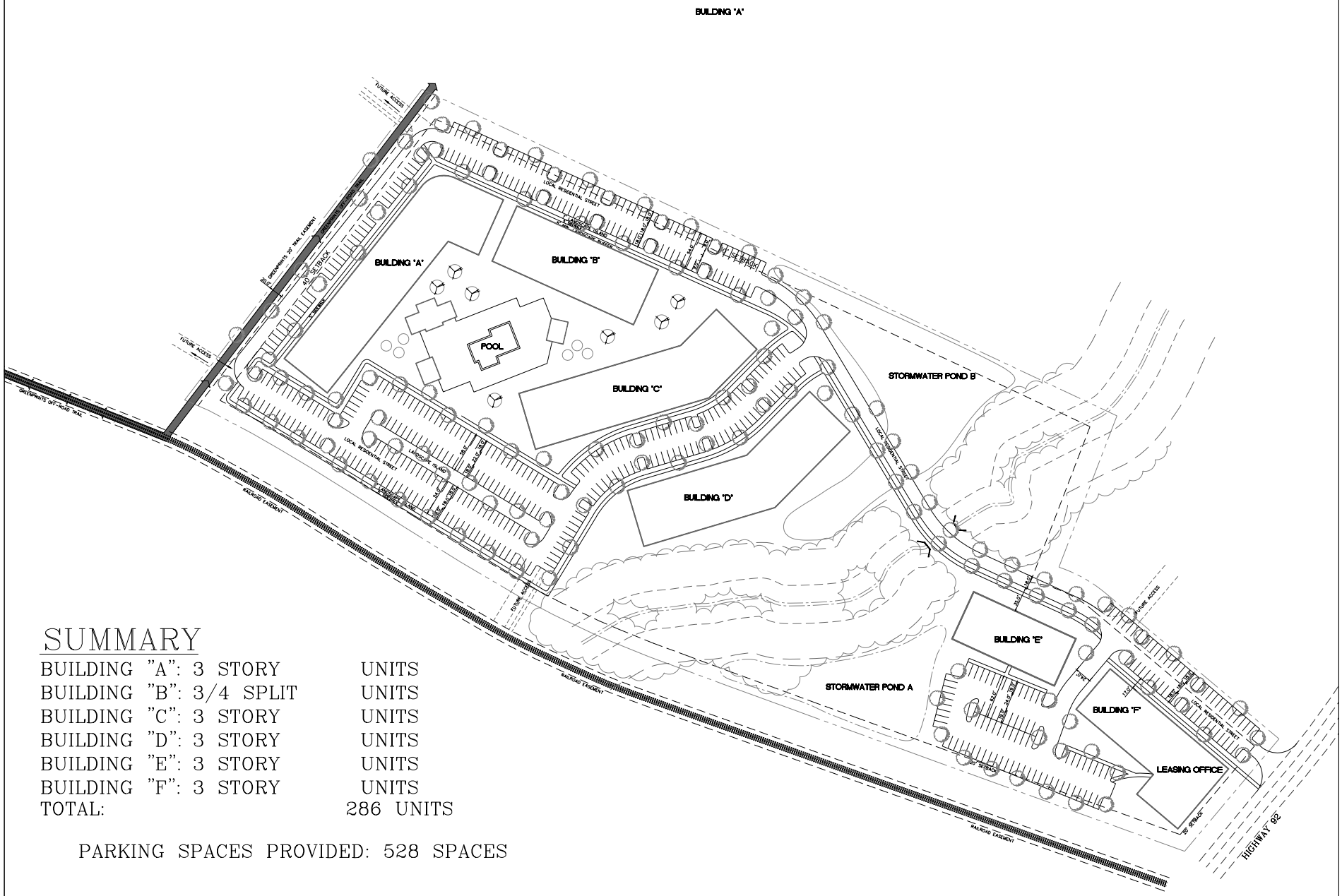
Trip generation estimates for the project were based on the rates and equations published in the 8th edition of the Institute of Transportation Engineers (ITE) Trip Generation report. This reference contains traffic volume count data collected at similar facilities nationwide. The trip generation was based on the following ITE Land Use: *220 – Apartment.* The calculated trip generation for the site is shown in Table 4.

TABLE 4
TRIP GENERATION

Land Use – Size	A.M. Peak Hour			P.M. Peak Hour			24-Hour 2-way
	Enter	Exit	Total	Enter	Exit	Total	Two-way
220 – Apartment – 386 Units.	29	115	144	114	61	175	1,857

Trip Distribution

The trip distribution describes how traffic arrives and departs from the site. An overall trip distribution was developed for the site based on a review of the existing travel patterns in the area and the locations of major roadways and highways that will serve the development. This distribution is shown in Figure 5. The site-generated traffic volumes, shown in Table 4, were assigned to the study area intersections based on this distribution. The AM and PM peak hour new traffic generated by the site volumes are shown in Figure 6.



SUMMARY

BUILDING "A":	3 STORY	UNITS
BUILDING "B":	3/4 SPLIT	UNITS
BUILDING "C":	3 STORY	UNITS
BUILDING "D":	3 STORY	UNITS
BUILDING "E":	3 STORY	UNITS
BUILDING "F":	3 STORY	UNITS
TOTAL:		286 UNITS

PARKING SPACES PROVIDED: 528 SPACES

GRAPHIC SCALE

(IN FEET)
1 inch = 50 ft.

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LAND PLANNING
CIVIL ENGINEERING
LANDSCAPE ARCHITECTURE

PROJECT:
LAUREL WOOD
APARTMENT HOMES
LAND LOT XXX
XXTH DISTRICT
XX COUNTY, GEORGIA
ADDRESS

REVISIONS:

LAYOUT & STAKING PLAN

SCALE:	1"=50'
DATE:	10/19/2011
DRAWN BY:	MIKE WRIGHT
PROJECT MANAGER:	MIKE WRIGHT
QA/QC CHECK:	

PROJECT NO.
11-074

C3.0

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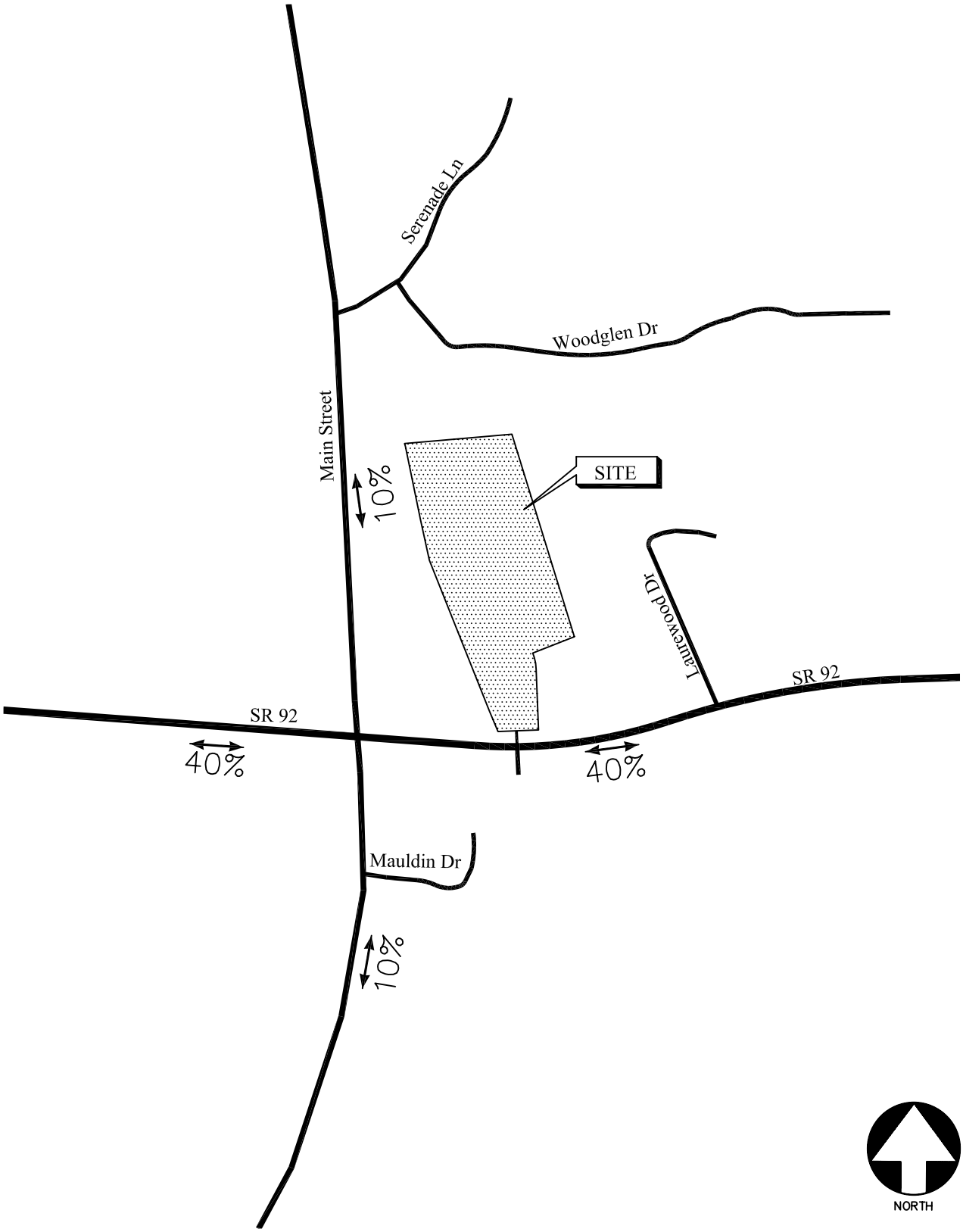
G:\PROJECTS\2011\11-074 LaurelWoods Apartments\Drawing\Concept_1-06-12.dwg January 04, 2012



TRIP DISTRIBUTION FIGURE 5

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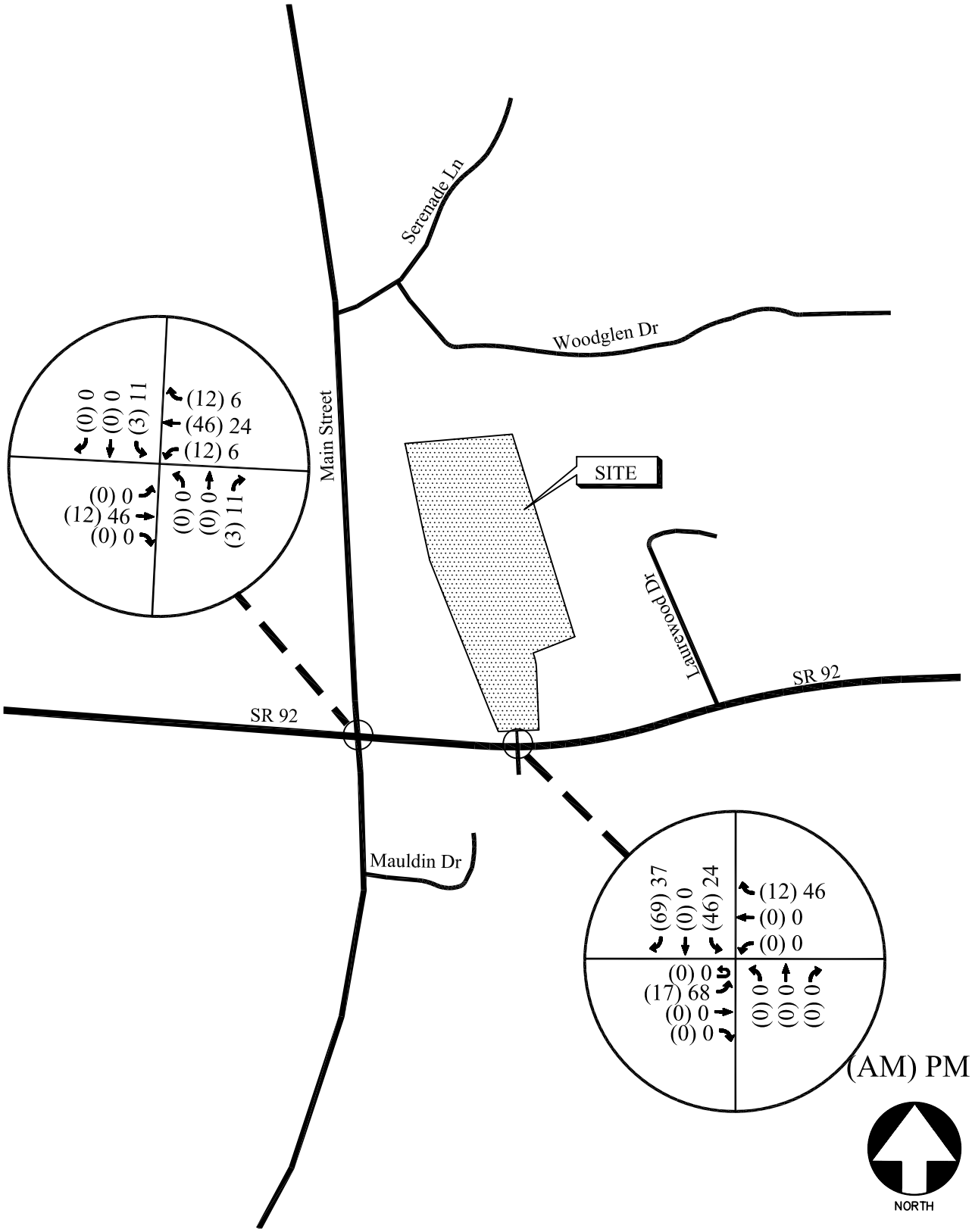

SITE-GENERATED WEEKDAY PEAK-HOUR VOLUMES FIGURE 6

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FUTURE TRAFFIC OPERATIONS

In order to evaluate future traffic operations in this area, a projection was made of future base year traffic volumes. The Georgia Department of Transportation recorded average daily traffic volumes at several locations in the vicinity of the site. Reviewing a linear regression of historic counts over the last several years revealed growth of approximately 1% in the area. This growth factor was applied to the existing traffic volumes on the roadways in order to estimate the build year (2013) traffic volumes prior to the addition of site-generated traffic. The site generated traffic volumes (shown in Figure 6) were added to base traffic volumes to calculate the future traffic volumes. The resulting total future peak hour volumes are shown in Figure 7. These volumes were used to analyze future traffic operations at all the study intersections.

The results of the analysis, assuming all recommended improvements identified above have been implemented, are shown in Table 5.

TABLE 5
FUTURE INTERSECTION OPERATIONS

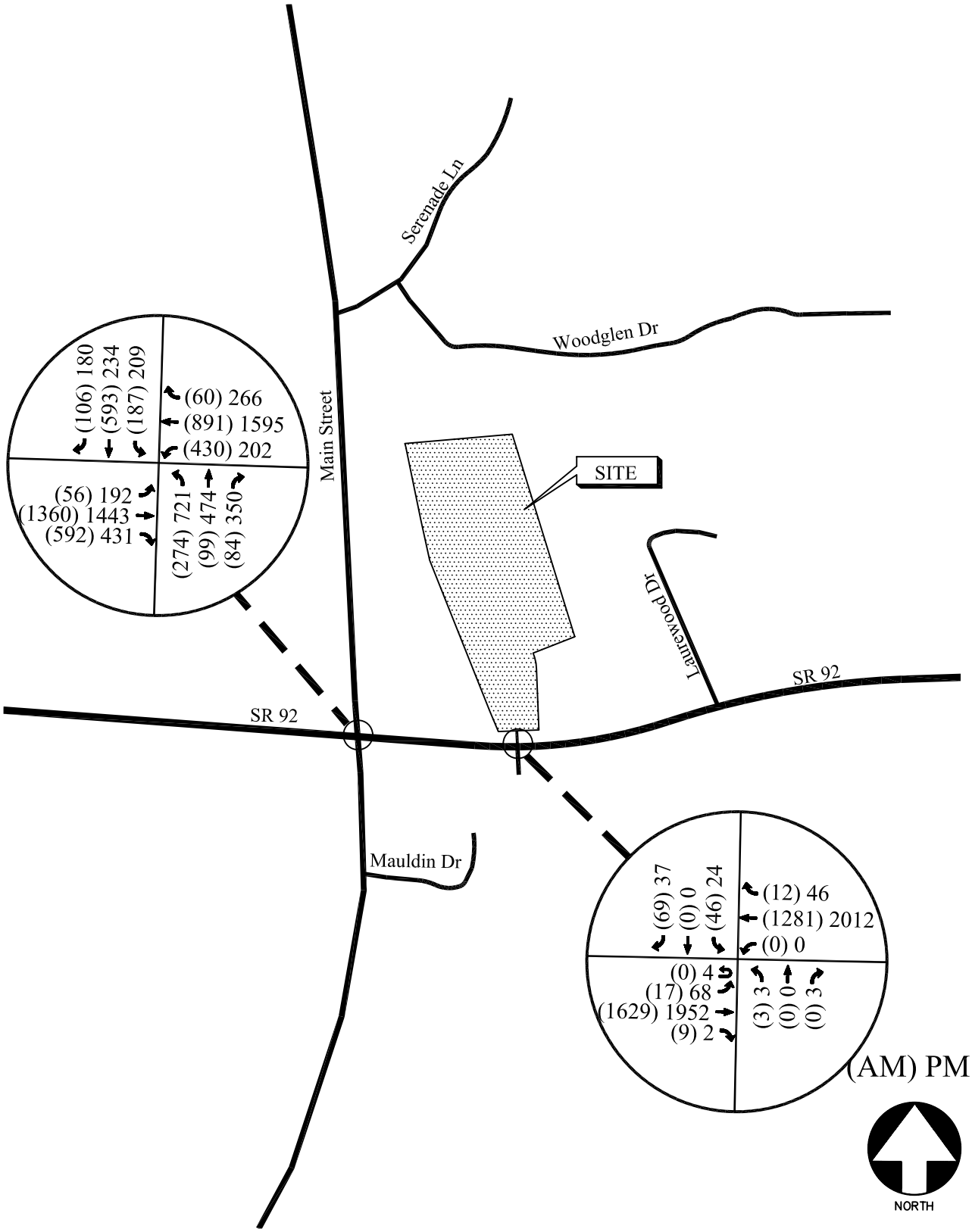
Intersection	Traffic Control	A.M. Peak Hour		P.M. Peak Hour	
		LOS (Delay)	v/c ratio	LOS (Delay)	v/c ratio
SR 92 / Main Street	Signalized	D (41.7)	0.84	D (41.6)	0.80
SR 92 / Site Drwy / Commercial Drwy	Stop				
-Eastbound Left	Controlled	B (13.0)	-	B (13.0)	-
-Westbound Left	on Site Drwy	A (0.0)	-	A (0.0)	-

* v/c ratio is not calculated for unsignalized intersections
**results beyond range

The results of the future conditions analysis indicates that the signalized intersection of SR 92 / Main Street operates at an acceptable level-of-service (LOS) in both the AM and PM peak hours.

After the addition of traffic from the proposed development, there will be insignificant changes to delay for vehicles travelling eastbound or westbound on SR 92. The largest delays will be seen for the vehicles exiting the main site driveway and the opposite commercial driveway during peak hours. This traffic will experience delays while waiting for gaps in the main street traffic flow during the busiest time periods on SR 92. It is not unusual for an unsignalized access point to have delays during peak times on major facilities such as SR 92. It should be noted that the traffic generated by either of the side street approaches is likely not sufficient to warrant the installation of a traffic signal (per MUTCD standards).

There are no major impacts to the main line approaches at this intersection; therefore no addition improvements are recommended beyond what is shown on the attached site plan. Recommended traffic control and lane geometry is shown in Figure 8.



FUTURE WEEKDAY PEAK HOUR VOLUMES FIGURE 7

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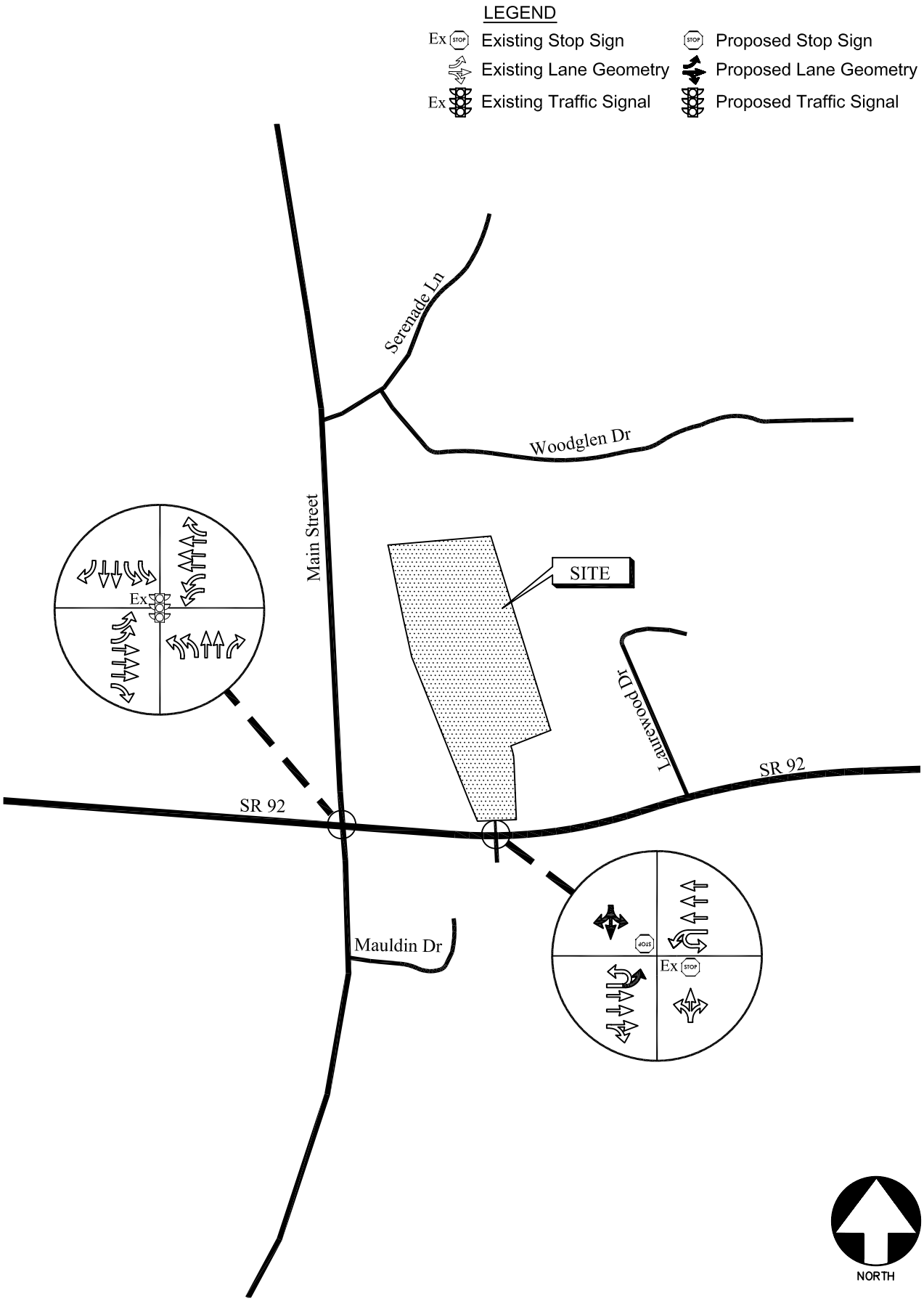

FUTURE TRAFFIC CONTROL AND LANE GEOMETRY FIGURE 8

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CONCLUSIONS AND RECOMMENDATIONS

Traffic operations were evaluated due the additional traffic generated by the proposed Laurelwood apartment complex in on SR 92 in Woodstock, Georgia. The Laurelwood apartment complex is a 286 unit development that will include a full access driveway as the southbound approach to an existing median break on SR 92. The median break is located approximately 740' east of Main Street (centerline-to-centerline).

AM and PM turning movement traffic counts were collected at the study intersection of SR 92 (Alabama Highway) / Main Street and the site driveway location. These counts were used to analyze the existing traffic operations at the study intersections. According to the existing operations analysis, the signalized intersection of SR 92 / Main Street is currently operating at an acceptable level-of-service in both the AM and PM peak hours. The mainline approaches at the median break intersection are also operating at an acceptable LOS, with some delays for traffic exiting the existing commercial driveway.

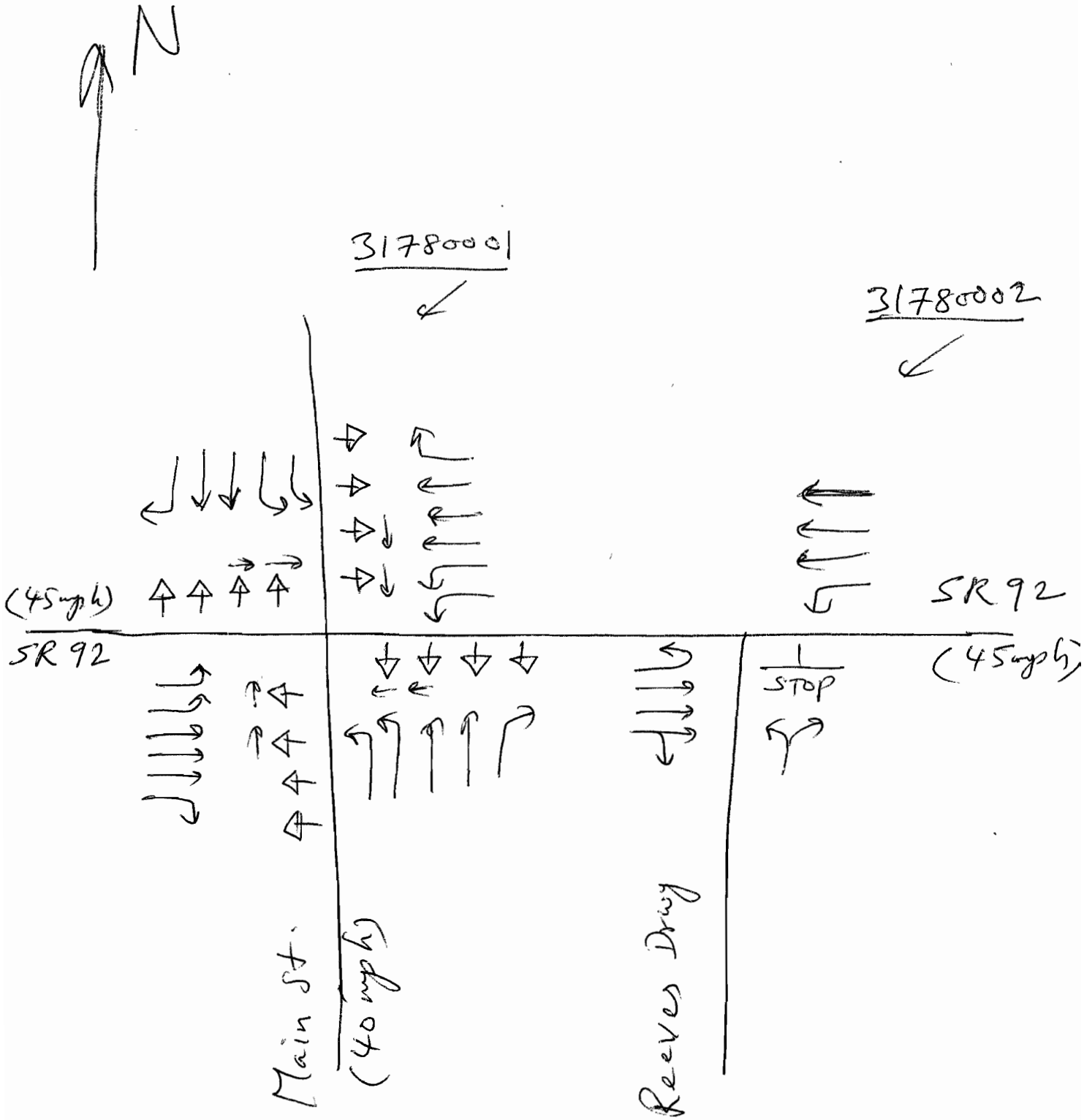
Future traffic operations were evaluated at the study intersections after the addition of traffic from the proposed development. The result of the future analysis reveals that there will be insignificant changes to delay for vehicles travelling eastbound or westbound on SR 92. The largest delays will be seen for the vehicles exiting the main site driveway and the opposite commercial driveway during peak hours. This traffic will experience delays while waiting for gaps in the main street traffic flow during the busiest time periods on SR 92. It is not unusual for an unsignalized access point to have delays during peak times on major facilities such as SR 92. It should be noted that the traffic generated by either of the side street approaches is likely not sufficient to warrant the installation of a traffic signal (per MUTCD standards).

Sight distance was evaluated at the proposed driveway location through field observations. AASHTO standards for case B-1 (Left Turn from Minor Road) require that 565 feet of visibility be provided (at a height of 3.5 feet) to cross three lanes on a 45 mph roadway. The available sight distance at the driveway is approximately 850 ft. The available sight distance looking east from the driveway is limited by grades in the right-of-way. It is recommended that these grades be adjusted to allow the required sight distance.

It is recommended that the striping for the eastbound westbound left turn lane be modified to show left turning arrows (GDOT type 2) instead of the existing u-turn arrows (GDOT type 7). There are no major impacts to the main line approaches at this intersection; therefore no addition improvements are recommended beyond what is shown on the attached site plan.

Appendix

Existing Intersection Traffic Counts


N
31780001
31780002
(45mph)
SR 92
SR 92
(45mph)
STOP
Main St.
(40mph)
Reeves Drwy

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TMC Data
Alabama Rd (SR 92) @
Main St
7-9am | 4-6pm

File Name : 31780001
Site Code : 31750001
Start Date : 2/23/2012
Page No : 1

Groups Printed- Cars, Trucks & Buses

	Main St Northbound					Main St Southbound					Alabama Rd (SR 92) Eastbound					Alabama Rd (SR 92) Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	61	24	16	0	101	44	158	26	0	228	10	329	154	0	493	104	203	12	0	319	1141
07:15 AM	67	25	18	0	110	47	170	29	0	246	12	335	159	0	506	116	215	13	0	344	1206
07:30 AM	71	29	21	0	121	46	154	28	0	228	14	323	146	0	483	100	208	12	0	320	1152
07:45 AM	72	20	25	0	117	45	105	22	0	172	19	348	127	0	494	94	211	11	0	316	1099
Total	271	98	80	0	449	182	587	105	0	874	55	1335	586	0	1976	414	837	48	0	1299	4598
08:00 AM	79	30	39	0	148	68	101	24	0	193	13	323	126	0	462	66	182	25	0	273	1076
08:15 AM	61	38	30	0	129	43	95	27	0	165	29	319	81	0	429	83	227	19	0	329	1052
08:30 AM	97	38	26	0	161	48	83	30	0	161	14	278	92	0	384	49	213	20	0	282	988
08:45 AM	89	38	32	0	159	32	72	36	0	140	33	309	89	0	431	59	220	21	0	300	1030
Total	326	144	127	0	597	191	351	117	0	659	89	1229	388	0	1706	257	842	85	0	1184	4146
*** BREAK ***																					
04:00 PM	112	81	72	0	265	45	51	53	0	149	42	361	94	0	497	45	377	45	0	467	1378
04:15 PM	166	106	57	0	329	48	54	48	0	150	35	310	115	0	460	46	373	63	0	482	1421
04:30 PM	169	99	71	0	339	45	66	45	0	156	50	324	104	0	478	46	376	52	0	474	1447
04:45 PM	188	122	83	0	393	65	37	45	0	147	49	327	90	0	466	44	377	76	0	497	1503
Total	635	408	283	0	1326	203	208	191	0	602	176	1322	403	0	1901	181	1503	236	0	1920	5749
05:00 PM	164	107	99	0	370	46	80	51	0	177	45	347	111	0	503	64	405	72	0	541	1591
05:15 PM	193	141	83	0	417	40	49	37	0	126	46	385	122	0	553	40	397	57	0	494	1590
05:30 PM	149	161	60	0	370	51	59	24	0	134	44	312	83	0	439	51	367	70	0	488	1431
05:45 PM	174	112	75	0	361	45	36	52	0	133	45	330	97	0	472	43	388	48	0	479	1445
Total	680	521	317	0	1518	182	224	164	0	570	180	1374	413	0	1967	198	1557	247	0	2002	6057
Grand Total	1912	1171	807	0	3890	758	1370	577	0	2705	500	5260	1790	0	7550	1050	4739	616	0	6405	20550
Apprch %	49.2	30.1	20.7	0		28	50.6	21.3	0		6.6	69.7	23.7	0		16.4	74	9.6	0		
Total %	9.3	5.7	3.9	0	18.9	3.7	6.7	2.8	0	13.2	2.4	25.6	8.7	0	36.7	5.1	23.1	3	0	31.2	

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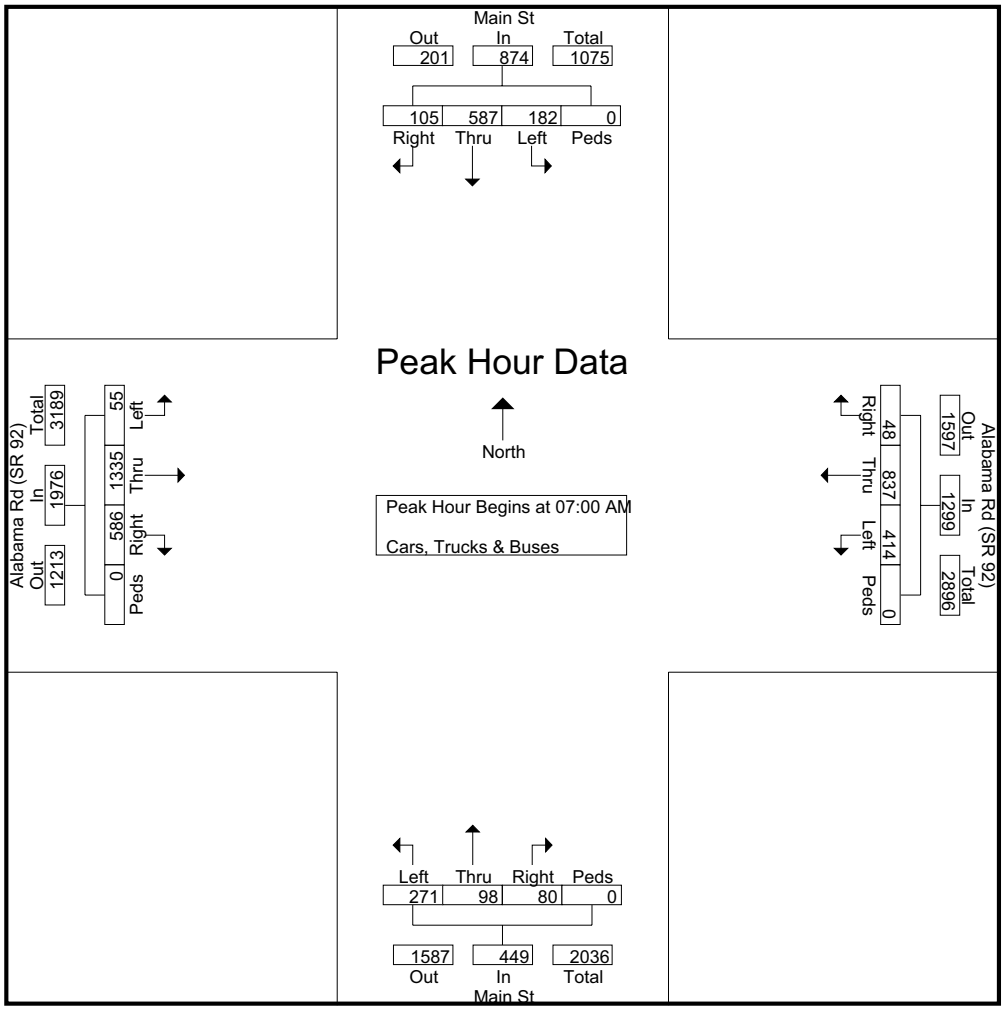
TMC Data
Alabama Rd (SR 92) @
Main St
7-9am | 4-6pm

File Name : 31780001
Site Code : 31750001
Start Date : 2/23/2012
Page No : 2

	Main St Northbound					Main St Southbound					Alabama Rd (SR 92) Eastbound					Alabama Rd (SR 92) Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	61	24	16	0	101	44	158	26	0	228	10	329	154	0	493	104	203	12	0	319	1141
07:15 AM	67	25	18	0	110	**47**	**170**	**29**	0	**246**	12	335	**159**	0	**506**	**116**	**215**	**13**	0	**344**	**1206**
07:30 AM	71	**29**	21	0	**121**	46	154	28	0	228	14	323	146	0	483	100	208	12	0	320	1152
07:45 AM	**72**	20	**25**	0	117	45	105	22	0	172	**19**	**348**	127	0	494	94	211	11	0	316	1099
Total Volume	271	98	80	0	449	182	587	105	0	874	55	1335	586	0	1976	414	837	48	0	1299	4598
% App. Total	60.4	21.8	17.8	0		20.8	67.2	12	0		2.8	67.6	29.7	0		31.9	64.4	3.7	0		
PHF	.941	.845	.800	.000	.928	.968	.863	.905	.000	.888	.724	.959	.921	.000	.976	.892	.973	.923	.000	.944	.953



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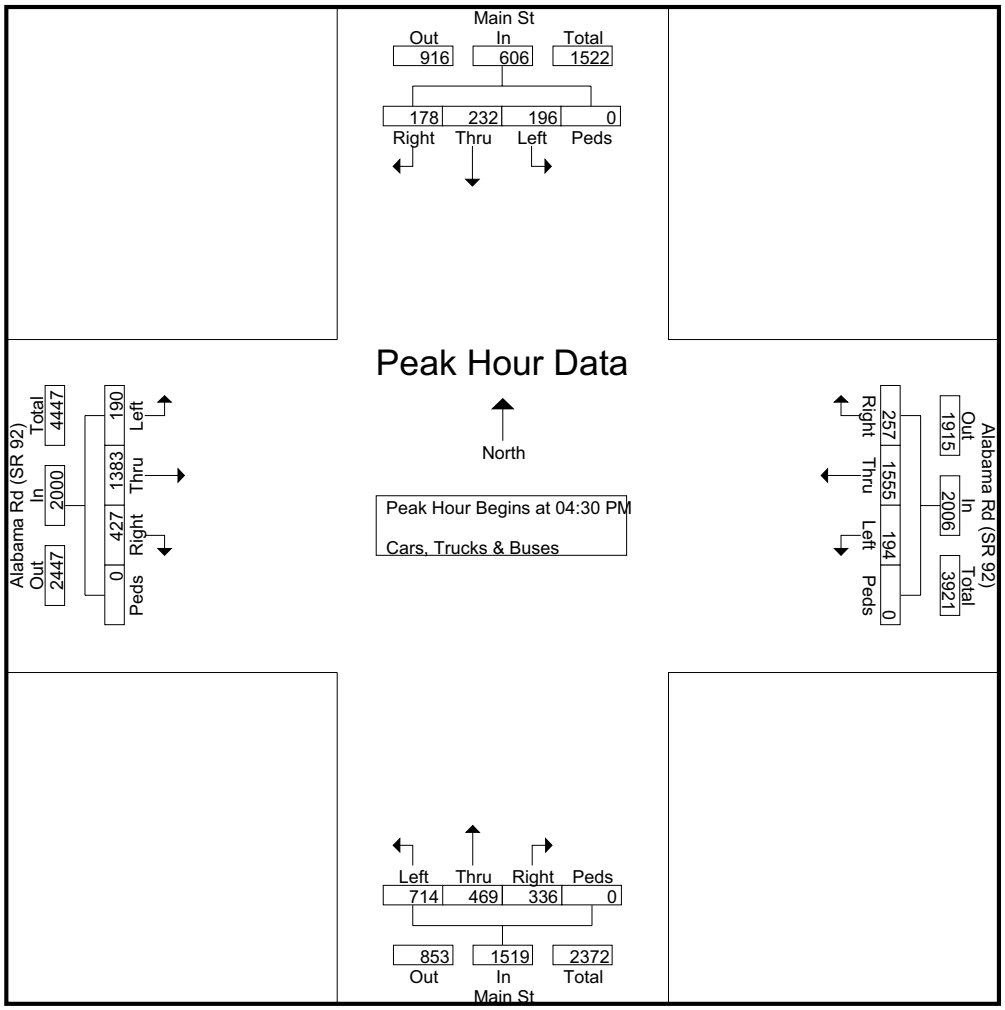
TMC Data
Alabama Rd (SR 92) @
Main St
7-9am | 4-6pm

File Name : 31780001
Site Code : 31750001
Start Date : 2/23/2012
Page No : 3

	Main St Northbound					Main St Southbound					Alabama Rd (SR 92) Eastbound					Alabama Rd (SR 92) Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	169	99	71	0	339	45	66	45	0	156	**50**	324	104	0	478	46	376	52	0	474	1447
04:45 PM	188	122	83	0	393	**65**	37	45	0	147	49	327	90	0	466	44	377	**76**	0	497	1503
05:00 PM	164	107	**99**	0	370	46	**80**	**51**	0	**177**	45	347	111	0	503	**64**	**405**	72	0	**541**	**1591**
05:15 PM	**193**	**141**	83	0	**417**	40	49	37	0	126	46	**385**	**122**	0	**553**	40	397	57	0	494	1590
Total Volume	714	469	336	0	1519	196	232	178	0	606	190	1383	427	0	2000	194	1555	257	0	2006	6131
% App. Total	47	30.9	22.1	0		32.3	38.3	29.4	0		9.5	69.2	21.4	0		9.7	77.5	12.8	0		
PHF	.925	.832	.848	.000	.911	.754	.725	.873	.000	.856	.950	.898	.875	.000	.904	.758	.960	.845	.000	.927	.963



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TMC Data
Alabama Rd (SR 92) @
Reeves Floral Drwy
7-9am | 4-6pm

File Name : 31780002
Site Code : 31750002
Start Date : 2/23/2012
Page No : 1

Groups Printed- Cars, Trucks & Buses

	Reeves Floral Drwy Northbound					Southbound					Alabama Rd (SR 92) Eastbound					Alabama Rd (SR 92) Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	U-Turn	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	386	1	0	387	0	316	0	0	316	703
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	394	2	0	396	0	345	0	0	345	741
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	384	1	0	385	0	312	0	0	312	697
07:45 AM	1	0	0	0	1	0	0	0	0	0	0	414	3	0	417	0	324	0	0	324	742
Total	1	0	0	0	1	0	0	0	0	0	0	1578	7	0	1585	0	1297	0	0	1297	2883
08:00 AM	2	0	0	0	2	0	0	0	0	0	0	421	3	0	424	0	287	0	0	287	713
08:15 AM	1	0	1	0	2	0	0	0	0	0	0	405	3	0	408	1	330	0	0	331	741
08:30 AM	4	0	0	0	4	0	0	0	0	0	2	352	1	0	355	1	268	0	0	269	628
08:45 AM	3	0	1	0	4	0	0	0	0	0	0	379	4	0	383	0	286	0	0	286	673
Total	10	0	2	0	12	0	0	0	0	0	2	1557	11	0	1570	2	1171	0	0	1173	2755
*** BREAK ***																					
04:00 PM	5	0	5	0	10	0	0	0	0	0	0	467	1	0	468	0	464	0	0	464	942
04:15 PM	2	0	1	0	3	0	0	0	0	0	1	407	1	0	409	0	481	0	0	481	893
04:30 PM	0	0	0	0	0	0	0	0	0	0	4	453	1	0	458	0	479	0	0	479	937
04:45 PM	1	0	2	0	3	0	0	0	0	0	0	471	1	0	472	0	486	0	0	486	961
Total	8	0	8	0	16	0	0	0	0	0	5	1798	4	0	1807	0	1910	0	0	1910	3733
05:00 PM	2	0	1	0	3	0	0	0	0	0	0	494	0	0	494	0	535	0	0	535	1032
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	515	0	0	515	0	492	0	0	492	1007
05:30 PM	0	0	0	0	0	0	0	0	0	0	1	413	0	0	414	1	491	0	0	492	906
05:45 PM	0	0	1	0	1	0	0	0	0	0	0	453	1	0	454	0	464	0	0	464	919
Total	2	0	2	0	4	0	0	0	0	0	1	1875	1	0	1877	1	1982	0	0	1983	3864
Grand Total	21	0	12	0	33	0	0	0	0	0	8	6808	23	0	6839	3	6360	0	0	6363	13235
Apprch %	63.6	0	36.4	0		0	0	0	0		0.1	99.5	0.3	0		0	100	0	0		
Total %	0.2	0	0.1	0	0.2	0	0	0	0	0	0.1	51.4	0.2	0	51.7	0	48.1	0	0	48.1	

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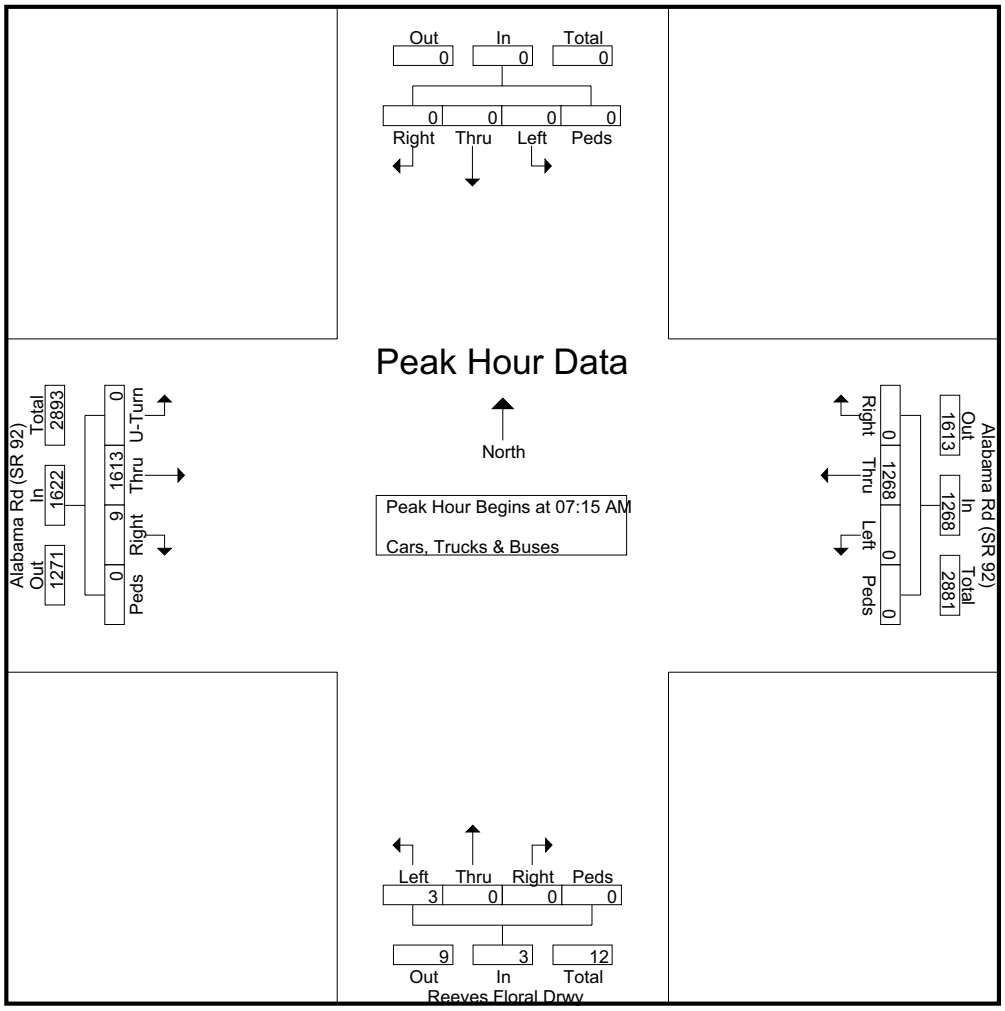
TMC Data
Alabama Rd (SR 92) @
Reeves Floral Drwy
7-9am | 4-6pm

File Name : 31780002
Site Code : 31750002
Start Date : 2/23/2012
Page No : 2

	Reeves Floral Drwy Northbound					Southbound					Alabama Rd (SR 92) Eastbound					Alabama Rd (SR 92) Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	U-Turn	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	394	2	0	396	0	**345**	0	0	**345**	741
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	384	1	0	385	0	312	0	0	312	697
07:45 AM	1	0	0	0	1	0	0	0	0	0	0	414	**3**	0	417	0	324	0	0	324	**742**
08:00 AM	**2**	0	0	0	**2**	0	0	0	0	0	0	**421**	3	0	**424**	0	287	0	0	287	713
Total Volume	3	0	0	0	3	0	0	0	0	0	0	1613	9	0	1622	0	1268	0	0	1268	2893
% App. Total	100	0	0	0		0	0	0	0		0	99.4	0.6	0		0	100	0	0		
PHF	.375	.000	.000	.000	.375	.000	.000	.000	.000	.000	.000	.958	.750	.000	.956	.000	.919	.000	.000	.919	.975



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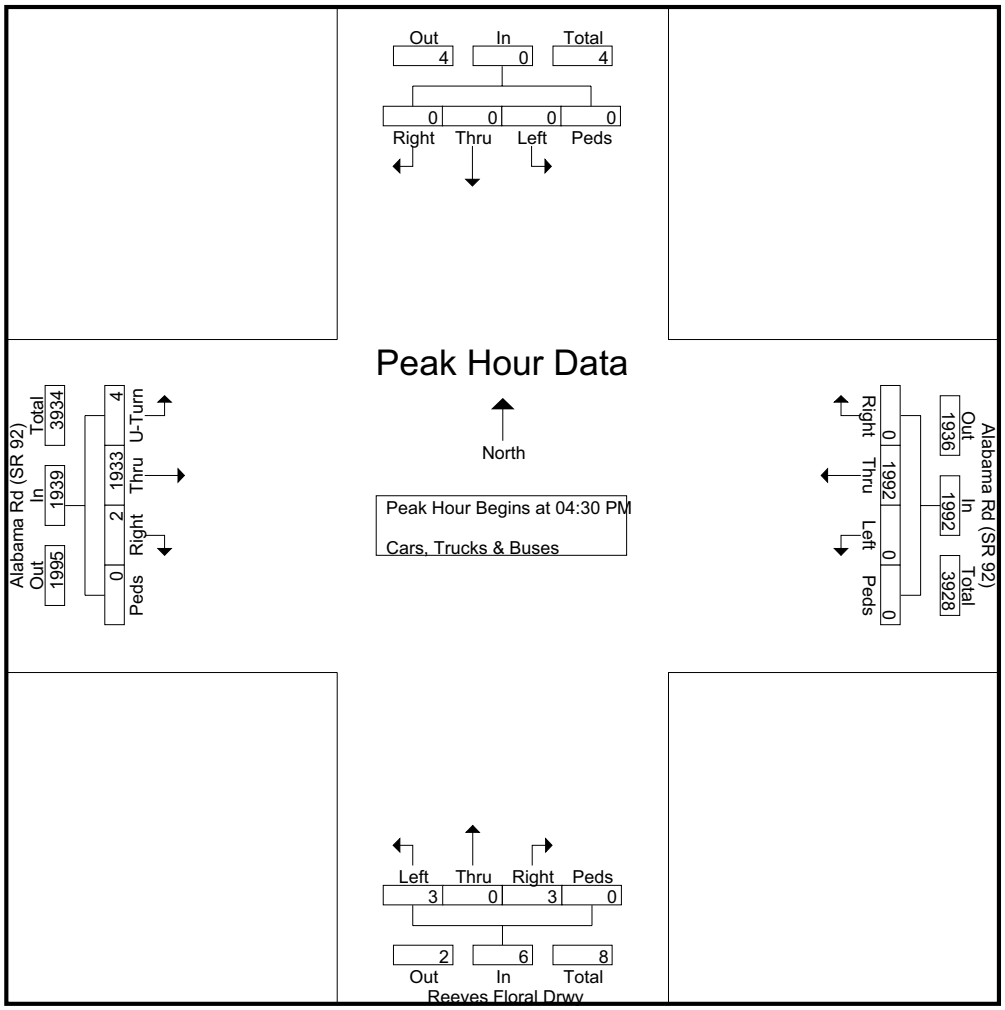
TMC Data
Alabama Rd (SR 92) @
Reeves Floral Drwy
7-9am | 4-6pm

File Name : 31780002
Site Code : 31750002
Start Date : 2/23/2012
Page No : 3

	Reeves Floral Drwy Northbound					Southbound					Alabama Rd (SR 92) Eastbound					Alabama Rd (SR 92) Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	U-Turn	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	0	0	0	0	0	0	0	0	0	0	**4**	453	**1**	0	458	0	479	0	0	479	937
04:45 PM	1	0	**2**	0	**3**	0	0	0	0	0	0	471	1	0	472	0	486	0	0	486	961
05:00 PM	**2**	0	1	0	3	0	0	0	0	0	0	494	0	0	494	0	**535**	0	0	**535**	**1032**
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	**515**	0	0	**515**	0	492	0	0	492	1007
Total Volume	3	0	3	0	6	0	0	0	0	0	4	1933	2	0	1939	0	1992	0	0	1992	3937
% App. Total	50	0	50	0		0	0	0	0		0.2	99.7	0.1	0		0	100	0	0		
PHF	.375	.000	.375	.000	.500	.000	.000	.000	.000	.000	.250	.938	.500	.000	.941	.000	.931	.000	.000	.931	.954



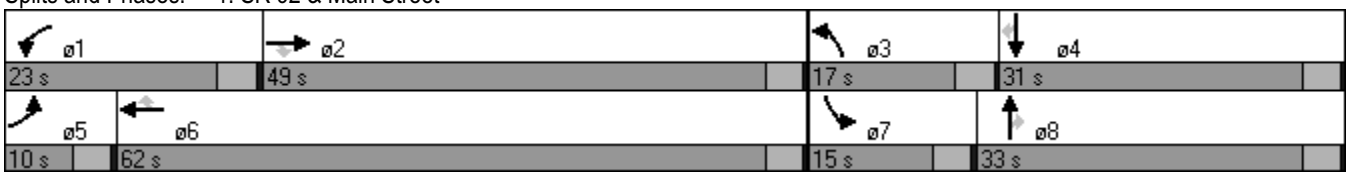
Existing Intersection Analysis

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	1335	586	414	837	48	271	98	80	182	587	105
Lane Group Flow (vph)	76	1391	637	465	863	52	288	117	100	188	683	115
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	10.0	49.0	49.0	23.0	62.0	62.0	17.0	33.0	33.0	15.0	31.0	31.0
Total Split (%)	8.3%	40.8%	40.8%	19.2%	51.7%	51.7%	14.2%	27.5%	27.5%	12.5%	25.8%	25.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None
v/c Ratio	0.42	0.71	0.84	0.87	0.34	0.06	0.78	0.14	0.22	0.63	0.89	0.26
Control Delay	62.8	34.0	32.3	66.8	18.7	4.7	67.6	36.3	8.2	62.8	59.9	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.8	34.0	32.3	66.8	18.7	4.7	67.6	36.3	8.2	62.8	59.9	8.4
Queue Length 50th (ft)	29	336	301	182	147	0	113	37	0	73	269	0
Queue Length 95th (ft)	44	393	#530	#261	180	21	#175	58	32	112	322	48
Internal Link Dist (ft)		640			776			317			685	
Turn Bay Length (ft)	400		400	230		230	250		200	350		350
Base Capacity (vph)	179	1975	762	548	2592	832	377	863	462	315	796	445
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.70	0.84	0.85	0.33	0.06	0.76	0.14	0.22	0.60	0.86	0.26

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: SR 92 & Main Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	1335	586	414	837	48	271	98	80	182	587	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.72	0.96	0.92	0.89	0.97	0.92	0.94	0.84	0.80	0.97	0.86	0.91
Adj. Flow (vph)	76	1391	637	465	863	52	288	117	100	188	683	115
RTOR Reduction (vph)	0	0	148	0	0	26	0	0	76	0	0	90
Lane Group Flow (vph)	76	1391	489	465	863	26	288	117	24	188	683	25
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	5.0	46.3	46.3	18.7	60.0	60.0	12.9	28.6	28.6	10.4	26.1	26.1
Effective Green, g (s)	5.0	46.3	46.3	18.7	60.0	60.0	12.9	28.6	28.6	10.4	26.1	26.1
Actuated g/C Ratio	0.04	0.39	0.39	0.16	0.50	0.50	0.11	0.24	0.24	0.09	0.22	0.22
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	143	1962	611	535	2543	792	369	843	377	298	770	344
v/s Ratio Prot	0.02	0.27		c0.14	0.17		c0.08	0.03		0.05	c0.19	
v/s Ratio Perm			c0.31			0.02			0.02			0.02
v/c Ratio	0.53	0.71	0.80	0.87	0.34	0.03	0.78	0.14	0.06	0.63	0.89	0.07
Uniform Delay, d1	56.4	31.2	32.7	49.5	18.1	15.3	52.2	36.0	35.3	52.9	45.5	37.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.8	2.2	10.6	14.0	0.4	0.1	10.2	0.1	0.1	4.3	12.0	0.1
Delay (s)	60.1	33.4	43.3	63.5	18.4	15.3	62.4	36.1	35.4	57.3	57.5	37.4
Level of Service	E	C	D	E	B	B	E	D	D	E	E	D
Approach Delay (s)		37.3			33.5			51.0			55.1	
Approach LOS		D			C			D			E	

Intersection Summary			
HCM Average Control Delay	41.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations							
Volume (veh/h)	0	1613	9	0	1268	3	0
Sign Control		Free			Free	Stop	
Grade		0%			0%	0%	
Peak Hour Factor	0.25	0.96	0.75	0.25	0.92	0.38	0.25
Hourly flow rate (vph)	0	1680	12	0	1378	8	0
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		Raised			Raised		
Median storage veh)		1			1		
Upstream signal (ft)		856					
pX, platoon unblocked	0.00			0.77		0.77	0.77
vC, conflicting volume	0			1692		2146	566
vC1, stage 1 conf vol						1686	
vC2, stage 2 conf vol						459	
vCu, unblocked vol	0			858		1446	0
tC, single (s)	0.0			4.1		6.8	6.9
tC, 2 stage (s)						5.8	
tF (s)	0.0			2.2		3.5	3.3
p0 queue free %	0			100		96	100
cM capacity (veh/h)	0			600		216	836

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1
Volume Total	672	672	348	0	0	459	459	459	8
Volume Left	0	0	0	0	0	0	0	0	8
Volume Right	0	0	12	0	0	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700	1700	216
Volume to Capacity	0.40	0.40	0.20	0.00	0.00	0.27	0.27	0.27	0.04
Queue Length 95th (ft)	0	0	0	0	0	0	0	0	3
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.3
Lane LOS									C
Approach Delay (s)	0.0				0.0				22.3
Approach LOS									C

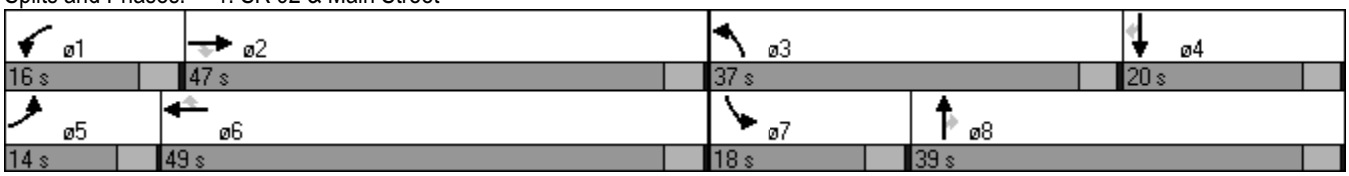
Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	1383	427	194	1555	257	714	469	336	196	232	178
Lane Group Flow (vph)	200	1537	485	255	1620	306	768	565	395	261	322	205
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	14.0	47.0	47.0	16.0	49.0	49.0	37.0	39.0	39.0	18.0	20.0	20.0
Total Split (%)	11.7%	39.2%	39.2%	13.3%	40.8%	40.8%	30.8%	32.5%	32.5%	15.0%	16.7%	16.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None
v/c Ratio	0.69	0.78	0.53	0.75	0.79	0.39	0.87	0.59	0.71	0.70	0.73	0.64
Control Delay	66.8	36.6	4.8	66.8	35.8	7.1	54.1	40.2	28.5	62.0	61.0	26.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.8	36.6	4.8	66.8	35.8	7.1	54.1	40.2	28.5	62.0	61.0	26.1
Queue Length 50th (ft)	78	397	0	100	417	26	288	195	151	101	126	44
Queue Length 95th (ft)	#125	461	62	121	482	73	362	228	237	120	138	116
Internal Link Dist (ft)		640			776			317			685	
Turn Bay Length (ft)	400		400	230		230	250		200	350		350
Base Capacity (vph)	294	1964	909	349	2043	788	944	1032	586	401	473	335
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.78	0.53	0.73	0.79	0.39	0.81	0.55	0.67	0.65	0.68	0.61

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: SR 92 & Main Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	1383	427	194	1555	257	714	469	336	196	232	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.95	0.90	0.88	0.76	0.96	0.84	0.93	0.83	0.85	0.75	0.72	0.87
Adj. Flow (vph)	200	1537	485	255	1620	306	768	565	395	261	322	205
RTOR Reduction (vph)	0	0	298	0	0	152	0	0	128	0	0	125
Lane Group Flow (vph)	200	1537	187	255	1620	154	768	565	267	261	322	80
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	10.1	46.3	46.3	11.9	48.1	48.1	30.8	32.7	32.7	13.1	15.0	15.0
Effective Green, g (s)	10.1	46.3	46.3	11.9	48.1	48.1	30.8	32.7	32.7	13.1	15.0	15.0
Actuated g/C Ratio	0.08	0.39	0.39	0.10	0.40	0.40	0.26	0.27	0.27	0.11	0.12	0.12
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	289	1962	611	340	2038	635	881	964	431	375	442	198
v/s Ratio Prot	0.06	0.30		c0.07	c0.32		c0.22	0.16		0.08	c0.09	
v/s Ratio Perm			0.12			0.10			0.17			0.05
v/c Ratio	0.69	0.78	0.31	0.75	0.79	0.24	0.87	0.59	0.62	0.70	0.73	0.40
Uniform Delay, d1	53.4	32.4	25.7	52.6	31.6	23.9	42.7	37.8	38.2	51.5	50.5	48.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.0	3.2	1.3	9.0	3.3	0.9	9.5	0.9	2.7	5.5	5.9	1.3
Delay (s)	60.4	35.6	27.0	61.6	34.9	24.8	52.2	38.7	40.9	57.1	56.5	49.7
Level of Service	E	D	C	E	C	C	D	D	D	E	E	D
Approach Delay (s)		36.0			36.6			45.2			54.9	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	40.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations							
Volume (veh/h)	4	1933	2	0	1992	3	3
Sign Control		Free			Free	Stop	
Grade		0%			0%	0%	
Peak Hour Factor	0.25	0.94	0.50	0.25	0.93	0.38	0.38
Hourly flow rate (vph)	0	2056	4	0	2142	8	8
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		Raised			Raised		
Median storage veh)		1			1		
Upstream signal (ft)		856					
pX, platoon unblocked	0.00			0.74		0.74	0.74
vC, conflicting volume	0			2060		2772	687
vC1, stage 1 conf vol						2058	
vC2, stage 2 conf vol						714	
vCu, unblocked vol	0			1212		2171	0
tC, single (s)	0.0			4.1		6.8	6.9
tC, 2 stage (s)						5.8	
tF (s)	0.0			2.2		3.5	3.3
p0 queue free %	0			100		94	99
cM capacity (veh/h)	0			424		129	804

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1
Volume Total	823	823	415	0	0	714	714	714	16
Volume Left	0	0	0	0	0	0	0	0	8
Volume Right	0	0	4	0	0	0	0	0	8
cSH	1700	1700	1700	1700	1700	1700	1700	1700	222
Volume to Capacity	0.48	0.48	0.24	0.00	0.00	0.42	0.42	0.42	0.07
Queue Length 95th (ft)	0	0	0	0	0	0	0	0	6
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.4
Lane LOS									C
Approach Delay (s)	0.0				0.0				22.4
Approach LOS									C

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	48.5%	ICU Level of Service	A
Analysis Period (min)	15		

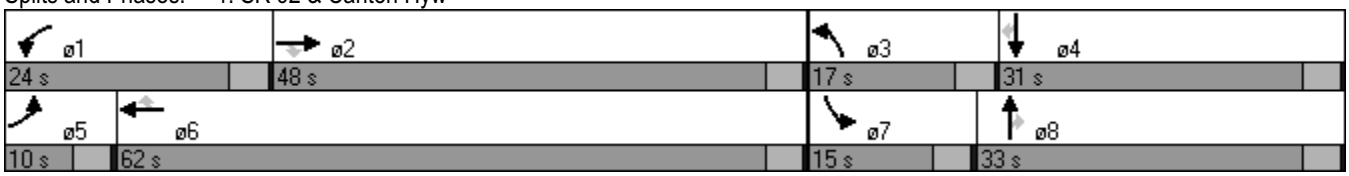
Future Intersection Analysis

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	56	1360	592	430	891	60	274	99	84	187	593	106
Lane Group Flow (vph)	78	1417	643	483	919	65	291	118	105	193	690	116
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	10.0	48.0	48.0	24.0	62.0	62.0	17.0	33.0	33.0	15.0	31.0	31.0
Total Split (%)	8.3%	40.0%	40.0%	20.0%	51.7%	51.7%	14.2%	27.5%	27.5%	12.5%	25.8%	25.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None
v/c Ratio	0.45	0.73	0.86	0.87	0.36	0.08	0.80	0.14	0.23	0.64	0.89	0.27
Control Delay	64.2	35.1	34.6	65.8	18.8	4.2	69.3	36.4	8.1	63.3	60.6	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.2	35.1	34.6	65.8	18.8	4.2	69.3	36.4	8.1	63.3	60.6	8.4
Queue Length 50th (ft)	30	349	316	189	159	0	114	37	0	75	272	0
Queue Length 95th (ft)	45	408	#551	#265	193	24	#178	59	32	114	#327	48
Internal Link Dist (ft)		399			776			477			529	
Turn Bay Length (ft)	400		400	230		230	250		200	350		350
Base Capacity (vph)	172	1934	749	572	2588	838	372	857	463	315	796	446
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.73	0.86	0.84	0.36	0.08	0.78	0.14	0.23	0.61	0.87	0.26

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 20 (17%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: SR 92 & Canton Hyw



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	56	1360	592	430	891	60	274	99	84	187	593	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.72	0.96	0.92	0.89	0.97	0.92	0.94	0.84	0.80	0.97	0.86	0.91
Adj. Flow (vph)	78	1417	643	483	919	65	291	118	105	193	690	116
RTOR Reduction (vph)	0	0	147	0	0	32	0	0	80	0	0	91
Lane Group Flow (vph)	78	1417	496	483	919	33	291	118	25	193	690	25
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	4.8	45.6	45.6	19.5	60.3	60.3	12.7	28.4	28.4	10.5	26.2	26.2
Effective Green, g (s)	4.8	45.6	45.6	19.5	60.3	60.3	12.7	28.4	28.4	10.5	26.2	26.2
Actuated g/C Ratio	0.04	0.38	0.38	0.16	0.50	0.50	0.11	0.24	0.24	0.09	0.22	0.22
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	137	1932	602	558	2555	795	363	838	375	300	773	346
v/s Ratio Prot	0.02	0.28		c0.14	0.18		c0.08	0.03		0.06	c0.19	
v/s Ratio Perm			c0.31			0.02			0.02			0.02
v/c Ratio	0.57	0.73	0.82	0.87	0.36	0.04	0.80	0.14	0.07	0.64	0.89	0.07
Uniform Delay, d1	56.6	32.0	33.6	49.0	18.1	15.2	52.4	36.2	35.5	52.9	45.5	37.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.3	2.5	12.1	13.2	0.4	0.1	12.0	0.1	0.1	4.7	12.6	0.1
Delay (s)	61.9	34.5	45.7	62.2	18.5	15.3	64.4	36.2	35.6	57.6	58.2	37.3
Level of Service	E	C	D	E	B	B	E	D	D	E	E	D
Approach Delay (s)		38.9			32.8			52.1			55.6	
Approach LOS		D			C			D			E	

Intersection Summary			
HCM Average Control Delay	41.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	17	1629	9	0	1281	12	3	0	0	46	0	69
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.75	0.92	0.25	0.92	0.25	0.38	0.25	0.25	0.25	0.25	0.25
Hourly flow rate (vph)	18	2172	10	0	1392	48	8	0	0	184	0	276
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh)		1			1							
Upstream signal (ft)		856										
pX, platoon unblocked				0.77			0.77	0.77	0.77	0.77	0.77	
vC, conflicting volume	1440			2182			2952	3653	729	2176	3634	488
vC1, stage 1 conf vol							2212	2212		1416	1416	
vC2, stage 2 conf vol							740	1440		759	2217	
vCu, unblocked vol	1440			1470			2477	3393	0	1462	3368	488
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			100			86	100	100	0	100	47
cM capacity (veh/h)	467			348			56	72	830	124	75	526

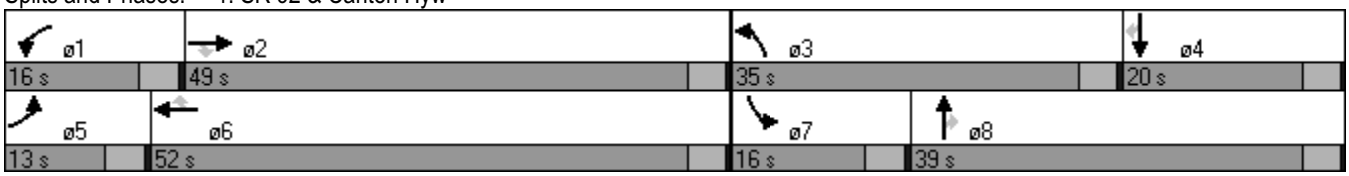
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	18	869	869	444	0	557	557	326	8	460
Volume Left	18	0	0	0	0	0	0	0	8	184
Volume Right	0	0	0	10	0	0	0	48	0	276
cSH	467	1700	1700	1700	1700	1700	1700	1700	56	230
Volume to Capacity	0.04	0.51	0.51	0.26	0.00	0.33	0.33	0.19	0.14	2.00
Queue Length 95th (ft)	3	0	0	0	0	0	0	0	11	847
Control Delay (s)	13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.8	501.9
Lane LOS	B								F	F
Approach Delay (s)	0.1				0.0				79.8	501.9
Approach LOS									F	F

Intersection Summary			
Average Delay	56.4		
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	192	1443	431	202	1595	266	721	474	350	209	234	180
Lane Group Flow (vph)	202	1603	490	266	1661	317	775	571	412	279	325	207
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	13.0	49.0	49.0	16.0	52.0	52.0	35.0	39.0	39.0	16.0	20.0	20.0
Total Split (%)	10.8%	40.8%	40.8%	13.3%	43.3%	43.3%	29.2%	32.5%	32.5%	13.3%	16.7%	16.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None
v/c Ratio	0.75	0.80	0.53	0.77	0.79	0.39	0.90	0.59	0.75	0.82	0.74	0.67
Control Delay	72.0	36.7	4.6	68.5	34.4	6.4	58.4	40.0	33.5	72.9	61.3	30.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.0	36.7	4.6	68.5	34.4	6.4	58.4	40.0	33.5	72.9	61.3	30.7
Queue Length 50th (ft)	80	410	0	105	414	24	297	196	182	110	128	56
Queue Length 95th (ft)	#139	475	60	126	478	68	#398	231	274	129	139	130
Internal Link Dist (ft)		399			776			477			529	
Turn Bay Length (ft)	400		400	230		230	250		200	350		350
Base Capacity (vph)	269	1996	919	350	2106	812	887	1032	572	343	472	323
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.80	0.53	0.76	0.79	0.39	0.87	0.55	0.72	0.81	0.69	0.64

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 20 (17%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: SR 92 & Canton Hyw



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	192	1443	431	202	1595	266	721	474	350	209	234	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Peak-hour factor, PHF	0.95	0.90	0.88	0.76	0.96	0.84	0.93	0.83	0.85	0.75	0.72	0.87
Adj. Flow (vph)	202	1603	490	266	1661	317	775	571	412	279	325	207
RTOR Reduction (vph)	0	0	298	0	0	156	0	0	112	0	0	113
Lane Group Flow (vph)	202	1603	192	266	1661	161	775	571	300	279	325	94
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	9.4	47.1	47.1	12.0	49.7	49.7	30.0	33.0	33.0	11.9	14.9	14.9
Effective Green, g (s)	9.4	47.1	47.1	12.0	49.7	49.7	30.0	33.0	33.0	11.9	14.9	14.9
Actuated g/C Ratio	0.08	0.39	0.39	0.10	0.41	0.41	0.25	0.28	0.28	0.10	0.12	0.12
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	269	1996	621	343	2106	656	858	973	435	340	439	197
v/s Ratio Prot	0.06	0.32		c0.08	c0.33		c0.23	0.16		0.08	0.09	
v/s Ratio Perm			0.12			0.10			c0.19			0.06
v/c Ratio	0.75	0.80	0.31	0.78	0.79	0.25	0.90	0.59	0.69	0.82	0.74	0.48
Uniform Delay, d1	54.2	32.3	25.2	52.7	30.6	22.9	43.6	37.6	38.9	53.0	50.7	48.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.2	3.5	1.3	10.5	3.1	0.9	12.7	0.9	4.5	14.6	6.6	1.8
Delay (s)	65.3	35.9	26.5	63.2	33.7	23.8	56.3	38.5	43.4	67.6	57.3	50.7
Level of Service	E	D	C	E	C	C	E	D	D	E	E	D
Approach Delay (s)		36.5			35.8			47.5			59.2	
Approach LOS		D			D			D			E	

Intersection Summary			
HCM Average Control Delay	41.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (veh/h)	4	68	1952	0	0	2012	46	3	0	3	24	0
Sign Control			Free			Free			Stop			Stop
Grade			0%			0%			0%			0%
Peak Hour Factor	0.25	0.94	0.50	0.25	0.25	0.93	0.25	0.38	0.25	0.38	0.25	0.25
Hourly flow rate (vph)	0	72	3904	0	0	2163	184	8	0	8	96	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type			Raised			Raised						
Median storage veh)			1			1						
Upstream signal (ft)			856									
pX, platoon unblocked	0.00				0.72			0.72	0.72	0.72	0.72	0.72
vC, conflicting volume	0	2347			3904			4918	6396	1301	3709	6304
vC1, stage 1 conf vol								4049	4049		2255	2255
vC2, stage 2 conf vol								869	2347		1454	4049
vCu, unblocked vol	0	2347			3676			5077	7120	79	3407	6993
tC, single (s)	0.0	4.1			4.1			7.5	6.5	6.9	7.5	6.5
tC, 2 stage (s)								6.5	5.5		6.5	5.5
tF (s)	0.0	2.2			2.2			3.5	4.0	3.3	3.5	4.0
p0 queue free %	0	65			100			0	100	99	0	100
cM capacity (veh/h)	0	206			43			1	0	698	34	4

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	72	1562	1562	781	0	865	865	617	16	244
Volume Left	72	0	0	0	0	0	0	0	8	96
Volume Right	0	0	0	0	0	0	0	184	8	148
cSH	206	1700	1700	1700	1700	1700	1700	1700	3	75
Volume to Capacity	0.35	0.92	0.92	0.46	0.00	0.51	0.51	0.36	5.40	3.26
Queue Length 95th (ft)	37	0	0	0	0	0	0	0	Err	Err
Control Delay (s)	31.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Err	Err
Lane LOS	D								F	F
Approach Delay (s)	0.6				0.0				Err	Err
Approach LOS									F	F

Intersection Summary			
Average Delay	394.9		
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	SBR
Lane Configurations	
Volume (veh/h)	37
Sign Control	
Grade	
Peak Hour Factor	0.25
Hourly flow rate (vph)	148
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	813
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	813
tC, single (s)	6.9
tC, 2 stage (s)	
tF (s)	3.3
p0 queue free %	54
cM capacity (veh/h)	321

Direction, Lane #

Traffic Volume Worksheets

12-003 Laurelwood Apartments

Traffic Volumes
Future Conditions

A&R Engineering
March 2012

SR 92 @ Main Street

A.M. Peak Hour

	Northbound				Southbound				Eastbound				Westbound			
Condition	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	271	98	80	449	182	587	105	874	55	1335	586	1976	414	837	48	1299
Growth Factor (%):	1	1	1		1	1	1		1	1	1		1	1	1	
Base Condition:	274	99	81	453	184	593	106	883	56	1348	592	1996	418	845	48	1312
Total New Trips	0	0	3	3	3	0	0	3	0	12	0	12	12	46	12	70
Future Traffic Volumes:	274	99	84	456	187	593	106	886	56	1360	592	2008	430	891	60	1382

P.M. Peak Hour

	Northbound				Southbound				Eastbound				Westbound			
Condition	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot	L	T	R	Tot
Existing:	714	469	336	1519	196	232	178	606	190	1383	427	2000	194	1555	257	2006
Growth Factor (%):	1	1	1		1	1	1		1	1	1		1	1	1	
Base Condition:	721	474	339	1534	198	234	180	612	192	1397	431	2020	196	1571	260	2026
Total New Trips	0	0	11	11	11	0	0	11	0	46	0	46	6	24	6	36
Future Traffic Volumes:	721	474	350	1545	209	234	180	623	192	1443	431	2066	202	1595	266	2062

12-003 Laurelwood Apartments

Traffic Volumes
Future Conditions

A&R Engineering
March 2012

SR 92 @ Site Driveway

A.M. Peak Hour

	Northbound				Southbound					Eastbound				Westbound			
Condition	L	T	R	Tot	L	T	R	Tot	U-Turr	L	T	R	Tot	L	T	R	Tot
Existing:	3	0	0	3	0	0	0	0	0	0	1613	9	1622	0	1268	0	1268
Growth Factor (%):	0	0	0		0	0	0		1	0	1	0		0	1	0	
Base Condition:	3	0	0	3	0	0	0	0	0	0	1629	9	1638	0	1281	0	1281
Total New Trips	0	0	0	0	46	0	69	115	0	17	0	0	17	0	0	12	12
Future Traffic Volumes:	3	0	0	3	46	0	69	115	0	17	1629	9	1655	0	1281	12	1293

P.M. Peak Hour

	Northbound				Southbound					Eastbound				Westbound			
Condition	L	T	R	Tot	L	T	R	Tot	U-Turr	L	T	R	Tot	L	T	R	Tot
Existing:	3	0	3	6	0	0	0	0	4	0	1933	2	1939	0	1992	0	1992
Growth Factor (%):	0	0	0		0	0	0		1	0	1	0		0	1	0	
Base Condition:	3	0	3	6	0	0	0	0	4	0	1952	2	1954	0	2012	0	2012
Total New Trips	0	0	0	0	24	0	37	61	0	68	0	0	68	0	0	46	46
Future Traffic Volumes:	3	0	3	6	24	0	37	61	4	68	1952	2	2022	0	2012	46	2058