



1717 Bissonnet

Traffic Impact of Proposed Driveway



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1717 Bissonnet

Traffic Impact of Proposed Driveway

Introduction

Purpose

This report will document findings and recommendations relative to the traffic impact of driveway access for the proposed redevelopment of property located at 1717 Bissonnet Street in southwest Houston. Houston permits and regulates driveway access design and location through its building code¹.

The existing site is the Maryland Manor apartment complex.

The proposed development, 1717 Bissonnet, will be a mixed-use development replacing the existing apartment complex. The proposed 23-story development will include apartments and townhomes, a restaurant, spa, specialty retail and executive office suites.

Construction, originally slated to begin in 2008 with full occupancy by 2010, has been delayed due to neighborhood concerns and the inability to get final approval for proposed driveway access.

Project History

Traffic Engineers, Inc. submitted a Traffic Impact Analysis (TIA) for the proposed development on August 6, 2007. The findings were that there would be no significant traffic impact due to the additional trips generated by the development. This was approved by the City, but approval was withdrawn after area residents expressed their concern about the development through protests and demonstrations at the site.

Since that time the City has been debating how to regulate developments such as 1717 Bissonnet.

¹ Houston Amendments to the 2003 International Building Code, effective January 4, 2006

The densification of the Houston inner loop helps meet improved transportation goals in general and specific goals for the planned Metro Rail on Richmond and the existing Main Street Rail. Densification will lead to reduced regional vehicle miles traveled through reduced trips per household, improved modal split, and reduced trip length. And ultimately will lead to reduced fuel consumption and mobile source air pollution.

There are almost always a number of local neighborhood concerns about the impacts of site specific high density development near their neighborhood. Traffic impacts are usually high on their list, but not the only concern.

The City of Houston Mayor issued a directive² on February 27, 2008 dealing with high density developments. This directive related specifically to traffic and relies on Article III, Section 40-86 of the City of Houston Code of Ordinances. Both the directive and Sec 40-86 are included in the Appendix of this report.

The City of Houston City Engineer has made a determination that the proposed 1717 Bissonnet development falls under the Mayor's directive and that the applicant's most recent submittal (at the time of this writing) is disapproved for the following:

"THE PROPOSED PROJECT AT 1717 BISSONNET HAS NOT BEEN APPROVED AND THE PROPOSED RESTRIPIING WOULD NOT ADDRESS ALL IMPACTS OF THE PROPOSED PROJECT. UNTIL 1717 BISSONNET PROJECT IS APPROVED, NO CURRENT JUSTIFICATION EXISTS FOR APPROVAL OF RESTRIPIING PLANS."

"NO ADDITIONAL RELEVANT DATA/INFORMATION HAS BEEN PROVIDED REGARDING PROPOSED DRIVEWAY PERMIT APPLICATION. NO REDUCTIONS IN PROJECTED TRIP GENERATION RATES DUE TO CHANGE IN PROJECT SCOPE HAVE BEEN PRESENTED FOR CONSIDERATION. UNDER SECTION 40-86 OF THE CODE OF ORDINANCES, THE DIMENSIONS AND CONDITIONS OF BISSONNET AND THE EFFECT OF ENTERING/EXITING VEHICLES (IN THE AMOUNTS PROJECTED), WILL EXCESSIVELY INTERFERE WITH THE NORMAL USE OF THE BISSONNET STREET RIGHT OF WAY."

The purpose of this report is to provide additional relevant data/information regarding the proposed access for 1717 Bissonnet specifically related to the dimensions and conditions of Bissonnet Street and the effect of entering and exiting vehicles on the normal use of the Bissonnet Street right of way.

² Interim Procedures on Traffic Impacts of High Density Development

Study Methodology

All federal, state, and local governmental agencies permit driveway access based on approved policies/guidelines and/or accepted engineering principles and practices. The reason for this is to provide uniform application in design, review, and construction within the governmental jurisdiction.

Traffic Engineers, Inc. has requested the specific requirements/guidelines for driveway access at this specific site in its response dated September 10, 2008 and a letter to the City Engineer dated October 14, 2008 in order to understand the additional relevant data/information required by the City. The City has not responded to these requests (as of this writing).

References

Since no specific requirements/guidelines have been provided by the City, the study methodology and relevant data/information presented in this document is based on the City's *Draft Guidelines for Traffic Impact Analysis and Access Management* that were published at the time of the driveway permit application and under which the original TIA was completed; *Transportation Impact Analyses for Site Development an ITE Proposed Recommended Practice, Institute of Transportation Engineers*; *ITE Trip Generation, 8th Edition, Institute of Transportation Engineers*; *Texas Department of Transportation Access Management Manual*; *Highway Capacity Manual 2000, Transportation Research Board*; *Harris County, Design and Development Guidelines, Section VII Traffic Impact Analysis Guidelines* and other pertinent publications.

Street Network

The City of Houston uses four hierarchy classifications³ for urban streets. The classifications are Principal Thoroughfare, Thoroughfare, Collector, and Local. Further classifications of Major Collector and Express Street are defined in the building code⁴ and MTFP.

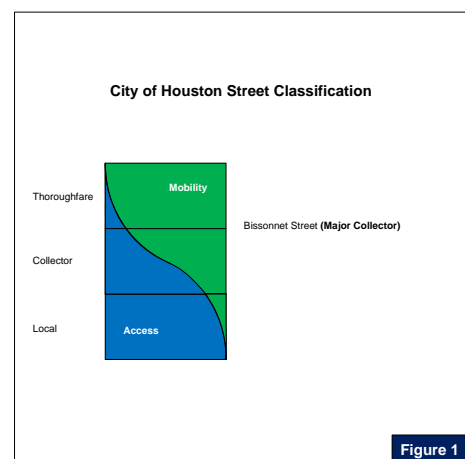


Figure 1 highlights the relationship between mobility and

³ Houston Planning and Development Department "Major Thoroughfare and Freeway Plan Policy Statement"

⁴ Houston Amendments to the 2003 International Building Code, effective January 4, 2006

access as street classification varies.

Principal Thoroughfare: more than 5 miles long; connects freeways and other principal thoroughfares; more than 30,000 vehicles per day, usually spaced 3 - 5 miles apart.
Thoroughfare: more than 3 miles long; connects freeways and principal thoroughfares; more than 20,000 vehicles per day; usually spaced one-half to 1 mile apart. **Major Collector:** Published on the Major Thoroughfare and Freeway Plan. **Collector:** One to 2 miles long; connects thoroughfares and local streets; more than 5,000 vehicles per day; less than 1 mile spacing. **Local:** less than 1 mile long; carries little traffic; provides access to homes and local businesses; accommodates on-street parking and pedestrians.

Bissonnet is currently classified as a Thoroughfare along most of its 13.5 mile length and as a Major Collector (of sufficient width) for the 1.25 mile segment along which the 1717 Bissonnet site is located.

Study Area

The original TIA study area was the proposed site driveways and the adjacent intersections as required for a Category II TIA (100 to 500 Peak Hour trips). The proposed development will generate 184 trips during the Peak Hour. In order to provide additional relevant data/information, the study area has now been expanded to that of a Category III TIA (500 to 1000 Peak Hour trips). A Category III TIA includes the site driveways, the adjacent intersections and any signalized intersections within one quarter mile of the site. However, the study area along Bissonnet Street has been further expanded from the usual $\frac{1}{4}$ mile required for a Category III TIA to over $\frac{3}{4}$ mile in order to include the closest major thoroughfares intersecting Bissonnet Street.

The intersections included in the study are:

1. Bissonnet @ Montrose (signalized Major Thoroughfare),
2. Bissonnet @ Mandell (signalized),
3. Bissonnet @ Dunlavy (unsignalized Major Collector),
4. Bissonnet @ 1717 Bissonnet Driveway (unsignalized),
5. Bissonnet @ Ashby (unsignalized),
6. Bissonnet @ Hazard (signalized),
7. Bissonnet @ Shepherd (signalized Major Thoroughfare/Major Collector), and
8. Bissonnet @ Greenbriar (signalized Major Thoroughfare).

Traffic Model

The traffic modeling for the project was completed using Synchro 7/SimTraffic 7 software. The Synchro/SimTraffic model is widely used for traffic operations analysis by professional traffic engineers throughout the United States. Due to delays in project approval, updated relevant data were collected in November, 2008 for this TIA update. The data for the original TIA were collected in 2007.

Criteria

The analysis of existing and future conditions was completed using conservative values and assumptions (largest impact). The criteria for the study are:

1. Analyses were completed for PM peak hour for each intersection irrespective of concurrent times (overstates arterial level of service),
2. Expanded study area from $\frac{1}{4}$ to $\frac{3}{4}$ miles,
3. ITE Trip Generation⁵ (not owner supplied rates or average),
4. No trip deductions for mode (transit, pedestrians, bicycles),
5. No trip deductions for internal capture,
6. No trip deductions for Passby,
7. No trip deductions for life style of expected residents,
8. Turning movement count data were collected on November 13, 2008
9. Turning movement count data were multiplied by 102%,
10. Heavy vehicle (Bus) set at 1% on Bissonnet 0% on cross streets and driveway, and
11. All traffic generated by 1717 Bissonnet was assumed to access the site in one driveway on Bissonnet located approximately half way between Ashby and Dunlavy.

Although it is common practice for agencies to accept trip reductions and off street parking requirements reductions in accordance with site specific facts such as good transit service, LEED goals, or owner supplied trip generation estimates, none were sought or included in these analyses.

The applicant has chosen not to claim trip reductions for these items in order to emphasize that the proposed development will not pose a significant traffic impact and will not excessively interfere with the normal use of the Bissonnet Street right of way.

⁵ ITE Trip Generation 7th Edition, Institute of Transportation Engineers, Washington, DC

Existing Conditions

Existing Site Development

The existing site is the Maryland Manor apartment complex. The apartment complex consists of 67 apartments and a leasing/management office. The ITE trip generation for the PM peak hour is 35 trips in and 19 trips out for a total of 54 trips.

Existing Traffic Data

Traffic data for turning movement counts and 24 hour counts were collected and are discussed below. Details are listed in the Appendix.

Turning Movement Counts

Turning movement count data were collected at eight intersections within the defined study area as listed above. These data are included in the Appendix.

24 Hour Counts

Twenty four hour count data are listed in Table 1.

Table 1
Weekday 24 Hour Volumes

Location	Year	24 Hr. Volume
1800 Bissonnet ⁶	NA/NA/2001	17,720
1800 Bissonnet ⁶	NA/NA/2006	18,800
1639 Bissonnet ⁷	1/14/2008	13,240
1810 Bissonnet ⁷	1/14/2008	13,518
1720 Bissonnet ⁷	1/17/2008	14,618
1717 Bissonnet ⁸	11/10/2008	13,380
1717 Bissonnet ⁸	11/11/2008	14,121
1717 Bissonnet ⁸	11/12/2008	14,589
1717 Bissonnet ⁸	11/13/2008	14,435
1717 Bissonnet ⁸	11/14/2008	15,561

⁶ Source: HGAC

⁷ Source: City of Houston

⁸ Source: CJ Hensch & Associates

Average Daily Traffic and Variation

Detailed traffic volume data are included in the Appendix. The Average Daily Traffic (ADT) for count data at 1717 Bissonnet was 13,031 vehicles per day. The Average Weekday Traffic (AWDT) was 14,417 vehicles per day. The weekday range was 2,181 vehicles per day.

The Average Weekday Peak Hour (AWPH) was 1,461 vehicles per hour. The range was 81 vehicles per hour. The directional distribution was somewhat weighted towards eastbound both on a daily basis and during the peak hour.

Speed

The legal speed limit on Bissonnet is 30 mph.

Future Conditions

Proposed Development

1717 Bissonnet will be a primarily residential mixed-use development constructed along the south side of the 1700 block of Bissonnet Street.

The proposed 23-story development will include apartments and townhomes. Nonresidential land uses will include a 5,125 SF fine dining restaurant, 3,250 SF spa, 4,950 SF specialty retail and 6,700 SF executive office suites.

Site Access

The existing Maryland Manor site has seven driveways. The proposed 1717 Bissonnet site access is planned for one driveway on Bissonnet Street located as discussed below. A 911 gate, which will be locked, will be provided for fire access on Ashby Street.

Trip Generation

The ITE trip generation for the proposed development is 184 trips during the PM peak hour. Since the development is an in-fill, the existing 54 trips are deducted for a net increase in traffic on the roadway system of 130 trips, 69 in and 61 out during the PM peak hour.

Trip Distribution

Trips were distributed 10% each to the north and south and 40% each to the east and west. The assignment to the roadway network was not capacity constrained.

Known Area Development

The only development known to be planned in the area (at the time of the original application) was the addition to the Medical Clinic of Houston which was approved by the City and is now in operation. According to the Traffic Trip Distribution Study for MCH, this project is not expected to generate a significant increase in area traffic volumes. Most of the increase in traffic from the Medical Clinic of Houston expansion is expected to use Rice Blvd.⁹

Assessment of Traffic Operations

The measure of traffic operations on a street, highway, or freeway is its capability to move traffic which is often referred to as its capacity or level of service.

Capacity

Capacity is computed using the Highway Capacity Manual (HCM)¹⁰ and is the number of vehicles that can cross a given point along a roadway during a given period of time (usually during the peak 15 minutes of the peak hour of the average weekday).

The capacity of a surface street is largely limited by the capacity of its intersections and driveways and their type of control (traffic signal, stop sign, yield sign) and number of approach lanes and to a lesser extent by other features such as lane width, roadway curvature and grade, intersection control system features, vehicle characteristics and mix of heavy vehicles, rural or urban area, driver population, etc.

Demand

Demand is the number of vehicles that want to cross a given point on a roadway during a given time period. Demand is physically measured by collecting traffic counts on the roadway.

⁹ Traffic Trip Distribution Study New Building and Garage East of 1707 Sunset Blvd., Walter P. Moore and Associates, Inc., July 18, 2007

¹⁰ Level of Service based on delay cited in Table 2 above from *Highway Capacity Manual 2000*, TRB Committee on Highway Capacity and Quality of Service, as computed using Synchro/SimTraffic 7 Software, by Trafficware®

Level of Service

The relationship between demand and capacity is expressed as a level of service (LOS). The range of levels of service (A through F), describe the demand/capacity relationship in a qualitative manner based on the quantitative measure of the amount of delay at an intersection or the average speed along a street.

The amount of delay or the average travel speed is the most important measure of effectiveness for a thoroughfare.

Level of service (LOS) ranges from LOS A through LOS F, where A is a very good level of service (brief delays) and F is a very poor level of service (long delays) for intersections or intersection approaches. Arterial level of service, which is also controlled by the items listed above, is expressed as LOS A when the average operating speeds are near the speed limit and LOS F when average operating speeds are less than one third of the speed limit of a roadway.

The Level of Service (LOS) criteria are in Table 2 listed below.

Table 2
Level of Service (LOS)

Signalized Intersection		Unsignalized Intersection		Bissonnet Segment	
LOS	Delay(sec /vehicle)	LOS	Delay(sec /vehicle)	LOS	Average Speed (mph)
A	≤10	A	≤10	A	>27
B	> 10 ≤ 20	B	> 10 ≤ 15	B	> 21 ≤ 27
C	> 20 ≤ 35	C	> 15 ≤ 25	C	> 15 ≤ 21
D	> 35 ≤ 55	D	> 25 ≤ 35	D	> 12 ≤ 15
E	> 55 ≤ 80	E	> 35 ≤ 50	E	> 10 ≤ 12
F	> 80	F	> 50	F	< 10

Driveway capacity and intersection capacity are computed by the same methods and are subject to the items listed above.

Streets in urban areas are generally designed to an LOS of D or better except in the case of context sensitive solutions where LOS E or better may be considered for design.

The LOS for unsignalized intersections/driveways and signalized intersections/driveways are slightly different as defined in the *Highway Capacity Manual 2000* (HCM).

Traffic Flow Analyses

Traffic flow analyses were prepared using Synchro/SimTraffic 7 for LOS, delay, and queue assessment at eight intersections within the study area for the PM peak hour on the average weekday for future traffic with and without the 1717 Bissonnet development.

The City of Houston proposed TIA guidelines recommends software such as Synchro is appropriate for traffic analyses. The HCM recommends using simulation to evaluate unsignalized intersections.

Delay and Level of Service

The future traffic with and without the traffic from the proposed 1717 Bissonnet development was analyzed using existing traffic multiplied by 102%. The delay and level of service is based on the highest 15 minutes of the highest hour of the average weekday.

The existing Bissonnet driveway is located approximately 115 ft. west of Dunlavy and the future Bissonnet driveway will be located approximately 250 ft. west of Dunlavy.

The future analysis for the 1717 Bissonnet development is based on one driveway serving the entire site located on Bissonnet Street. The existing site has seven driveways serving it on Bissonnet and on Ashby which would be removed.

The intersection levels of service (LOS) and average delay per vehicle (seconds) for the PM peak hour are listed in Table 3 using HCM analysis for signalized intersections.

Level of service for signalized intersections is based on the overall average delay for vehicles using the intersection.

Table 3
Signalized Intersections
PM Level of Service Analyses

Bissonnet Intersection	Future Traffic Without Development		Future Traffic With Development	
	LOS	Delay Seconds/Vehicle	LOS	Delay Seconds/Vehicle
Greenbriar	C	27.2	C	28.0
Shepherd	E	72.9	E	77.2
Hazard	B	12.6	B	12.6
Mandell	C	28.8	C	29.3
Montrose	C	22.5	C	22.6

Small increases in delay between future without 1717 Bissonnet development and future with 1717 Bissonnet development are indicated. All signalized intersections in the study area operate at LOS E or better in the future with or without the proposed 1717 Bissonnet development.

Level of service for unsignalized intersections is based on the average delay on each approach for vehicles using the intersection. HCM recommends the use of simulation for analyses of unsignalized driveways and unsignalized intersections.

In order to analyze the unsignalized intersections, a simulation model was run to estimate the approach delays and level of service. The SimTraffic model was run for a PM peak hour 60 minute simulation using 5 iterations with a 7 minute seeding time for each alternative and no outliers were deleted from the analyses.

The results from the average of the five runs were used for future without development and future with development of 1717 Bissonnet.

A detailed view of the components of delay (seconds per vehicle) at the unsignalized intersections and 1717 Bissonnet Driveway is presented in Table 4.

Table 4
 Unsignalized Intersections
 PM Level of Service Analyses

Bissonnet Intersection Approach	Future Traffic Without Development		Future Traffic With Development	
	LOS	Delay Seconds/Vehicle	LOS	Delay Seconds/Vehicle
Ashby				
N/B	B	11.5	B	14.5
E/B	A	1.6	A	1.8
W/B	A	2.6	A	2.3
1717 Bissonnet Driveway				
N/B	C	18.6	C	21.8
E/B	A	3.2	A	1.4
W/B	A	0.9	A	4.3
Dunlavy				
N/B	A	7.2	A	7.7
S/B	B	12.2	C	19.0
E/B	A	2.3	A	5.1
W/B	A	3.7	A	3.9

Reports for the Synchro HCM and SimTraffic analyses are listed in the Appendix.

All driveways and intersections induce delay (interference) on the main street that they intersect. The amount of induced delay depends on the amount of traffic using the main street, the amount of traffic using the driveway or intersection, and the other factors that affect the movement of traffic on a specific street.

There is little difference in delay (between future without development and future with 1717 Bissonnet) at either the 1717 Bissonnet Driveway or the adjacent Bissonnet intersections with Ashby and Dunlavy.

The reduction in delay for the eastbound approach at the 1717 Bissonnet Driveway, even though the traffic volumes are higher, is due to the more favorable location of the future driveway. The increased delay for the westbound approach, while insignificant, is due to the

increase in traffic volume in the future. The future use of the proposed 1717 Bissonnet Driveway will not excessively interfere with the normal use of the Bissonnet Street right of way from the standpoint of increased delay on Bissonnet Street.

Queuing

Most driveways and intersections along this section of Bissonnet Street do not have left turn lanes serving them. As a result, queues can develop behind left turning vehicles while they wait for a gap in oncoming traffic. Occasionally, these queues block other driveways and intersections.

The future driveway was located so that queues from the 1717 Bissonnet driveway would not extend into either adjacent intersection. The 95th percentile queues from the proposed 1717 Bissonnet driveway are not expected to extend into the adjacent intersections of Ashby nor Dunlavy during the peak fifteen minutes of PM peak hour.

Arterial Level of Service

Arterial levels of service (LOS) based on average speed between Montrose and Greenbriar for background and future are listed in Table 5.

The arterial level of service does not change due to the added trips from the proposed development.

**Table 5
PM Peak Arterial Level of Service**

Direction	Future Traffic Without Development		Future Traffic With Development	
	LOS	Speed	LOS	Speed
Eastbound	C	18 mph	C	17 mph
Westbound	C	16 mph	C	15 mph

No change in arterial level of service is indicated between the future conditions and future conditions with the addition of the 1717 Bissonnet traffic.

Article III, Section 40-86 Compliance

Sec. 40-86. Permit for construction of driveways.

- (a) No person shall construct, or cause to be constructed, any driveway connecting private property with a public street without first obtaining a written permit therefor from the city engineer.
- (b) Upon receipt of an application for a driveway permit, the city engineer shall make a determination as to whether the driveway applied for is necessary to provide reasonable access to the private property consistent with the safety and convenience of the public, taking into account the following matters:
 - (1) The nature and volume of traffic on the street on which the private property abuts.
 - (2) The dimensions and type of construction of the street on which the private property abuts.
 - (3) The effect that the passage of vehicles to and from the private property will have on the safety of the traveling public and on the movement of traffic in the street to which the driveway connects.
 - (4) The use to be made of the private property.
 - (5) The dimensions of the private property, and the type and location of improvements thereon or to be placed thereon.
 - (6) The extent of the access which the private property has or will have to other public streets, if any.
- (c) After making such determination, the city engineer shall grant or refuse the application in accordance with the following rules:
 - (1) He shall refuse to issue a permit for a single driveway opening unless it shall have been found to be necessary for reasonable access.
 - (2) If the application is for more than one driveway opening into the same premises, he shall allow no more such openings than the minimum number necessary to provide reasonable access.
 - (3) He shall refuse to issue a permit for any driveway opening as to which it has been found that the proposed use of the driveway would create an extraordinary traffic hazard or would excessively interfere with the normal use of the street right-of-way.
 - (4) Every permit issued shall specify the maximum width of the driveway opening for which the permit is granted and such width shall be no greater than the minimum necessary to provide reasonable access.
 - (5) If a permit is granted for more than one driveway opening into the same premises, it shall specify that each such opening shall be separated from the others by a distance of not less than 20 feet, and that an upright curb must be constructed along the edge of the area of separation next to the improved portion of the street.

(Code 1968, § 41-86; Ord. No. 90-635, §§ 110, 111, 5-23-90; Ord. No. 93-514, § 77, 5-5-93)

The explicit requirements of Sec 40-86 c (1), (2), (4), and (5) are met by the proposed 1717 Bissonnet driveway. Traffic Engineers, Inc. has not been advised by the City of any specific guideline or regulation with regard to Sec 40-86 c (3) however, the delay and queuing induced on Bissonnet Street by the proposed 1717 Bissonnet driveway is not excessive delay (interference) from a traffic engineering standpoint. The Bissonnet Street approaches to the

1717 Bissonnet Driveway will operate at LOS A and 95th percentile queues on Bissonnet Street will not encroach into the adjacent intersections using the existing Bissonnet Street configuration (no mitigation).

Conclusion

Bissonnet Street operating speeds are low and arterial level of service is adequate. On street parking is allowed during non peak hours. Most intersections and driveways do not have left turn lanes and that contributes to lower operating speeds. The lane width (17 ft. to 18 ft.) is wide enough to accommodate bicycles. There is excellent bus service. Traffic uses the street in a manner consistent with its design. Left turn vehicles queue close to the centerline while through vehicles slowly pass on the right. Oncoming traffic often stops to allow left turns in front of them.

The proposed single driveway on Bissonnet Street is adequate to serve the traffic generated by the 1717 Bissonnet development. The trips generated by the driveway do not pose a significant traffic impact to Bissonnet Street as measured by arterial speed and intersection level of service/delay. There will be an increase in traffic concentration directly at the proposed driveway and a modest increase in delay is expected for traffic turning left into the driveway from the east on Bissonnet Street.

However, the driveway and the trips generated do not rise to the level of excessive interference and no mitigation is required to achieve an improved level of service on Bissonnet Street. In fact, the Bissonnet Street approaches to the 1717 Bissonnet driveway will operate at LOS A.

Given the nature and volume of traffic on Bissonnet, the delay, queuing and arterial level of service effects associated with the proposed use of the 1717 Bissonnet driveway will not excessively interfere with the normal use of the Bissonnet Street right of way, to which it will connect.

Appendix

Traffic Data

Traffic Analyses Reports

 Turning Movement Report
 PM

Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
#1 Bissonnet at Greenbriar													
Base	0	0	0	263	1129	211	0	575	45	37	505	0	2765
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	263	1129	211	0	575	45	37	505	0	2765
#2 Bissonnet at Shepherd													
Base	49	1115	21	0	0	0	102	812	0	0	612	85	2796
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	49	1115	21	0	0	0	102	812	0	0	612	85	2796
#3 Bissonnet at Hazard													
Base	10	145	28	57	90	43	50	689	6	27	578	25	1748
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	10	145	28	57	90	43	50	689	6	27	578	25	1748
#4 Bissonnet at Ashby													
Base	19	0	61	0	0	0	0	722	23	33	617	0	1475
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	19	0	61	0	0	0	0	722	23	33	617	0	1475
#5 Bissonnet at 1717 Bissonnet Driveway													
Base	9	0	10	0	0	0	0	781	17	18	645	0	1480
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	9	0	10	0	0	0	0	781	17	18	645	0	1480
#6 Bissonnet at Dunlavy													
Base	1	0	4	11	1	56	79	685	4	0	593	26	1460
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	0	4	11	1	56	79	685	4	0	593	26	1460
#7 Bissonnet at Mandell													
Base	46	136	130	35	47	30	14	620	4	19	540	30	1651
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	46	136	130	35	47	30	14	620	4	19	540	30	1651
#11 Bissonnet at Montrose													
Base	44	730	4	200	506	84	120	568	54	8	405	269	2992
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	44	730	4	200	506	84	120	568	54	8	405	269	2992

 Trip Generation Report

Forecast for PM

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
1		1.00	Buckhead Full	104.00	80.00	104	80	184	141.5
1		-1.00	Mland Manor	35.00	19.00	-35	-19	-54	-41.5
1		0.00	Rest Deduct	25.00	12.00	0	0	0	0.0
1		0.00	Retail Deduct	15.00	19.00	0	0	0	0.0
Zone 1 Subtotal						69	61	130	100.0
TOTAL						69	61	130	100.0

 Turning Movement Report
 PM

Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
#1 Bissonnet at Greenbriar													
Base	0	0	0	268	1152	215	0	587	46	38	515	0	2820
Added	0	0	0	0	0	0	0	28	0	0	24	0	52
Total	0	0	0	268	1152	215	0	615	46	38	539	0	2872
#2 Bissonnet at Shepherd													
Base	50	1137	21	0	0	0	104	828	0	0	624	87	2852
Added	0	0	0	0	0	0	0	28	0	0	24	0	52
Total	50	1137	21	0	0	0	104	856	0	0	648	87	2904
#3 Bissonnet at Hazard													
Base	10	148	29	58	92	44	51	703	6	28	590	25	1783
Added	0	0	0	0	0	0	0	28	0	0	24	0	52
Total	10	148	29	58	92	44	51	731	6	28	614	25	1835
#4 Bissonnet at Ashby													
Base	19	0	62	0	0	0	0	736	23	34	629	0	1505
Added	0	0	7	0	0	0	0	28	0	6	24	0	65
Total	19	0	69	0	0	0	0	764	23	40	653	0	1570
#5 Bissonnet at 1717 Bissonnet Driveway													
Base	9	0	10	0	0	0	0	781	17	18	645	0	1480
Added	31	0	31	0	0	0	0	0	35	35	0	0	132
Balanc	0	0	-1	0	0	0	0	0	0	-1	0	0	-2
Total	40	0	40	0	0	0	0	781	52	52	645	0	1610
#6 Bissonnet at Dunlavy													
Base	1	0	4	11	1	57	81	699	4	0	605	27	1489
Added	0	0	0	0	0	7	6	24	0	0	28	0	65
Total	1	0	4	11	1	64	87	723	4	0	633	27	1554
#7 Bissonnet at Mandell													
Base	47	139	133	36	48	31	14	632	4	19	551	31	1684
Added	0	0	0	0	0	0	0	24	0	0	28	0	52
Total	47	139	133	36	48	31	14	656	4	19	579	31	1736
#11 Bissonnet at Montrose													
Base	45	745	4	204	516	86	122	579	55	8	413	274	3052
Added	0	0	0	0	0	0	0	24	0	0	28	0	52
Total	45	745	4	204	516	86	122	603	55	8	441	274	3104

 Trip Generation Report

Forecast for PM

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
1		1.00	Buckhead Full	104.00	80.00	104	80	184	197.8
1		-1.00	Mland Manor	35.00	19.00	-35	-19	-54	-58.1
1		-1.00	Rest Deduct	25.00	12.00	-25	-12	-37	-39.8
1		0.00	Retail Deduct	22.00	25.00	0	0	0	0.0
	Zone 1 Subtotal					44	49	93	100.0
TOTAL						44	49	93	100.0

 Turning Movement Report
 PM

Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
#1 Bissonnet at Greenbriar													
Base	0	0	0	268	1152	215	0	587	46	38	515	0	2820
Added	0	0	0	0	0	0	0	18	0	0	20	0	38
Total	0	0	0	268	1152	215	0	605	46	38	535	0	2858
#2 Bissonnet at Shepherd													
Base	50	1137	21	0	0	0	104	828	0	0	624	87	2852
Added	0	0	0	0	0	0	0	18	0	0	20	0	38
Total	50	1137	21	0	0	0	104	846	0	0	644	87	2890
#3 Bissonnet at Hazard													
Base	10	148	29	58	92	44	51	703	6	28	590	25	1783
Added	0	0	0	0	0	0	0	18	0	0	20	0	38
Total	10	148	29	58	92	44	51	721	6	28	610	25	1821
#4 Bissonnet at Ashby													
Base	19	0	62	0	0	0	0	736	23	34	629	0	1505
Added	0	0	4	0	0	0	0	18	0	5	20	0	47
Total	19	0	66	0	0	0	0	754	23	39	649	0	1552
#5 Bissonnet at 1717 Bissonnet Driveway													
Base	9	0	10	0	0	0	0	781	17	18	645	0	1480
Added	25	0	25	0	0	0	0	0	22	22	0	0	94
Total	34	0	35	0	0	0	0	781	39	40	645	0	1574
#6 Bissonnet at Dunlavy													
Base	1	0	4	11	1	57	81	699	4	0	605	27	1489
Added	0	0	0	0	0	4	5	20	0	0	18	0	47
Total	1	0	4	11	1	61	86	719	4	0	623	27	1536
#7 Bissonnet at Mandell													
Base	47	139	133	36	48	31	14	632	4	19	551	31	1684
Added	0	0	0	0	0	0	0	20	0	0	18	0	38
Total	47	139	133	36	48	31	14	652	4	19	569	31	1722
#11 Bissonnet at Montrose													
Base	45	745	4	204	516	86	122	579	55	8	413	274	3052
Added	0	0	0	0	0	0	0	20	0	0	18	0	38
Total	45	745	4	204	516	86	122	599	55	8	431	274	3090

 Trip Generation Report

Forecast for PM

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
1		1.00	Buckhead Full	104.00	80.00	104	80	184	221.7
1		-1.00	Mland Manor	35.00	19.00	-35	-19	-54	-65.1
1		0.00	Rest Deduct	25.00	12.00	0	0	0	0.0
1		-1.00	Retail Deduct	22.00	25.00	-22	-25	-47	-56.6
	Zone 1 Subtotal					47	36	83	100.0
TOTAL						47	36	83	100.0

 Turning Movement Report
 PM

Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
#1 Bissonnet at Greenbriar													
Base	0	0	0	268	1152	215	0	587	46	38	515	0	2820
Added	0	0	0	0	0	0	0	19	0	0	14	0	33
Total	0	0	0	268	1152	215	0	606	46	38	529	0	2853
#2 Bissonnet at Shepherd													
Base	50	1137	21	0	0	0	104	828	0	0	624	87	2852
Added	0	0	0	0	0	0	0	19	0	0	14	0	33
Total	50	1137	21	0	0	0	104	847	0	0	638	87	2885
#3 Bissonnet at Hazard													
Base	10	148	29	58	92	44	51	703	6	28	590	25	1783
Added	0	0	0	0	0	0	0	19	0	0	14	0	33
Total	10	148	29	58	92	44	51	722	6	28	604	25	1816
#4 Bissonnet at Ashby													
Base	19	0	62	0	0	0	0	736	23	34	629	0	1505
Added	0	0	5	0	0	0	0	19	0	4	14	0	42
Total	19	0	67	0	0	0	0	755	23	38	643	0	1547
#5 Bissonnet at 1717 Bissonnet Driveway													
Base	9	0	10	0	0	0	0	781	17	18	645	0	1480
Added	18	0	18	0	0	0	0	0	24	24	0	0	84
Total	27	0	28	0	0	0	0	781	41	42	645	0	1564
#6 Bissonnet at Dunlavy													
Base	1	0	4	11	1	57	81	699	4	0	605	27	1489
Added	0	0	0	0	0	5	4	14	0	0	19	0	42
Total	1	0	4	11	1	62	85	713	4	0	624	27	1531
#7 Bissonnet at Mandell													
Base	47	139	133	36	48	31	14	632	4	19	551	31	1684
Added	0	0	0	0	0	0	0	14	0	0	19	0	33
Total	47	139	133	36	48	31	14	646	4	19	570	31	1717
#11 Bissonnet at Montrose													
Base	45	745	4	204	516	86	122	579	55	8	413	274	3052
Added	0	0	0	0	0	0	0	14	0	0	19	0	33
Total	45	745	4	204	516	86	122	593	55	8	432	274	3085

 Trip Generation Report

Forecast for PM

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
1		1.00	Buckhead Full	104.00	80.00	104	80	184	206.7
1		-1.00	Mland Manor	35.00	19.00	-35	-19	-54	-60.7
1		0.00	Rest Deduct	25.00	12.00	0	0	0	0.0
1		0.00	Retail Deduct	22.00	25.00	0	0	0	0.0
1		-1.00	92 Unit Deduct	25.00	16.00	-25	-16	-41	-46.1
	Zone 1 Subtotal					44	45	89	100.0
TOTAL						44	45	89	100.0

 Turning Movement Report
 PM

Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
#1 Bissonnet at Greenbriar													
Base	0	0	0	268	1152	215	0	587	46	38	515	0	2820
Added	0	0	0	0	0	0	0	18	0	0	18	0	36
Total	0	0	0	268	1152	215	0	605	46	38	533	0	2856
#2 Bissonnet at Shepherd													
Base	50	1137	21	0	0	0	104	828	0	0	624	87	2852
Added	0	0	0	0	0	0	0	18	0	0	18	0	36
Total	50	1137	21	0	0	0	104	846	0	0	642	87	2888
#3 Bissonnet at Hazard													
Base	10	148	29	58	92	44	51	703	6	28	590	25	1783
Added	0	0	0	0	0	0	0	18	0	0	18	0	36
Total	10	148	29	58	92	44	51	721	6	28	608	25	1819
#4 Bissonnet at Ashby													
Base	19	0	62	0	0	0	0	736	23	34	629	0	1505
Added	0	0	4	0	0	0	0	18	0	5	18	0	45
Total	19	0	66	0	0	0	0	754	23	39	647	0	1550
#5 Bissonnet at 1717 Bissonnet Driveway													
Base	9	0	10	0	0	0	0	781	17	18	645	0	1480
Added	23	0	23	0	0	0	0	0	22	22	0	0	90
Total	32	0	33	0	0	0	0	781	39	40	645	0	1570
#6 Bissonnet at Dunlavy													
Base	1	0	4	11	1	57	81	699	4	0	605	27	1489
Added	0	0	0	0	0	4	5	18	0	0	18	0	45
Total	1	0	4	11	1	61	86	717	4	0	623	27	1534
#7 Bissonnet at Mandell													
Base	47	139	133	36	48	31	14	632	4	19	551	31	1684
Added	0	0	0	0	0	0	0	18	0	0	18	0	36
Total	47	139	133	36	48	31	14	650	4	19	569	31	1720
#11 Bissonnet at Montrose													
Base	45	745	4	204	516	86	122	579	55	8	413	274	3052
Added	0	0	0	0	0	0	0	18	0	0	18	0	36
Total	45	745	4	204	516	86	122	597	55	8	431	274	3088

 Trip Generation Report

Forecast for PM

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
1		1.00	Buckhead Full	104.00	80.00	104	80	184	153.3
1		-1.00	Mland Manor	35.00	19.00	-35	-19	-54	-45.0
1		0.00	Rest Deduct	25.00	12.00	0	0	0	0.0
1		0.00	Retail Deduct	15.00	19.00	0	0	0	0.0
1		0.00	92 Unit Deduct	25.00	16.00	0	0	0	0.0
1		-1.00	Office Deduct	2.00	8.00	-2	-8	-10	-8.3
	Zone 1 Subtotal					67	53	120	100.0
TOTAL						67	53	120	100.0

 Turning Movement Report
 PM

Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
#1 Bissonnet at Greenbriar													
Base	0	0	0	268	1152	215	0	587	46	38	515	0	2820
Added	0	0	0	0	0	0	0	27	0	0	21	0	48
Total	0	0	0	268	1152	215	0	614	46	38	536	0	2868
#2 Bissonnet at Shepherd													
Base	50	1137	21	0	0	0	104	828	0	0	624	87	2852
Added	0	0	0	0	0	0	0	27	0	0	21	0	48
Total	50	1137	21	0	0	0	104	855	0	0	645	87	2900
#3 Bissonnet at Hazard													
Base	10	148	29	58	92	44	51	703	6	28	590	25	1783
Added	0	0	0	0	0	0	0	27	0	0	21	0	48
Total	10	148	29	58	92	44	51	730	6	28	611	25	1831
#4 Bissonnet at Ashby													
Base	19	0	62	0	0	0	0	736	23	34	629	0	1505
Added	0	0	7	0	0	0	0	27	0	5	21	0	60
Total	19	0	69	0	0	0	0	763	23	39	650	0	1565
#5 Bissonnet at 1717 Bissonnet Driveway													
Base	9	0	10	0	0	0	0	781	17	18	645	0	1480
Added	27	0	27	0	0	0	0	0	34	34	0	0	122
Balanc	-1	0	0	0	0	0	0	0	0	-1	0	0	-2
Total	35	0	37	0	0	0	0	781	51	51	645	0	1600
#6 Bissonnet at Dunlavy													
Base	1	0	4	11	1	57	81	699	4	0	605	27	1489
Added	0	0	0	0	0	7	5	21	0	0	27	0	60
Total	1	0	4	11	1	64	86	720	4	0	632	27	1549
#7 Bissonnet at Mandell													
Base	47	139	133	36	48	31	14	632	4	19	551	31	1684
Added	0	0	0	0	0	0	0	21	0	0	27	0	48
Total	47	139	133	36	48	31	14	653	4	19	578	31	1732
#11 Bissonnet at Montrose													
Base	45	745	4	204	516	86	122	579	55	8	413	274	3052
Added	0	0	0	0	0	0	0	21	0	0	27	0	48
Total	45	745	4	204	516	86	122	600	55	8	440	274	3100

 Trip Generation Report

Forecast for PM

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
1		1.00	Buckhead Full	104.00	80.00	104	80	184	141.5
1		-1.00	Mland Manor	35.00	19.00	-35	-19	-54	-41.5
1		0.00	Rest Deduct	25.00	12.00	0	0	0	0.0
1		0.00	Retail Deduct	15.00	19.00	0	0	0	0.0
Zone 1 Subtotal						69	61	130	100.0
TOTAL						69	61	130	100.0

Turning Movement Report
PM

Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
#1 Bissonnet at Greenbriar													
Base	0	0	0	268	1152	215	0	587	46	38	515	0	2820
Added	0	0	0	1	0	0	0	37	0	0	0	0	38
Total	0	0	0	269	1152	215	0	624	46	38	515	0	2858
#2 Bissonnet at Shepherd													
Base	50	1137	21	0	0	0	104	828	0	0	624	87	2852
Added	0	0	1	0	0	0	0	38	0	0	0	0	39
Total	50	1137	22	0	0	0	104	866	0	0	624	87	2891
#3 Bissonnet at Hazard													
Base	10	148	29	58	92	44	51	703	6	28	590	25	1783
Added	0	0	1	1	0	0	0	39	0	0	0	0	41
Total	10	148	30	59	92	44	51	742	6	28	590	25	1824
#4 Bissonnet at Ashby													
Base	19	0	62	0	0	0	0	736	23	34	629	0	1505
Added	0	0	28	0	0	0	0	41	0	0	0	0	69
Adjust	0	0	18	0	0	0	0	0	0	0	0	0	18
Total	19	0	108	0	0	0	0	777	23	34	629	0	1592
#5 Bissonnet at 1717 Bissonnet Driveway													
Base	9	0	10	0	0	0	0	781	17	18	645	0	1480
Added	0	0	61	0	0	0	0	0	69	0	0	0	130
Balanc	-9	0	9	0	0	0	0	0	18	-18	0	0	0
Total	0	0	80	0	0	0	0	781	104	0	645	0	1610
#6 Bissonnet at Dunlavy													
Base	1	0	4	11	1	57	81	699	4	0	605	27	1489
Added	0	0	0	0	0	0	34	27	0	0	0	0	61
Adjust	0	0	0	0	0	0	9	0	0	0	0	0	9
Total	1	0	4	11	1	57	124	726	4	0	605	27	1559
#7 Bissonnet at Mandell													
Base	47	139	133	36	48	31	14	632	4	19	551	31	1684
Added	0	0	0	0	0	0	1	26	1	0	0	0	28
Total	47	139	133	36	48	31	15	658	5	19	551	31	1712
#11 Bissonnet at Montrose													
Base	45	745	4	204	516	86	122	579	55	8	413	274	3052
Added	0	0	0	0	0	0	3	23	1	0	0	0	27
Total	45	745	4	204	516	86	125	602	56	8	413	274	3079

HCM Signalized Intersection Capacity Analysis

Synchro Report

1: Bissonnet & Greenbriar

Future Traffic Without Development

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕						↕↕↕	
Volume (vph)	0	587	46	38	515	0	0	0	0	268	1152	215
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	
Lane Util. Factor		1.00		1.00	1.00						0.91	
Frpb, ped/bikes		1.00		1.00	1.00						1.00	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.99		1.00	1.00						0.98	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		1862		1805	1881						4990	
Flt Permitted		1.00		0.09	1.00						0.99	
Satd. Flow (perm)		1862		168	1881						4990	
Peak-hour factor, PHF	1.00	0.83	0.83	0.77	0.89	1.00	1.00	1.00	1.00	0.93	0.93	0.93
Adj. Flow (vph)	0	707	55	49	579	0	0	0	0	288	1239	231
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	15	0
Lane Group Flow (vph)	0	759	0	49	579	0	0	0	0	0	1743	0
Confl. Peds. (#/hr)				2	2							2
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	1%	0%
Turn Type				Perm						Perm		
Protected Phases		2			6							4
Permitted Phases											4	
Actuated Green, G (s)		55.0		55.0	55.0						54.8	
Effective Green, g (s)		56.1		56.1	56.1						55.9	
Actuated g/C Ratio		0.47		0.47	0.47						0.47	
Clearance Time (s)		5.1		5.1	5.1						5.1	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		870		79	879						2325	
v/s Ratio Prot		0.41			0.31							
v/s Ratio Perm				0.29							0.35	
v/c Ratio		0.87		0.62	0.66						0.75	
Uniform Delay, d1		28.7		24.0	24.6						26.3	
Progression Factor		1.00		0.30	0.37						1.00	
Incremental Delay, d2		9.6		4.4	0.5						2.3	
Delay (s)		38.4		11.5	9.7						28.6	
Level of Service		D		B	A						C	
Approach Delay (s)		38.4			9.9			0.0			28.6	
Approach LOS		D			A			A			C	
Intersection Summary												
HCM Average Control Delay				27.2								C
HCM Volume to Capacity ratio				0.81								
Actuated Cycle Length (s)				120.0				Sum of lost time (s)			8.0	
Intersection Capacity Utilization				87.4%				ICU Level of Service			E	
Analysis Period (min)				15								
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Synchro Report

2: Bissonnet & Shepherd

Future Traffic Without Development

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕		↔	↕		↔	↕		↔	↕	
Volume (vph)	104	828	0	0	624	87	50	1137	21	0	0	0
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				
Lane Util. Factor	1.00	1.00			1.00			0.95				
Frpb, ped/bikes	1.00	1.00			1.00			1.00				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.98			1.00				
Flt Protected	0.95	1.00			1.00			1.00				
Satd. Flow (prot)	1805	1881			1852			3558				
Flt Permitted	0.06	1.00			1.00			1.00				
Satd. Flow (perm)	122	1881			1852			3558				
Peak-hour factor, PHF	0.77	0.85	1.00	1.00	0.82	0.82	0.83	0.83	0.83	1.00	1.00	1.00
Adj. Flow (vph)	135	974	0	0	761	106	60	1370	25	0	0	0
RTOR Reduction (vph)	0	0	0	0	4	0	0	1	0	0	0	0
Lane Group Flow (vph)	135	974	0	0	863	0	0	1454	0	0	0	0
Confl. Peds. (#/hr)							2					
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Turn Type	pm+pt			Perm								
Protected Phases	5	2			6			8				
Permitted Phases	2				8			8				
Actuated Green, G (s)	69.1	69.1			57.2			40.7				
Effective Green, g (s)	70.2	70.2			58.3			41.8				
Actuated g/C Ratio	0.59	0.59			0.49			0.35				
Clearance Time (s)	5.1	5.1			5.1			5.1				
Vehicle Extension (s)	3.0	3.0			3.0			3.0				
Lane Grp Cap (vph)	182	1100			900			1239				
v/s Ratio Prot	0.05	c0.52			c0.47							
v/s Ratio Perm	0.38							0.41				
v/c Ratio	0.74	0.89			0.96			1.17				
Uniform Delay, d1	49.3	21.4			29.7			39.1				
Progression Factor	0.77	0.63			0.95			1.00				
Incremental Delay, d2	10.7	6.3			19.0			86.8				
Delay (s)	48.5	19.8			47.3			125.9				
Level of Service	D	B			D			F				
Approach Delay (s)	23.3				47.3			125.9			0.0	
Approach LOS	C				D			F			A	

Intersection Summary			
HCM Average Control Delay	72.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

Synchro Report

3: Bissonnet & Hazard

Future Traffic Without Development

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕		↔	↕		↔	↕		↔	↕	
Volume (vph)	51	703	6	28	590	26	10	148	29	58	92	44
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				
Lane Util. Factor	1.00	1.00			1.00			1.00				
Frpb, ped/bikes	1.00	1.00			1.00			1.00				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			1.00			0.98				
Flt Protected	0.95	1.00			0.95			1.00				
Satd. Flow (prot)	1804	1879			1805			1868			1848	1804
Flt Permitted	0.31	1.00			0.24			1.00			0.98	0.75
Satd. Flow (perm)	597	1879			461			1868			1819	1382
Peak-hour factor, PHF	0.69	0.89	0.89	0.84	0.91	0.91	0.81	0.81	0.81	0.80	0.80	0.80
Adj. Flow (vph)	74	790	7	33	648	29	12	183	36	72	115	55
RTOR Reduction (vph)	0	0	0	0	2	0	0	12	0	0	19	0
Lane Group Flow (vph)	74	797	0	33	675	0	0	219	0	0	223	0
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Parking (#/hr)									0			0
Turn Type	Perm				Perm			Perm			Perm	
Protected Phases	2				6			8			4	
Permitted Phases	2				8			4			4	
Actuated Green, G (s)	37.7	37.7			37.7	37.7		12.4			12.4	
Effective Green, g (s)	38.7	38.7			38.7	38.7		13.3			13.3	
Actuated g/C Ratio	0.65	0.65			0.65	0.65		0.22			0.22	
Clearance Time (s)	5.0	5.0			5.0	5.0		4.9			4.9	
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	385	1212			297	1205		403			306	
v/s Ratio Prot		c0.42				0.36						
v/s Ratio Perm	0.12				0.07			0.12			c0.16	
v/c Ratio	0.19	0.66			0.11	0.56		0.54			0.73	
Uniform Delay, d1	4.3	6.6			4.1	5.9		20.7			21.7	
Progression Factor	1.00	1.26			1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.5	1.3			0.8	1.9		1.5			8.4	
Delay (s)	4.8	9.5			4.8	7.8		22.2			30.1	
Level of Service	A	A			A	A		C			C	
Approach Delay (s)	9.1				7.7			22.2			30.1	
Approach LOS	A				A			C			C	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: Bissonnet & Mandell

Synchro Report
Future Traffic Without Development

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Volume (vph)	14	632	4	19	551	31	47	139	133	36	48	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	16	16	16	14	14	14
Total Lost time (s)	4.6			4.6			4.3			4.3		
Lane Util. Factor	1.00			1.00			1.00			1.00		
Frbp, ped/bikes	1.00			1.00			0.99			1.00		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	1.00			0.99			0.94			0.96		
Fit Protected	1.00			1.00			0.99			0.98		
Satd. Flow (prot)	2128			2113			1989			1923		
Fit Permitted	0.98			0.97			0.99			0.98		
Satd. Flow (perm)	2094			2054			1989			1923		
Peak-hour factor, PHF	0.93	0.93	0.93	0.91	0.91	0.91	0.88	0.88	0.88	0.78	0.78	0.78
Adj. Flow (vph)	15	680	4	21	605	34	53	158	151	46	62	40
RTOR Reduction (vph)	0	0	0	0	2	0	0	30	0	0	15	0
Lane Group Flow (vph)	0	699	0	0	658	0	0	332	0	0	133	0
Confl. Peds. (#/hr)	1		2	2		1			6	6		
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm		Perm		Split		Split		Split		Split	
Protected Phases	2		6		8		8		4		4	
Permitted Phases	2		6									
Actuated Green, G (s)	45.9		45.9		18.3		9.0					
Effective Green, g (s)	47.1		47.1		19.5		10.2					
Actuated g/C Ratio	0.52		0.52		0.22		0.11					
Clearance Time (s)	5.8		5.8		5.5		5.5					
Vehicle Extension (s)	3.0		3.0		3.0		3.0					
Lane Grp Cap (vph)	1096		1075		431		218					
v/s Ratio Prot	c0.33		0.32		c0.17		c0.07					
v/s Ratio Perm	0.64		0.61		0.77		0.61					
v/c Ratio	15.3		15.0		33.1		38.0					
Uniform Delay, d1	1.00		1.83		1.00		1.00					
Progression Factor	2.8		2.4		8.3		4.8					
Incremental Delay, d2	18.2		29.9		41.4		42.8					
Delay (s)	B		C		D		D					
Level of Service	18.2		29.9		41.4		42.8					
Approach Delay (s)	B		C		D		D					
Approach LOS	B		C		D		D					

Intersection Summary			
HCM Average Control Delay	28.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.2
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Bissonnet & Montrose

Synchro Report
Future Traffic Without Development

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔		↔	↔	↔		↔	↔	↔
Volume (vph)	122	579	55	8	413	274	45	745	4	204	516	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.2		4.2	4.2	4.1	4.2	4.2		4.1	4.2	
Lane Util. Factor	1.00	0.95		0.95	1.00	1.00	0.95	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	0.94	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.85	1.00	1.00	1.00		1.00	0.98	
Fit Protected	0.95	1.00		1.00	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)	1798	3523		3571	1518	1805	3571	1787		3486		
Fit Permitted	0.28	1.00		0.94	1.00	0.41	1.00	0.14		1.00		
Satd. Flow (perm)	538	3523		3350	1518	777	3571	262		3486		
Peak-hour factor, PHF	0.85	0.88	0.88	0.88	0.88	0.86	0.85	0.91	0.91	0.79	0.94	0.94
Adj. Flow (vph)	144	658	62	9	469	319	53	819	4	258	549	91
RTOR Reduction (vph)	0	8	0	0	0	219	0	1	0	0	14	0
Lane Group Flow (vph)	144	712	0	0	478	100	53	822	0	258	626	0
Confl. Peds. (#/hr)	29		9	9		29			11			14
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	1%	0%	1%	1%	0%
Turn Type	pm+pt		Perm		Perm		pm+pt		pm+pt		pm+pt	
Protected Phases	5		2		6		3		8		7	
Permitted Phases	2		6		6		8		4		4	
Actuated Green, G (s)	32.8		32.8		21.5		21.5		30.9		27.5	
Effective Green, g (s)	33.9		33.9		22.6		22.6		33.1		28.6	
Actuated g/C Ratio	0.38		0.38		0.25		0.25		0.37		0.32	
Clearance Time (s)	5.2		5.3		5.3		5.3		5.2		5.3	
Vehicle Extension (s)	3.0		3.0		3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	303		1327		841		381		337		1135	
v/s Ratio Prot	0.04		c0.20		0.14		0.07		0.01		c0.23	
v/s Ratio Perm	0.14		0.14		0.14		0.07		0.05		0.24	
v/c Ratio	0.48		0.54		0.57		0.26		0.16		0.72	
Uniform Delay, d1	19.8		21.9		29.4		27.0		18.5		27.2	
Progression Factor	0.51		0.56		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.9		1.2		2.8		1.7		0.2		2.3	
Delay (s)	11.0		13.6		32.2		28.7		18.8		29.5	
Level of Service	B		B		C		C		B		C	
Approach Delay (s)	13.1		30.8		28.9		18.1		18.1		18.1	
Approach LOS	B		C		C		C		B		B	

Intersection Summary			
HCM Average Control Delay	22.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1: Bissonnet & Greenbriar

Synchro Report
Future Traffic With Development

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔						↔↔↔	
Volume (vph)	0	615	46	38	539	0	0	0	0	268	1152	215
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	
Lane Util. Factor		1.00		1.00	1.00						0.91	
Frpb, ped/bikes		1.00		1.00	1.00						1.00	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.99		1.00	1.00						0.98	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		1863		1805	1881						4990	
Flt Permitted		1.00		0.07	1.00						0.99	
Satd. Flow (perm)		1863		142	1881						4990	
Peak-hour factor, PHF	1.00	0.83	0.83	0.77	0.89	1.00	1.00	1.00	1.00	0.93	0.93	0.93
Adj. Flow (vph)	0	741	55	49	606	0	0	0	0	288	1239	231
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	16	0
Lane Group Flow (vph)	0	793	0	49	606	0	0	0	0	0	1742	0
Confl. Peds. (#/hr)			2	2								2
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	1%	0%
Turn Type				Perm						Perm		
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		56.3		56.3	56.3						53.5	
Effective Green, g (s)		57.4		57.4	57.4						54.6	
Actuated g/C Ratio		0.48		0.48	0.48						0.46	
Clearance Time (s)		5.1		5.1	5.1						5.1	
Vehicle Extension (s)		3.0		3.0	3.0						3.0	
Lane Grp Cap (vph)		891		68	900						2270	
v/s Ratio Prot		c0.43			0.32							
v/s Ratio Perm				0.34							0.35	
v/c Ratio		0.89		0.72	0.67						0.77	
Uniform Delay, d1		28.4		24.9	24.1						27.4	
Progression Factor		1.00		0.26	0.34						1.00	
Incremental Delay, d2		11.1		8.5	0.5						2.6	
Delay (s)		39.5		15.0	8.6						29.9	
Level of Service		D		B	A						C	
Approach Delay (s)		39.5			9.1			0.0			29.9	
Approach LOS		D			A			A			C	

Intersection Summary			
HCM Average Control Delay	28.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
2: Bissonnet & Shepherd

Synchro Report
Future Traffic With Development

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔						↔↔↔	
Volume (vph)	104	856	0	0	648	87	50	1137	21	0	0	0
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	
Lane Util. Factor		1.00		1.00	1.00						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						1.00	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		1.00		1.00	1.00			0.98			1.00	
Flt Protected		0.95		1.00	1.00			1.00			1.00	
Satd. Flow (prot)		1805		1881	1853			3558			1.00	
Flt Permitted		0.06		1.00	1.00			1.00			1.00	
Satd. Flow (perm)		121		1881	1853			3558			1.00	
Peak-hour factor, PHF	0.77	0.85	1.00	1.00	0.82	0.82	0.83	0.83	0.83	1.00	1.00	1.00
Adj. Flow (vph)	135	1007	0	0	790	106	60	1370	25	0	0	0
RTOR Reduction (vph)	0	0	0	0	4	0	0	1	0	0	0	0
Lane Group Flow (vph)	135	1007	0	0	892	0	0	1454	0	0	0	0
Confl. Peds. (#/hr)							2					
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%
Turn Type		pm+pt					Perm					
Protected Phases		5	2		6			8				
Permitted Phases		2					8					
Actuated Green, G (s)		69.8	69.8		57.9			40.0				
Effective Green, g (s)		70.9	70.9		59.0			41.1				
Actuated g/C Ratio		0.59	0.59		0.49			0.34				
Clearance Time (s)		5.1	5.1		5.1			5.1				
Vehicle Extension (s)		3.0	3.0		3.0			3.0				
Lane Grp Cap (vph)		182	1111		911			1219				
v/s Ratio Prot		0.05	c0.54		c0.48							
v/s Ratio Perm		0.39						0.41				
v/c Ratio		0.74	0.91		0.98			1.19				
Uniform Delay, d1		50.4	21.6		29.9			39.5				
Progression Factor		0.78	0.64		0.96			1.00				
Incremental Delay, d2		10.2	7.4		22.8			95.0				
Delay (s)		49.3	21.1		51.6			134.4				
Level of Service		D	C		D			F				
Approach Delay (s)		24.4			51.6			134.4			0.0	
Approach LOS		C			D			F			A	

Intersection Summary			
HCM Average Control Delay	77.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Bissonnet & Hazard

Synchro Report
Future Traffic With Development

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔			↔			↔	↔
Volume (vph)	51	731	6	28	614	26	10	148	29	58	92	44
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	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frft	1.00	1.00		1.00	0.99			0.98			0.97	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1804	1879		1805	1869			1848			1804	
Flt Permitted	0.30	1.00		0.22	1.00			0.98			0.75	
Satd. Flow (perm)	566	1879		427	1869			1819			1382	
Peak-hour factor, PHF	0.69	0.89	0.89	0.84	0.91	0.91	0.81	0.81	0.81	0.80	0.80	0.80
Adj. Flow (vph)	74	821	7	33	675	29	12	183	36	72	115	55
RTOR Reduction (vph)	0	0	0	0	2	0	0	12	0	0	19	0
Lane Group Flow (vph)	74	828	0	33	702	0	0	219	0	0	223	0
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Parking (#/hr)									0			0
Turn Type	Perm		Perm		Perm		Perm		Perm			
Protected Phases	2		6		8		4				4	
Permitted Phases	2		6		8		4				4	
Actuated Green, G (s)	37.7	37.7		37.7	37.7			12.4			12.4	
Effective Green, g (s)	38.7	38.7		38.7	38.7			13.3			13.3	
Actuated g/C Ratio	0.65	0.65		0.65	0.65			0.22			0.22	
Clearance Time (s)	5.0	5.0		5.0	5.0			4.9			4.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	365		1212		275		1206		403		306	
v/s Ratio Prot	c0.44				0.38						c0.07	
v/s Ratio Perm	0.13		0.08				0.12				c0.16	
v/c Ratio	0.20		0.68		0.12		0.58		0.54		0.73	
Uniform Delay, d1	4.3		6.8		4.1		6.1		20.7		21.7	
Progression Factor	1.00		1.26		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.5		1.2		0.9		2.1		1.5		8.4	
Delay (s)	4.9		9.7		5.0		8.1		22.2		30.1	
Level of Service	A		A		A		A		C		C	
Approach Delay (s)	9.3				8.0				22.2		30.1	
Approach LOS	A				A				C		C	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Bissonnet & Mandell

Synchro Report
Future Traffic With Development

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Volume (vph)	14	656	4	19	579	31	47	139	133	36	48	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	16	16	16	14	14	14
Total Lost time (s)		4.6			4.6			4.3			4.3	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frft		1.00			1.00			0.94			0.96	
Flt Protected		1.00			1.00			0.99			0.98	
Satd. Flow (prot)		2129			2114			1989			1923	
Flt Permitted		0.98			0.97			0.99			0.98	
Satd. Flow (perm)		2094			2055			1989			1923	
Peak-hour factor, PHF	0.93	0.93	0.93	0.91	0.91	0.91	0.88	0.88	0.88	0.78	0.78	0.78
Adj. Flow (vph)	15	705	4	21	636	34	53	158	151	46	62	40
RTOR Reduction (vph)	0	0	0	0	2	0	0	30	0	0	15	0
Lane Group Flow (vph)	0	724	0	0	689	0	0	332	0	0	133	0
Confl. Peds. (#/hr)	1		2	2		1		6	6			
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm		Perm		Split		Split		Split			
Protected Phases	2		6		8		8		4		4	
Permitted Phases	2		6		8		8		4		4	
Actuated Green, G (s)	45.9				45.9				18.3		9.0	
Effective Green, g (s)	47.1				47.1				19.5		10.2	
Actuated g/C Ratio	0.52				0.52				0.22		0.11	
Clearance Time (s)	5.8				5.8				5.5		5.5	
Vehicle Extension (s)	3.0				3.0				3.0		3.0	
Lane Grp Cap (vph)	1096				1075				431		218	
v/s Ratio Prot	c0.35				0.34				c0.17		c0.07	
v/s Ratio Perm	0.66				0.64				0.77		0.61	
v/c Ratio	15.6				15.4				33.1		38.0	
Uniform Delay, d1	1.00				1.84				1.00		1.00	
Progression Factor	3.1				2.7				8.3		4.8	
Incremental Delay, d2	18.8				31.0				41.4		42.8	
Delay (s)	18.8				31.0				41.4		42.8	
Level of Service	B				C				D		D	
Approach Delay (s)	18.8				31.0				41.4		42.8	
Approach LOS	B				C				D		D	

Intersection Summary			
HCM Average Control Delay	29.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.2
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Bissonnet & Montrose

Synchro Report
Future Traffic With Development

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↔	↔	↕	↔
Volume (vph)	122	603	55	8	441	274	45	745	4	204	516	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.1	4.2			4.2	4.2	4.1	4.2		4.1	4.2	
Lane Util. Factor	1.00	0.95			0.95	1.00	1.00	0.95		1.00	0.95	
Flpb, ped/bikes	1.00	1.00			1.00	0.94	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99			1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1799	3525			3571	1518	1805	3571		1787	3486	
Flt Permitted	0.26	1.00			0.94	1.00	0.41	1.00		0.14	1.00	
Satd. Flow (perm)	499	3525			3352	1518	777	3571		260	3486	
Peak-hour factor, PHF	0.85	0.88	0.88	0.88	0.88	0.86	0.85	0.91	0.91	0.79	0.94	0.94
Adj. Flow (vph)	144	685	62	9	501	319	53	819	4	258	549	91
RTOR Reduction (vph)	0	7	0	0	0	217	0	1	0	0	14	0
Lane Group Flow (vph)	144	740	0	0	510	102	53	822	0	258	626	0
Confl. Peds. (#/hr)	29	9	9	9	29				11			14
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	1%	0%	1%	1%	0%
Turn Type	pm+pt			Perm	Perm	pm+pt			pm+pt			
Protected Phases	5	2			6	3	8		7		4	
Permitted Phases	2			6		8			4			
Actuated Green, G (s)	33.0	33.0			21.8	21.8	30.7	27.4	46.4		37.9	
Effective Green, g (s)	34.1	34.1			22.9	22.9	32.9	28.5	47.5		39.0	
Actuated g/C Ratio	0.38	0.38			0.25	0.25	0.37	0.32	0.53		0.43	
Clearance Time (s)	5.2	5.3			5.3	5.3	5.2	5.3	5.2		5.3	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	292	1336			853	386	334	1131	390		1511	
v/s Ratio Prot	0.04	c0.21					0.01	c0.23	c0.11		0.18	
v/s Ratio Perm	0.15				0.15	0.07	0.05		0.24			
v/c Ratio	0.49	0.55			0.60	0.26	0.16	0.73	0.66		0.41	
Uniform Delay, d1	19.8	22.0			29.5	26.8	18.7	27.3	15.2		17.6	
Progression Factor	0.50	0.56			1.00	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2	1.0	1.2			3.1	1.7	0.2	2.4	4.2		0.2	
Delay (s)	10.8	13.4			32.6	28.5	18.9	29.7	19.4		17.8	
Level of Service	B	B			C	C	B	C	B		B	
Approach Delay (s)		13.0			31.0			29.0			18.3	
Approach LOS		B			C			C			B	

Intersection Summary			
HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

SimTraffic Performance Report

Simulation Results
Future Traffic Without Development

1: Bissonnet & Greenbriar Performance by approach

Approach	EB	WB	SB	All
Delay / Veh (s)	26.6	16.8	25.8	23.9
Vehicles Entered	641	675	1629	2945
Vehicles Exited	642	675	1632	2949
Hourly Exit Rate	642	675	1632	2949
Input Volume	633	674	1635	2942
% of Volume	101	100	100	100
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

2: Bissonnet & Shepherd Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	32.0	34.7	59.3	44.1
Vehicles Entered	937	708	1188	2833
Vehicles Exited	939	707	1184	2830
Hourly Exit Rate	939	707	1184	2830
Input Volume	932	711	1208	2851
% of Volume	101	99	98	99
Denied Entry Before	1	1	0	2
Denied Entry After	0	3	6	9

3: Bissonnet & Hazard Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	10.5	10.0	21.8	29.7	13.4
Vehicles Entered	853	643	177	191	1864
Vehicles Exited	853	642	178	191	1864
Hourly Exit Rate	853	642	178	191	1864
Input Volume	849	644	187	194	1874
% of Volume	100	100	95	98	99
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

4: Bissonnet & Ashby Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	1.6	2.6	11.5	2.6
Vehicles Entered	785	653	81	1519
Vehicles Exited	787	652	81	1520
Hourly Exit Rate	787	652	81	1520
Input Volume	790	654	81	1525
% of Volume	100	100	100	100
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

SimTraffic Performance Report

Simulation Results
Future Traffic Without Development

5: Bissonnet & 1717 Bissonnet Dwy Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	3.2	0.9	18.6	2.4
Vehicles Entered	795	659	18	1472
Vehicles Exited	796	659	18	1473
Hourly Exit Rate	796	659	18	1473
Input Volume	799	663	19	1481
% of Volume	100	99	95	99
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

6: Bissonnet & Dunlavy Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	2.3	3.7	7.2	12.2	3.4
Vehicles Entered	788	626	3	71	1488
Vehicles Exited	788	625	3	71	1487
Hourly Exit Rate	788	625	3	71	1487
Input Volume	792	632	5	69	1498
% of Volume	99	99	60	103	99
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

7: Bissonnet & Mandell Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	22.6	37.1	39.6	37.7	31.6
Vehicles Entered	712	591	316	112	1731
Vehicles Exited	714	595	316	110	1735
Hourly Exit Rate	714	595	316	110	1735
Input Volume	721	601	319	115	1756
% of Volume	99	99	99	96	99
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

11: Bissonnet & Montrose Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	14.1	34.2	29.0	21.8	24.5
Vehicles Entered	789	702	769	795	3055
Vehicles Exited	788	695	767	793	3043
Hourly Exit Rate	788	695	767	793	3043
Input Volume	801	695	794	806	3096
% of Volume	98	100	97	98	98
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

Queuing and Blocking Report

Simulation Results
Future Traffic Without Development

Intersection: 4: Bissonnet & Ashby

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	118	259	78
Average Queue (ft)	7	48	37
95th Queue (ft)	54	166	63
Link Distance (ft)	539	287	244
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		2	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Bissonnet & 1717 Bissonnet Dwy

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	268	98	49
Average Queue (ft)	50	17	16
95th Queue (ft)	184	66	44
Link Distance (ft)	287	86	197
Upstream Blk Time (%)	1	1	
Queuing Penalty (veh)	6	5	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Bissonnet & Dunlavy

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LR	LTR
Maximum Queue (ft)	125	166	24	83
Average Queue (ft)	56	12	3	37
95th Queue (ft)	128	75	18	68
Link Distance (ft)	86	866	165	245
Upstream Blk Time (%)	6			
Queuing Penalty (veh)	46			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 59

Arterial Level of Service

Simulation Results
Future Traffic Without Development

Arterial Level of Service: EB Bissonnet

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	30	8.5	21.7	0.1	19
Greenbriar	1	26.9	32.8	0.1	6
Shepherd	2	28.4	44.6	0.1	12
	31	1.3	5.7	0.0	24
	32	1.6	12.2	0.1	26
Hazard	3	9.8	20.1	0.1	16
	34	1.8	13.6	0.1	26
Ashby	4	1.6	14.6	0.1	27
1717 Bissonnet Dwy	5	3.3	10.7	0.1	20
Southhampton Est	6	1.9	4.5	0.0	17
Mandell	7	22.4	42.3	0.2	15
	8	4.8	36.8	0.3	26
	9	0.5	5.2	0.0	27
	10	2.4	22.5	0.2	27
Montrose	11	12.1	18.1	0.1	11
Total		127.4	305.4	1.5	18

Arterial Level of Service: WB Bissonnet

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Montrose	11	44.3	63.6	0.2	9
	10	2.1	9.1	0.1	22
	9	1.4	22.0	0.2	28
	8	0.4	5.0	0.0	28
Mandell	7	37.1	66.8	0.3	14
Dunlavy	6	4.1	25.4	0.2	25
1717 Bissonnet Dwy	5	0.8	3.8	0.0	21
Ashby	4	2.4	9.5	0.1	23
	34	1.6	14.8	0.1	27
Hazard	3	9.7	21.5	0.1	16
	32	2.5	13.3	0.1	24
	31	16.9	27.6	0.1	12
Shepherd	2	34.6	38.7	0.0	5
Greenbriar	1	14.4	30.0	0.1	16
	30	1.1	7.3	0.1	26
Total		173.2	358.5	1.6	16

SimTraffic Performance Report

Simulation Results
Future Traffic With Development

1: Bissonnet & Greenbriar Performance by approach

Approach	EB	WB	SB	All
Delay / Veh (s)	26.6	17.7	26.3	24.4
Vehicles Entered	662	681	1628	2971
Vehicles Exited	663	682	1628	2973
Hourly Exit Rate	663	682	1628	2973
Input Volume	661	698	1635	2994
% of Volume	100	98	100	99
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

2: Bissonnet & Shepherd Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	34.0	33.7	75.8	51.4
Vehicles Entered	963	718	1209	2890
Vehicles Exited	964	719	1205	2888
Hourly Exit Rate	964	719	1205	2888
Input Volume	960	735	1208	2903
% of Volume	100	98	100	99
Denied Entry Before	4	2	1	7
Denied Entry After	1	3	7	11

3: Bissonnet & Hazard Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	11.1	10.9	20.9	32.2	13.9
Vehicles Entered	887	659	178	184	1908
Vehicles Exited	887	660	178	183	1908
Hourly Exit Rate	887	660	178	183	1908
Input Volume	877	668	187	194	1926
% of Volume	101	99	95	94	99
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

4: Bissonnet & Ashby Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	1.8	2.3	14.5	2.7
Vehicles Entered	827	676	86	1589
Vehicles Exited	825	677	87	1589
Hourly Exit Rate	825	677	87	1589
Input Volume	819	685	88	1592
% of Volume	101	99	99	100
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

SimTraffic Performance Report

Simulation Results
Future Traffic With Development

5: Bissonnet & 1717 Bissonnet Dwy Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	1.4	4.3	21.8	3.6
Vehicles Entered	843	688	80	1611
Vehicles Exited	843	689	80	1612
Hourly Exit Rate	843	689	80	1612
Input Volume	833	697	80	1610
% of Volume	101	99	100	100
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

6: Bissonnet & Dunlavy Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	5.1	3.9	7.7	19.0	5.3
Vehicles Entered	833	647	4	82	1566
Vehicles Exited	833	647	4	81	1565
Hourly Exit Rate	833	647	4	81	1565
Input Volume	822	659	5	76	1562
% of Volume	101	98	80	107	100
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

7: Bissonnet & Mandell Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	26.2	42.7	34.5	41.5	34.3
Vehicles Entered	752	628	313	113	1806
Vehicles Exited	750	624	314	113	1801
Hourly Exit Rate	750	624	314	113	1801
Input Volume	745	629	319	115	1808
% of Volume	101	99	98	98	100
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

11: Bissonnet & Montrose Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	16.4	43.2	27.8	22.7	26.9
Vehicles Entered	827	708	802	812	3149
Vehicles Exited	828	706	804	812	3150
Hourly Exit Rate	828	706	804	812	3150
Input Volume	825	723	794	806	3148
% of Volume	100	98	101	101	100
Denied Entry Before	0	1	0	0	1
Denied Entry After	0	1	0	0	1

Queuing and Blocking Report

Simulation Results
Future Traffic With Development

Intersection: 4: Bissonnet & Ashby

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	112	144	104
Average Queue (ft)	9	52	43
95th Queue (ft)	65	138	81
Link Distance (ft)	539	132	244
Upstream Blk Time (%)		2	
Queuing Penalty (veh)		12	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Bissonnet & 1717 Bissonnet Dwy

Movement	EB	WB	NB	NB
Directions Served	TR	LT	L	R
Maximum Queue (ft)	136	234	87	63
Average Queue (ft)	17	91	30	28
95th Queue (ft)	80	225	65	55
Link Distance (ft)	132	230	197	197
Upstream Blk Time (%)	1	1		
Queuing Penalty (veh)	4	7		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Bissonnet & Dunlavy

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LR	LTR
Maximum Queue (ft)	244	199	30	127
Average Queue (ft)	106	13	4	45
95th Queue (ft)	244	84	20	95
Link Distance (ft)	230	866	165	245
Upstream Blk Time (%)	2			0
Queuing Penalty (veh)	19			0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 42

Arterial Level of Service

Simulation Results
Future Traffic With Development

Arterial Level of Service: EB Bissonnet

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	30	10.2	23.5	0.1	17
Greenbriar	1	26.8	32.7	0.1	6
Shepherd	2	32.0	48.4	0.1	12
	31	1.5	5.9	0.0	24
	32	1.7	12.4	0.1	26
Hazard	3	10.4	20.7	0.1	16
	34	1.8	13.7	0.1	26
Ashby	4	1.8	14.9	0.1	27
1717 Bissonnet Dwy	5	1.5	5.5	0.0	21
Southampton Est	6	4.7	10.8	0.1	17
Mandell	7	26.0	46.1	0.2	14
	8	4.9	37.2	0.3	25
	9	0.5	5.3	0.0	27
	10	2.5	22.7	0.2	27
Montrose	11	13.6	19.7	0.1	10
Total		139.8	319.4	1.5	17

Arterial Level of Service: WB Bissonnet

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Montrose	11	54.7	73.9	0.2	8
	10	2.1	9.1	0.1	22
	9	1.4	22.0	0.2	28
	8	0.4	5.0	0.0	28
Mandell	7	42.7	72.6	0.3	13
Dunlavy	6	4.3	25.6	0.2	24
1717 Bissonnet Dwy	5	4.0	10.3	0.1	18
Ashby	4	2.0	5.8	0.0	19
	34	1.4	14.7	0.1	27
Hazard	3	10.4	22.2	0.1	16
	32	3.2	14.0	0.1	23
	31	17.4	28.0	0.1	11
Shepherd	2	34.4	38.6	0.0	5
Greenbriar	1	14.9	30.4	0.1	16
	30	1.1	7.2	0.1	27
Total		194.3	379.4	1.6	15

SimTraffic Performance Report

Simulation Results
Future Traffic (No Restaurant)

1: Bissonnet & Greenbriar Performance by approach

Approach	EB	WB	SB	All
Delay / Veh (s)	26.7	16.3	27.7	24.9
Vehicles Entered	646	680	1667	2993
Vehicles Exited	645	680	1665	2990
Hourly Exit Rate	645	680	1665	2990
Input Volume	651	694	1635	2980
% of Volume	99	98	102	100
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

2: Bissonnet & Shepherd Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	31.5	34.1	72.8	49.5
Vehicles Entered	935	715	1194	2844
Vehicles Exited	935	715	1187	2837
Hourly Exit Rate	935	715	1187	2837
Input Volume	950	731	1208	2889
% of Volume	98	98	98	98
Denied Entry Before	1	1	0	2
Denied Entry After	0	2	2	4

3: Bissonnet & Hazard Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	9.9	11.0	21.9	31.8	13.7
Vehicles Entered	858	664	183	199	1904
Vehicles Exited	858	660	181	198	1897
Hourly Exit Rate	858	660	181	198	1897
Input Volume	867	664	187	194	1912
% of Volume	99	99	97	102	99
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

4: Bissonnet & Ashby Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	1.8	2.2	16.0	2.7
Vehicles Entered	800	680	83	1563
Vehicles Exited	802	680	83	1565
Hourly Exit Rate	802	680	83	1565
Input Volume	809	679	85	1573
% of Volume	99	100	98	99
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

SimTraffic Performance Report

Simulation Results
Future Traffic (No Restaurant)

5: Bissonnet & 1717 Bissonnet Dwy Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	1.4	3.4	17.5	3.0
Vehicles Entered	812	684	71	1567
Vehicles Exited	813	685	72	1570
Hourly Exit Rate	813	685	72	1570
Input Volume	820	685	69	1574
% of Volume	99	100	104	100
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

6: Bissonnet & Dunlavy Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	4.7	3.5	7.6	12.2	4.5
Vehicles Entered	810	650	5	70	1535
Vehicles Exited	810	652	5	70	1537
Hourly Exit Rate	810	652	5	70	1537
Input Volume	817	650	5	73	1545
% of Volume	99	100	100	96	99
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

7: Bissonnet & Mandell Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	27.9	46.2	38.5	37.1	36.7
Vehicles Entered	733	618	312	113	1776
Vehicles Exited	735	624	314	113	1786
Hourly Exit Rate	735	624	314	113	1786
Input Volume	741	619	319	115	1794
% of Volume	99	101	98	98	100
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

11: Bissonnet & Montrose Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	15.9	35.6	28.8	22.7	25.4
Vehicles Entered	813	707	770	800	3090
Vehicles Exited	813	707	771	799	3090
Hourly Exit Rate	813	707	771	799	3090
Input Volume	821	713	794	806	3134
% of Volume	99	99	97	99	99
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	1	0	0	1

SimTraffic Performance Report

Simulation Results
Future Traffic (No Retail/Spa)

1: Bissonnet & Greenbriar Performance by approach

Approach	EB	WB	SB	All
Delay / Veh (s)	26.5	16.7	25.5	23.8
Vehicles Entered	655	657	1590	2902
Vehicles Exited	656	655	1592	2903
Hourly Exit Rate	656	655	1592	2903
Input Volume	652	688	1635	2975
% of Volume	101	95	97	98
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

2: Bissonnet & Shepherd Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	30.7	32.1	65.7	46.0
Vehicles Entered	932	699	1223	2854
Vehicles Exited	934	700	1216	2850
Hourly Exit Rate	934	700	1216	2850
Input Volume	951	725	1208	2884
% of Volume	98	97	101	99
Denied Entry Before	2	1	0	3
Denied Entry After	0	2	0	2

3: Bissonnet & Hazard Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	10.3	10.4	20.9	34.5	13.9
Vehicles Entered	853	641	188	189	1871
Vehicles Exited	854	640	189	192	1875
Hourly Exit Rate	854	640	189	192	1875
Input Volume	868	658	187	194	1907
% of Volume	98	97	101	99	98
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

4: Bissonnet & Ashby Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	1.7	2.2	16.3	2.7
Vehicles Entered	800	653	81	1534
Vehicles Exited	802	652	80	1534
Hourly Exit Rate	802	652	80	1534
Input Volume	810	672	86	1568
% of Volume	99	97	93	98
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

SimTraffic Performance Report

Simulation Results
Future Traffic (No Retail/Spa)

5: Bissonnet & 1717 Bissonnet Dwy Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	1.1	4.2	18.0	3.1
Vehicles Entered	808	671	53	1532
Vehicles Exited	808	670	53	1531
Hourly Exit Rate	808	670	53	1531
Input Volume	822	687	55	1564
% of Volume	98	98	96	98
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

6: Bissonnet & Dunlavy Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	4.3	3.7	13.0	12.4	4.5
Vehicles Entered	800	640	5	74	1519
Vehicles Exited	800	637	5	74	1516
Hourly Exit Rate	800	637	5	74	1516
Input Volume	810	651	5	74	1540
% of Volume	99	98	100	100	98
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

7: Bissonnet & Mandell Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	27.7	38.3	39.0	38.3	34.1
Vehicles Entered	723	610	325	107	1765
Vehicles Exited	718	611	324	106	1759
Hourly Exit Rate	718	611	324	106	1759
Input Volume	735	620	319	115	1789
% of Volume	98	99	102	92	98
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

11: Bissonnet & Montrose Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	15.2	38.1	28.5	22.4	25.7
Vehicles Entered	784	707	795	795	3081
Vehicles Exited	785	709	794	794	3082
Hourly Exit Rate	785	709	794	794	3082
Input Volume	815	714	794	806	3129
% of Volume	96	99	100	99	98
Denied Entry Before	0	1	0	0	1
Denied Entry After	0	0	0	0	0

SimTraffic Performance Report

Simulation Results
Future Traffic (No Office)

1: Bissonnet & Greenbriar Performance by approach

Approach	EB	WB	SB	All
Delay / Veh (s)	26.8	18.6	24.9	23.8
Vehicles Entered	641	690	1616	2947
Vehicles Exited	641	690	1615	2946
Hourly Exit Rate	641	690	1615	2946
Input Volume	660	695	1635	2990
% of Volume	97	99	99	99
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	1	1

2: Bissonnet & Shepherd Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	29.7	39.7	80.5	53.7
Vehicles Entered	936	725	1219	2880
Vehicles Exited	937	725	1207	2869
Hourly Exit Rate	937	725	1207	2869
Input Volume	959	732	1208	2899
% of Volume	98	99	100	99
Denied Entry Before	1	1	0	2
Denied Entry After	0	6	9	15

3: Bissonnet & Hazard Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	10.7	11.3	21.5	35.2	14.3
Vehicles Entered	852	675	178	186	1891
Vehicles Exited	852	676	177	187	1892
Hourly Exit Rate	852	676	177	187	1892
Input Volume	876	669	187	194	1926
% of Volume	97	101	95	96	98
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

4: Bissonnet & Ashby Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	1.7	2.4	13.1	2.5
Vehicles Entered	796	703	77	1576
Vehicles Exited	794	701	79	1574
Hourly Exit Rate	794	701	79	1574
Input Volume	818	689	88	1595
% of Volume	97	102	90	99
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

SimTraffic Performance Report

Simulation Results
Future Traffic (No Office)

5: Bissonnet & 1717 Bissonnet Dwy Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	1.3	4.1	20.0	3.4
Vehicles Entered	804	706	69	1579
Vehicles Exited	803	706	69	1578
Hourly Exit Rate	803	706	69	1578
Input Volume	832	697	72	1601
% of Volume	97	101	96	99
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

6: Bissonnet & Dunlavy Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	4.6	4.2	8.2	15.0	4.9
Vehicles Entered	789	664	4	80	1537
Vehicles Exited	789	664	4	80	1537
Hourly Exit Rate	789	664	4	80	1537
Input Volume	818	659	5	76	1558
% of Volume	96	101	80	105	99
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

7: Bissonnet & Mandell Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	23.6	40.8	36.0	36.1	32.7
Vehicles Entered	710	626	307	113	1756
Vehicles Exited	712	626	306	112	1756
Hourly Exit Rate	712	626	306	112	1756
Input Volume	735	628	319	115	1797
% of Volume	97	100	96	97	98
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

11: Bissonnet & Montrose Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	15.3	41.0	27.6	21.9	26.0
Vehicles Entered	784	697	792	793	3066
Vehicles Exited	781	701	793	788	3063
Hourly Exit Rate	781	701	793	788	3063
Input Volume	822	722	794	806	3144
% of Volume	95	97	100	98	97
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	1	0	1	2

SimTraffic Performance Report

Simulation Results
Future Traffic (134 Residential Units)

1: Bissonnet & Greenbriar Performance by approach

Approach	EB	WB	SB	All
Delay / Veh (s)	26.5	16.4	25.4	23.5
Vehicles Entered	650	696	1634	2980
Vehicles Exited	650	697	1635	2982
Hourly Exit Rate	650	697	1635	2982
Input Volume	651	692	1635	2978
% of Volume	100	101	100	100
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

2: Bissonnet & Shepherd Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	28.7	35.8	62.5	44.5
Vehicles Entered	948	730	1191	2869
Vehicles Exited	955	729	1179	2863
Hourly Exit Rate	955	729	1179	2863
Input Volume	950	729	1208	2887
% of Volume	101	100	98	99
Denied Entry Before	2	1	0	3
Denied Entry After	1	4	2	7

3: Bissonnet & Hazard Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	10.5	12.1	21.4	30.4	14.0
Vehicles Entered	871	676	183	188	1918
Vehicles Exited	871	676	184	188	1919
Hourly Exit Rate	871	676	184	188	1919
Input Volume	867	662	187	194	1910
% of Volume	100	102	98	97	100
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

4: Bissonnet & Ashby Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	1.7	2.1	13.2	2.5
Vehicles Entered	806	689	86	1581
Vehicles Exited	806	690	85	1581
Hourly Exit Rate	806	690	85	1581
Input Volume	809	677	85	1571
% of Volume	100	102	100	101
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

SimTraffic Performance Report

Simulation Results
Future Traffic (134 Residential Units)

5: Bissonnet & 1717 Bissonnet Dwy Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	1.3	4.2	19.1	3.3
Vehicles Entered	818	698	68	1584
Vehicles Exited	818	698	68	1584
Hourly Exit Rate	818	698	68	1584
Input Volume	820	685	65	1570
% of Volume	100	102	105	101
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

6: Bissonnet & Dunlavy Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	4.4	3.9	11.9	14.9	4.7
Vehicles Entered	815	666	5	74	1560
Vehicles Exited	812	667	5	74	1558
Hourly Exit Rate	812	667	5	74	1558
Input Volume	815	650	5	73	1543
% of Volume	100	103	100	101	101
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

7: Bissonnet & Mandell Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	29.7	51.9	35.9	40.0	39.3
Vehicles Entered	737	633	322	113	1805
Vehicles Exited	728	633	324	114	1799
Hourly Exit Rate	728	633	324	114	1799
Input Volume	739	619	319	115	1792
% of Volume	99	102	102	99	100
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

11: Bissonnet & Montrose Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	16.1	43.1	28.7	22.2	27.1
Vehicles Entered	807	724	796	804	3131
Vehicles Exited	807	721	796	803	3127
Hourly Exit Rate	807	721	796	803	3127
Input Volume	819	713	794	806	3132
% of Volume	99	101	100	100	100
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

SimTraffic Performance Report

Simulation Results
Future Traffic (TWLTL)

1: Bissonnet & Greenbriar Performance by approach

Approach	EB	WB	SB	All
Delay / Veh (s)	26.3	15.9	27.2	24.5
Vehicles Entered	654	672	1648	2974
Vehicles Exited	655	671	1648	2974
Hourly Exit Rate	655	671	1648	2974
Input Volume	661	698	1635	2994
% of Volume	99	96	101	99
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

2: Bissonnet & Shepherd Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	31.9	34.9	60.6	44.5
Vehicles Entered	958	706	1181	2845
Vehicles Exited	959	706	1183	2848
Hourly Exit Rate	959	706	1183	2848
Input Volume	960	735	1208	2903
% of Volume	100	96	98	98
Denied Entry Before	1	1	0	2
Denied Entry After	1	4	2	7

3: Bissonnet & Hazard Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	10.8	10.1	21.6	30.9	13.6
Vehicles Entered	874	655	189	184	1902
Vehicles Exited	875	653	189	183	1900
Hourly Exit Rate	875	653	189	183	1900
Input Volume	877	668	187	194	1926
% of Volume	100	98	101	94	99
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

4: Bissonnet & Ashby Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	2.1	0.8	14.6	2.3
Vehicles Entered	832	670	90	1592
Vehicles Exited	832	670	91	1593
Hourly Exit Rate	832	670	91	1593
Input Volume	819	685	88	1592
% of Volume	102	98	103	100
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

SimTraffic Performance Report

Simulation Results
Future Traffic (TWLTL)

5: Bissonnet & 1717 Bissonnet Dwy Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	1.2	1.5	16.4	2.1
Vehicles Entered	843	678	82	1603
Vehicles Exited	843	677	82	1602
Hourly Exit Rate	843	677	82	1602
Input Volume	833	697	80	1610
% of Volume	101	97	102	100
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

6: Bissonnet & Dunlavy Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	2.2	3.8	8.5	13.9	3.4
Vehicles Entered	831	644	6	75	1556
Vehicles Exited	834	644	6	74	1558
Hourly Exit Rate	834	644	6	74	1558
Input Volume	822	659	5	76	1562
% of Volume	101	98	120	97	100
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

7: Bissonnet & Mandell Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	31.0	54.9	38.9	41.6	41.2
Vehicles Entered	755	624	320	117	1816
Vehicles Exited	754	617	319	117	1807
Hourly Exit Rate	754	617	319	117	1807
Input Volume	745	629	319	115	1808
% of Volume	101	98	100	102	100
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	2	0	0	2

11: Bissonnet & Montrose Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	15.9	48.7	27.8	20.5	27.6
Vehicles Entered	840	719	807	795	3161
Vehicles Exited	840	716	807	795	3158
Hourly Exit Rate	840	716	807	795	3158
Input Volume	825	723	794	806	3148
% of Volume	102	99	102	99	100
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	1	0	0	1

SimTraffic Performance Report

Simulation Results
Future Traffic (BBLTL)

1: Bissonnet & Greenbriar Performance by approach

Approach	EB	WB	SB	All
Delay / Veh (s)	26.5	16.5	25.9	23.9
Vehicles Entered	664	668	1616	2948
Vehicles Exited	663	668	1618	2949
Hourly Exit Rate	663	668	1618	2949
Input Volume	670	674	1636	2980
% of Volume	99	99	99	99
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

2: Bissonnet & Shepherd Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	34.0	36.2	65.0	47.5
Vehicles Entered	958	705	1200	2863
Vehicles Exited	956	703	1188	2847
Hourly Exit Rate	956	703	1188	2847
Input Volume	970	711	1209	2890
% of Volume	99	99	98	99
Denied Entry Before	1	1	0	2
Denied Entry After	1	1	4	6

3: Bissonnet & Hazard Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	10.6	10.2	20.8	33.1	13.8
Vehicles Entered	875	647	182	196	1900
Vehicles Exited	875	645	182	196	1898
Hourly Exit Rate	875	645	182	196	1898
Input Volume	888	644	188	195	1915
% of Volume	99	100	97	101	99
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

4: Bissonnet & Ashby Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	1.9	0.7	12.6	2.2
Vehicles Entered	816	646	120	1582
Vehicles Exited	815	646	119	1580
Hourly Exit Rate	815	646	119	1580
Input Volume	832	645	127	1604
% of Volume	98	100	94	99
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

5: Bissonnet & 1717 Bissonnet Dwy Performance by approach

Approach	EB	WB	NB	All
Delay / Veh (s)	1.2	0.7	8.6	1.4
Vehicles Entered	860	647	71	1578
Vehicles Exited	860	646	71	1577
Hourly Exit Rate	860	646	71	1577
Input Volume	885	645	80	1610
% of Volume	97	100	89	98
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

6: Bissonnet & Dunlavy Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	2.0	3.8	14.3	12.3	3.2
Vehicles Entered	837	631	4	72	1544
Vehicles Exited	837	630	4	72	1543
Hourly Exit Rate	837	630	4	72	1543
Input Volume	862	629	5	69	1565
% of Volume	97	100	80	104	99
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

7: Bissonnet & Mandell Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	28.7	47.3	37.3	37.9	37.3
Vehicles Entered	717	604	305	121	1747
Vehicles Exited	719	603	307	121	1750
Hourly Exit Rate	719	603	307	121	1750
Input Volume	748	601	319	115	1783
% of Volume	96	100	96	105	98
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

11: Bissonnet & Montrose Performance by approach

Approach	EB	WB	NB	SB	All
Delay / Veh (s)	15.8	42.9	28.2	21.6	26.6
Vehicles Entered	798	700	793	818	3109
Vehicles Exited	794	697	793	821	3105
Hourly Exit Rate	794	697	793	821	3105
Input Volume	827	695	794	806	3122
% of Volume	96	100	100	102	99
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0