AMERICAN PHARMACISTS ASSOCIATION
TRAFFIC IMPACT STUDY
WASHINGTON, D.C.

Prepared for:
American Pharmacists Association

Prepared by:
Wells & Associates, LLC

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ZONING COMMISSION
District of Columbia
CASE NO. 04-01
EXHIBIT NO. 20B

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INTRODUCTION

This report presents the results of a traffic impact study of the American Pharmacists Association (APhA) site, which includes both the property now owned by APhA and the remainder of Square 62, which APhA proposes to acquire from the General Services Administration (GSA).

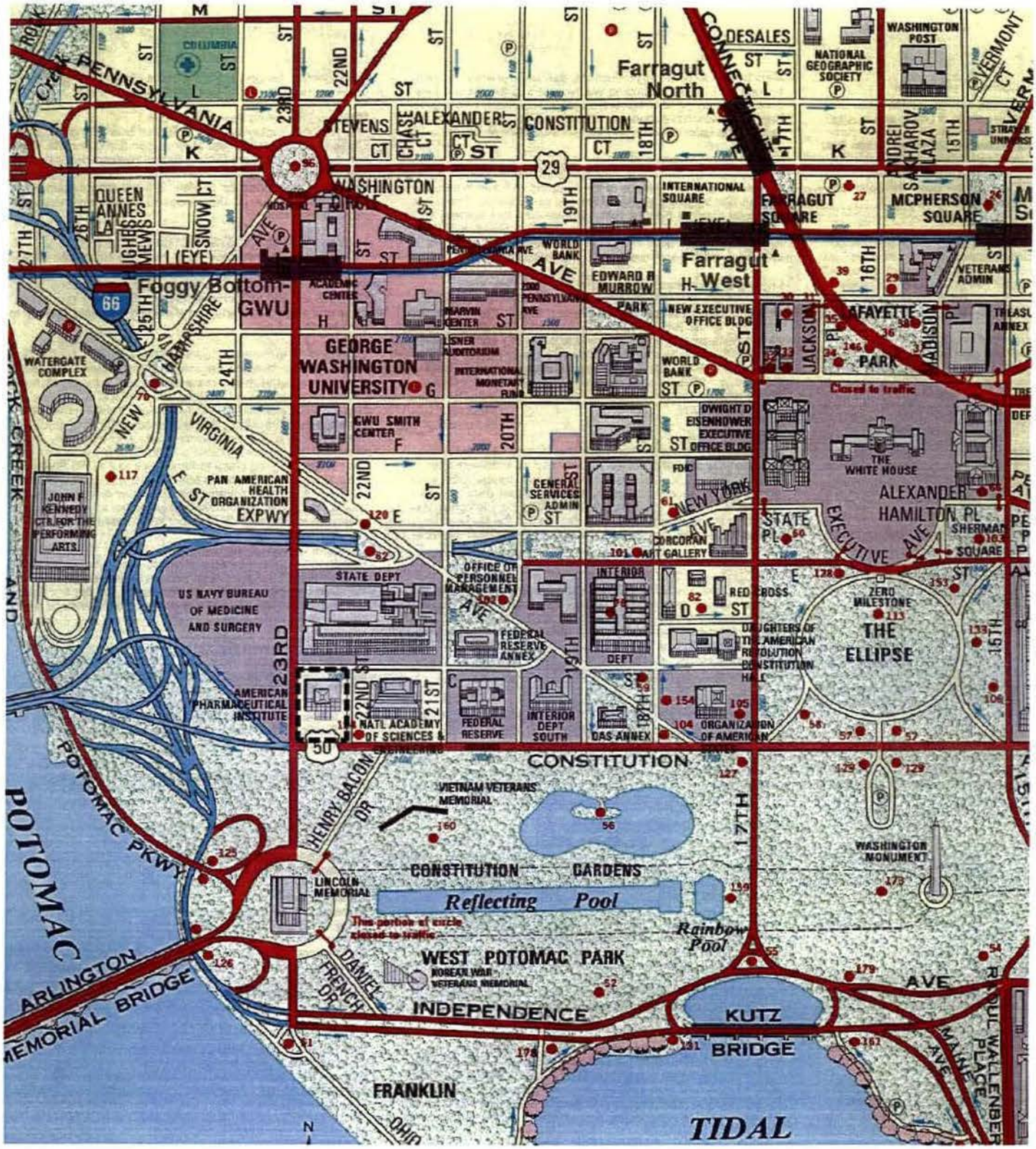
The subject site is bounded by C Street on the north, Constitution Avenue on the south, 22nd Street on the east, and 23rd Street on the west in the northwest section of Washington, D.C., as shown on Figure 1. The U.S. Department of State (DOS) is located immediately north of APhA, the National Academy of Sciences and Engineering is located to the east, and the U.S. Navy Bureau of Medicine and Surgery is located to the west.

APhA headquarters staff occupies the existing 48,983 gross square foot (GSF) building that includes the 17,033 SF Pope Building with its 31,950 SF addition. The building is served by 35 surface parking spaces. Full-movement driveways are located on 22nd and 23rd Streets.

APhA proposes to demolish the 31,950 GSF addition of its existing building (the Annex) and build a new addition of 193,750 GSF, for a total building area of 210,783 GSF that includes space below grade. Thus, 161,800 GSF will be added on the APhA site (i.e., 210,783 - 48,983 = 161,800 GSF). This building will be served by 150 underground structured parking spaces.

Full-movement driveways to the APhA site would be retained on both 22nd and 23rd Streets, as shown on Figure 2. This is preferable to a single driveway since two driveways would better disburse site traffic and provide a second, emergency driveway in case one driveway is closed for any reason.

For purposes of this traffic analysis, this development was assumed to be completely built and occupied by 2005.



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Figure 1

Site Location

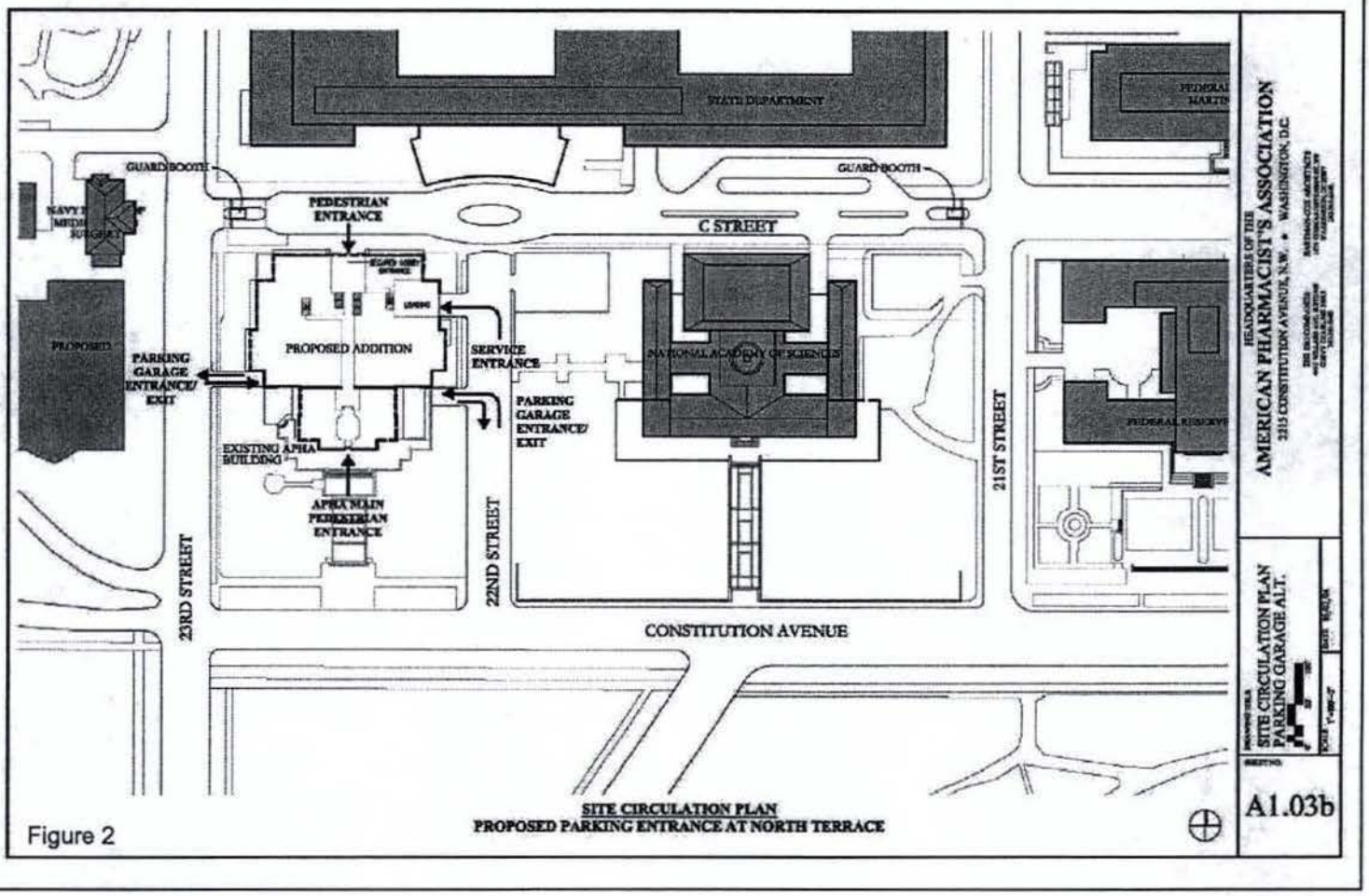
North

Schematic

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SITE CIRCULATION PLAN
PROPOSED PARKING ENTRANCE AT NORTH TERRACE

Figure 2

Tasks undertaken in this study included the following:

1. Review the APhA's proposed development plans and other background data.

2. A field reconnaissance of existing roadway and intersection geometrics, traffic controls, and traffic signal phasings/timings.

3. Attendance at a scoping meeting with District Division of Transportation (DDOT) staff.

4. Counts of existing traffic at four key intersections and the two existing APhA driveways.

5. Analysis of existing levels of service at these intersections.

6. Background future traffic volumes were forecasted for project buildout, 2005.

7. Background levels of service were calculated at key intersections based on background traffic forecasts, existing traffic controls, and existing intersection geometrics.

8. The number of AM and PM peak hour trips that would be generated by the proposed expansion were estimated based on: (1) Institute of Transportation Engineers (ITE) trip generation rates, (2) the proximity of the project to the nearest Metro stations, and (3) experience with other comparable projects in Washington, D.C.

9. Total future traffic volumes were forecasted for project buildout, 2005.

10. Total future levels of service were calculated at key intersections based on total future traffic forecasts, existing traffic controls, and existing intersection geometrics.

11. Operational improvements required to adequately accommodate site traffic were identified.

Sources of data for this analysis included traffic counts conducted by Wells & Associates, ITE, the Washington Metropolitan Area Transit Authority (WMATA), the District of Columbia, the APhA, and The JBG Companies.

The conclusions of this study are as follows:

1. ***All intersections in the study area currently operate within their theoretical capacities, at level of service (LOS) "C" or better, during both the AM and PM peak hours.***

2. ***Long queues of vehicles and stop delays were observed on eastbound Constitution Avenue (on the Theodore Roosevelt Bridge) and on northbound 23rd Street during the AM peak hour, and on westbound Constitution Avenue and southbound 23rd Street during the PM peak hour, due to heavy traffic volumes and the limited green time allocated to these approaches. These queues occasionally back up into adjacent intersections.***

3. ***All intersections in the study area would continue to operate at LOS "C" in 2005, without the expanded APhA.***

4. ***APhA is conveniently located near the Foggy Bottom Metro station and several Metrobus routes.***

5. ***The proposed 161,800 GSF expansion is anticipated to generate 86 net additional AM peak hour vehicle-trips and 82 net additional PM peak hour vehicle-trips.***

6. ***The APhA driveway/22nd Street intersection is forecasted to operate at an acceptable LOS "A" during both the AM and PM peak hours.***

7. *The APhA driveway/23rd Street intersection is forecasted to operate at an acceptable LOS "D" or better during the AM and PM peak hours.*

8. *The modest traffic volumes that would be generated by the proposed APhA project would add less than one second of delay per vehicle during both the AM and PM peak hours at nearby public street intersections. This additional delay would be imperceptible.*

9. *The proposed 150-space parking supply would adequately meet project parking demands. This supply is 33 (or 28 percent) more spaces that would be required under the SP-2 zoning designation.*

10. *It is recommended that access plans on 22nd Street for the secured Department of State driveway, the new APhA driveway, and the existing National Academy of Sciences driveway be coordinated.*

BACKGROUND DATA

Study Scope

This traffic study was conducted in accordance with a scoping agreement between Wells & Associates and DDOT staff. This study includes the following intersections:

1. 23rd Street/C Street,
2. 23rd Street/APhA Driveway,
3. 23rd Street/Constitution Avenue,
4. 22nd Street/C Street,
5. 22nd Street/APhA Driveway, and
6. 22nd Street/Constitution Avenue.

The impact of the subject project was evaluated at project buildout, which is anticipated to occur in 2005.

Level of service (LOS) "D" is considered the minimum acceptable level of service in urban areas such as Washington, D.C. However, there are many areas within an urban region (e.g., downtown) for which LOS "E" (saturated flow or full capacity) is accepted for short periods of time, such as during peak commuter periods.

Public Road Network

Existing Network. I-66, Constitution Avenue (U.S. Route 50), and Independence Avenue provide regional access to the APhA site. Local access is provided by 22nd and 23rd Streets. Existing intersection lane use and traffic control at key intersections in the site vicinity are shown on Figure 3.

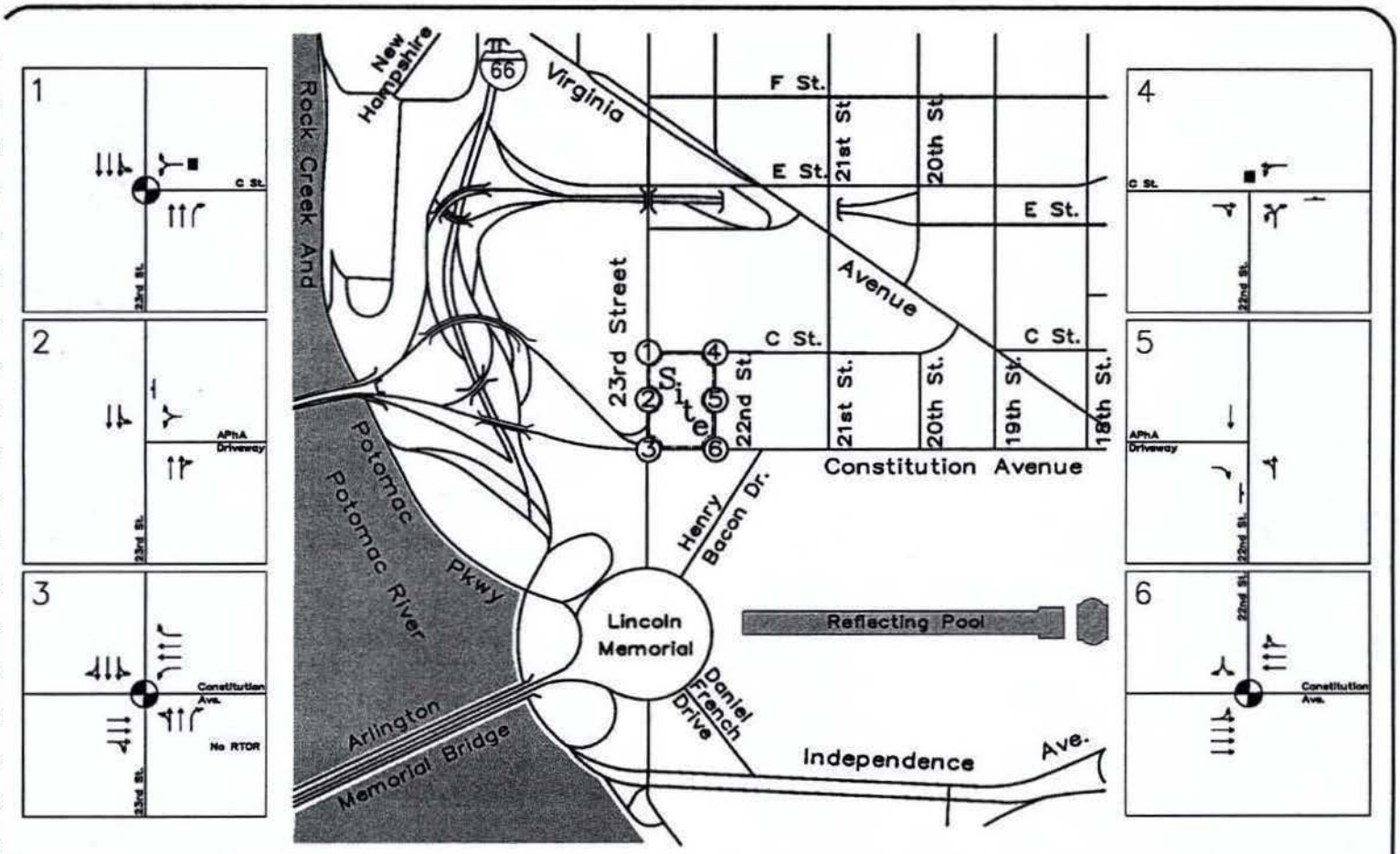


Figure 3
Existing Lane Use and Traffic Control

Represents One Travel Lane
Signalized Intersection
Stop Sign
RTOR Right Turn On Red
Secured Access
North Schematic

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Future Improvements. C Street, between 21st and 23rd Street, and 21st Street between C Street and Virginia Avenue, adjacent to the State Department, are restricted to authorized traffic for security reasons. Future traffic conditions were evaluated in this report assuming that restricted conditions remain in place.

Existing Traffic Counts

Existing Counts. Existing AM and PM peak period traffic counts were conducted by Wells & Associates on December 10th, and 17th 2002 at the following intersections, with the exception of the 23rd Street APhA driveway, which was counted on May 16, 2001:

1. 23rd Street/C Street,
2. 23rd Street/APhA Driveway,
3. 23rd Street/Constitution Avenue,
4. 22nd Street/C Street,
5. 22nd Street/APhA Driveway, and
6. 22nd Street/Constitution Avenue.

The results are included in Appendix A and summarized on Figure 4.

The AM peak hour generally occurred at 8:15 to 9:15 AM, and the PM peak hour generally occurred at 5:15 to 6:15 PM. Constitution Avenue and 23rd Street carry heavy peak hour traffic volumes. 22nd Street carries modest volumes. C Street is restricted to State Department traffic.

Constitution Avenue, east of 23rd Street, carried 2,827 AM peak hour trips, and 3,081 PM peak hour trips. Approximately 60 percent of these trips traveled eastbound toward downtown Washington in the morning, and 53 percent traveled westbound in the afternoon.

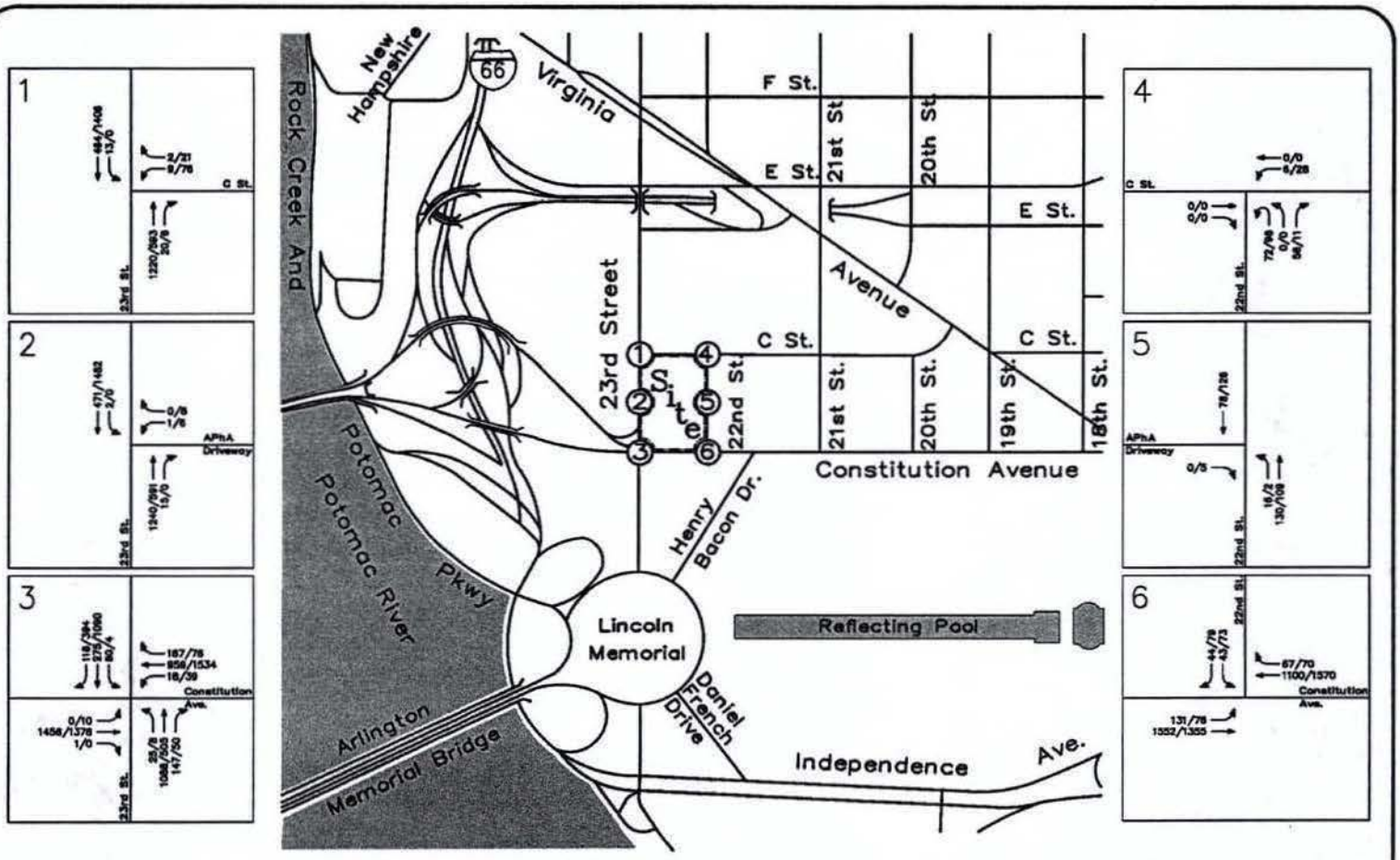


Figure 4
Existing Peak Hour Volumes

AM PEAK HOUR
PM PEAK HOUR
000/000

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23rd Street, north of Constitution Avenue, carried 1,728 AM peak hour trips, and 2,079 PM peak hour trips. Approximately three-quarters of these trips traveled northbound toward downtown in the morning and southbound away from downtown in the afternoon.

C Street, which is restricted to State Department traffic only, carried 64 to 39 peak hour trips. 22nd Street which provides local access only to the APhA, National Academy of Sciences, and the State department carried 285 to 298 peak hour trips.

Driveway Counts. The existing 48,983 S.F. APhA headquarters generates 34 trips at 8:15 to 9:15 AM (or 0.69 trip per 1,000 S.F.), and 21 trips at 5:15 to 6:15 PM (or 0.43 trips per 1,000 S.F.), based on counts at APhA's 22nd and 23rd Street driveways.

Public Transportation Facilities and Services

Seven Metrobus lines and two Metrorail stations serve APhA. Metrobus Lines 13A/B and 13F/G operate on Constitution Avenue adjacent to the site. Other nearby bus lines are listed on Table 1.

The Foggy Bottom Metro station, which serves the Orange and Blue Lines, is located seven blocks (or approximately 2,600 feet) north of the APhA on Eye Street. The Farragut North Metro Station, which serves the Red Line, is located 13 blocks (or approximately 4,600 feet) northeast of the site on Connecticut Avenue at K Street.

Table 1
American Pharmacists Association
Bus Routes In Site Vicinity

Route No.	Route Name
13A, 13B, 13F, 13G	Ronald Reagan Washington National Airport-Pentagon-DC Line
H1	Brookland-Potomac Park Line
L1	Connecticut Avenue Line
P1	Anacostia-Eckington Line
X1	Benning Road-Potomac Park Line
N3	Massachusetts Avenue Line

Source: Washington Metropolitan Area Transit Authority

ANALYSIS

Existing Levels of Service

Existing peak hour levels of service were estimated at the six key intersections in the study area based on the existing lane usage and traffic control shown on Figure 2, the existing traffic volumes shown on Figure 3, and the Highway Capacity Manual and Synchro analysis methodologies. The results are presented in Appendix B and summarized in Table 2.

Table 2 indicates that the C Street/23rd Street, Constitution Avenue/23rd Street, and Constitution Avenue/22nd Street signalized intersections currently operate at LOS "C" or better during peak hours.

Left turns out of the APhA driveway on 23rd Street (which were made by only one vehicle in the AM peak hour and six vehicles in the PM peak hour) operate at acceptable LOS "C" in the AM peak hour. APhA traffic relies on gaps created in 23rd Street traffic by nearby upstream and downstream traffic signals. All other turning movements at this and other stop-sign-controlled intersections operate at an acceptable LOS "A".

Long queues of vehicles and stop delays were observed on eastbound Constitution Avenue (on the Theodore Roosevelt Bridge) and northbound on 23rd Street during the AM peak hour, and on westbound Constitution Avenue and southbound 23rd Street during the PM peak hour, due to heavy traffic volumes and the limited green time allocated to these approaches. These queues occasionally back up into adjacent intersections, causing greater delays than reported by the HCM capacity analysis method.

Table 2
American Pharmacists Association
Intersection Levels of Service Summary[1]

No.	Intersection	Control	Approach/ Movement	Existing AM	Existing PM	Background[2] AM	Background[2] PM	Total Future[3] AM	Total Future[3] PM
1	**23rd Street/C Street**	Signal	Intersection	B [10 8]	A [8 4]	B [11 2]	A [8.4]	B [11.1]	A [8 4]
2	**23rd Street/APhA Driveway**	STOP	SBL	A [0 1]	A [0 0]	A [0 1]	A [0.0]	A [0 2]	A [0 0]
			WBL	C [23.8]	C [16.0]	C [24.8]	C [16 2]	D [32.8]	C [20 6]
3	**23rd Street/Constitution Avenue**	Signal	Intersection	C [20.1]	C [24.5]	C [20 6]	C [25 9]	C [20 9]	C [26.4]
4	**22nd Street/C Street**	STOP	WBL	A [7.2]	A [7 3]	A [7 2]	A [7.3]	A [7 2]	A [7.3]
			NB	A [8 5]	A [8.4]	A [8.5]	A [8 4]	A [8.5]	A [8.4]
5	**22nd Street/APhA Driveway**	STOP	EB	A [0 0]	A [9 0]	A [0.0]	A [9 0]	A [8 7]	A [9.2]
			NBL	A [0.9]	A [0 1]	A [0 9]	A [0 1]	A [3 0]	A [0 8]
6	**22nd Street/Constitution Avenue**	Signal	Intersection	B [11.4]	B [16 0]	B [11 5]	B [16 6]	B [11.9]	B [16.9]

Notes.

1. Numbers in brackets [] reflect delay in seconds per vehicle
2. Background is defined as projected future traffic conditions without proposed changes to the APhA site
3. Total Future is defined as projected future traffic conditions with proposed changes to the APhA site.

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Background Traffic Growth

Annual background traffic growth was estimated at one percent growth per year compounded for two years to 2005. This growth rate reflects the cumulative impact of regional traffic growth and traffic that will be generated by projects that have been approved in the District of Columbia but have not yet been built, such as the George Washington University expansion/re-development.

Traffic trends have been stable in recent years, with little to no growth each year. The one percent annual growth rate was used in the interest of conservatism. This growth rate was applied to all movements (with the exception of those entering or exiting the APhA site) on 23rd Street, C Street, 22nd Street, and Constitution Avenue. Background traffic growth was, therefore, estimated at two percent over the two-year period to 2005.

Background Traffic Forecasts

Background peak hour traffic forecasts, without the proposed APhA expansion, were estimated based on existing traffic counts and historic background traffic growth. The background traffic forecasts for the year of project buildout (2005) are shown on Figure 5.

Background Future Levels of Service

Future peak hour levels of service, without the proposed APhA expansion, were estimated at the six key intersections in the study area for the year of project buildout (2005) based on the intersection lane usage and traffic control shown on Figure 3; the background traffic forecasts shown on Figure 5; and the Highway Capacity Manual and Synchro analysis methodologies.

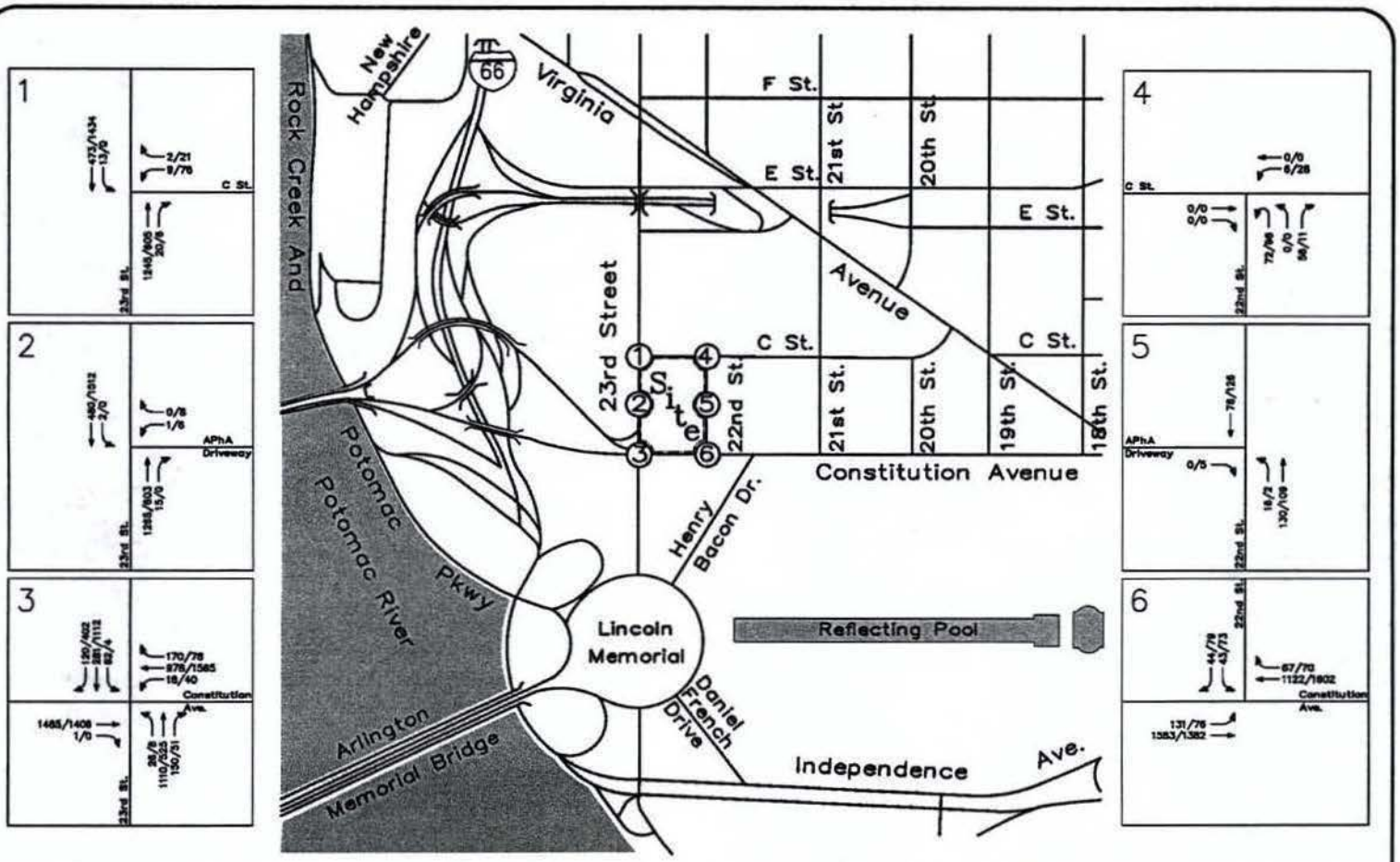


Figure 5
Background Future Peak Hour Traffic Forecasts

AM PEAK HOUR / PM PEAK HOUR
000/000

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The results are presented in Appendix C, and are summarized in Table 2.

Background traffic growth will not significantly change existing peak hour delays or levels of service, as shown in Table 2.

Site Trip Generation Analysis

The numbers of trips that will be generated by the proposed APhA expansion were estimated based on: (1) Institute of Transportation Engineers (ITE) trip generation rates, (2) the proximity of the project to the nearest Metro stations, and (3) experience with other comparable projects in Washington, D.C.

It is anticipated that approximately 60 percent of all APhA employees and visitors will commute by some mode other than private automobile, given the proximity of Metrorail and Metrobus services and the limited availability of parking on the subject site and vicinity. Average auto occupancy is estimated at 1.4 persons per vehicle.

It is estimated that the proposed 161,800 GSF expansion will generate 86 additional AM peak hour trips and 82 additional PM peak hour trips. The existing building and proposed expansion will generate a total of 120 AM peak hour trips and 103 PM peak hour trips, as shown in Table 3.

The proposed 150-space parking supply is 33 (or 28 percent) more spaces that would be required under the SP-2 zoning designation. As shown on Table 3, based on the number of trips generated with the proposed expansion, there would be a 73 percent (109 trips/150 spaces x 100) turnover rate during AM Peak Hour and a 58 percent (87 trips/150 spaces x 100) in the PM Peak Hour.

Table 3
American Pharmacists Association
Site Trip Generation Analysis

Trip Type/ Land Use	Development Program [4]	Units	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total
ITE Vehicle-Trips [1]								
Office	161,800	S.F	241	33	274	44	216	261
ITE Person-Trips [2]								
Office	161,800	S F.	265	36	301	49	238	287
APhA Vehicle Trips[3]								
Office	161,800	S F	76	10	86	14	68	82
Existing Parking	-	-	33	1	34	2	19	21
Total Future Vehicle Trips			109	11	120	16	87	103

Notes:

(1) Based on ITE, Trip Generation, 6th Edition Trip Generation equations for general office (710)

(2) Assumptions.

	Office
Non-auto mode split:	0%
Average vehicle occupancy (persons per vehicle)	1.1

(3) Assumptions

	Office
Non-auto mode split:	60%
Average vehicle occupancy (persons per vehicle)	1 4

(4) Source:
American Pharmacists Association

Trip Distribution Analysis

The distribution of peak hour site-generated trips was determined based on existing traffic counts, local knowledge, and engineering judgment. It is estimated that approximately five percent of all site-generated trips will approach from the north on 23rd Street, 35 percent will approach from the east on Constitution, 20 percent will approach from the west off of I-66 onto Constitution, and the remaining 40 percent will approach from the south on 23rd Street, traveling on Route 50 and Memorial Bridge (see Figure 6).

Site Traffic Assignments

These site-generated traffic volumes were assigned to the public road network according to this directional distribution. The resulting site traffic assignments are shown on Figure 6.

Total Future Traffic Forecasts

These site traffic assignments were added to the future background traffic volumes shown on Figure 5 to yield the total future traffic forecasts shown on Figure 7.

Total Future Levels of Service

Future peak hour levels of service with the proposed APhA expansion were estimated at the key intersections in the study area based on the lane usage and traffic controls shown on Figure 3; the total future traffic forecasts shown on Figure 7; and the Highway Capacity Manual and Synchro analysis methodologies. The results are presented in Appendix D and summarized in Table 2.

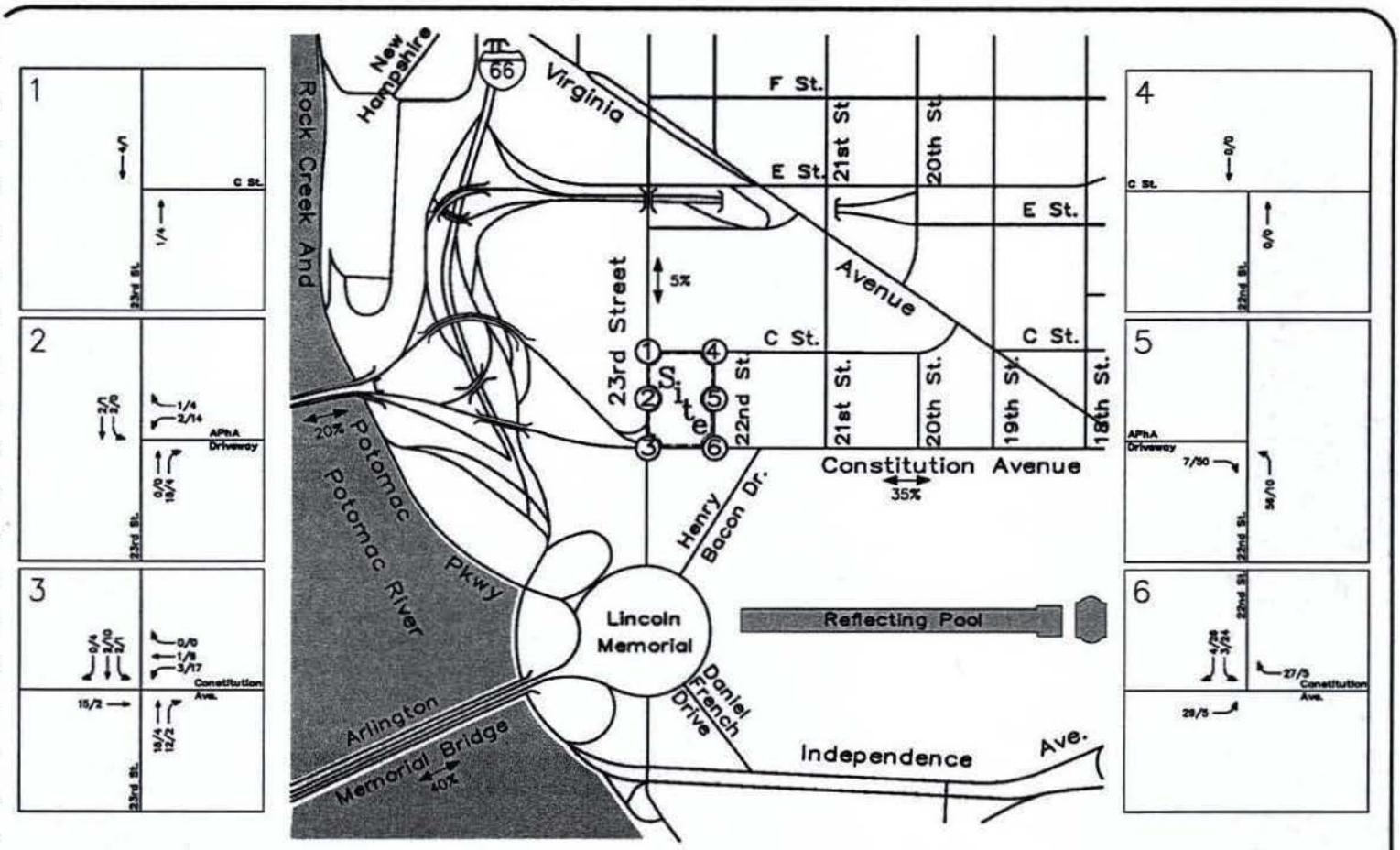


Figure 6
Site–Generated Peak Hour Traffic Assignments
And Directional Distribution

AM PEAK HOUR
PM PEAK HOUR
000/000

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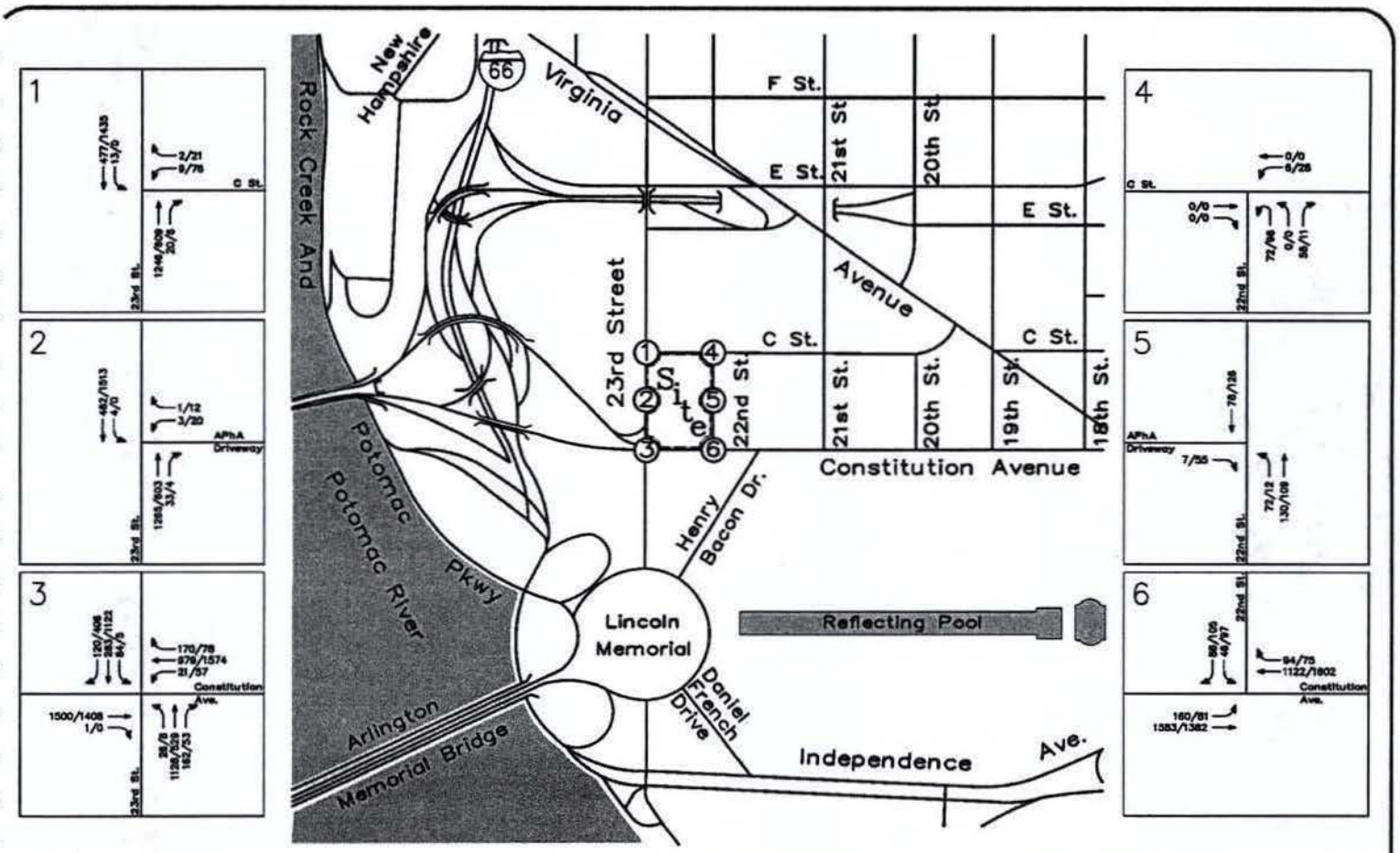


Figure 7
Total Future Peak Hour Traffic Forecasts

AM PEAK HOUR
PM PEAK HOUR
000/000

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Table 2 indicates that all other intersections will operate at an acceptable LOS "D" or better during both the AM and PM peak hours with the proposed APhA expansion. The proposed APhA expansion will have no significant adverse impact on traffic in the area.

CONCLUSIONS

The conclusions of this study are as follows:

1. All intersections in the study area currently operate within their theoretical capacities, at level of service (LOS) "C" or better, during both the AM and PM peak hours.

2. Long queues of vehicles and stop delays were observed on eastbound Constitution Avenue (on the Theodore Roosevelt Bridge) and on northbound 23rd Street during the AM peak hour, and on westbound Constitution Avenue and southbound 23rd Street during the PM peak hour, due to heavy traffic volumes and the limited green time allocated to these approaches. These queues occasionally back up into adjacent intersections.

3. All intersections in the study area would continue to operate at LOS "C" in 2005, without the expanded APhA.

4. APhA is conveniently located near the Foggy Bottom Metro station and several Metrobus routes.

5. The proposed 161,800 GSF expansion is anticipated to generate 86 net additional AM peak hour vehicle-trips and 82 net additional PM peak hour vehicle-trips.

6. The APhA driveway/22nd Street intersection is forecasted to operate at an acceptable LOS "A" during both the AM and PM peak hours.

7. The APhA driveway/23rd Street intersection is forecasted to operate at an acceptable LOS "D" or better during the AM and PM peak hours.

8. The modest traffic volumes that would be generated by the proposed APhA project would add less than one second of delay per vehicle during both the AM and PM peak hours at nearby public street intersections. This additional delay would be imperceptible.

9. The proposed 150-space parking supply would adequately meet project parking demands. This supply is 33 (or 28 percent) more spaces that would be required under the SP-2 zoning designation.

10. It is recommended that access plans on 22nd Street for the secured Department of State driveway, the new APhA driveway, and the existing National Academy of Sciences driveway be coordinated.

Appendix A

Existing Traffic Counts

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McLean, Virginia

Existing Traffic Count

PROJECT:	AphA	DATE:	12/10/2002	SOUTHBOUND ROAD.	23rd Street
W & A JOB NO.:	1528	DAY:	Tuesday	NORTHBOUND ROAD:	23rd Street
INTERSECTION:	23rd Street/C Street	WEATHER	Wet and Cold	WESTBOUND ROAD:	C Street
LOCATION:	Washington, DC	COUNTED BY:	The Stuarts	EASTBOUND ROAD:	
		INPUTED BY.	MLA		

Time Period	Turning Movements																		Total	PHF	Time Period
	Southbound 23rd Street				Westbound C Street				Northbound 23rd Street				Westbound C Street				North & South	East & West			
	2 Thru Car	2 Thru Bus	3 Left Car	Total	4 Right Car	4 Right Bus		Total	7 Right Car	7 Right Bus	8 Thru	Total	6 Left Car	6 Left Bus		Total					
7:00-7:15	61	1	0	62	2	0	0	2	20	0	201	221	1	0	0	1	283	3	288		7:00-7:15
7:15-7:30	68	2	0	70	3	0	0	3	6	0	191	197	0	0	0	0	267	3	270		7:15-7:30
7:30-7:45	86	2	2	90	2	0	0	2	8	0	257	265	0	0	0	0	355	2	357		7:30-7:45
7:45-8:00	101	4	13	118	4	1	0	5	15	0	276	291	2	0	0	2	409	7	416		7:45-8:00
8:00-8:15	109	4	6	119	0	0	0	0	9	0	231	240	3	0	0	3	359	3	362		8:00-8:15
8:15-8:30	105	4	4	113	8	2	0	10	13	1	249	263	3	1	0	4	376	14	390		8:15-8:30
8:30-8:45	112	4	3	119	1	0	0	1	10	0	275	285	0	2	0	2	404	3	407		8:30-8:45
8:45-9:00	126	3	3	132	0	0	0	0	7	0	292	299	0	1	0	1	431	1	432		8:45-9:00
9:00-9:15	106	2	6	114	0	1	0	1	2	0	292	294	4	0	0	4	408	5	413		9:00-9:15
9:15-9:30	118	2	1	121	0	0	0	0	0	1	320	321	1	1	0	2	442	2	444		9:15-9:30
9:30-9:45	122	3	3	128	2	1	0	3	2	0	271	273	2	0	0	2	401	5	406		9:30-9:45
9:45-10:00	102	1	7	110	3	2	0	5	1	1	242	244	1	1	0	2	354	7	361		9:45-10:00
4:00-4:15	313	2	2	317	6	1	0	7	2	0	125	127	10	1	0	11	444	18	462		4:00-4:15
4:15-4:30	327	2	3	332	4	2	0	6	0	0	105	105	4	1	0	5	437	11	448		4:15-4:30
4:30-4:45	358	1	5	364	5	2	0	7	0	0	132	132	9	2	0	11	496	18	514		4:30-4:45
4:45-5:00	351	4	2	357	4	1	0	5	0	0	130	130	12	0	0	12	487	17	504		4:45-5:00
5:00-5:15	381	0	0	381	9	0	0	9	1	0	170	171	27	0	0	27	552	36	588		5:00-5:15
5:15-5:30	351	1	3	355	3	1	0	4	0	0	135	135	27	0	0	27	490	31	521		5:15-5:30
5:30-5:45	354	1	0	355	4	0	0	4	0	0	124	124	25	0	0	25	479	29	508		5:30-5:45
5:45-6:00	404	0	0	404	6	0	0	6	0	0	135	135	15	0	0	15	539	21	560		5:45-6:00
6:00-6:15	416	0	0	416	8	0	0	8	0	0	120	120	20	0	0	20	536	28	564		6:00-6:15
6:15-6:30	394	2	0	396	3	0	0	3	0	0	127	127	23	0	0	23	523	26	549		6:15-6:30
6:30-6:45	393	1	0	394	4	0	0	4	0	0	149	149	18	0	0	18	543	22	565		6:30-6:45
6:45-7:00	276	0	0	276	4	0	0	4	0	0	154	154	15	0	0	15	430	19	449		6:45-7:00
16 Hour Totals	5,534	46	63	5,643	85	14	0	99	96	3	4,709	4,808	222	10	0	232	10,451	331	10,782		
1 Hour Totals																					
7:00-8:00	316	9	15	340	11	1	0	12	49	0	925	974	3	0	0	3	1,314	15	1,329	0.80	7:00-8:00
7:15-8:15	384	12	21	397	9	1	0	10	38	0	955	993	5	0	0	5	1,390	15	1,405	0.84	7:15-8:15
7:30-8:30	401	14	25	440	14	3	0	17	45	1	1,013	1,059	8	1	0	9	1,499	26	1,525	0.92	7:30-8:30
7:45-8:45	427	16	28	469	13	3	0	16	47	1	1,031	1,079	8	3	0	11	1,548	27	1,575	0.95	7:45-8:45
8:00-9:00	452	15	16	483	9	2	0	11	39	1	1,047	1,087	6	4	0	10	1,570	21	1,591	0.92	8:00-9:00
8:15-9:15	449	13	16	478	9	3	0	12	32	1	1,108	1,141	7	4	0	11	1,619	23	1,642	0.95	8:15-9:15
8:30-9:30	462	11	13	486	1	1	0	2	19	1	1,179	1,199	5	4	0	9	1,685	11	1,696	0.95	8:30-9:30
8:45-9:45	472	10	13	495	2	2	0	4	11	1	1,175	1,187	7	2	0	9	1,682	13	1,695	0.95	8:45-9:45
9:00-10:00	448	8	17	473	5	4	0	9	5	2	1,125	1,132	8	2	0	10	1,605	19	1,624	0.91	9:00-10:00
4:00-5:00	1,349	9	12	1,370	19	6	0	25	2	0	492	494	35	4	0	39	1,884	64	1,928	0.94	4:00-5:00
4:15-5:15	1,417	7	10	1,434	22	5	0	27	1	0	537	538	52	3	0	55	1,972	82	2,054	0.87	4:15-5:15
4:30-5:30	1,441	6	10	1,457	21	4	0	25	1	0	567	568	75	2	0	77	2,025	102	2,127	0.90	4:30-5:30
4:45-5:45	1,437	6	5	1,448	20	2	0	22	1	0	559	560	91	0	0	91	2,008	113	2,121	0.90	4:45-5:45
5:00-6:00	1,490	2	3	1,495	22	1	0	23	1	0	564	565	94	0	0	94	2,060	117	2,177	0.93	5:00-6:00
5:15-6:15	1,525	2	3	1,530	21	1	0	22	0	0	514	514	87	0	0	87	2,044	109	2,153	0.95	5:15-6:15
5:30-6:30	1,568	3	0	1,571	21	0	0	21	0	0	506	506	83	0	0	83	2,077	104	2,181	0.97	5:30-6:30
5:45-6:45	1,607	3	0	1,610	21	0	0	21	0	0	531	531	76	0	0	76	2,141	97	2,238	0.99	5:45-6:45
6:00-7:00	1,479	3	0	1,482	19	0	0	19	0	0	550	550	76	0	0	76	2,032	95	2,127	0.94	6:00-7:00
AM Peak 8:30-9:30	462	11	13	486	1	1	0	2	19	1	1,179	1,199	5	4	0	9	1,685	11	1,696	0.95	AM Peak 8:30-9:30
PM Peak 5:45-6:45	1,607	3	0	1,610	21	0	0	21	0	0	531	531	76	0	0	76	2,141	97	2,238	0.99	PM Peak 5:45-6:45

Wells & Associates, LLC

McLean, Virginia

Existing Traffic Count

PROJECT:	American Pharmaceutical	DATE:	05/16/2001	SOUTHBOUND ROAD:	23 rd St	
W & A JOB NO.:	1528	DAY:	Wednesday	NORTHBOUND ROAD.	23rd St	
INTERSECTION:	23rd St/American Pharm Entrance	WEATHER:	Sunny & Mild	WESTBOUND ROAD:	American Pharm Entrance	
LOCATION:	Washington, DC	COUNTED BY:	GB	EASTBOUND ROAD.		
		INPUTED BY:	ELD			

Time Period	Turning Movements																		Total	PHF	Time Period
	Southbound 23 rd St				Westbound American Pharm Entrance				Northbound 23rd St				Eastbound 0				North & South	East & West			
	1 Right	2 Thru	3 Left	Total	4 Right	5 Thru	6 Left	Total	7 Right	8 Thru	9 Left	Total	10 Right	11 Thru	12 Left	Total					
AM																					
6:00-6:15	0	17	0	17	0	0	0	0	0	66	0	66	0	0	0	0	83	0	83		6:00-6.15
6:15-6:30	0	47	0	47	0	0	0	0	0	162	0	162	0	0	0	0	209	0	209		6:15-6:30
6:30-6:45	0	55	0	55	0	0	0	0	0	201	0	201	0	0	0	0	256	0	256		6:30-6:45
6:45-7:00	0	62	0	62	0	0	0	0	0	255	0	255	0	0	0	0	317	0	317		6:45-7:00
7:00-7:15	0	74	0	74	0	0	0	0	0	291	0	291	0	0	0	0	365	0	365		7:00-7:15
7:15-7:30	0	78	0	78	0	0	0	0	0	293	0	293	0	0	0	0	371	0	371		7:15-7:30
7:30-7:45	0	111	0	111	0	0	0	0	1	344	0	345	0	0	0	0	456	0	456		7:30-7:45
7:45-8:00	0	131	0	131	0	0	0	0	1	351	0	352	0	0	0	0	483	0	483		7:45-8:00
8:00-8:15	0	112	0	112	0	0	0	0	3	407	0	410	0	0	0	0	522	0	522		8:00-8:15
8:15-8:30	0	109	1	110	0	0	1	1	3	384	0	387	0	0	0	0	497	1	498		8:15-8:30
8:30-8:45	0	107	1	108	0	0	0	0	5	361	0	366	0	0	0	0	474	0	474		8:30-8.45
8.45-9:00	0	103	0	103	0	0	0	0	4	418	0	422	0	0	0	0	525	0	525		8:45-9:00
3 Hour Totals	0	1,006	2	1,008	0	0	1	1	17	3,533	0	3,550	0	0	0	0	4,558	1	4,559		
1 Hour Totals																					
6:00-7:00	0	181	0	181	0	0	0	0	0	684	0	684	0	0	0	0	865	0	865	0.68	6:00-7:00
6.15-7:15	0	238	0	238	0	0	0	0	0	909	0	909	0	0	0	0	1,147	0	1,147	0.79	6:15-7:15
6:30-7:30	0	269	0	269	0	0	0	0	0	1,040	0	1,040	0	0	0	0	1,309	0	1,309	0.88	6:30-7:30
6.45-7:45	0	325	0	325	0	0	0	0	1	1,183	0	1,184	0	0	0	0	1,509	0	1,509	0.83	6:45-7:45
7:00-8:00	0	394	0	394	0	0	0	0	2	1,279	0	1,281	0	0	0	0	1,675	0	1,675	0.87	7:00-8:00
7:15-8:15	0	432	0	432	0	0	0	0	5	1,395	0	1,400	0	0	0	0	1,832	0	1,832	0.88	7.15-8:15
7:30-8:30	0	463	1	464	0	0	1	1	8	1,486	0	1,494	0	0	0	0	1,958	1	1,959	0.94	7:30-8:30
7:45-8:45	0	459	2	461	0	0	1	1	12	1,503	0	1,515	0	0	0	0	1,976	1	1,977	0.95	7:45-8:45
8:00-9:00	0	431	2	433	0	0	1	1	15	1,570	0	1,585	0	0	0	0	2,018	1	2,019	0.96	8:00-9.00
AM Peak 8:00-9:00	**0**	**431**	**2**	**433**	**0**	**0**	**1**	**1**	**15**	**1,570**	**0**	**1,585**	**0**	**0**	**0**	**0**	**2,018**	**1**	**2,019**	**0.96**	**AM Peak 8:00-9:00**
PM																					
4:00-4:15	0	242	0	242	0	0	0	0	0	45	0	45	0	0	0	0	287	0	287		4:00-4 15
4.15-4:30	0	370	0	370	0	0	0	0	0	108	0	108	0	0	0	0	478	0	478		4:15-4.30
4:30-4.45	0	389	0	389	1	0	1	2	0	149	0	149	0	0	0	0	538	2	540		4:30-4:45
4:45-5:00	0	456	0	456	0	0	1	1	0	108	0	108	0	0	0	0	564	1	565		4:45-5:00
5:00-5:15	0	483	0	483	1	0	2	3	0	110	0	110	0	0	0	0	593	3	596		5:00-5:15
5:15-5:30	0	447	0	447	2	0	4	6	0	89	0	89	0	0	0	0	536	6	542		5:15-5:30
5:30-5:45	0	568	0	568	3	0	0	3	0	140	0	140	0	0	0	0	708	3	711		5:30-5:45
5:45-6:00	0	541	0	541	0	0	2	2	0	155	0	155	0	0	0	0	696	2	698		5:45-6:00
6:00-6:15	0	571	0	571	0	0	0	0	0	126	0	126	0	0	0	0	697	0	697		6:00-6:15
6:15-6:30	0	465	0	465	0	0	0	0	0	176	0	176	0	0	0	0	641	0	641		6.15-6.30
6:30-6:45	0	465	0	465	0	0	0	0	0	105	0	105	0	0	0	0	570	0	570		6.30-6:45
6:45-7:00	0	340	0	340	0	0	0	0	0	123	0	123	0	0	0	0	463	0	463		6:45-7:00
3 Hour Totals	0	5,337	0	5,337	7	0	10	17	0	1,434	0	1,434	0	0	0	0	6,771	17	6,788		
1 Hour Totals																					
4:00-5:00	0	1,457	0	1,457	1	0	2	3	0	410	0	410	0	0	0	0	1,867	3	1,870	0.83	4:00-5.00
4:15-5:15	0	1,698	0	1,698	2	0	4	6	0	475	0	475	0	0	0	0	2,173	6	2,179	0.91	4:15-5:15
4:30-5:30	0	1,775	0	1,775	4	0	8	12	0	456	0	456	0	0	0	0	2,231	12	2,243	0.94	4.30-5.30
4:45-5:45	0	1,954	0	1,954	6	0	7	13	0	447	0	447	0	0	0	0	2,401	13	2,414	0 85	4:45-5:45
5:00-6:00	0	2,039	0	2,039	6	0	8	14	0	494	0	494	0	0	0	0	2,533	14	2,547	0.90	5:00-6:00
5:15-6:15	0	2,127	0	2,127	5	0	6	11	0	510	0	510	0	0	0	0	2,637	11	2,648	0 93	5:15-6:15
5:30-6:30	0	2,145	0	2,145	3	0	2	5	0	597	0	597	0	0	0	0	2,742	5	2,747	0 97	5:30-6:30
5:45-6:45	0	2,042	0	2,042	0	0	2	2	0	562	0	562	0	0	0	0	2,604	2	2,606	0.93	5:45-6:45
6:00-7:00	0	1,841	0	1,841	0	0	0	0	0	530	0	530	0	0	0	0	2,371	0	2,371	0.85	6:00-7:00
PM Peak 5:30-6:30	**0**	**2,145**	**0**	**2,145**	**3**	**0**	**2**	**5**	**0**	**597**	**0**	**597**	**0**	**0**	**0**	**0**	**2,742**	**5**	**2,747**	**0.97**	**PM Peak 5:30-6:30**

Wells & Associates, LLC

McLean, Virginia

Existing Traffic Count

PROJECT:	AphA	DATE:	12/17/2002	SOUTHBOUND ROAD:	23rd.Street	
W & A JOB NO.:	1528	DAY:	Tuesday	NORTHBOUND ROAD:	23rd.Street	
INTERSECTION:	Constitution Av & 23th.St	WEATHER:	cold	WESTBOUND ROAD:	Constitution Avenue	
LOCATION:	Washington,DC	COUNTED BY:	Stuarts & Carson	EASTBOUND ROAD:	Constitution Avenue	
		INPUTED BY:	agan			

Time Period	Turning Movements																				Total	PHF	Time Period
	Southbound 23rd.Street				Westbound Constitution Avenue				Northbound 23rd.Street				Eastbound Constitution Avenue				North & South	East & West					
	1 Right	2 Thru	3 Left	Total	4 Right	5 Thru	6 Left	Total	7 Right	8 Thru	9 Left	Total	10 Right	11 Thru	12 Left	Total							
AM																							
7:00-7:15	17	37	16	70	29	169	6	204	9	219	3	231	0	347	0	347	301	551	852		7:00-7:15		
7:15-7:30	16	40	3	59	40	211	5	256	9	230	4	243	1	351	0	352	302	608	910		7:15-7:30		
7:30-7:45	26	44	15	85	42	214	11	267	23	259	4	286	0	371	4	375	371	642	1,013		7:30-7:45		
7:45-8:00	21	60	15	96	40	225	3	268	29	315	11	355	1	342	0	343	451	611	1,062		7:45-8:00		
8:00-8:15	38	50	18	106	46	194	7	247	37	318	2	357	0	356	0	356	483	603	1,086		8:00-8:15		
8:15-8:30	28	33	21	82	33	202	4	239	48	289	4	341	0	360	0	360	423	599	1,022		8:15-8:30		
8:30-8:45	31	39	26	96	48	211	4	263	33	278	8	319	0	398	0	398	415	661	1,076		8:30-8:45		
8:45-9:00	29	37	17	83	29	172	5	206	31	290	1	322	0	369	0	369	405	575	980		8:45-9:00		
9:00-9:15	22	21	22	65	35	186	6	227	43	277	3	323	0	329	1	330	388	557	945		9:00-9:15		
9:125-9:30	17	30	14	61	30	142	4	176	25	241	0	266	1	296	0	297	327	473	800		9:125-9:30		
9.30-9:45	32	40	15	87	34	163	2	199	14	175	1	190	2	306	1	309	277	508	785		9:30-9:45		
9.45-10:00	36	39	19	94	55	169	2	226	10	149	1	160	6	339	0	345	254	571	825		9.45-10:00		
3 Hour Totals	313	479	201	954	461	2,258	59	2,778	311	3,049	42	3,393	11	4,164	6	4,181	4,577	6,959	11,336				
1 Hour Totals																							
7:00-8:00	80	181	49	310	151	819	25	995	70	1,023	22	1,115	2	1,411	4	1,417	1,425	2,412	3,837	0.90	7:00-8:00		
7:15-8:15	101	194	51	346	168	844	26	1,038	98	1,122	21	1,241	2	1,420	4	1,426	1,587	2,464	4,051	0 95	7:15-8:15		
7:30-8:30	113	187	69	369	161	835	25	1,021	137	1,181	21	1,339	1	1,429	4	1,434	1,708	2,455	4,163	0 98	7:30-8:30		
7:45-8:45	118	182	80	380	167	832	18	1,017	147	1,200	25	1,372	1	1,456	0	1,457	1,752	2,474	4,226	0.98	7:45-8:45		
8:00-9:00	126	159	82	367	156	779	20	955	149	1,175	15	1,339	0	1,483	0	1,483	1,706	2,438	4,144	0.96	8:00-9:00		
8:15-9:15	110	130	86	326	145	771	19	935	155	1,134	16	1,305	0	1,456	1	1,457	1,631	2,392	4,023	0.93	8:15-9:15		
8:30-9:30	99	127	79	305	142	711	19	872	132	1,086	12	1,230	1	1,392	1	1,394	1,535	2,266	3,801	0 88	8:30-9:30		
8:45-9:45	100	128	68	296	128	663	17	808	113	983	5	1,101	3	1,300	2	1,305	1,397	2,113	3,510	0.90	8:45-9:45		
9:00-10:00	107	130	70	307	154	680	14	828	92	842	5	939	9	1,270	2	1,281	1,246	2,109	3,355	0.89	9:00-10:00		
AM Peak 7:45-8:45	118	182	80	380	167	832	18	1,017	147	1,200	25	1,372	1	1,456	0	1,457	1,752	2,474	4,226	0.98	**AM Peak 7:45-8:45**		
PM																							
4:00-4:15	74	193	2	269	33	333	7	373	16	84	5	105	0	250	5	255	374	628	1,002		4:00-4:15		
4:15-4:30	99	238	0	337	30	283	5	318	9	70	2	81	0	278	5	283	418	601	1,019		4 15-4 30		
4:30-4:45	71	283	1	355	21	302	9	332	13	63	4	80	0	265	2	267	435	599	1,034		4:30-4:45		
4:45-5:00	81	211	0	292	12	347	9	368	11	83	2	96	0	280	7	287	388	655	1,043		4:45-5:00		
5:00-5:15	102	262	0	364	24	313	8	345	18	73	3	94	0	288	4	292	458	637	1,095		5:00-5.15		
5:15-5:30	107	261	0	368	14	335	8	357	3	78	2	83	0	272	3	275	451	632	1,083		5:15-5:30		
5:30-5:45	98	285	1	384	25	377	6	408	11	79	0	90	0	267	1	268	474	676	1,150		5.30-5:45		
5:45-6:00	78	233	0	311	18	400	15	433	10	82	2	94	0	284	1	285	405	718	1,123		5:45-6:00		
6:00-6:15	97	263	0	360	30	325	6	361	17	101	1	119	0	259	3	262	479	623	1,102		6:00-6:15		
6:15-6:30	111	266	0	377	12	325	12	349	12	103	1	116	0	253	3	256	493	605	1,098		6:15-6.30		
6:30-6:45	106	281	0	387	16	360	6	382	3	110	4	117	0	270	3	273	504	655	1,159		6.30-6:45		
6:45-7:00	91	213	0	304	14	340	8	362	10	109	3	122	0	232	2	234	426	596	1,022		6:45-7:00		
3 Hour Totals	1,113	2,983	4	4,166	249	4,040	99	4,388	133	1,035	29	1,197	0	3,198	39	3,237	5,305	7,625	12,930				
1 Hour Totals																							
4:00-5:00	325	925	3	1,253	96	1,265	30	1,391	49	300	13	362	0	1,073	19	1,092	1,615	2,483	4,098	0.98	4:00-5:00		
4:15-5:15	353	994	1	1,348	87	1,245	31	1,363	51	289	11	351	0	1,111	18	1,129	1,699	2,492	4,191	0.96	4:15-5:15		
4:30-5:30	361	1,017	1	1,379	71	1,297	34	1,402	45	297	11	353	0	1,105	16	1,121	1,732	2,523	4,255	0.97	4:30-5:30		
4:45-5:45	388	1,019	1	1,408	75	1,372	31	1,478	43	313	7	363	0	1,107	15	1,122	1,771	2,600	4,371	0.95	4:45-5:45		
5:00-6:00	385	1,041	1	1,427	81	1,425	37	1,543	42	312	7	361	0	1,111	9	1,120	1,788	2,663	4,451	0.97	5:00-6:00		
5:15-6:15	380	1,042	1	1,423	87	1,437	35	1,559	41	340	5	386	0	1,082	8	1,090	1,809	2,649	4,458	0.97	5:15-6:15		
5:30-6:30	384	1,047	1	1,432	85	1,427	39	1,551	50	365	4	419	0	1,063	8	1,071	1,851	2,622	4,473	0.97	5:30-6:30		
5:45-6:45	392	1,043	0	1,435	78	1,410	39	1,525	42	396	8	446	0	1,066	10	1,076	1,881	2,601	4,482	0.97	5:45-6:45		
6:00-7:00	405	1,023	0	1,428	72	1,350	32	1,454	42	423	9	474	0	1,014	11	1,025	1,902	2,479	4,381	0.94	6:00-7:00		
PM Peak 5:45-6:45	392	1,043	0	1,435	78	1,410	39	1,525	42	396	8	446	0	1,066	10	1,076	1,881	2,601	4,482	0.97	**PM Peak 5:45-6:45**		

Wells & Associates, LLC

McLean, Virginia

Existing Traffic Count

PROJECT:	AphA	DATE:	12/10/2002	SOUTHBOUND ROAD:	22nd Street	
W & A JOB NO.:	1528	DAY.	Tuesday	NORTHBOUND ROAD:	22nd Street	
INTERSECTION:	22nd Street/C Street	WEATHER.	Wet and Cold	WESTBOUND ROAD:	C Street	
LOCATION:	Washington, DC	COUNTED BY:	MLA	EASTBOUND ROAD:	C Street	
		INPUTED BY:	MLA			

Time Period	Turning Movements																		Total	PHF	Time Period
	Southbound 22nd Street				Westbound C Street				Northbound 22nd Street				Eastbound C Street				North & South	East & West			
	1 Right	2 Thru	3 Left	Total	4 Right	5 Thru	6 Left	Total	7 Right	8 Thru	9 Left	Total	10 Right	11 Thru	12 Left	Total					
7:00-7:15	14	34	6	54	0	5	10	15	13	0	3	16	3	1	0	4	70	19	89		7:00-7:15
7:15-7:30	11	31	5	47	0	7	5	12	24	0	2	26	0	0	0	0	73	12	85		7:15-7:30
7:30-7:45	39	62	13	114	0	11	26	37	55	0	7	62	1	4	0	5	176	42	218		7:30-7:45
7:45-8:00	14	42	6	62	0	6	10	16	43	0	8	51	3	1	0	4	113	20	133		7:45-8:00
8:00-8:15	14	53	5	72	0	5	10	15	47	0	5	52	0	1	0	1	124	16	140		8:00-8:15
8:15-8:30	20	54	4	78	0	7	9	16	55	0	9	64	0	0	0	0	142	16	158		8:15-8:30
8:30-8:45	14	41	9	64	0	4	4	8	73	0	4	77	0	3	0	3	141	11	152		8:30-8:45
8:45-9:00	8	56	11	75	0	4	10	14	61	0	4	65	1	3	0	4	140	18	158		8:45-9:00
9:00-9:15	10	29	14	53	0	4	8	12	72	0	2	74	0	3	0	3	127	15	142		9:00-9:15
9:15-9:30	15	34	11	60	0	2	3	5	67	0	2	69	1	4	0	5	129	10	139		9:15-9:30
9:30-9:45	14	30	6	50	0	2	3	5	42	0	3	45	0	8	0	8	95	13	108		9:30-9:45
9:45-10:00	7	10	2	19	0	2	2	4	28	0	1	29	1	9	0	10	48	14	62		9:45-10:00
4:00-4:15	38	89	0	127	0	2	17	19	18	0	1	19	1	7	0	8	146	27	173		4:00-4:15
4:15-4:30	26	71	5	102	0	3	6	9	0	0	0	0	0	8	0	8	102	17	119		4:15-4:30
4:30-4:45	55	119	3	177	0	0	12	12	21	0	0	21	0	8	0	8	198	20	218		4:30-4:45
4:45-5:00	37	67	1	105	0	1	8	9	24	0	0	24	0	10	0	10	129	19	148		4:45-5:00
5:00-5:15	50	112	2	164	0	0	13	13	19	0	0	19	0	9	0	9	183	22	205		5:00-5:15
5:15-5:30	43	110	1	154	0	9	9	18	8	0	1	9	1	12	0	13	163	31	194		5:15-5:30
5:30-5:45	40	146	2	188	0	0	12	12	10	0	0	10	0	12	0	12	198	24	222		5:30-5:45
5:45-6:00	45	127	2	174	0	0	8	8	10	0	0	10	0	4	0	4	184	12	196		5:45-6:00
6:00-6:15	28	146	2	176	0	0	10	10	8	0	0	8	0	13	0	13	184	23	207		6:00-6:15
6:15-6:30	25	128	1	154	0	0	12	12	5	0	0	5	0	5	0	5	159	17	176		6:15-6:30
6:30-6:45	18	119	1	138	0	0	10	10	5	0	1	6	1	6	0	7	144	17	161		6:30-6:45
6:45-7:00	13	119	1	133	0	0	2	2	4	0	0	4	0	5	0	5	137	7	144		6:45-7:00
16 Hour Totals	598	1,829	113	2,540	0	74	219	293	712	0	53	765	13	136	0	149	3,305	442	3,747		
1 Hour Totals																					
7:00-8:00	78	169	30	277	0	29	51	80	135	0	20	155	7	6	0	13	432	93	525	0.80	7:00-8:00
7:15-8:15	78	188	29	295	0	29	51	80	169	0	22	191	4	6	0	10	486	90	576	0.66	7:15-8:15
7:30-8:30	87	211	28	326	0	29	55	84	200	0	29	229	4	6	0	10	555	94	649	0.74	7:30-8:30
7:45-8:45	62	190	24	276	0	22	33	55	218	0	26	244	3	5	0	8	520	63	583	0.92	7:45-8:45
8:00-9:00	56	204	29	289	0	20	33	53	236	0	22	258	1	7	0	8	547	61	608	0.98	8:00-9:00
8:15-9:15	52	180	38	270	0	19	31	50	261	0	19	280	1	9	0	10	550	60	610	0.97	8:15-9:15
8:30-9:30	47	160	45	252	0	14	25	39	273	0	12	285	2	13	0	15	537	54	591	0.94	8:30-9:30
8:45-9:45	47	149	42	238	0	12	24	36	242	0	11	253	2	18	0	20	491	56	547	0.87	8:45-9:45
9:00-10:00	46	103	33	182	0	10	16	26	209	0	8	217	2	24	0	26	399	52	451	0.79	9:00-10:00
4:00-5:00	158	348	9	511	0	6	43	49	63	0	1	64	1	33	0	34	575	83	658	0.75	4:00-5:00
4:15-5:15	168	369	11	548	0	4	39	43	64	0	0	64	0	35	0	35	612	78	690	0.79	4:15-5:15
4:30-5:30	185	408	7	600	0	10	42	52	72	0	1	73	1	39	0	40	673	92	765	0.88	4:30-5:30
4:45-5:45	170	435	6	611	0	10	42	52	61	0	1	62	1	43	0	44	673	96	769	0.87	4:45-5:45
5:00-6:00	178	495	7	680	0	9	42	51	47	0	1	48	1	37	0	38	728	89	817	0.92	5:00-6:00
5:15-6:15	158	529	7	692	0	9	39	48	36	0	1	37	1	41	0	42	729	90	819	0.92	5:15-6:15
5:30-6:30	138	547	7	692	0	0	42	42	33	0	0	33	0	34	0	34	725	76	801	0.90	5:30-6:30
5:45-6:45	116	520	6	642	0	0	40	40	28	0	1	29	1	28	0	29	671	69	740	0.89	5:45-6:45
6:00-7:00	84	512	5	601	0	0	34	34	22	0	1	23	1	29	0	30	624	64	688	0.83	6:00-7:00
AM Peak 7:30-8:30	87	87	28	326	0	29	55	84	200	0	29	229	4	6	0	10	555	94	649	0.74	AM Peak 7:30-8:30
PM Peak 5:15-6:15	158	529	7	692	0	9	39	48	36	0	1	37	1	41	0	42	729	90	819	0.92	PM Peak 5:15-6:15

Wells & Associates, LLC

McLean, Virginia

Existing Traffic Count

PROJECT:	AphA	DATE:	12/17/2002	SOUTHBOUND ROAD:	22 nd.Street	
W & A JOB NO.:	1528	DAY:	Tuesday	NORTHBOUND ROAD:	22 nd Street	
INTERSECTION:	Constitution Ave.& 22nd.St.	WEATHER.	cold	WESTBOUND ROAD:	Constitution Avenue	
LOCATION.	Washington,DC	COUNTED BY.	Runions	EASTBOUND ROAD:	Constitution Avenue	
		INPUTED BY:	agan			

Time Period	Turning Movements: Southbound 22 nd.Street 1 Right	2 Thru	3 Left	Total	Westbound Constitution Avenue 4 Right	5 Thru	6 Left	Total	Northbound 22 nd.Street 7 Right	8 Thru	9 Left	Total	Eastbound Constitution Avenue 10 Right	11 Thru	12 Left	Total	North & South	East & West	Total	PHF	Time Period
AM																					
7:00-7:15	7	0	5	12	12	217	0	229	0	0	0	0	0	402	10	412	12	641	653		7:00-7:15
7:15-7:30	5	0	6	11	4	240	0	244	0	0	0	0	0	332	16	348	11	592	603		7:15-7:30
7:30-7:45	10	0	14	24	14	291	0	305	0	0	0	0	0	402	29	431	24	736	760		7:30-7:45
7:45-8:00	8	0	7	15	9	247	0	256	0	0	0	0	0	351	35	386	15	642	657		7 45-8:00
8:00-8:15	11	0	10	21	16	239	0	255	0	0	0	0	0	381	34	415	21	670	691		8:00-8:15
8.15-8:30	15	0	12	27	28	245	0	273	0	0	0	0	0	418	37	455	27	728	755		8 15-8:30
8:30-8:45	12	0	6	18	14	230	0	244	0	0	0	0	0	424	22	446	18	690	708		8.30-8:45
8:45-9:00	14	0	9	23	15	216	0	231	0	0	0	0	0	361	25	386	23	617	640		8:45-9:00
9:00-9.15	14	0	8	22	15	182	0	197	0	0	0	0	0	325	13	338	22	535	557		9:00-9:15
9:125-9:30	10	0	8	18	24	193	0	217	0	0	0	0	0	383	16	399	18	616	634		9:125-9:30
9:30-9.45	15	0	10	25	20	198	0	218	0	0	0	0	0	344	17	361	25	579	604		9:30-9:45
9 45-10:00	19	0	10	29	20	212	0	232	0	0	0	0	0	323	24	347	29	579	608		9.45-10:00
3 Hour Totals	140	0	165	245	191	2,710	0	2,901	0	0	0	0	0	4,446	278	4,724	245	7,625	7,870		
1 Hour Totals																					
7:00-8:00	30	0	32	62	39	995	0	1,034	0	0	0	0	0	1,487	90	1,577	62	2,611	2,673	0.88	7:00-8.00
7:15-8:15	34	0	37	71	43	1,017	0	1,060	0	0	0	0	0	1,466	114	1,580	71	2,640	2,711	0.89	7:15-8:15
7:30-8:30	44	0	43	87	67	1,022	0	1,089	0	0	0	0	0	1,552	135	1,687	87	2,776	2,863	0.94	7:30-8.30
7.45-8:45	46	0	35	81	67	961	0	1,028	0	0	0	0	0	1,574	128	1,702	81	2,730	2,811	0.93	7:45-8:45
8:00-9:00	52	0	37	89	73	930	0	1,003	0	0	0	0	0	1,584	118	1,702	89	2,705	2,794	0.93	8:00-9.00
8:15-9:15	55	0	35	90	72	873	0	945	0	0	0	0	0	1,528	97	1,625	90	2,570	2,660	0.88	8:15-9:15
8.30-9:30	50	0	31	81	68	821	0	889	0	0	0	0	0	1,493	76	1,569	81	2,458	2,539	0.90	8.30-9:30
8.45-9:45	53	0	35	88	74	789	0	863	0	0	0	0	0	1,413	71	1,484	88	2,347	2,435	0.95	8:45-9:45
9:00-10:00	58	0	36	94	79	785	0	864	0	0	0	0	0	1,375	70	1,445	94	2,309	2,403	0.95	9:00-10:00
AM Peak 7:30-8:30	44	0	43	87	67	1,022	0	1,089	0	0	0	0	0	1,552	135	1,687	87	2,776	2,863	0.94	**AM Peak 7:30-8:30**
PM																					
4:00-4:15	22	0	23	45	13	319	0	332	0	0	0	0	0	293	22	315	45	647	692		4 00-4.15
4.15-4:30	16	0	17	33	16	378	0	394	0	0	0	0	0	362	23	385	33	779	812		4 15-4:30
4:30-4:45	19	0	16	35	16	325	0	341	0	0	0	0	0	317	14	331	35	672	707		4.30-4:45
4:45-5:00	19	0	13	32	12	357	0	369	0	0	0	0	0	326	17	343	32	712	744		4:45-5:00
5:00-5:15	25	0	27	52	26	347	0	373	0	0	0	0	0	350	22	372	52	745	797		5:00-5:15
5.15-5:30	27	0	20	47	8	326	0	334	0	0	0	0	0	302	13	315	47	649	696		5:15-5:30
5:30-5.45	27	0	9	36	17	416	0	433	0	0	0	0	0	342	8	350	36	783	819		5:30-5:45
5:45-6:00	20	0	7	27	9	385	0	394	0	0	0	0	0	284	6	290	27	684	711		5:45-6:00
6:00-6:15	38	0	6	44	17	340	0	357	0	0	0	0	0	274	16	290	44	647	691		6:00-6:15
6.15-6:30	21	0	11	32	10	381	0	391	0	0	0	0	0	263	15	278	32	669	701		6:15-6:30
6:30-6:45	15	0	6	21	5	394	0	399	0	0	0	0	0	291	9	300	21	699	720		6:30-6:45
6:45-7:00	28	0	3	31	6	348	0	354	0	0	0	0	0	286	8	294	31	648	679		6 45-7:00
3 Hour Totals	277	0	158	435	158	4,316	0	4,471	0	0	0	0	0	3,696	173	3,869	435	8,334	8,769		
1 Hour Totals																					
4:00-5:00	76	0	69	145	57	1,379	0	1,436	0	0	0	0	0	1,298	76	1,374	145	2,810	2,955	0 91	4:00-5:00
4:15-5:15	79	0	73	152	70	1,407	0	1,477	0	0	0	0	0	1,355	76	1,431	152	2,908	3,060	0.94	4.15-5:15
4:30-5:30	90	0	76	166	62	1,355	0	1,417	0	0	0	0	0	1,295	66	1,361	166	2,778	2,944	0.92	4:30-5:30
4:45-5:45	98	0	69	167	63	1,446	0	1,509	0	0	0	0	0	1,320	60	1,380	167	2,889	3,056	0.93	4:45-5.45
5:00-6:00	99	0	63	162	60	1,474	0	1,534	0	0	0	0	0	1,278	49	1,327	162	2,861	3,023	0.92	5:00-6:00
5:15-6:15	112	0	42	154	51	1,467	0	1,518	0	0	0	0	0	1,202	43	1,245	154	2,763	2,917	0.89	5:15-6:15
5:30-6:30	106	0	33	139	53	1,522	0	1,575	0	0	0	0	0	1,163	45	1,208	139	2,783	2,922	0.89	5.30-6.30
5:45-6:45	94	0	30	124	41	1,500	0	1,541	0	0	0	0	0	1,112	46	1,158	124	2,699	2,823	0.98	5:45-6:45
6:00-7:00	102	0	26	128	38	1,463	0	1,501	0	0	0	0	0	1,114	48	1,162	128	2,663	2,791	0.97	6:00-7:00
PM Peak 4:15-5:15	79	0	73	152	70	1,407	0	1,477	0	0	0	0	0	1,355	76	1,431	152	2,908	3,060	0.94	**PM Peak 4:15-5:15**

Wells & Associates, LLC

McLean, Virginia

Existing Traffic Count

PROJECT.	AphA	DATE:	12/10/2002	SOUTHBOUND ROAD.	22nd Street	
W & A JOB NO.:	1528	DAY:	Tuesday	NORTHBOUND ROAD:	22nd Street	
INTERSECTION:	22nd Street/C Street	WEATHER:	Wet and Cold	WESTBOUND ROAD:	C Street	
LOCATION:	Washington, DC	COUNTED BY:	MLA	EASTBOUND ROAD:	C Street	
		INPUTED BY:	MLA			

Time Period	Turning Movements: Southbound 22nd Street				Westbound C Street				Northbound 22nd Street				Eastbound C Street				North & South	East & West	Total	PHF	Time Period
	1 Right	2 Thru	3 Left	Total	4 Right	5 Thru	6 Left	Total	7 Right	8 Thru	9 Left	Total	10 Right	11 Thru	12 Left	Total					
7:00-7:15	14	34	6	54	0	5	10	15	13	0	3	16	3	1	0	4	70	19	89		7:00-7:15
7:15-7:30	11	31	5	47	0	7	5	12	24	0	2	26	0	0	0	0	73	12	85		7:15-7:30
7:30-7:45	39	62	13	114	0	11	26	37	55	0	7	62	1	4	0	5	176	42	218		7:30-7:45
7:45-8:00	14	42	6	62	0	6	10	16	43	0	8	51	3	1	0	4	113	20	133		7:45-8:00
8:00-8:15	14	53	5	72	0	5	10	15	47	0	5	52	0	1	0	1	124	16	140		8:00-8:15
8:15-8:30	20	54	4	78	0	7	9	16	55	0	9	64	0	0	0	0	142	16	158		8:15-8:30
8:30-8:45	14	41	9	64	0	4	4	8	73	0	4	77	0	3	0	3	141	11	152		8:30-8:45
8:45-9:00	8	56	11	75	0	4	10	14	61	0	4	65	1	3	0	4	140	18	158		8:45-9:00
9:00-9:15	10	29	14	53	0	4	8	12	72	0	2	74	0	3	0	3	127	15	142		9:00-9:15
9:15-9:30	15	34	11	60	0	2	3	5	67	0	2	69	1	4	0	5	129	10	139		9:15-9:30
9:30-9:45	14	30	6	50	0	2	3	5	42	0	3	45	0	8	0	8	95	13	108		9:30-9:45
9:45-10:00	7	10	2	19	0	2	2	4	28	0	1	29	1	9	0	10	48	14	62		9:45-10:00
4:00-4.15	38	89	0	127	0	2	17	19	18	0	1	19	1	7	0	8	146	27	173		4:00-4:15
4 15-4:30	26	71	5	102	0	3	6	9	0	0	0	0	0	8	0	8	102	17	119		4:15-4:30
4:30-4.45	55	119	3	177	0	0	12	12	21	0	0	21	0	8	0	8	198	20	218		4:30-4:45
4:45-5:00	37	67	1	105	0	1	8	9	24	0	0	24	0	10	0	10	129	19	148		4:45-5:00
5:00-5:15	50	112	2	164	0	0	13	13	19	0	0	19	0	9	0	9	183	22	205		5:00-5.15
5:15-5.30	43	110	1	154	0	9	9	18	8	0	1	9	1	12	0	13	163	31	194		5:15-5:30
5:30-5:45	40	146	2	188	0	0	12	12	10	0	0	10	0	12	0	12	198	24	222		5:30-5:45
5:45-6:00	45	127	2	174	0	0	8	8	10	0	0	10	0	4	0	4	184	12	196		5:45-6:00
6:00-6.15	28	146	2	176	0	0	10	10	8	0	0	8	0	13	0	13	184	23	207		6:00-6:15
6:15-6:30	25	128	1	154	0	0	12	12	5	0	0	5	0	5	0	5	159	17	176		6:15-6:30
6:30-6:45	18	119	1	138	0	0	10	10	5	0	1	6	1	6	0	7	144	17	161		6:30-6:45
6:45-7:00	13	119	1	133	0	0	2	2	4	0	0	4	0	5	0	5	137	7	144		6:45-7:00
16 Hour Totals	598	1,829	113	2,540	0	74	219	293	712	0	53	765	13	136	0	149	3,305	442	3,747		
1 Hour Totals																					
7:00-8:00	78	169	30	277	0	29	51	80	135	0	20	155	7	6	0	13	432	93	525	0.80	7:00-8:00
7:15-8:15	78	188	29	295	0	29	51	80	169	0	22	191	4	6	0	10	486	90	576	0.86	7:15-8:15
7:30-8:30	87	211	28	326	0	29	55	84	200	0	29	229	4	6	0	10	555	94	649	0.74	7:30-8:30
7:45-8:45	62	190	24	276	0	22	33	55	218	0	26	244	3	5	0	8	520	63	583	0.92	7:45-8:45
8:00-9:00	56	204	29	289	0	20	33	53	236	0	22	258	1	7	0	8	547	61	608	0 98	8:00-9:00
8.15-9:15	52	180	38	270	0	19	31	50	261	0	19	280	1	9	0	10	550	60	610	0.97	8:15-9:15
8:30-9:30	47	160	45	252	0	14	25	39	273	0	12	285	2	13	0	15	537	54	591	0.94	8:30-9:30
8:45-9:45	47	149	42	238	0	12	24	36	242	0	11	253	2	18	0	20	491	56	547	0.87	8:45-9:45
9:00-10:00	46	103	33	182	0	10	16	26	209	0	8	217	2	24	0	26	399	52	451	0.79	9:00-10:00
4:00-5:00	156	346	9	511	0	6	43	49	63	0	1	64	1	33	0	34	575	83	658	0.75	4:00-5:00
4:15-5:15	168	389	11	548	0	4	39	43	64	0	0	64	0	35	0	35	612	78	690	0.79	4:15-5:15
4:30-5:30	185	408	7	600	0	10	42	52	72	0	1	73	1	39	0	40	673	92	765	0.88	4:30-5:30
4:45-5:45	170	435	6	611	0	10	42	52	61	0	1	62	1	43	0	44	673	96	769	0.87	4:45-5.45
5:00-6:00	178	495	7	680	0	9	42	51	47	0	1	48	1	37	0	38	728	89	817	0.92	5:00-6:00
5:15-6:15	156	529	7	692	0	9	39	48	36	0	1	37	1	41	0	42	729	90	819	0.92	5:15-6:15
5:30-6:30	138	547	7	692	0	0	42	42	33	0	0	33	0	34	0	34	725	76	801	0.90	5:30-6:30
5:45-6:45	116	520	6	642	0	0	40	40	28	0	1	29	1	28	0	29	671	69	740	0.89	5:45-6:45
6:00-7:00	84	512	5	601	0	0	34	34	22	0	1	23	1	29	0	30	624	64	688	0.83	6:00-7:00
AM Peak 7:30-8:30	87	87	28	326	0	29	55	84	200	0	29	229	4	6	0	10	555	94	649	0.74	AM Peak 7:30-8:30
PM Peak 5:15-6:15	156	529	7	692	0	9	39	48	36	0	1	37	1	41	0	42	729	90	819	0.92	PM Peak 5:15-6:15

Appendix B

Existing Levels of Service



Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0
Lane Util. Factor	1.00		0.95	1.00		0.91
Frt	0.98		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		1.00
Satd. Flow (prot)	1748		3539	1583		5078
Flt Permitted	0.96		1.00	1.00		0.90
Satd. Flow (perm)	1748		3539	1583		4583
Volume (vph)	9	2	1220	20	13	464
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	2	1326	22	14	504
RTOR Reduction (vph)	1	0	0	10	0	0
Lane Group Flow (vph)	11	0	1326	12	0	518
Turn Type				Perm	pm+pt	
Protected Phases	8		1		2	6
Permitted Phases				1	6	
Actuated Green, G (s)	21.0		43.0	43.0		49.0
Effective Green, g (s)	22.0		44.0	44.0		50.0
Actuated g/C Ratio	0.28		0.55	0.55		0.62
Clearance Time (s)	5.0		5.0	5.0		5.0
Lane Grp Cap (vph)	481		1946	871		2877
v/s Ratio Prot	c0.01		c0.37			c0.00
v/s Ratio Perm				0.01		0.11
v/c Ratio	0.02		0.68	0.01		0.18
Uniform Delay, d1	21.2		13.0	8.2		6.3
Progression Factor	1.00		0.84	1.35		1.00
Incremental Delay, d2	0.1		1.5	0.0		0.1
Delay (s)	21.2		12.4	11.0		6.5
Level of Service	C		B	B		A
Approach Delay (s)	21.2		12.4			6.5
Approach LOS	C		B			A

HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	1	1	1240	15	2	471
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	1	1348	16	2	512
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			296			210
pX, platoon unblocked	0.78	0.76			0.76	
vC, conflicting volume	1616	682			1364	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1313	257			1159	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	117	561			453	

Volume Total	2	899	466	173	341
Volume Left	1	0	0	2	0
Volume Right	1	0	16	0	0
cSH	193	1700	1700	453	1700
Volume to Capacity	0.01	0.53	0.27	0.00	0.20
Queue Length (ft)	1	0	0	0	0
Control Delay (s)	23.8	0.0	0.0	0.2	0.0
Lane LOS	C			A	
Approach Delay (s)	23.8	0.0		0.1	
Approach LOS	C				

Average Delay	0.0		
Intersection Capacity Utilization	44.8%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Configurations												
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		0.91		1.00	0.95	1.00		0.91			0.91	
Frt		1.00		1.00	1.00	0.85		0.98			0.96	
Flt Protected		1.00		0.95	1.00	1.00		1.00			0.99	
Satd. Flow (prot)		5085		1770	3539	1583		4991			4854	
Flt Permitted		1.00		0.95	1.00	1.00		0.92			0.67	
Satd. Flow (perm)		5085		1770	3539	1583		4604			3292	
Volume (vph)	0	1456	1	18	959	167	25	1088	147	80	275	118
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1583	1	20	1042	182	27	1183	160	87	299	128
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1584	0	20	1042	182	0	1370	0	0	514	0
Turn Type				Prot		Perm	Perm			Perm		
Protected Phases		2		1	6			8			4	
Permitted Phases						6	8			4		
Actuated Green, G (s)		28.0		5.0	38.0	38.0		32.0			32.0	
Effective Green, g (s)		29.0		6.0	39.0	39.0		33.0			33.0	
Actuated g/C Ratio		0.36		0.08	0.49	0.49		0.41			0.41	
Clearance Time (s)		5.0		5.0	5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)		1843		133	1725	772		1899			1358	
v/s Ratio Prot		c0.31		0.01	c0.29							
v/s Ratio Perm						0.11		c0.30			0.16	
v/c Ratio		0.86		0.15	0.60	0.24		0.72			0.94dl	
Uniform Delay, d1		23.6		34.6	14.9	11.9		19.7			16.4	
Progression Factor		1.00		0.52	0.62	0.55		1.00			0.64	
Incremental Delay, d2		5.5		1.9	1.3	0.6		2.4			0.8	
Delay (s)		29.1		19.9	10.5	7.1		22.1			11.2	
Level of Service		C		B	B	A		C			B	
Approach Delay (s)		29.1			10.2			22.1			11.2	
Approach LOS		C			B			C			B	

HCM Average Control Delay	20.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group



Lane Configurations							
Sign Control	Free			Free		Stop	
Grade	0%			0%		0%	
Volume (veh/h)	0	0	6	0	72	0	58
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	7	0	0	0	63
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type						None	
Median storage veh)							
Upstream signal (ft)	365						
pX, platoon unblocked					0.00		
vC, conflicting volume			0		0	13	0
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			0		0	13	0
tC, single (s)			4.1		0.0	6.4	6.2
tC, 2 stage (s)							
tF (s)			2.2		0.0	3.5	3.3
p0 queue free %			100		0	100	94
cM capacity (veh/h)			1623		0	1002	1085

Volume Total	0	7	63				
Volume Left	0	7	0				
Volume Right	0	0	63				
cSH	1700	1623	1085				
Volume to Capacity	0.00	0.00	0.06				
Queue Length (ft)	0	0	5				
Control Delay (s)	0.0	7.2	8.5				
Lane LOS		A	A				
Approach Delay (s)	0.0	7.2	8.5				
Approach LOS			A				

Average Delay	8.4		
Intersection Capacity Utilization	17.5%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	0	16	130	78	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	17	141	85	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				307		
pX, platoon unblocked						
vC, conflicting volume	261	85	85			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	261	85	85			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	99			
cM capacity (veh/h)	720	974	1512			

Volume Total	0	159	85			
Volume Left	0	17	0			
Volume Right	0	0	0			
cSH	1700	1512	1700			
Volume to Capacity	0.00	0.01	0.05			
Queue Length (ft)	0	1	0			
Control Delay (s)	0.0	0.9	0.0			
Lane LOS	A	A				
Approach Delay (s)	0.0	0.9	0.0			
Approach LOS	A					

Average Delay	0.6		
Intersection Capacity Utilization	17.7%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		0.86	0.91		1.00	
Frt		1.00	0.99		0.93	
Flt Protected		1.00	1.00		0.98	
Satd. Flow (prot)		6383	5041		1694	
Flt Permitted		0.72	1.00		0.98	
Satd. Flow (perm)		4624	5041		1694	
Volume (vph)	131	1552	1100	67	43	44
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	142	1687	1196	73	47	48
RTOR Reduction (vph)	0	0	8	0	32	0
Lane Group Flow (vph)	0	1829	1261	0	63	0
Turn Type	pm+pt					
Protected Phases	7	4	8		6	
Permitted Phases	4					
Actuated Green, G (s)		44.0	31.0		26.0	
Effective Green, g (s)		45.0	32.0		27.0	
Actuated g/C Ratio		0.56	0.40		0.34	
Clearance Time (s)		5.0	5.0		5.0	
Lane Grp Cap (vph)		2799	2016		572	
v/s Ratio Prot		c0.07	0.25		c0.06	
v/s Ratio Perm		c0.29				
v/c Ratio		0.65	0.63		0.11	
Uniform Delay, d1		12.1	19.2		18.2	
Progression Factor		0.33	1.00		1.00	
Incremental Delay, d2		0.6	1.5		0.4	
Delay (s)		4.6	20.7		18.6	
Level of Service		A	C		B	
Approach Delay (s)		4.6	20.7		18.6	
Approach LOS		A	C		B	

HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0
Lane Util. Factor	1.00		0.95	1.00		0.91
Frt	0.97		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		1.00
Satd. Flow (prot)	1740		3539	1583		5085
Flt Permitted	0.96		1.00	1.00		1.00
Satd. Flow (perm)	1740		3539	1583		5085
Volume (vph)	76	21	593	6	0	1406
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	83	23	645	7	0	1528
RTOR Reduction (vph)	12	0	0	3	0	0
Lane Group Flow (vph)	94	0	645	4	0	1528
Turn Type				Perm	custom	
Protected Phases	8		1		2	6
Permitted Phases	8			1	2	
Actuated Green, G (s)	21.0		43.0	43.0		49.0
Effective Green, g (s)	22.0		44.0	44.0		50.0
Actuated g/C Ratio	0.28		0.55	0.55		0.62
Clearance Time (s)	5.0		5.0	5.0		5.0
Lane Grp Cap (vph)	479		1946	871		3178
v/s Ratio Prot	c0.06		0.18			c0.30
v/s Ratio Perm				0.00		
v/c Ratio	0.20		0.33	0.00		0.48
Uniform Delay, d1	22.2		9.9	8.1		8.0
Progression Factor	1.00		0.51	0.40		1.00
Incremental Delay, d2	0.9		0.4	0.0		0.5
Delay (s)	23.1		5.5	3.2		8.6
Level of Service	C		A	A		A
Approach Delay (s)	23.1		5.5			8.6
Approach LOS	C		A			A

HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.3%	ICU Level of Service	A
Analysis Period (min)	15		

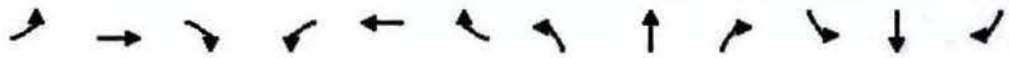
c Critical Lane Group



Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	6	8	591	0	0	1482
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	9	642	0	0	1611
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			296			210
pX, platoon unblocked	0.85	0.91			0.91	
vC, conflicting volume	1448	321			642	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1027	152			505	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	99			100	
cM capacity (veh/h)	196	788			959	

Volume Total	15	428	214	537	1074
Volume Left	7	0	0	0	0
Volume Right	9	0	0	0	0
cSH	343	1700	1700	959	1700
Volume to Capacity	0.04	0.25	0.13	0.00	0.63
Queue Length (ft)	3	0	0	0	0
Control Delay (s)	16.0	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	16.0	0.0		0.0	
Approach LOS	C				

Average Delay	0.1		
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Configurations												
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		0.91		1.00	0.95	1.00		0.91			0.91	
Frt		1.00		1.00	1.00	0.85		0.99			0.96	
Flt Protected		1.00		0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)		5085		1770	3539	1583		5014			4883	
Flt Permitted		1.00		0.95	1.00	1.00		0.91			0.94	
Satd. Flow (perm)		5085		1770	3539	1583		4548			4584	
Volume (vph)	0	1378	0	39	1534	76	8	505	50	4	1090	394
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1498	0	42	1667	83	9	549	54	4	1185	428
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1498	0	42	1667	83	0	612	0	0	1617	0
Turn Type				Prot		Perm	Perm			Perm		
Protected Phases		2		1	6			8			4	
Permitted Phases						6	8	8		4		
Actuated Green, G (s)		28.0		5.0	38.0	38.0		32.0			32.0	
Effective Green, g (s)		29.0		6.0	39.0	39.0		33.0			33.0	
Actuated g/C Ratio		0.36		0.08	0.49	0.49		0.41			0.41	
Clearance Time (s)		5.0		5.0	5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)		1843		133	1725	772		1876			1891	
v/s Ratio Prot		0.29		0.02	c0.47							
v/s Ratio Perm						0.05		0.13			c0.35	
v/c Ratio		0.81		0.32	0.97	0.11		0.33			0.86	
Uniform Delay, d1		23.0		35.1	19.9	11.1		16.0			21.3	
Progression Factor		1.00		0.81	1.09	1.10		1.00			0.67	
Incremental Delay, d2		4.0		3.1	9.3	0.1		0.5			4.7	
Delay (s)		27.1		31.4	30.8	12.4		16.4			19.0	
Level of Service		C		C	C	B		B			B	
Approach Delay (s)		27.1			30.0			16.4			19.0	
Approach LOS		C			C			B			B	

HCM Average Control Delay	24.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Configurations							
Sign Control	Free			Free		Stop	
Grade	0%			0%		0%	
Volume (veh/h)	0	0	28	0	98	0	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	30	0	0	0	12
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type						None	
Median storage veh)							
Upstream signal (ft)	365						
pX, platoon unblocked					0.00		
vC, conflicting volume			0		0	61	0
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			0		0	61	0
tC, single (s)			4.1		0.0	6.4	6.2
tC, 2 stage (s)							
tF (s)			2.2		0.0	3.5	3.3
p0 queue free %			98		0	100	99
cM capacity (veh/h)			1623		0	928	1085

Volume Total	0	30	12
Volume Left	0	30	0
Volume Right	0	0	12
cSH	1700	1623	1085
Volume to Capacity	0.00	0.02	0.01
Queue Length (ft)	0	1	1
Control Delay (s)	0.0	7.3	8.4
Lane LOS		A	A
Approach Delay (s)	0.0	7.3	8.4
Approach LOS			A

Average Delay	7.6		
Intersection Capacity Utilization	16.1%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	5	2	109	126	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	2	118	137	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				307		
pX, platoon unblocked						
vC, conflicting volume	260	137	137			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	260	137	137			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	728	912	1447			

Volume Total	5	121	137			
Volume Left	0	2	0			
Volume Right	5	0	0			
cSH	912	1447	1700			
Volume to Capacity	0.01	0.00	0.08			
Queue Length (ft)	0	0	0			
Control Delay (s)	9.0	0.1	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.0	0.1	0.0			
Approach LOS	A					

Average Delay	0.3		
Intersection Capacity Utilization	16.6%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		0.86	0.91		1.00	
Frt		1.00	0.99		0.93	
Flt Protected		1.00	1.00		0.98	
Satd. Flow (prot)		6391	5053		1691	
Flt Permitted		0.74	1.00		0.98	
Satd. Flow (perm)		4767	5053		1691	
Volume (vph)	76	1355	1570	70	73	79
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	83	1473	1707	76	79	86
RTOR Reduction (vph)	0	0	6	0	49	0
Lane Group Flow (vph)	0	1556	1777	0	116	0
Turn Type	pm+pt					
Protected Phases	7	4	8		6	
Permitted Phases	4					
Actuated Green, G (s)		44.0	31.0		26.0	
Effective Green, g (s)		45.0	32.0		27.0	
Actuated g/C Ratio		0.56	0.40		0.34	
Clearance Time (s)		5.0	5.0		5.0	
Lane Grp Cap (vph)		2864	2021		571	
v/s Ratio Prot		c0.06	c0.35		c0.10	
v/s Ratio Perm		0.24				
v/c Ratio		0.54	0.88		0.20	
Uniform Delay, d1		11.0	22.2		18.8	
Progression Factor		0.13	1.00		1.00	
Incremental Delay, d2		0.4	5.9		0.8	
Delay (s)		1.9	28.1		19.6	
Level of Service		A	C		B	
Approach Delay (s)		1.9	28.1		19.6	
Approach LOS		A	C		B	

HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Appendix C

Background Future Levels of Service



Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0
Lane Util. Factor	1.00		0.95	1.00		0.91
Frt	0.98		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		1.00
Satd. Flow (prot)	1748		3539	1583		5079
Flt Permitted	0.96		1.00	1.00		0.90
Satd. Flow (perm)	1748		3539	1583		4581
Volume (vph)	9	2	1245	20	13	473
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	2	1353	22	14	514
RTOR Reduction (vph)	1	0	0	10	0	0
Lane Group Flow (vph)	11	0	1353	12	0	528
Turn Type				Perm	pm+pt	
Protected Phases	8		1		2	6
Permitted Phases				1	6	
Actuated Green, G (s)	21.0		43.0	43.0		49.0
Effective Green, g (s)	22.0		44.0	44.0		50.0
Actuated g/C Ratio	0.28		0.55	0.55		0.62
Clearance Time (s)	5.0		5.0	5.0		5.0
Lane Grp Cap (vph)	481		1946	871		2876
v/s Ratio Prot	c0.01		c0.38			c0.00
v/s Ratio Perm				0.01		0.11
v/c Ratio	0.02		0.70	0.01		0.18
Uniform Delay, d1	21.2		13.1	8.2		6.4
Progression Factor	1.00		0.87	1.42		1.00
Incremental Delay, d2	0.1		1.5	0.0		0.1
Delay (s)	21.2		12.9	11.6		6.5
Level of Service	C		B	B		A
Approach Delay (s)	21.2		12.9			6.5
Approach LOS	C		B			A

HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	1	1	1265	15	2	480
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	1	1375	16	2	522
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			296			210
pX, platoon unblocked	0.78	0.75			0.75	
vC, conflicting volume	1648	696			1391	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1344	260			1188	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	110	554			437	

Volume Total	2	917	475	176	348
Volume Left	1	0	0	2	0
Volume Right	1	0	16	0	0
cSH	184	1700	1700	437	1700
Volume to Capacity	0.01	0.54	0.28	0.00	0.20
Queue Length (ft)	1	0	0	0	0
Control Delay (s)	24.8	0.0	0.0	0.2	0.0
Lane LOS	C			A	
Approach Delay (s)	24.8	0.0		0.1	
Approach LOS	C				

Average Delay	0.0		
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

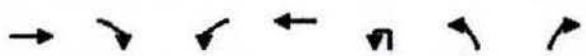


Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0		4.0			4.0	
Lane Util. Factor		0.91		1.00	0.95	1.00		0.91			0.91	
Frt		1.00		1.00	1.00	0.85		0.98			0.96	
Flt Protected		1.00		0.95	1.00	1.00		1.00			0.99	
Satd. Flow (prot)		5085		1770	3539	1583		4991			4855	
Flt Permitted		1.00		0.95	1.00	1.00		0.92			0.67	
Satd. Flow (perm)		5085		1770	3539	1583		4600			3272	
Volume (vph)	0	1485	1	18	978	170	26	1110	150	82	281	120
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1614	1	20	1063	185	28	1207	163	89	305	130
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1615	0	20	1063	185	0	1398	0	0	524	0
Turn Type				Prot		Perm	Perm			Perm		
Protected Phases		2		1	6			8			4	
Permitted Phases						6	8			4		
Actuated Green, G (s)		28.0		5.0	38.0	38.0		32.0			32.0	
Effective Green, g (s)		29.0		6.0	39.0	39.0		33.0			33.0	
Actuated g/C Ratio		0.36		0.08	0.49	0.49		0.41			0.41	
Clearance Time (s)		5.0		5.0	5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)		1843		133	1725	772		1898			1350	
v/s Ratio Prot		c0.32		0.01	c0.30							
v/s Ratio Perm						0.12		c0.30			0.16	
v/c Ratio		0.88		0.15	0.62	0.24		0.74			0.96dl	
Uniform Delay, d1		23.8		34.6	15.0	11.9		19.8			16.4	
Progression Factor		1.00		0.53	0.64	0.56		1.00			0.64	
Incremental Delay, d2		6.2		1.9	1.3	0.6		2.6			0.8	
Delay (s)		30.0		20.2	10.9	7.2		22.4			11.3	
Level of Service		C		C	B	A		C			B	
Approach Delay (s)		30.0			10.5			22.4			11.3	
Approach LOS		C			B			C			B	

HCM Average Control Delay	20.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group



Lane Configurations							
Sign Control	Free			Free		Stop	
Grade	0%			0%		0%	
Volume (veh/h)	0	0	6	0	72	0	58
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	7	0	0	0	63
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type						None	
Median storage veh)							
Upstream signal (ft)	365						
pX, platoon unblocked					0.00		
vC, conflicting volume			0		0	13	0
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			0		0	13	0
tC, single (s)			4.1		0.0	6.4	6.2
tC, 2 stage (s)							
tF (s)			2.2		0.0	3.5	3.3
p0 queue free %			100		0	100	94
cM capacity (veh/h)			1623		0	1002	1085

Volume Total	0	7	63				
Volume Left	0	7	0				
Volume Right	0	0	63				
cSH	1700	1623	1085				
Volume to Capacity	0.00	0.00	0.06				
Queue Length (ft)	0	0	5				
Control Delay (s)	0.0	7.2	8.5				
Lane LOS		A	A				
Approach Delay (s)	0.0	7.2	8.5				
Approach LOS			A				

Average Delay			8.4				
Intersection Capacity Utilization			17.5%		ICU Level of Service		A
Analysis Period (min)			15				



Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	0	16	130	78	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	17	141	85	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				307		
pX, platoon unblocked						
vC, conflicting volume	261	85	85			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	261	85	85			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	99			
cM capacity (veh/h)	720	974	1512			

Volume Total	0	159	85			
Volume Left	0	17	0			
Volume Right	0	0	0			
cSH	1700	1512	1700			
Volume to Capacity	0.00	0.01	0.05			
Queue Length (ft)	0	1	0			
Control Delay (s)	0.0	0.9	0.0			
Lane LOS	A	A				
Approach Delay (s)	0.0	0.9	0.0			
Approach LOS	A					

Average Delay	0.6		
Intersection Capacity Utilization	17.7%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		0.86	0.91		1.00	
Frt		1.00	0.99		0.93	
Flt Protected		1.00	1.00		0.98	
Satd. Flow (prot)		6384	5042		1694	
Flt Permitted		0.72	1.00		0.98	
Satd. Flow (perm)		4616	5042		1694	
Volume (vph)	131	1583	1122	67	43	44
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	142	1721	1220	73	47	48
RTOR Reduction (vph)	0	0	8	0	32	0
Lane Group Flow (vph)	0	1863	1285	0	63	0
Turn Type	pm+pt					
Protected Phases	7	4	8		6	
Permitted Phases	4					
Actuated Green, G (s)		44.0	31.0		26.0	
Effective Green, g (s)		45.0	32.0		27.0	
Actuated g/C Ratio		0.56	0.40		0.34	
Clearance Time (s)		5.0	5.0		5.0	
Lane Grp Cap (vph)		2795	2017		572	
v/s Ratio Prot		c0.07	0.26		c0.06	
v/s Ratio Perm		c0.30				
v/c Ratio		0.67	0.64		0.11	
Uniform Delay, d1		12.2	19.3		18.2	
Progression Factor		0.33	1.00		1.00	
Incremental Delay, d2		0.7	1.6		0.4	
Delay (s)		4.7	20.9		18.6	
Level of Service		A	C		B	
Approach Delay (s)		4.7	20.9		18.6	
Approach LOS		A	C		B	

HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0
Lane Util. Factor	1.00		0.95	1.00		0.91
Frt	0.97		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		1.00
Satd. Flow (prot)	1740		3539	1583		5085
Flt Permitted	0.96		1.00	1.00		1.00
Satd. Flow (perm)	1740		3539	1583		5085
Volume (vph)	76	21	605	6	0	1434
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	83	23	658	7	0	1559
RTOR Reduction (vph)	12	0	0	3	0	0
Lane Group Flow (vph)	94	0	658	4	0	1559
Turn Type				Perm	custom	
Protected Phases	8		1		2	6
Permitted Phases	8			1	2	
Actuated Green, G (s)	21.0		43.0	43.0		49.0
Effective Green, g (s)	22.0		44.0	44.0		50.0
Actuated g/C Ratio	0.28		0.55	0.55		0.62
Clearance Time (s)	5.0		5.0	5.0		5.0
Lane Grp Cap (vph)	479		1946	871		3178
v/s Ratio Prot	c0.06		0.19			c0.31
v/s Ratio Perm				0.00		
v/c Ratio	0.20		0.34	0.00		0.49
Uniform Delay, d1	22.2		10.0	8.1		8.1
Progression Factor	1.00		0.51	0.38		1.00
Incremental Delay, d2	0.9		0.5	0.0		0.5
Delay (s)	23.1		5.5	3.1		8.7
Level of Service	C		A	A		A
Approach Delay (s)	23.1		5.5			8.7
Approach LOS	C		A			A

HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	6	8	603	0	0	1512
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	9	655	0	0	1643
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			296			210
pX, platoon unblocked	0.85	0.90			0.90	
vC, conflicting volume	1477	328			655	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1042	150			513	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	99			100	
cM capacity (veh/h)	190	786			948	

Volume Total	15	437	218	548	1096
Volume Left	7	0	0	0	0
Volume Right	9	0	0	0	0
cSH	336	1700	1700	948	1700
Volume to Capacity	0.05	0.26	0.13	0.00	0.64
Queue Length (ft)	4	0	0	0	0
Control Delay (s)	16.2	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	16.2	0.0		0.0	
Approach LOS	C				

Average Delay	0.1		
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Configurations												
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		0.91		1.00	0.95	1.00		0.91			0.91	
Frt		1.00		1.00	1.00	0.85		0.99			0.96	
Flt Protected		1.00		0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)		5085		1770	3539	1583		5016			4883	
Flt Permitted		1.00		0.95	1.00	1.00		0.91			0.94	
Satd. Flow (perm)		5085		1770	3539	1583		4549			4584	
Volume (vph)	0	1406	0	40	1565	78	8	525	51	4	1112	402
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1528	0	43	1701	85	9	571	55	4	1209	437
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1528	0	43	1701	85	0	635	0	0	1650	0
Turn Type				Prot		Perm	Perm			Perm		
Protected Phases		2		1	6			8			4	
Permitted Phases						6	8	8		4		
Actuated Green, G (s)		28.0		5.0	38.0	38.0		32.0			32.0	
Effective Green, g (s)		29.0		6.0	39.0	39.0		33.0			33.0	
Actuated g/C Ratio		0.36		0.08	0.49	0.49		0.41			0.41	
Clearance Time (s)		5.0		5.0	5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)		1843		133	1725	772		1876			1891	
v/s Ratio Prot		0.30		0.02	c0.48							
v/s Ratio Perm						0.05		0.14			c0.36	
v/c Ratio		0.83		0.32	0.99	0.11		0.34			0.87	
Uniform Delay, d1		23.2		35.1	20.2	11.1		16.0			21.6	
Progression Factor		1.00		0.82	1.09	1.12		1.00			0.67	
Incremental Delay, d2		4.5		3.0	12.0	0.1		0.5			5.3	
Delay (s)		27.7		31.7	34.1	12.6		16.5			19.8	
Level of Service		C		C	C	B		B			B	
Approach Delay (s)		27.7			33.1			16.5			19.8	
Approach LOS		C			C			B			B	

HCM Average Control Delay	25.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Lane Configurations							
Sign Control	Free			Free		Stop	
Grade	0%			0%		0%	
Volume (veh/h)	0	0	28	0	98	0	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	30	0	0	0	12
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type						None	
Median storage veh)							
Upstream signal (ft)	365						
pX, platoon unblocked					0.00		
vC, conflicting volume			0		0	61	0
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			0		0	61	0
tC, single (s)			4.1		0.0	6.4	6.2
tC, 2 stage (s)							
tF (s)			2.2		0.0	3.5	3.3
p0 queue free %			98		0	100	99
cM capacity (veh/h)			1623		0	928	1085

Volume Total	0	30	12
Volume Left	0	30	0
Volume Right	0	0	12
cSH	1700	1623	1085
Volume to Capacity	0.00	0.02	0.01
Queue Length (ft)	0	1	1
Control Delay (s)	0.0	7.3	8.4
Lane LOS		A	A
Approach Delay (s)	0.0	7.3	8.4
Approach LOS			A

Average Delay	7.6		
Intersection Capacity Utilization	16.1%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	5	2	109	126	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	2	118	137	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				307		
pX, platoon unblocked						
vC, conflicting volume	260	137	137			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	260	137	137			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	728	912	1447			

Volume Total	5	121	137
Volume Left	0	2	0
Volume Right	5	0	0
cSH	912	1447	1700
Volume to Capacity	0.01	0.00	0.08
Queue Length (ft)	0	0	0
Control Delay (s)	9.0	0.1	0.0
Lane LOS	A	A	
Approach Delay (s)	9.0	0.1	0.0
Approach LOS	A		

Average Delay	0.3		
Intersection Capacity Utilization	16.6%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		0.86	0.91		1.00	
Frt		1.00	0.99		0.93	
Flt Protected		1.00	1.00		0.98	
Satd. Flow (prot)		6391	5053		1691	
Flt Permitted		0.74	1.00		0.98	
Satd. Flow (perm)		4758	5053		1691	
Volume (vph)	76	1382	1602	70	73	79
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	83	1502	1741	76	79	86
RTOR Reduction (vph)	0	0	6	0	49	0
Lane Group Flow (vph)	0	1585	1811	0	116	0
Turn Type	pm+pt					
Protected Phases	7	4	8		6	
Permitted Phases	4					
Actuated Green, G (s)		44.0	31.0		26.0	
Effective Green, g (s)		45.0	32.0		27.0	
Actuated g/C Ratio		0.56	0.40		0.34	
Clearance Time (s)		5.0	5.0		5.0	
Lane Grp Cap (vph)		2860	2021		571	
v/s Ratio Prot		c0.06	c0.36		c0.10	
v/s Ratio Perm		0.25				
v/c Ratio		0.55	0.90		0.20	
Uniform Delay, d1		11.1	22.4		18.8	
Progression Factor		0.13	1.00		1.00	
Incremental Delay, d2		0.4	6.7		0.8	
Delay (s)		1.9	29.2		19.6	
Level of Service		A	C		B	
Approach Delay (s)		1.9	29.2		19.6	
Approach LOS		A	C		B	

HCM Average Control Delay	16.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Appendix D

Total Future Levels of Service



Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0
Lane Util. Factor	1.00		0.95	1.00		0.91
Frt	0.98		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		1.00
Satd. Flow (prot)	1748		3539	1583		5079
Flt Permitted	0.96		1.00	1.00		0.90
Satd. Flow (perm)	1748		3539	1583		4582
Volume (vph)	9	2	1246	20	13	477
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	2	1354	22	14	518
RTOR Reduction (vph)	1	0	0	10	0	0
Lane Group Flow (vph)	11	0	1354	12	0	532
Turn Type				Perm	pm+pt	
Protected Phases	8		1		2	6
Permitted Phases				1	6	
Actuated Green, G (s)	21.0		43.0	43.0		49.0
Effective Green, g (s)	22.0		44.0	44.0		50.0
Actuated g/C Ratio	0.28		0.55	0.55		0.62
Clearance Time (s)	5.0		5.0	5.0		5.0
Lane Grp Cap (vph)	481		1946	871		2876
v/s Ratio Prot	c0.01		c0.38			c0.00
v/s Ratio Perm				0.01		0.11
v/c Ratio	0.02		0.70	0.01		0.18
Uniform Delay, d1	21.2		13.1	8.2		6.4
Progression Factor	1.00		0.87	1.51		1.00
Incremental Delay, d2	0.1		1.5	0.0		0.1
Delay (s)	21.2		12.9	12.4		6.5
Level of Service	C		B	B		A
Approach Delay (s)	21.2		12.8			6.5
Approach LOS	C		B			A

HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		

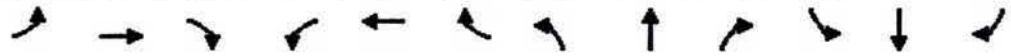
c Critical Lane Group



Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	3	1	1265	33	4	482
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	1	1375	36	4	524
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			296			210
pX, platoon unblocked	0.77	0.74			0.74	
vC, conflicting volume	1664	705			1411	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1355	255			1206	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	100			99	
cM capacity (veh/h)	107	552			426	

Volume Total	4	917	494	179	349
Volume Left	3	0	0	4	0
Volume Right	1	0	36	0	0
cSH	134	1700	1700	426	1700
Volume to Capacity	0.03	0.54	0.29	0.01	0.21
Queue Length 95th (ft)	3	0	0	1	0
Control Delay (s)	32.8	0.0	0.0	0.5	0.0
Lane LOS	D			A	
Approach Delay (s)	32.8	0.0		0.2	
Approach LOS	D				

Average Delay	0.1		
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Configurations												
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		0.91		1.00	0.95	1.00		0.91			0.91	
Frt		1.00		1.00	1.00	0.85		0.98			0.96	
Flt Protected		1.00		0.95	1.00	1.00		1.00			0.99	
Satd. Flow (prot)		5085		1770	3539	1583		4987			4856	
Flt Permitted		1.00		0.95	1.00	1.00		0.92			0.66	
Satd. Flow (perm)		5085		1770	3539	1583		4596			3253	
Volume (vph)	0	1500	1	21	979	170	26	1128	162	84	283	120
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1630	1	23	1064	185	28	1226	176	91	308	130
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1631	0	23	1064	185	0	1430	0	0	529	0
Turn Type				Prot		Perm	Perm			Perm		
Protected Phases		2		1	6			8			4	
Permitted Phases						6	8			4		
Actuated Green, G (s)		28.0		5.0	38.0	38.0		32.0			32.0	
Effective Green, g (s)		29.0		6.0	39.0	39.0		33.0			33.0	
Actuated g/C Ratio		0.36		0.08	0.49	0.49		0.41			0.41	
Clearance Time (s)		5.0		5.0	5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)		1843		133	1725	772		1896			1342	
v/s Ratio Prot		c0.32		0.01	c0.30							
v/s Ratio Perm						0.12		c0.31			0.16	
v/c Ratio		0.88		0.17	0.62	0.24		0.75			0.98dl	
Uniform Delay, d1		23.9		34.7	15.0	11.9		20.0			16.5	
Progression Factor		1.00		0.57	0.60	0.60		1.00			0.64	
Incremental Delay, d2		6.7		2.2	1.3	0.6		2.8			0.9	
Delay (s)		30.6		21.9	10.3	7.7		22.9			11.4	
Level of Service		C		C	B	A		C			B	
Approach Delay (s)		30.6			10.1			22.9			11.4	
Approach LOS		C			B			C			B	

HCM Average Control Delay	20.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group



Lane Configurations							
Sign Control	Free			Free		Stop	
Grade	0%			0%		0%	
Volume (veh/h)	0	0	6	0	72	0	58
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	7	0	0	0	63
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type						None	
Median storage veh)							
Upstream signal (ft)	365						
pX, platoon unblocked					0.00		
vC, conflicting volume			0		0	13	0
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			0		0	13	0
tC, single (s)			4.1		0.0	6.4	6.2
tC, 2 stage (s)							
tF (s)			2.2		0.0	3.5	3.3
p0 queue free %			100		0	100	94
cM capacity (veh/h)			1623		0	1002	1085

Volume Total	0	7	63				
Volume Left	0	7	0				
Volume Right	0	0	63				
cSH	1700	1623	1085				
Volume to Capacity	0.00	0.00	0.06				
Queue Length 95th (ft)	0	0	5				
Control Delay (s)	0.0	7.2	8.5				
Lane LOS		A	A				
Approach Delay (s)	0.0	7.2	8.5				
Approach LOS			A				

Average Delay	8.4		
Intersection Capacity Utilization	17.5%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	7	72	130	78	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	8	78	141	85	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				307		
pX, platoon unblocked						
vC, conflicting volume	383	85	85			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	383	85	85			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	95			
cM capacity (veh/h)	588	974	1512			

Volume Total	8	220	85			
Volume Left	0	78	0			
Volume Right	8	0	0			
cSH	974	1512	1700			
Volume to Capacity	0.01	0.05	0.05			
Queue Length 95th (ft)	1	4	0			
Control Delay (s)	8.7	3.0	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.7	3.0	0.0			
Approach LOS	A					

Average Delay	2.3		
Intersection Capacity Utilization	20.8%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		0.86	0.91		1.00	
Frt		1.00	0.99		0.91	
Flt Protected		1.00	1.00		0.98	
Satd. Flow (prot)		6379	5026		1669	
Flt Permitted		0.72	1.00		0.98	
Satd. Flow (perm)		4585	5026		1669	
Volume (vph)	160	1583	1122	94	46	88
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	1721	1220	102	50	96
RTOR Reduction (vph)	0	0	12	0	64	0
Lane Group Flow (vph)	0	1895	1310	0	82	0
Turn Type	pm+pt					
Protected Phases	7	4	8		6	
Permitted Phases	4					
Actuated Green, G (s)		44.0	31.0		26.0	
Effective Green, g (s)		45.0	32.0		27.0	
Actuated g/C Ratio		0.56	0.40		0.34	
Clearance Time (s)		5.0	5.0		5.0	
Lane Grp Cap (vph)		2781	2010		563	
v/s Ratio Prot		c0.08	0.26		c0.09	
v/s Ratio Perm		c0.31				
v/c Ratio		0.68	0.65		0.15	
Uniform Delay, d1		12.4	19.5		18.5	
Progression Factor		0.34	1.00		1.00	
Incremental Delay, d2		0.7	1.7		0.5	
Delay (s)		4.9	21.1		19.0	
Level of Service		A	C		B	
Approach Delay (s)		4.9	21.1		19.0	
Approach LOS		A	C		B	

HCM Average Control Delay	11.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0
Lane Util. Factor	1.00		0.95	1.00		0.91
Frt	0.97		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		1.00
Satd. Flow (prot)	1740		3539	1583		5085
Flt Permitted	0.96		1.00	1.00		1.00
Satd. Flow (perm)	1740		3539	1583		5085
Volume (vph)	76	21	609	6	0	1435
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	83	23	662	7	0	1560
RTOR Reduction (vph)	12	0	0	3	0	0
Lane Group Flow (vph)	94	0	662	4	0	1560
Turn Type				Perm	custom	
Protected Phases	8		1		2	6
Permitted Phases	8			1	2	
Actuated Green, G (s)	21.0		43.0	43.0		49.0
Effective Green, g (s)	22.0		44.0	44.0		50.0
Actuated g/C Ratio	0.28		0.55	0.55		0.62
Clearance Time (s)	5.0		5.0	5.0		5.0
Lane Grp Cap (vph)	479		1946	871		3178
v/s Ratio Prot	c0.06		0.19			c0.31
v/s Ratio Perm				0.00		
v/c Ratio	0.20		0.34	0.00		0.49
Uniform Delay, d1	22.2		10.0	8.1		8.1
Progression Factor	1.00		0.51	0.41		1.00
Incremental Delay, d2	0.9		0.5	0.0		0.5
Delay (s)	23.1		5.5	3.3		8.7
Level of Service	C		A	A		A
Approach Delay (s)	23.1		5.5			8.7
Approach LOS	C		A			A

HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

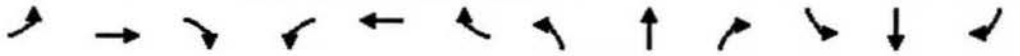
c Critical Lane Group



Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	20	12	603	4	0	1513
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	13	655	4	0	1645
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			296			210
pX, platoon unblocked	0.85	0.90			0.90	
vC, conflicting volume	1480	330			660	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1042	151			516	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	89	98			100	
cM capacity (veh/h)	191	784			945	

Volume Total	35	437	223	548	1096
Volume Left	22	0	0	0	0
Volume Right	13	0	4	0	0
cSH	266	1700	1700	945	1700
Volume to Capacity	0.13	0.26	0.13	0.00	0.64
Queue Length 95th (ft)	11	0	0	0	0
Control Delay (s)	20.6	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	20.6	0.0		0.0	
Approach LOS	C				

Average Delay	0.3		
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Configurations												
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		0.91		1.00	0.95	1.00		0.91			0.91	
Frt		1.00		1.00	1.00	0.85		0.99			0.96	
Flt Protected		1.00		0.95	1.00	1.00		1.00			1.00	
Satd. Flow (prot)		5085		1770	3539	1583		5013			4883	
Flt Permitted		1.00		0.95	1.00	1.00		0.91			0.94	
Satd. Flow (perm)		5085		1770	3539	1583		4545			4582	
Volume (vph)	0	1408	0	57	1574	78	8	529	53	5	1122	406
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1530	0	62	1711	85	9	575	58	5	1220	441
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1530	0	62	1711	85	0	642	0	0	1666	0
Turn Type				Prot		Perm	Perm			Perm		
Protected Phases		2		1	6			8			4	
Permitted Phases						6	8	8		4		
Actuated Green, G (s)		28.0		5.0	38.0	38.0		32.0			32.0	
Effective Green, g (s)		29.0		6.0	39.0	39.0		33.0			33.0	
Actuated g/C Ratio		0.36		0.08	0.49	0.49		0.41			0.41	
Clearance Time (s)		5.0		5.0	5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)		1843		133	1725	772		1875			1890	
v/s Ratio Prot		0.30		0.04	c0.48							
v/s Ratio Perm						0.05		0.14			c0.36	
v/c Ratio		0.83		0.47	0.99	0.11		0.34			0.88	
Uniform Delay, d1		23.3		35.5	20.3	11.1		16.1			21.7	
Progression Factor		1.00		0.83	1.07	1.13		1.00			0.67	
Incremental Delay, d2		4.5		5.5	13.1	0.1		0.5			5.7	
Delay (s)		27.8		34.9	35.0	12.7		16.6			20.4	
Level of Service		C		C	C	B		B			C	
Approach Delay (s)		27.8			34.0			16.6			20.4	
Approach LOS		C			C			B			C	

HCM Average Control Delay	26.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Lane Configurations							
Sign Control	Free			Free		Stop	
Grade	0%			0%		0%	
Volume (veh/h)	0	0	28	0	98	0	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	30	0	0	0	12
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type						None	
Median storage veh)							
Upstream signal (ft)	365						
pX, platoon unblocked					0.00		
vC, conflicting volume			0		0	61	0
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			0		0	61	0
tC, single (s)			4.1		0.0	6.4	6.2
tC, 2 stage (s)							
tF (s)			2.2		0.0	3.5	3.3
p0 queue free %			98		0	100	99
cM capacity (veh/h)			1623		0	928	1085

Volume Total	0	30	12
Volume Left	0	30	0
Volume Right	0	0	12
cSH	1700	1623	1085
Volume to Capacity	0.00	0.02	0.01
Queue Length 95th (ft)	0	1	1
Control Delay (s)	0.0	7.3	8.4
Lane LOS		A	A
Approach Delay (s)	0.0	7.3	8.4
Approach LOS			A

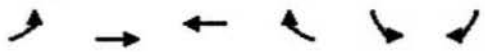
Average Delay		7.6	
Intersection Capacity Utilization	16.1%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	55	12	109	126	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	60	13	118	137	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				307		
pX, platoon unblocked						
vC, conflicting volume	282	137	137			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	282	137	137			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	93	99			
cM capacity (veh/h)	702	912	1447			

Volume Total	60	132	137
Volume Left	0	13	0
Volume Right	60	0	0
cSH	912	1447	1700
Volume to Capacity	0.07	0.01	0.08
Queue Length 95th (ft)	5	1	0
Control Delay (s)	9.2	0.8	0.0
Lane LOS	A	A	
Approach Delay (s)	9.2	0.8	0.0
Approach LOS	A		

Average Delay	2.0		
Intersection Capacity Utilization	19.1%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	
Lane Util. Factor		0.86	0.91		1.00	
Frt		1.00	0.99		0.93	
Flt Protected		1.00	1.00		0.98	
Satd. Flow (prot)		6390	5051		1691	
Flt Permitted		0.74	1.00		0.98	
Satd. Flow (perm)		4723	5051		1691	
Volume (vph)	81	1382	1602	75	97	105
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	88	1502	1741	82	105	114
RTOR Reduction (vph)	0	0	6	0	49	0
Lane Group Flow (vph)	0	1590	1817	0	170	0
Turn Type	pm+pt					
Protected Phases	7	4	8		6	
Permitted Phases	4					
Actuated Green, G (s)		44.0	31.0		26.0	
Effective Green, g (s)		45.0	32.0		27.0	
Actuated g/C Ratio		0.56	0.40		0.34	
Clearance Time (s)		5.0	5.0		5.0	
Lane Grp Cap (vph)		2844	2020		571	
v/s Ratio Prot		c0.06	c0.36		c0.13	
v/s Ratio Perm		0.25				
v/c Ratio		0.56	0.90		0.30	
Uniform Delay, d1		11.2	22.5		19.5	
Progression Factor		0.14	1.00		1.00	
Incremental Delay, d2		0.4	6.9		1.3	
Delay (s)		2.1	29.4		20.8	
Level of Service		A	C		C	
Approach Delay (s)		2.1	29.4		20.8	
Approach LOS		A	C		C	

HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group