



APPLICATION ACCEPTED: June 14, 2013  
BOARD OF ZONING APPEALS: August 7, 2013  
DEFERRAL DATE: February 12, 2014  
TIME: 9:00 a.m.

# County of Fairfax, Virginia

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February 5, 2014

## ADDENDUM 1

**SPECIAL PERMIT APPLICATION NO. SP 2013-PR-044**

### PROVIDENCE DISTRICT

**APPLICANT:** Appletree Montessori, LLC  
**OWNER:** Annely K. Carver  
**STREET ADDRESS:** 8809 Arlington Boulevard, Fairfax 22031  
**TAX MAP REFERENCE:** 48-4 ((1)) 41  
**LOT SIZE:** 41,216 square feet  
**ZONING DISTRICT:** R-1  
**ZONING ORDINANCE PROVISIONS:** 8-305  
**SPECIAL PERMIT PROPOSAL:** To permit a home child care facility with 12 children.

**STAFF RECOMMENDATION:** Staff recommends approval of SP 2013-PR-044 for the home child care facility subject to the development conditions contained in Attachment 1.

It should be noted that it is not the intent of staff to recommend that the Board, in adopting any conditions, relieve the applicant/owner from compliance with the provisions of any applicable ordinances, regulations, or adopted standards.

*O:\ehaley\8-7) SP 2013-PR-044 Appletree Montessori (HCC)\Appletree Montessori staff report*

*Erin M. Haley*

It should be further noted that the content of this report reflects the analysis and recommendations of staff; it does not reflect the position of the Board of Zoning Appeals. A copy of the BZA's Resolution setting forth this decision will be mailed within five (5) days after the decision becomes final.

The approval of this application does not interfere with, abrogate or annul any easements, covenants, or other agreements between parties, as they may apply to the property subject to the application.

For additional information, call Zoning Evaluation Division, Department of Planning and Zoning at 703-324-1280, 12055 Government Center Parkway, Suite 801, Fairfax, Virginia 22035. **Board of Zoning Appeals' meetings are held in the Board Room, Ground Level, Government Center Building, 12000 Government Center Parkway, Fairfax, Virginia 22035-5505.**



Americans with Disabilities Act (ADA): Reasonable accommodation is available upon 48 hours advance notice. For additional information on ADA call (703) 324-1334 or TTY 711 (Virginia Relay Center).

## BACKGROUND AND DESCRIPTION OF THE APPLICATION

The applicant is requesting approval of a special permit for a home child care facility for up to twelve (12) children on site at any one time between the hours of 7:00 a.m. and 6:00 p.m., Monday through Friday. The children are expected to arrive at staggered times between 7:00 a.m. and 9:15 a.m. and depart between 3:00 p.m. and 6:00 p.m. Employees will include the resident of the property and two part-time non-residential employees who will drive to the property.

The applicant originally submitted the application for the special permit on June 14, 2013. In the staff report dated July 31, 2013, staff initially recommended denial.

Reasons for the denial recommendation included:

- **Sight Distance** -- The sight distances for the existing entrances to the property were partially blocked by vegetation creating unsafe ingress and egress conditions.
- **Gravel Driveway** -- The existing driveway is gravel with two points of access to Route 50 and no improved transition. Both the Virginia Department of Transportation's (VDOT) and the Fairfax County Department of Transportation (FCDOT) determined that the entrances are substandard for safe operation on Route 50.
- **Right-Turn Lane Necessity** -- The VDOT analysis memo stated that the potential need for a right-turn lane into the site needed to be analyzed and appropriately addressed. FCDOT also stated that the applicant must provide an analysis to determine if an eastbound right turn lane, or right turn taper or a radius, is warranted on Route 50 at the site access.
- **Left-Turn Capability** -- Due to the right-in/right-out site access, FCDOT requested analysis of the level of additional U-turns and whether this would create safety problems at the traffic signal at Barkley Road (for the westbound left approach to the property) and at the unsignalized Chichester Lane (for eastbound traffic).
- **Second Access Point** -- FCDOT and VDOT originally had significant concerns about the lack of safe ingress and egress to the applicant's property. The safety concerns were increased by the presence of two points of access to the site.
- **Septic System** -- The Fairfax County Health Department conducted an initial review of the application and originally determined that they could not support approval of the application because they did not initially believe that the existing system could support the additional waste that would be generated by the proposed use.

At the public hearing on August 7, 2013, the Board of Zoning Appeals (BZA) requested additional information from the applicant. The BZA voted to defer decision to give time for the required information to be compiled and any project changes made. Suggested items for the applicant to provide included a Traffic Impact Assessment, a revised plat, and documentation proving that the septic system could support the proposed use.

The applicant has provided a revised plat titled, "Special Permit Application Plat, Appletree Montessori, LLC, 8809 Arlington Boulevard, Fairfax, Virginia," dated January 30, 2014, which is included as Attachment 2. The applicant also submitted a Traffic Impact Assessment (TIA) that was reviewed by VDOT and FCDOT, and the requested information for the Health Department to revise their assessment of the existing septic system. The revised special permit plat shows the eastern point of access eliminated and blocked by vegetation, the western point of access improved to VDOT's and FCDOT's requested standard, a paved driveway and parking lot with striped stalls, and cleared site distance areas. The TIA was reviewed by both VDOT and FCDOT and their comments were revised.

## ANALYSIS

A summary of the changes from the original application are as follows:

- **Sight Distance Issue** -- The applicant has since cleared excess vegetation to improve the sight distance to a level that the Virginia Department of Transportation (VDOT) feels allows for safe egress from the property.
- **Gravel Driveway** -- While site access remains a concern, FCDOT and VDOT have agreed that, given the low number of trips generated by the proposed use, construction of a commercial entrance with a 50 foot radius and removal of the eastern access point are adequate. The applicant also now proposes to remove the gravel from the property, replace some of it with grass, pave the driveway, and add a paved parking area with seven striped parking stalls. Proposed Development Conditions have been included to address these issues.
- **Right-Turn Lane Necessity** -- The applicant has provided a Traffic Impact Analysis (TIA) and after review, both VDOT and FCDOT have determined that a right-turn treatment with a 50-foot entrance radius is required. The applicant has updated their plat to include the required improvement.
- **Left-Turn Capability** -- Upon review of the TIA, VDOT and FCDOT have determined that conflict with U-turn traffic would not be significant and no changes to the traffic signal or striping are required.
- **Second Access Point** -- The applicant has altered their Special Permit Plat to depict closing the eastern access point with landscaping and removing the existing pavement.

SP 2013-PR-044

- **Septic System** -- Additional analysis has now allowed the Health Department to revise their opinion and support approval of the application, as long as the number of children on-site does not exceed 12 children.

## ZONING ORDINANCE REQUIREMENTS

- Sect. 8-006 General Special Permit Standards
- Sect. 8-303 All Group 3 Uses
- Sect. 8-305 Additional Standards for Home Child Care Facilities

### Summary of Zoning Ordinance Provisions

This special permit is subject to Sects. 8-006, 8-303, and 8-305 of the Zoning Ordinance as referenced above, a copy of which is included in Appendix 6. *With the additional information provided and submission of the revised Special Permit Plat that addresses the transportation issues previously expressed, staff finds that the applicant now meets these standards.*

Standard 2. The proposed use shall be in harmony with the general purpose and intent of the applicable zoning district regulations.

*Staff finds that with the removal of the majority of gravel in the front yard and the removal of the second access point that the existing use is now in harmony with the appearance and function of a residence and therefore meets the purpose and intent of a residential, R-1 zoning district.*

Standard 4. The proposed use shall be such that pedestrian and vehicular traffic associated with such use will not be hazardous or conflict with the existing and anticipated traffic in the neighborhood.

*After reviewing the TIA provided by the applicant, VDOT and FCDOT have concluded that the proposed use will not create traffic safety concerns for the neighborhood as long as the applicant complies with the proposed Development Conditions.*

Standard 7. Adequate utility, drainage, parking, loading and other necessary facilities to serve the proposed use shall be provided. Parking and loading requirements shall be in accordance with the provisions of Article 11.

*The Fairfax County Health Department has determined that the existing septic system could support the additional waste generated by the proposed use of a home child care facility of up to 12 children and 2 additional employees, so long as the applicant complies with the proposed Development Conditions and no additional children are added to the facility.*

## CONCLUSION AND RECOMMENDATIONS

SP 2013-PR-044

In conclusion, Revised Proposed Development Conditions have been included in Attachment 1 that address the above issues as well as new memos that have been provided by VDOT (Attachment 3), FCDOT (Attachment 4), the applicant's response to FCDOT's memo (Attachment 5), and the Traffic Impact Assessment (Attachment 6).

Based upon the revisions to the Special Permit Plat and additional information provided to address transportation and septic system concern, staff now recommends approval of SP 2013-PR-044 subject to the Revised Proposed Development Conditions dated February 5, 2014, included in Attachment 1 to this memo.

It should be noted that it is not the intent of staff to recommend that the Board, in adopting any conditions, relieve the applicant/owner from compliance with the provisions of any applicable ordinances, regulations, or adopted standards.

It should be further noted that the content of this report reflects the analysis and recommendations of staff; it does not reflect the position of the Board of Zoning Appeals.

The approval of this application does not interfere with, abrogate or annul any easements, covenants, or other agreements between parties, as they may apply to the property subject to the application.

### **Attachments**

1. Proposed Development Conditions
2. Special permit plat, revised January 30, 2014
3. Comments from VDOT, dated January 21, 2014
4. Memo from FCDOT, dated January 24, 2014
5. Applicant's response to FCDOT, dated January 30, 2014
6. Traffic Impact Assessment, dated October 14, 2014

**REVISED PROPOSED DEVELOPMENT CONDITIONS****SP 2013-PR-044****February 5, 2014**

If it is the intent of the Board of Zoning Appeals to approve SP 2013-PR-044 located at Tax Map 48-4 ((1)) 0041 for a home child care facility with up to 12 children pursuant to Section 3-403 and 8-305 of the Fairfax County Zoning Ordinance, staff recommends that the Board condition the approval by requiring conformance with the following development conditions. **Changes to Development Conditions dated July 31, 2013 have been struck through and/or bolded.**

1. This approval is granted to the applicant, Appletree Montessori, LLC, only and is not transferable without further action of the Board, and is for the location indicated on the application, 8809 Arlington Boulevard, and is not transferable to other land.
2. This special permit is granted only for the purpose(s), structure(s) and/or use(s) indicated on the ~~House Location Survey prepared by L.S. Whitson of Sam Whitson Land Surveying, Inc., dated February 7, 2011~~ **Special Permit Application Plat prepared by Michael R. Albright of Christopher Consultants, dated January 30, 2014**, and approved with this application, as qualified by these development conditions.
3. A copy of this Special Permit SHALL BE POSTED in a conspicuous place on the property of the use and be made available to all departments of the County of Fairfax during the hours of operation of the permitted use.
4. The maximum hours of operation of the home child care facility shall be limited to 7:00 a.m. to 6:00 p.m., Monday through Friday.
5. The dwelling that contains the child care facility shall be the primary residence of the applicant.
6. The maximum number of children on site at any one time shall be twelve, ~~ex~~including the applicant's own children.
7. A minimum of seven (7) parking spaces shall be provided on the subject parcel within areas of existing paving, as well as a turnaround area.
8. There shall be no signage associated with the home child care facility.

9. The ingress/egress points to the site shall be provided and upgraded as determined by the Virginia Department of Transportation (VDOT) and/or the Fairfax County Department of Transportation (FCDOT) to meet commercial access standards and include a 50 foot entrance radius.
10. **The applicant shall ensure that there is a single point of vehicular access to the site from Route 50, as shown on the Special Permit Plat.**
11. Adequate sight distance shall be provided as determined by VDOT/FCDOT to meet their standards.
- ~~12. If determined necessary by VDOT/FDOT, an analysis shall be provided to determine if an eastbound right turn lane, or right turn taper or radius, is warranted on Route 50 at the site access.~~
- ~~13. The septic system shall be upgraded as needed to meet the requirements of the Fairfax County/Health Department standards.~~
14. **Prior to establishment of the use, the applicant shall remove all gravel from the front yard area not proposed to be paved, and the area shall be scarified and replanted with grass and/or ornamental vegetation.**
15. **The applicant shall not increase enrollment in the home child care facility beyond seven children until VDOT has approved the proposed site entry and issued all required permits.**
16. **Prior to establishment of the use, the applicant shall ensure that all conditions imposed by the Fairfax County Health Department relating to the property's septic system shall be met as required. Should the septic system fail, the use shall be suspended until the Fairfax County Health Department approves the applicant's measures taken to repair, replace the system, or connect to the public sewer system.**

This approval, contingent upon the above-noted conditions, shall not relieve the applicant from compliance with the provisions of any applicable ordinances, regulations or adopted standards.

Pursuant to Sect. 8-015 of the Zoning Ordinance, this special permit shall automatically expire, without notice, thirty (30) months after the date of approval unless the use has been established as outlined above. The Board of Zoning Appeals may grant additional time to establish the use if a written request for additional time is filed with the Zoning Administrator prior to the date of expiration of the special permit. The request must specify the amount of additional time requested, the basis for the amount of time requested and an explanation of why additional time is required.



**Haley, Erin M.**

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**From:** Kraucunas, Paul J. (VDOT), P.E. <Paul.Kraucunas@VDOT.Virginia.gov>  
**Sent:** Tuesday, January 21, 2014 9:52 AM  
**To:** Haley, Erin M.; Kessler, Alan  
**Subject:** RE: Appletree Montessori Traffic Assessment, SP 2013-PR-044

Erin + Alan,

Our Traffic Engineering Section has been able to review this study earlier than expected.

It is VDOT's position that:

1. The right-turn volume is low and an exclusive right-turn lane is not warranted. (A large radius entrance would be helpful)
2. Regarding the U-turn, the change of removing the protected left-turn signal phase discussed in the report should not be made due to the high conflicting left-turn and opposing through traffic. Considering the U-Turn traffic (1 (AM) /3 (PM) vehicle/hr) and the NB approach right-turn traffic (92 (AM) / 54 (PM) vehicle/hr) are not high, the conflict would not be significant. So the U-turn is acceptable without any changes to the traffic signal or striping.

Please contact me if you have any questions,  
Paul

**From:** Haley, Erin M. [<mailto:Erin.Haley@fairfaxcounty.gov>]  
**Sent:** Tuesday, December 31, 2013 2:30 PM  
**To:** Kraucunas, Paul J. (VDOT), P.E.; Kessler, Alan  
**Subject:** FW: Appletree Montessori Traffic Assessment, SP 2013-PR-044

Hello,

I am attaching the information I received regarding the Appletree Montessori Traffic Assessment. I am not sure if the applicant already sent this to you directly. Please let me know if you have any questions or concerns.

Thank you,  
Erin M. Haley  
Staff Coordinator  
Fairfax County  
Zoning Evaluation Division  
703-324-1239  
[Erin.Haley@fairfaxcounty.gov](mailto:Erin.Haley@fairfaxcounty.gov)



**MEMORANDUM**

**DATE:** January 24, 2014

**TO:** Barbara Berlin, Director  
Zoning Evaluation Division  
Department of Planning and Zoning

**FROM:** Angela Kadar Rodeheaver, Chief  
Site Analysis Section  
Department of Transportation 

**FILE:** 3-6 (SP 2013-PR-044)

**SUBJECT:** Transportation Impact

**REFERENCE:** SP 2013-PR-044; AppleTree Montessori, LLC  
Traffic Zone: 1518; Land Identification Map: 48-4 ((01)) 41

Transmitted herewith are comments from the Department of Transportation with respect to the referenced application. These comments are based on the revised plat dated December 17, 2013 and a recently submitted traffic analysis dated October 14, 2013.

The special permit request is to permit a child care facility with a maximum enrollment of 12 children. The hours of operation are from 7:00 am to 6:00 pm.

The revised plat demonstrates a direct site access to Route 50 located only a mile and a half from the Capital Beltway. The heavily travelled Route 50 is designated as a Principal Arterial and it is also part of the National Highway System (NHS). Both these designations help define Route 50 as a limited access facility and one that favors mobility for longer through trips rather than direct land access. Along with the high traffic volumes, the site's direct access bisects Route 50 between two median breaks (one which is signalized), where over 30 vehicles accidents were reported between years 2006 and 2010.

- Per the mobility concerns and safety issues mentioned above the site's consolidated single access point to Route 50 should be complemented with a right turn treatment. The vehicular trip generation for the proposed 12-child day-care permits a radius treatment rather than a right turn deceleration lane. However, a treatment with a 50-ft. radius is recommended to help ensure some deceleration area for right turning vehicles into the site. It also should be noted that any further enrollment or increase in site vehicular site trips will warrant the need for a deceleration treatment such as a full-width right turn lane.



**christopher consultants**  
engineering · surveying · land planning

January 30, 2014

Ms. Angela Kadar Rodeheaver  
Chief  
Site Analysis Section  
Fairfax County Department of Transportation  
4050 Legato Road  
Suite 400  
Fairfax, VA 22033

RE: Appletree Montessori, LLC Transportation Impact  
Plan Number: SP 2013-PR-044  
ccl Project #13161.001.00

Dear Ms. Rodeheaver:

We are in receipt of your comments dated January 24, 2014 and offer the following in response.

1. The revised plat demonstrates a direct site access to Route 50 located only a mile and a half from the Capital Beltway. The heavily travelled Route 50 is designated as a Principal Arterial and it is also part of the National Highway System (NHS). Both these designations help define Route 50 as a limited access facility and one that favors mobility for longer through trips rather than direct land access. Along with the high traffic volumes, the site's direct access bisects Route 50 between two median breaks (one which is signalized), where over 30 vehicles accidents were reported between years 2006 and 2010.

Per the mobility concerns and safety issues mentioned above the site's consolidated single access point to Route 50 should be complemented with a right turn treatment. The vehicular trip generation for the proposed 12-child day-care permits a radius treatment rather than a right turn deceleration lane. However, a treatment with a 50-ft. radius is recommended to help ensure some deceleration area for right turning vehicles into the site. It also should be noted that any further enrollment or increase in site vehicular site trips will warrant the need for a deceleration treatment such as a full-width right turn lane.

**Response:** The entrance has been revised to show a right-turn treatment with a 50-ft. entrance radius to ensure deceleration area for vehicles entering the site. We acknowledge that any further enrollment or increase in site vehicular trips will warrant the need for a full-width right turn lane into the site for deceleration.

Ms. Angela Kadar Rodeheaver  
January 30, 2014  
Page 2

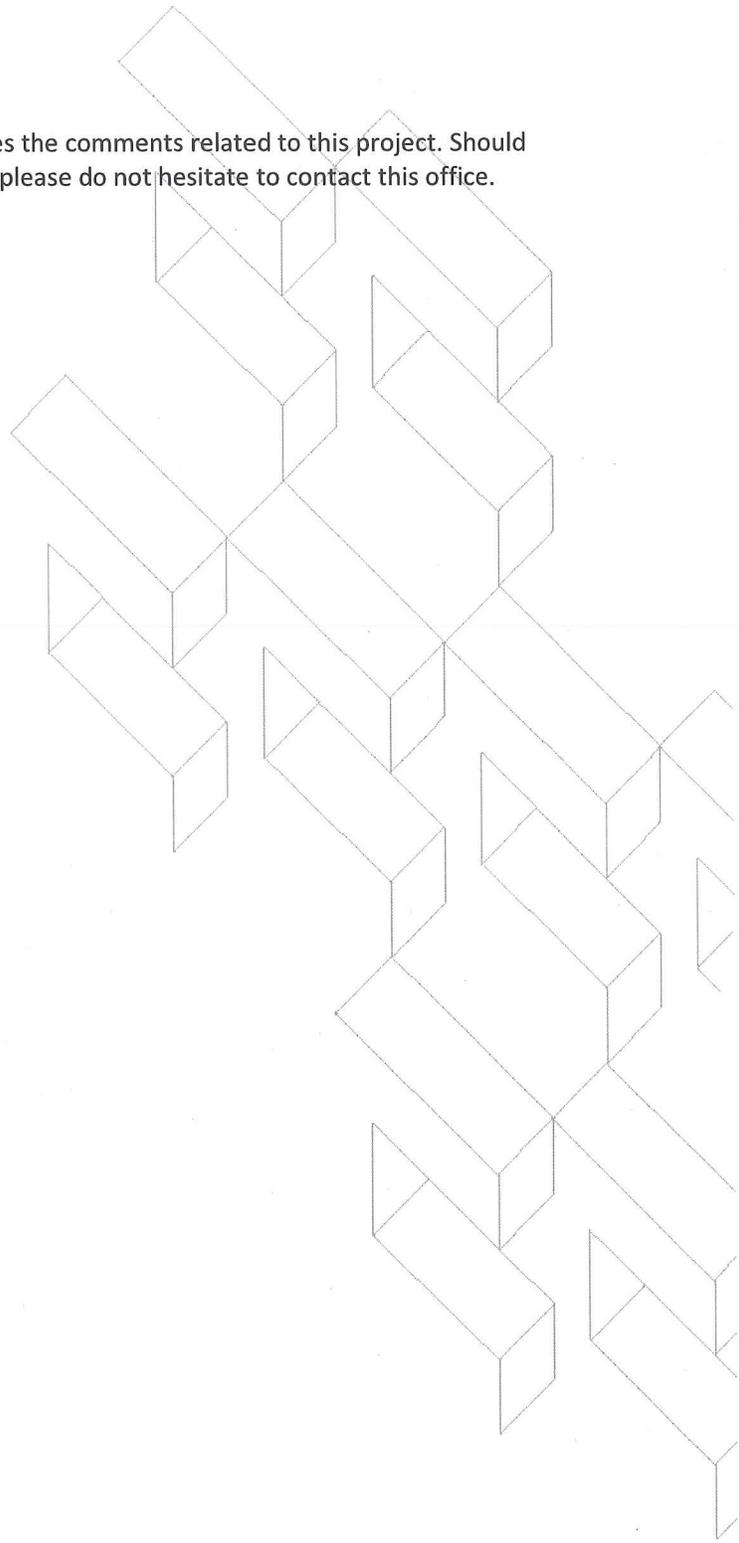
We trust that the above response satisfactorily addresses the comments related to this project. Should you have any questions or need additional information, please do not hesitate to contact this office.

Very truly yours,



Kathryn M. Winters, E.I.T.  
Engineer II – Public Division

KMW/ms



**WELLS + ASSOCIATES**

## MEMORANDUM

**To:** Ms. Annelly Carver  
Appletree Montessori

**From:** John Wilson  
Christopher Turnbull

**Date:** October 14, 2013

**Re:** Appletree Montessori School – Traffic Assessment  
Site No. SP-2013-PR-044  
Fairfax County, Virginia

210 Wirt Street, SW  
Suite 201  
Leesburg, Virginia 20175  
703-443-1442  
703-443-1225 FAX  
[www.mjwells.com](http://www.mjwells.com)

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**INTRODUCTION**

This memorandum provides a traffic analysis for Appletree Montessori School located at 8809 Arlington Boulevard, Fairfax County, Virginia, an existing home child care facility. The traffic analysis is being completed to address Fairfax County Special Permit Application, Proposed Development Condition #11 that indicates:

11. If determined necessary by VDOT/FDOT, an analysis shall be provided to determine if an eastbound right-turn lane, or right-turn taper, or radius, is warranted on Route 50 at the site access.

Appletree Montessori School currently serves seven (7) students and the special permit would allow an increase in enrollment of up to twelve (12) total students. No physical expansion or additional access points are proposed to the school's facility.

**BACKGROUND INFORMATION**Existing Traffic Counts

Existing AM and PM peak hour traffic counts were completed by Wells + Associates on Thursday, September 19, 2013 at the Arlington Boulevard (Route 50) and Barkley Gate Lane/Barkley Drive, site entrances, and Arlington Boulevard (Route 50) and Chichester Lane.

The counts are included in Attachment B and summarized on Figure 1.

The AM peak hour occurred between 8:00 AM and 9:00 AM and the PM peak hour occurred between 5:15 PM and 6:15 PM. Arlington Boulevard (Route 50) presently carries approximately 3,602 AM peak hour trips and 3,800 PM peak hour trips. Sixty-four (64) percent of all motorist travel eastbound in the morning and fifty-nine (59) travel westbound in the evening.



## WELLS + ASSOCIATES

### MEMORANDUM

A review of existing traffic counts at the site driveway indicates that approximately three (3) trips enter and exit during the AM peak hour and one (1) trip enter and exist during the PM peak hour. The distribution of existing trips are estimated to be 50% from the east and 50% from the west.

#### Public Road Network

Access to the site is provided from a circular gravel driveway from Arlington Boulevard (Route 50). Right-in movements occur at the eastern driveway while right-out movements occur at the western driveway. Median breaks are located west of the site at Arlington Boulevard (Route 50) and Barkley Gate Lane/Barkley Drive, a signalized intersection, and east of the site at Arlington Boulevard Boulevard (Route 50) and Chichester Lane, a side street stop controlled intersection. U-turn movements are permitted at both of these intersections.

Arlington Boulevard (Route 50) is a four-lane, median-divided roadway with a posted speed limit of 45 mph. Right and left turn pockets are provided at the signalized intersection of Barkley Gate Lane/Barkley Drive. An eastbound left turn pocket is provided at the unsignalized, T-intersection of Chichester Lane. A "Do Not Block Intersection" sign exists in advance of the intersection for eastbound traffic.

Figure 1 depicts the lane usage and traffic controls of the study intersections.

#### **ANALYSIS**

To evaluate the need for a right turn treatment at the site entry, traffic forecasts with the additional five (5) students were developed. The number of trips that would be generated by the additional students using "Day Care" use (LU Code 565) was estimated based on the Institution of Traffic Engineers (ITE) Trip Generation Manual and the difference between existing and future students. The resulting additional trips are shown in Table 1 and are shown to generate 4 AM and PM peak hour trips (2 inbound and 2 outbound).



# WELLS + ASSOCIATES

## MEMORANDUM

**Table I**  
**Appletree Montessori**  
**Trip Generation**

Use	ITE <sup>(1)</sup> Land Use Code	Amount	Units	AM Peak Hour			PM Peak Hour			Average Daily Traffic
				In	Out	Total	In	Out	Total	
DayCare - Proposed	565	12	Students	5	5	10	5	5	10	53
DayCare - Existing		7	Students	3	3	6	1	1	6	31
<b>Difference</b>				2	2	4	4	4	4	22

Notes:

(1) Trip generation based on Institute of Transportation Engineers Trip Generation, 9th Edition.

These site generate trips were assigned to the road network based on trip distributions discussed above. The site generated trips were then added to existing trips to arrive at total future peak hour traffic forecasts shown on Figure 2.

### Right-Turn Lane Analysis

Using the total future peak hour traffic forecasts at the site entrance, a right-turn lane analysis was completed for the eastbound direction. The analysis is based on VDOT criteria using Figure 3-27 (4-Lane Highway) of the VDOT Roadway Design Manual. The criteria indicate that the lower threshold for a taper treatment is 10 right turns and 40 right turns for a full-width turn lane. Given the maximum trips forecasted during the AM and PM peak hours is five (5) right turns, the existing radius treatment is warranted and suggests the treatment is safe and adequate according to VDOT criteria. The VDOT criteria, with posted volumes at the entry, are attached.

### Left-Turn Capability

Although not a development condition, DOT staff requested the applicant determine if a signal head redesign is needed to eliminate the westbound and eastbound green arrow option of the protected-permitted left turn phasing at the Route 50 and Barkley Drive intersection. This request is based on increased U-turn traffic and a northbound right turn overlap that occurs with the westbound left turn arrow that could create conflicts. Since U-turns are permitted today, the conflict also exists and as noted by staff, VDOT could prohibit U-turns at the intersection to eliminate the potential conflict or eliminate the right-turn overlap.

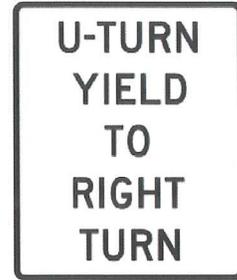
In the case of site trips wishing to access the property, the number of U-turns are very low, estimated at a maximum of 3 trips during the commuter peak hours. An analysis of the suggested removal of the protected portion of the Protected-Permitted left turn phasing indicates the level of service (LOS) for the movement would decrease from a LOS "C" and "A" to a LOS "D" and "B" during the AM and PM peak hours, respectively. The queues are reported to increase from 25 feet to 115 feet during the AM



## WELLS + ASSOCIATES

### MEMORANDUM

peak hour and 45 feet to 175 feet during the PM peak hour. In addition, the left and U-turners are likely to experience increased frustration due to the heavy volumes on Route 50 during the peak hours and no guaranteed movement which could increase the number of conflicts that do not occur today. In addition, it is not common for agencies to decrease the level of control at intersections. For these reasons, if a remedial measure is desired by DOT and/or VDOT, a “U-turn Yield to Right Turn” sign placed on the signal arm is suggested as an alternative to changing the Protected-Permitted Route 50 left turn phasing. Since the U-turn demand does not rise to that required by the project, Fairfax County and/or VDOT should commission the enhancement.



### CONCLUSIONS

The conclusions of this traffic review for the Appletree Montessori School is as follows:

1. Access to the property will continue to be provided via the existing driveways Arlington Boulevard (Route 50).
2. An increase of five (5) students would result in four (4) AM and PM peak hour trips (2 inbound and 2 outbound). A maximum of five (5) entering and exiting trips are forecasted during the critical AM and PM peak hours.
3. The existing radius treatment is appropriate and is safe and adequate according to Virginia Department of Transportation criteria.
4. A “U-turn Yield to Right Turn” sign placed on the signal arm is provided as an alternative to changing the intersection left turn signal phasing. The enhancement should be commissioned by Fairfax County Department of Transportation and/or the Virginia Department of Transportation should remedial measure be desired under existing conditions.

#### Attachments:

Figure 1 – Existing Traffic Counts

Figure 2 – Total Future Traffic Forecasts 2014

Figure 3-27 Guidelines for Right Turn Treatment (4-Lane Highway)

Attachment A – Traffic Counts

Attachment B – Photos from Site Access

Attachment C – Level of Service Worksheets

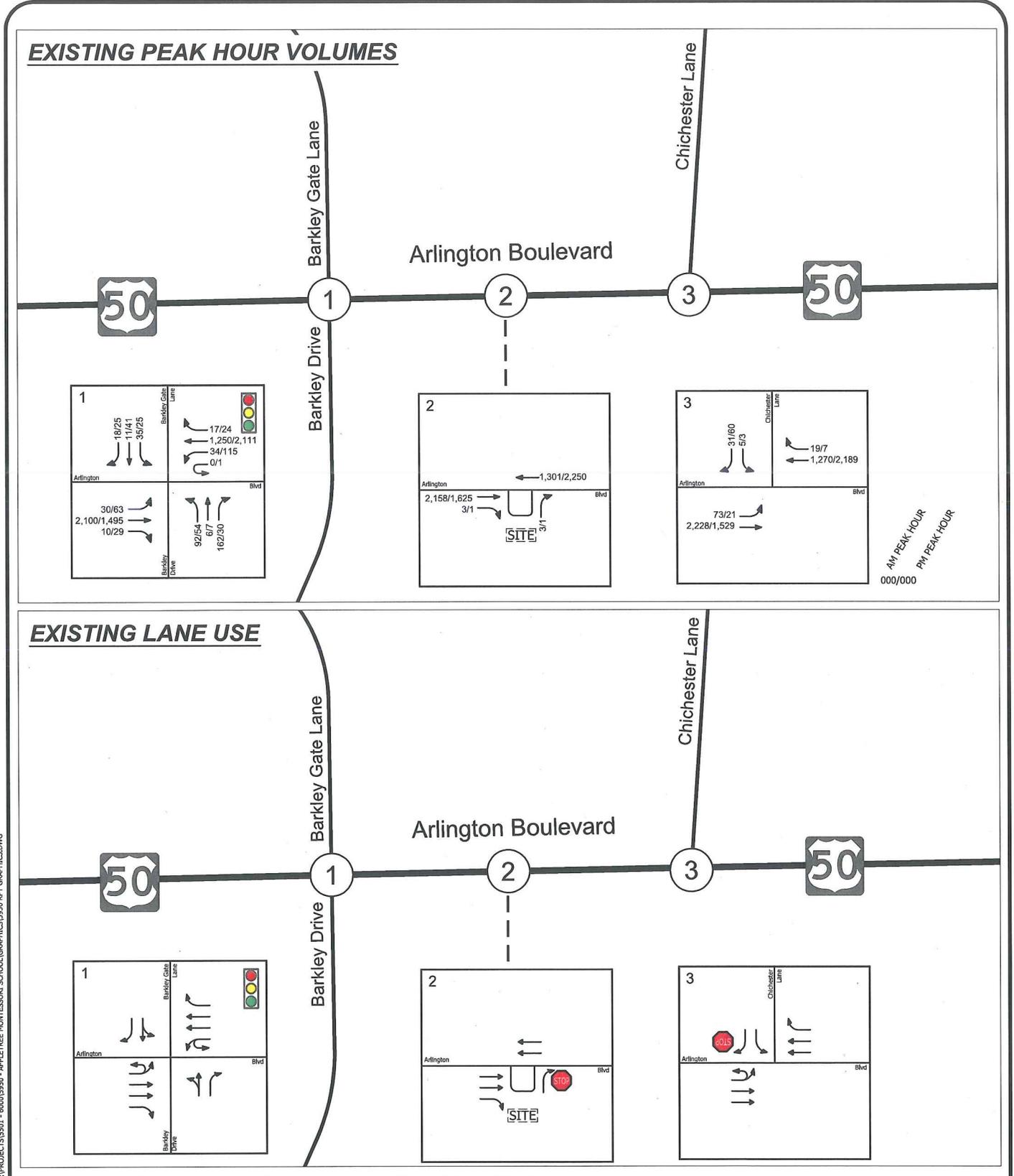


Figure 1  
Existing Peak Hour Traffic Volumes and Lane Use



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JFW

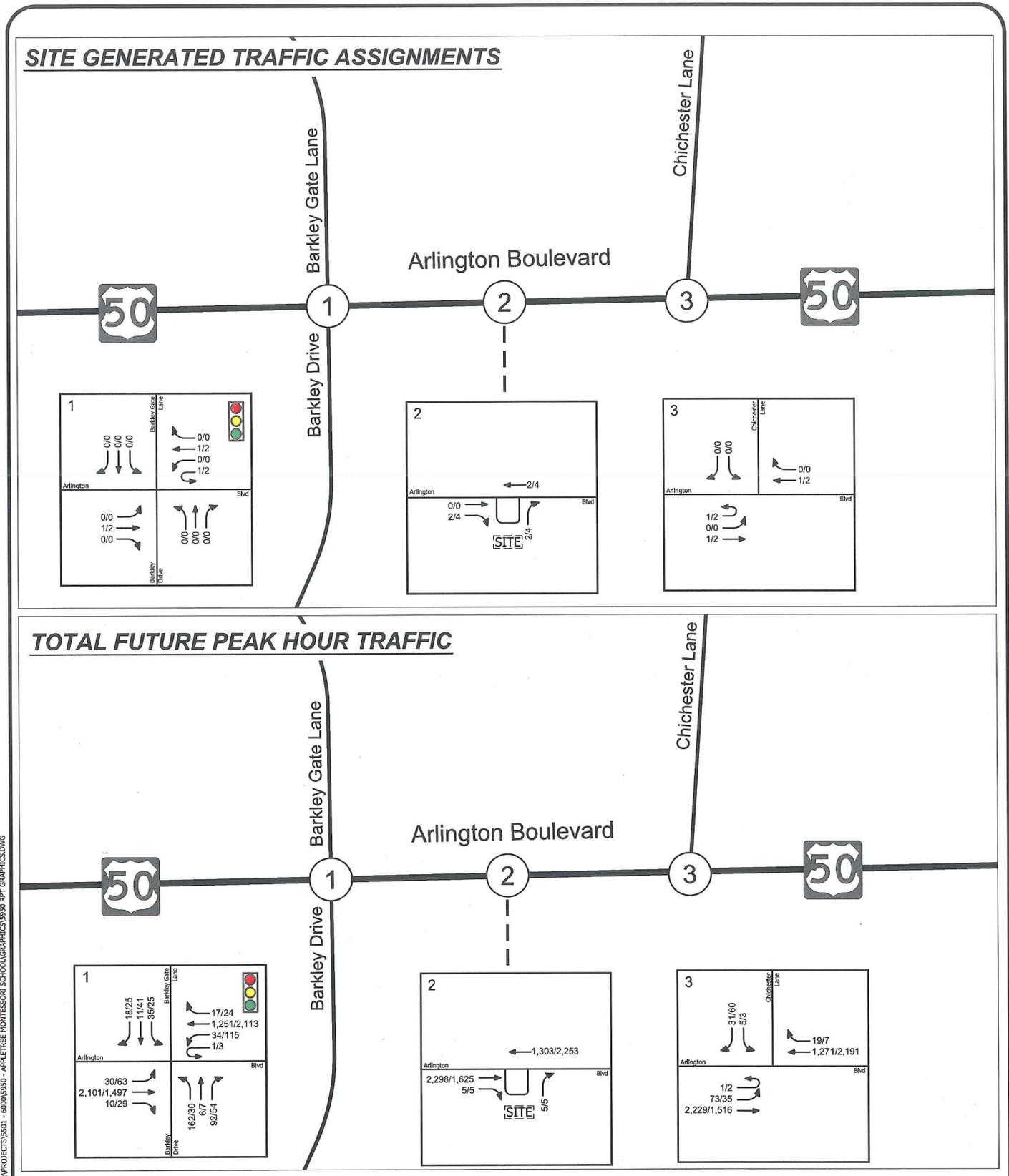
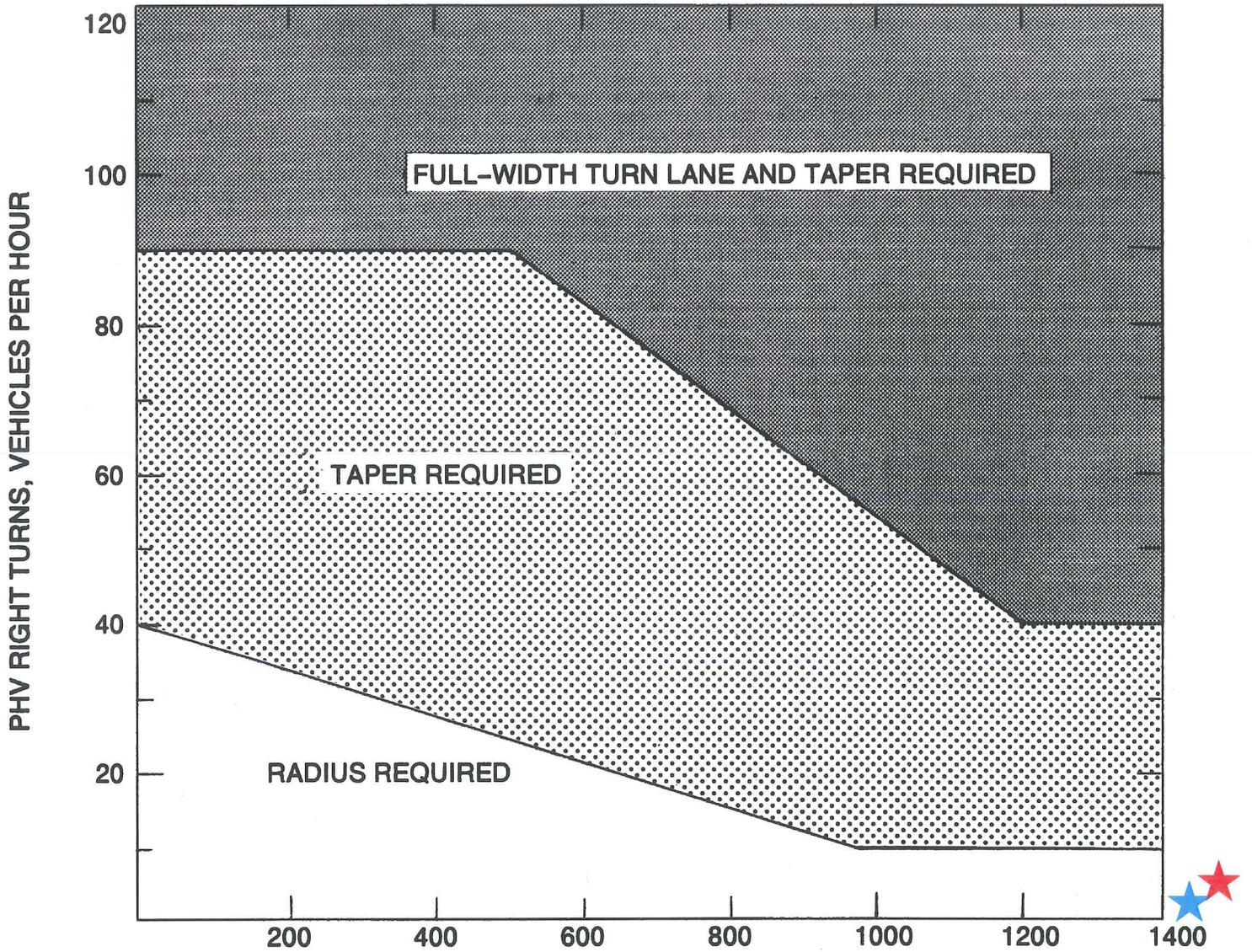


Figure 2  
 Site Generated Traffic Assignments and  
 Total Future Peak Hour Traffic Volumes



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JFW



PHV APPROACH TOTAL, VEHICLES PER HOUR  
 FIGURE 3-27 GUIDELINES FOR RIGHT TURN TREATMENT (4-LANE HIGHWAY)

AM PEAK - ★  
 PM PEAK - ★

Appendix A

Existing Traffic Counts

# Wells + Associates, Inc.

McLean, Virginia

## Turning Movement Count - All Vehicles

Time Period		Southbound Barkley Gate Lane - 979					Westbound Arlington Boulevard - 50					Northbound Barkley Drive - 979					Eastbound Arlington Boulevard - 50					North & South	East & West	Total	
		Right	Thru	Left	Total	PHF	Right	Thru	Left	U-Turn	Total	PHF	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total				PHF
<b>AM 15 Minute Volumes</b>																									
6:00 AM - 6:15 AM		0	0	2	2		1	69	1	0	71		10	0	2	12		1	271	0	272		14	343	357
6:15 AM - 6:30 AM		2	0	2	4		1	125	2	0	128		14	0	5	19		2	357	0	359		23	487	510
6:30 AM - 6:45 AM		2	0	7	9		1	123	2	0	126		42	0	16	58		0	511	0	511		67	637	704
6:45 AM - 7:00 AM		3	0	9	12		3	204	3	0	210		25	1	8	34		2	506	1	509		46	719	765
7:00 AM - 7:15 AM		6	0	9	15		3	183	4	0	190		25	0	16	41		3	570	0	573		56	763	819
7:15 AM - 7:30 AM		10	4	10	24		3	230	7	0	240		46	0	15	61		3	546	1	550		85	790	875
7:30 AM - 7:45 AM		11	0	7	18		4	243	6	0	253		45	0	22	67		5	536	0	541		85	794	879
7:45 AM - 8:00 AM		6	4	11	21		8	304	9	1	322		45	2	18	65		2	498	2	502		86	823	909
8:00 AM - 8:15 AM		4	2	9	15		8	291	11	0	310		49	3	19	71		6	495	1	502		86	812	898
8:15 AM - 8:30 AM		4	1	9	14		1	312	7	0	320		44	0	29	73		6	538	2	546		87	866	953
8:30 AM - 8:45 AM		5	6	10	21		5	315	6	0	326		27	3	17	47		7	537	6	550		68	876	944
8:45 AM - 9:00 AM		5	2	7	14		3	332	10	0	345		42	0	27	69		11	530	1	542		83	887	970
<b>Total</b>		<b>58</b>	<b>19</b>	<b>92</b>	<b>169</b>		<b>41</b>	<b>2731</b>	<b>68</b>	<b>1</b>	<b>2841</b>		<b>414</b>	<b>9</b>	<b>194</b>	<b>617</b>		<b>48</b>	<b>5895</b>	<b>14</b>	<b>5957</b>		<b>786</b>	<b>8797</b>	<b>9583</b>
<b>AM One Hour Volumes</b>																									
6:00 AM - 7:00 AM		7	0	20	27	0.56	6	521	8	0	535	0.64	91	1	31	123	0.53	5	1645	1	1651	0.81	150	2186	2336
6:15 AM - 7:15 AM		13	0	27	40	0.67	8	635	11	0	654	0.78	106	1	45	152	0.66	7	1944	1	1952	0.85	192	2606	2798
6:30 AM - 7:30 AM		21	4	35	60	0.63	10	740	16	0	766	0.80	138	1	55	194	0.80	8	2133	2	2143	0.93	254	2909	3163
6:45 AM - 7:45 AM		30	4	35	69	0.72	13	860	20	0	893	0.88	141	1	61	203	0.76	13	2158	2	2173	0.95	272	3066	3338
7:00 AM - 8:00 AM		33	8	37	78	0.81	18	960	26	1	1005	0.78	161	2	71	234	0.87	13	2150	3	2166	0.95	312	3170	3482
7:15 AM - 8:15 AM		31	10	37	78	0.81	23	1068	33	1	1125	0.87	185	5	74	264	0.93	16	2075	4	2095	0.95	342	3219	3561
7:30 AM - 8:30 AM		25	7	36	68	0.81	21	1150	33	1	1205	0.94	183	5	88	276	0.95	19	2067	5	2091	0.96	344	3295	3639
7:45 AM - 8:45 AM		19	13	39	71	0.85	22	1222	33	1	1278	0.98	165	8	83	256	0.88	21	2068	11	2100	0.95	327	3377	3704
8:00 AM - 9:00 AM		18	11	35	64	0.76	17	1250	34	0	1301	0.94	162	6	92	260	0.89	30	2100	10	2140	0.97	324	3441	3765
<b>PM 15 Minute Volumes</b>																									
4:00 PM - 4:15 PM		4	7	1	12		10	540	19	1	570		12	1	24	37		20	297	4	321		49	890	939
4:15 PM - 4:30 PM		3	4	4	11		6	530	20	2	558		12	0	33	45		17	347	1	365		56	921	977
4:30 PM - 4:45 PM		5	8	5	18		9	493	18	1	521		14	1	10	25		30	386	5	421		43	941	984
4:45 PM - 5:00 PM		2	4	7	13		2	492	26	1	521		5	1	17	23		14	355	0	369		36	889	925
5:00 PM - 5:15 PM		3	9	1	13		10	517	21	0	548		15	3	12	30		26	380	6	412		43	960	1003
5:15 PM - 5:30 PM		6	9	4	19		7	554	31	1	593		10	4	13	27		9	425	7	441		46	1033	1079
5:30 PM - 5:45 PM		1	17	10	28		6	475	24	0	505		4	2	12	18		24	365	8	397		46	902	948
5:45 PM - 6:00 PM		9	9	3	21		4	536	26	0	566		10	0	20	30		15	345	6	366		51	932	983
6:00 PM - 6:15 PM		9	6	8	23		7	546	34	0	587		6	1	9	16		15	360	8	383		39	970	1009
6:15 PM - 6:30 PM		7	10	6	23		10	509	31	0	550		10	0	7	17		32	370	2	404		40	954	994
6:30 PM - 6:45 PM		2	9	7	18		10	496	47	0	553		4	0	14	18		18	323	6	347		36	900	936
6:45 PM - 7:00 PM		5	9	2	16		10	505	25	0	540		14	1	11	26		21	268	4	293		42	833	875
<b>Total</b>		<b>56</b>	<b>101</b>	<b>58</b>	<b>215</b>		<b>91</b>	<b>6193</b>	<b>322</b>	<b>6</b>	<b>6612</b>		<b>116</b>	<b>14</b>	<b>182</b>	<b>312</b>		<b>241</b>	<b>4221</b>	<b>57</b>	<b>4519</b>		<b>527</b>	<b>11125</b>	<b>11652</b>
<b>PM One Hour Volumes</b>																									
4:00 PM - 5:00 PM		14	23	17	54	0.75	27	2055	83	5	2170	0.95	43	3	84	130	0.72	81	1385	10	1476	0.88	184	3641	3825
4:15 PM - 5:15 PM		13	25	17	55	0.76	27	2032	85	4	2148	0.96	46	5	72	123	0.68	87	1468	12	1567	0.93	178	3711	3889
4:30 PM - 5:30 PM		16	30	17	63	0.83	28	2056	96	3	2183	0.92	44	9	52	105	0.88	79	1546	18	1643	0.93	168	3823	3991
4:45 PM - 5:45 PM		12	39	22	73	0.65	25	2038	102	2	2167	0.91	34	10	54	98	0.82	73	1525	21	1619	0.92	171	3784	3955
5:00 PM - 6:00 PM		19	44	18	81	0.72	27	2082	102	1	2212	0.93	39	9	57	105	0.88	74	1515	27	1616	0.92	186	3827	4013
5:15 PM - 6:15 PM		25	41	25	91	0.81	24	2111	115	1	2251	0.95	30	7	54	91	0.76	63	1495	29	1587	0.90	182	3837	4019
5:30 PM - 6:30 PM		26	42	27	95	0.85	27	2066	115	0	2208	0.94	30	3	48	81	0.68	86	1440	24	1550	0.96	176	3758	3934
5:45 PM - 6:45 PM		27	34	24	85	0.92	31	2087	138	0	2256	0.96	30	1	50	81	0.68	80	1398	22	1500	0.93	166	3756	3922
6:00 PM - 7:00 PM		23	34	23	80	0.87	37	2056	137	0	2230	0.95	34	2	41	77	0.74	86	1321	20	1427	0.88	157	3657	3814

# Wells + Associates, Inc.

McLean, Virginia

## Turning Movement Count - All Vehicles

Time Period		Southbound 0					Westbound Arlington Boulevard - 50					Northbound Site Driveway					Eastbound Arlington Boulevard - 50					North & East & West		Total
		Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF	South	West	
<b>AM 15 Minute Volumes</b>																								
6:00 AM - 6:15 AM		0	0	0	0		0	0	0	0		0	0	0	0		0	312	0	312		0	312	312
6:15 AM - 6:30 AM		0	0	0	0		0	0	0	0		0	0	0	0		0	397	0	397		0	397	397
6:30 AM - 6:45 AM		0	0	0	0		0	0	0	0		0	0	0	0		0	515	0	515		0	515	515
6:45 AM - 7:00 AM		0	0	0	0		0	0	0	0		0	0	0	0		0	514	0	514		0	514	514
7:00 AM - 7:15 AM		0	0	0	0		0	0	0	0		0	0	0	0		0	569	0	569		0	569	569
7:15 AM - 7:30 AM		0	0	0	0		0	0	0	0		0	0	0	0		0	609	0	609		0	609	609
7:30 AM - 7:45 AM		0	0	0	0		0	0	0	0		0	0	0	0		0	583	0	583		0	583	583
7:45 AM - 8:00 AM		0	0	0	0		0	0	0	0		1	0	0	1		1	524	0	525		1	525	526
8:00 AM - 8:15 AM		0	0	0	0		0	0	0	0		0	0	0	0		0	546	0	546		0	546	546
8:15 AM - 8:30 AM		0	0	0	0		0	0	0	0		1	0	0	1		1	538	0	539		1	539	540
8:30 AM - 8:45 AM		0	0	0	0		0	0	0	0		0	0	0	0		0	509	0	509		0	509	509
8:45 AM - 9:00 AM		0	0	0	0		0	0	0	0		2	0	0	2		2	565	0	567		2	567	569
<b>Total</b>		0	0	0	0		0	0	0	0		4	0	0	4		4	6181	0	6185		4	6185	6189
<b>AM One Hour Volumes</b>																								
6:00 AM - 7:00 AM		0	0	0	0	0.00	0	0	0	0	0.00	0	0	0	0	0.00	0	1738	0	1738	0.84	0	1738	1738
6:15 AM - 7:15 AM		0	0	0	0	0.00	0	0	0	0	0.00	0	0	0	0	0.00	0	1995	0	1995	0.88	0	1995	1995
6:30 AM - 7:30 AM		0	0	0	0	0.00	0	0	0	0	0.00	0	0	0	0	0.00	0	2207	0	2207	0.91	0	2207	2207
6:45 AM - 7:45 AM		0	0	0	0	0.00	0	0	0	0	0.00	0	0	0	0	0.00	0	2275	0	2275	0.93	0	2275	2275
7:00 AM - 8:00 AM		0	0	0	0	0.00	0	0	0	0	0.00	1	0	0	1	0.25	1	2285	0	2286	0.94	1	2286	2287
7:15 AM - 8:15 AM		0	0	0	0	0.00	0	0	0	0	0.00	1	0	0	1	0.25	1	2262	0	2263	0.93	1	2263	2264
7:30 AM - 8:30 AM		0	0	0	0	0.00	0	0	0	0	0.00	2	0	0	2	0.50	2	2191	0	2193	0.94	2	2193	2195
7:45 AM - 8:45 AM		0	0	0	0	0.00	0	0	0	0	0.00	2	0	0	2	0.50	2	2117	0	2119	0.97	2	2119	2121
8:00 AM - 9:00 AM		0	0	0	0	0.00	0	0	0	0	0.00	3	0	0	3	0.38	3	2158	0	2161	0.95	3	2161	2164
<b>PM 15 Minute Volumes</b>																								
4:00 PM - 4:15 PM		0	0	0	0		0	0	0	0		0	0	0	0		3	286	0	289		0	289	289
4:15 PM - 4:30 PM		0	0	0	0		0	0	0	0		3	0	0	3		0	394	0	394		3	394	397
4:30 PM - 4:45 PM		0	0	0	0		0	0	0	0		0	0	0	0		0	378	0	378		0	378	378
4:45 PM - 5:00 PM		0	0	0	0		0	0	0	0		0	0	0	0		0	341	0	341		0	341	341
5:00 PM - 5:15 PM		0	0	0	0		0	0	0	0		0	0	0	0		0	417	0	417		0	417	417
5:15 PM - 5:30 PM		0	0	0	0		0	0	0	0		0	0	0	0		1	460	0	461		0	461	461
5:30 PM - 5:45 PM		0	0	0	0		0	0	0	0		1	0	0	1		0	395	0	395		1	395	396
5:45 PM - 6:00 PM		0	0	0	0		0	0	0	0		0	0	0	0		0	353	0	353		0	353	353
6:00 PM - 6:15 PM		0	0	0	0		0	0	0	0		0	0	0	0		0	369	0	369		0	369	369
6:15 PM - 6:30 PM		0	0	0	0		0	0	0	0		1	0	0	1		0	383	0	383		1	383	384
6:30 PM - 6:45 PM		0	0	0	0		0	0	0	0		0	0	0	0		0	333	0	333		0	333	333
6:45 PM - 7:00 PM		0	0	0	0		0	0	0	0		1	0	0	1		1	268	0	269		1	269	270
<b>Total</b>		0	0	0	0		0	0	0	0		6	0	0	6		5	4377	0	4382		6	4382	4388
<b>PM One Hour Volumes</b>																								
4:00 PM - 5:00 PM		0	0	0	0	0.00	0	0	0	0	0.00	3	0	0	3	0.25	3	1399	0	1402	0.89	3	1402	1405
4:15 PM - 5:15 PM		0	0	0	0	0.00	0	0	0	0	0.00	3	0	0	3	0.25	0	1530	0	1530	0.92	3	1530	1533
4:30 PM - 5:30 PM		0	0	0	0	0.00	0	0	0	0	0.00	0	0	0	0	0.00	1	1596	0	1597	0.87	0	1597	1597
4:45 PM - 5:45 PM		0	0	0	0	0.00	0	0	0	0	0.00	1	0	0	1	0.25	1	1613	0	1614	0.88	1	1614	1615
5:00 PM - 6:00 PM		0	0	0	0	0.00	0	0	0	0	0.00	1	0	0	1	0.25	1	1625	0	1626	0.88	1	1626	1627
5:15 PM - 6:15 PM		0	0	0	0	0.00	0	0	0	0	0.00	1	0	0	1	0.25	1	1577	0	1578	0.86	1	1578	1579
5:30 PM - 6:30 PM		0	0	0	0	0.00	0	0	0	0	0.00	2	0	0	2	0.50	0	1500	0	1500	0.95	2	1500	1502
5:45 PM - 6:45 PM		0	0	0	0	0.00	0	0	0	0	0.00	1	0	0	1	0.25	0	1438	0	1438	0.94	1	1438	1439
6:00 PM - 7:00 PM		0	0	0	0	0.00	0	0	0	0	0.00	2	0	0	2	0.50	1	1353	0	1354	0.88	2	1354	1356

# Wells + Associates, Inc.

McLean, Virginia

## Turning Movement Count - All Vehicles

Time Period		Southbound Chichester Lane - 2862					Westbound Arlington Boulevard - 50					Northbound 0					Eastbound Arlington Boulevard - 50					North & South	East & West	Total
		Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF			
<b>AM 15 Minute Volumes</b>																								
6:00 AM - 6:15 AM		0	0	0	0		1	74	0	75		0	0	0	0		0	289	0	289		0	364	364
6:15 AM - 6:30 AM		0	0	0	0		1	126	0	127		0	0	0	0		0	384	0	384		0	511	511
6:30 AM - 6:45 AM		1	0	0	1		2	134	0	136		0	0	0	0		0	550	6	556		1	692	693
6:45 AM - 7:00 AM		3	0	5	8		1	210	0	211		0	0	0	0		0	536	7	543		8	754	762
7:00 AM - 7:15 AM		1	0	1	2		0	165	0	165		0	0	0	0		0	582	7	589		2	754	756
7:15 AM - 7:30 AM		2	0	0	2		2	231	0	233		0	0	0	0		0	586	16	602		2	835	837
7:30 AM - 7:45 AM		3	0	0	3		7	249	0	256		0	0	0	0		0	553	20	573		3	829	832
7:45 AM - 8:00 AM		5	0	1	6		10	293	0	303		0	0	0	0		0	567	16	583		6	886	892
8:00 AM - 8:15 AM		3	0	0	3		5	299	0	304		0	0	0	0		0	545	16	561		3	865	868
8:15 AM - 8:30 AM		10	0	2	12		6	285	0	291		0	0	0	0		0	570	23	593		12	884	896
8:30 AM - 8:45 AM		5	0	2	7		3	292	0	295		0	0	0	0		0	555	17	572		7	867	874
8:45 AM - 9:00 AM		13	0	1	14		5	316	0	321		0	0	0	0		0	562	17	579		14	900	914
<b>Total</b>		<b>46</b>	<b>0</b>	<b>12</b>	<b>58</b>		<b>43</b>	<b>2674</b>	<b>0</b>	<b>2717</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>		<b>0</b>	<b>6279</b>	<b>145</b>	<b>6424</b>		<b>58</b>	<b>9141</b>	<b>9199</b>
<b>AM One Hour Volumes</b>																								
6:00 AM - 7:00 AM		4	0	5	9	0.28	5	544	0	549	0.65	0	0	0	0	0.00	0	1759	13	1772	0.80	9	2321	2330
6:15 AM - 7:15 AM		5	0	6	11	0.34	4	635	0	639	0.76	0	0	0	0	0.00	0	2052	20	2072	0.88	11	2711	2722
6:30 AM - 7:30 AM		7	0	6	13	0.41	5	740	0	745	0.80	0	0	0	0	0.00	0	2254	36	2290	0.95	13	3035	3048
6:45 AM - 7:45 AM		9	0	6	15	0.47	10	855	0	865	0.84	0	0	0	0	0.00	0	2257	50	2307	0.96	15	3172	3187
7:00 AM - 8:00 AM		11	0	2	13	0.54	19	938	0	957	0.79	0	0	0	0	0.00	0	2288	59	2347	0.97	13	3304	3317
7:15 AM - 8:15 AM		13	0	1	14	0.58	24	1072	0	1096	0.90	0	0	0	0	0.00	0	2251	68	2319	0.96	14	3415	3429
7:30 AM - 8:30 AM		21	0	3	24	0.50	28	1126	0	1154	0.95	0	0	0	0	0.00	0	2235	75	2310	0.97	24	3464	3488
7:45 AM - 8:45 AM		23	0	5	28	0.58	24	1169	0	1193	0.98	0	0	0	0	0.00	0	2237	72	2309	0.97	28	3502	3530
8:00 AM - 9:00 AM		31	0	5	36	0.64	19	1192	0	1211	0.94	0	0	0	0	0.00	0	2232	73	2305	0.97	36	3516	3552
<b>PM 15 Minute Volumes</b>																								
4:00 PM - 4:15 PM		36	0	5	41		1	599	0	600		0	0	0	0		0	301	1	302		41	902	943
4:15 PM - 4:30 PM		15	0	6	21		0	538	0	538		0	0	0	0		0	352	4	356		21	894	915
4:30 PM - 4:45 PM		9	0	1	10		2	584	0	586		0	0	0	0		0	364	5	369		10	955	965
4:45 PM - 5:00 PM		10	0	0	10		5	541	0	546		0	0	0	0		0	378	3	381		10	927	937
5:00 PM - 5:15 PM		13	0	2	15		3	547	0	550		0	0	0	0		0	389	14	403		15	953	968
5:15 PM - 5:30 PM		16	0	1	17		2	553	0	555		0	0	0	0		0	425	12	437		17	992	1009
5:30 PM - 5:45 PM		16	0	1	17		3	565	0	568		0	0	0	0		0	404	6	410		17	978	995
5:45 PM - 6:00 PM		13	0	0	13		0	537	0	537		0	0	0	0		0	351	1	352		13	889	902
6:00 PM - 6:15 PM		15	0	1	16		2	534	0	536		0	0	0	0		0	334	2	336		16	872	888
6:15 PM - 6:30 PM		7	0	2	9		2	549	0	551		0	0	0	0		0	381	3	384		9	935	944
6:30 PM - 6:45 PM		6	0	3	9		4	512	0	516		0	0	0	0		0	350	1	351		9	867	876
6:45 PM - 7:00 PM		7	0	0	7		11	531	0	542		0	0	0	0		0	280	6	286		7	828	835
<b>Total</b>		<b>163</b>	<b>0</b>	<b>22</b>	<b>185</b>		<b>35</b>	<b>6590</b>	<b>0</b>	<b>6625</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>		<b>0</b>	<b>4309</b>	<b>58</b>	<b>4367</b>		<b>185</b>	<b>10992</b>	<b>11177</b>
<b>PM One Hour Volumes</b>																								
4:00 PM - 5:00 PM		70	0	12	82	0.50	8	2262	0	2270	0.95	0	0	0	0	0.00	0	1395	13	1408	0.92	82	3678	3760
4:15 PM - 5:15 PM		47	0	9	56	0.67	10	2210	0	2220	0.95	0	0	0	0	0.00	0	1483	26	1509	0.94	56	3729	3785
4:30 PM - 5:30 PM		48	0	4	52	0.76	12	2225	0	2237	0.95	0	0	0	0	0.00	0	1556	34	1590	0.91	52	3827	3879
4:45 PM - 5:45 PM		55	0	4	59	0.87	13	2206	0	2219	0.98	0	0	0	0	0.00	0	1596	35	1631	0.93	59	3850	3909
5:00 PM - 6:00 PM		58	0	4	62	0.91	8	2202	0	2210	0.97	0	0	0	0	0.00	0	1569	33	1602	0.92	62	3812	3874
5:15 PM - 6:15 PM		60	0	3	63	0.93	7	2189	0	2196	0.97	0	0	0	0	0.00	0	1514	21	1535	0.88	63	3731	3794
5:30 PM - 6:30 PM		51	0	4	55	0.81	7	2185	0	2192	0.96	0	0	0	0	0.00	0	1470	12	1482	0.90	55	3674	3729
5:45 PM - 6:45 PM		41	0	6	47	0.73	8	2132	0	2140	0.97	0	0	0	0	0.00	0	1416	7	1423	0.93	47	3563	3610
6:00 PM - 7:00 PM		35	0	6	41	0.64	19	2126	0	2145	0.97	0	0	0	0	0.00	0	1345	12	1357	0.88	41	3502	3543

Appendix B

Photos from Site Access



Site inbound site access facing north toward Arlington Blvd. (Route 50)



Line of sight from inbound site access to the signalized intersection at Arlington Blvd. and Barkley Drive/Barkley Gate Lane

Appendix C

Level of Service Worksheets

Queues

1: Arlington Blvd & Barkley Gate Ln

10/14/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	11	2284	33	38	1360	18	107	176	50	20
v/c Ratio	0.04	0.85	0.03	0.37	0.47	0.01	0.78	0.69	0.47	0.11
Control Delay	3.8	20.6	1.7	15.4	7.5	1.9	128.6	93.7	106.9	28.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.8	20.6	1.7	15.4	7.5	1.9	128.6	93.7	106.9	28.3
Queue Length 50th (ft)	3	1120	0	9	263	0	153	221	69	0
Queue Length 95th (ft)	7	1291	11	22	394	7	#251	315	125	33
Internal Link Dist (ft)		1513			1307		666		542	
Turn Bay Length (ft)	480		890	360		530		150		320
Base Capacity (vph)	333	2693	1212	144	2923	1311	149	257	115	198
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.85	0.03	0.26	0.47	0.01	0.72	0.68	0.43	0.10

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis  
 1: Arlington Blvd & Barkley Gate Ln

10/14/2013



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↖	↕	↗		↖	↕	↗		↖	↗		↖
Volume (vph)	10	2101	30	1	34	1251	17	92	6	162	35	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		6%				-4%			0%			0%
Total Lost time (s)	6.5	7.0	7.0		6.5	7.0	7.0		7.0	7.0		7.0
Lane Util. Factor	1.00	0.95	1.00		1.00	0.95	1.00		1.00	1.00		1.00
Frt	1.00	1.00	0.85		1.00	1.00	0.85		1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00	1.00		0.96	1.00		0.96
Satd. Flow (prot)	1717	3433	1536		1805	3610	1615		1780	1583		1795
Flt Permitted	0.18	1.00	1.00		0.04	1.00	1.00		0.70	1.00		0.54
Satd. Flow (perm)	318	3433	1536		68	3610	1615		1311	1583		1011
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)	11	2284	33	1	37	1360	18	100	7	176	38	12
RTOR Reduction (vph)	0	0	7	0	0	0	4	0	0	13	0	0
Lane Group Flow (vph)	11	2284	26	0	38	1360	14	0	107	163	0	50
Turn Type	pm+pt		Perm	custom	pm+pt		Perm	Perm		pt+ov	Perm	
Protected Phases	5	2			1	6			8	8 !		4
Permitted Phases	2		2	!	6	6	8				4	
Actuated Green, G (s)	173.3	171.3	171.3		179.3	174.3	174.3		23.2	35.2		23.2
Effective Green, g (s)	173.3	171.3	171.3		179.3	174.3	174.3		23.2	35.2		23.2
Actuated g/C Ratio	0.79	0.78	0.78		0.82	0.79	0.79		0.11	0.16		0.11
Clearance Time (s)	6.5	7.0	7.0		6.5	7.0	7.0		7.0			7.0
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	2.0		3.0			3.0
Lane Grp Cap (vph)	263	2673	1196		95	2860	1280		138	253		107
v/s Ratio Prot	0.00	c0.67			0.01	c0.38				c0.10		
v/s Ratio Perm	0.03		0.02		0.32		0.01		c0.08			0.05
v/c Ratio	0.04	0.85	0.02		0.40	0.48	0.01		0.78	0.64		0.47
Uniform Delay, d1	5.9	16.1	5.5		30.9	7.6	4.8		95.9	86.5		92.6
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.0	3.7	0.0		1.0	0.6	0.0		23.3	5.5		3.2
Delay (s)	6.0	19.8	5.5		31.9	8.2	4.8		119.2	92.0		95.8
Level of Service	A	B	A		C	A	A		F	F		F
Approach Delay (s)		19.6				8.8			102.3			93.6
Approach LOS		B				A			F			F

Intersection Summary		
HCM Average Control Delay	22.8	HCM Level of Service C
HCM Volume to Capacity ratio	0.85	
Actuated Cycle Length (s)	220.0	Sum of lost time (s) 21.0
Intersection Capacity Utilization	88.9%	ICU Level of Service E
Analysis Period (min)	15	
! Phase conflict between lane groups.		
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis  
 1: Arlington Blvd & Barkley Gate Ln

10/14/2013

Movement	SBR
Lane Configurations	↑
Volume (vph)	18
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	7.0
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	20
RTOR Reduction (vph)	18
Lane Group Flow (vph)	2
Turn Type	Perm
Protected Phases	
Permitted Phases	4
Actuated Green, G (s)	23.2
Effective Green, g (s)	23.2
Actuated g/C Ratio	0.11
Clearance Time (s)	7.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	167
v/s Ratio Prot	
v/s Ratio Perm	0.00
v/c Ratio	0.01
Uniform Delay, d1	88.1
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	88.2
Level of Service	F
Approach Delay (s)	
Approach LOS	
<b>Intersection Summary</b>	

# HCM Unsignalized Intersection Capacity Analysis

## 2: Arlington Blvd & Site Access Outbound

10/14/2013



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↗
Volume (veh/h)	2298	0	0	1303	0	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2498	0	0	1416	0	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised		Raised			
Median storage (veh)	1		1			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			2498		3206	1249
vC1, stage 1 conf vol					2498	
vC2, stage 2 conf vol					708	
vCu, unblocked vol			2498		3206	1249
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	97
cM capacity (veh/h)			180		40	164

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	1249	1249	708	708	5
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	5
cSH	1700	1700	1700	1700	164
Volume to Capacity	0.73	0.73	0.42	0.42	0.03
Queue Length 95th (ft)	0	0	0	0	3
Control Delay (s)	0.0	0.0	0.0	0.0	27.6
Lane LOS					D
Approach Delay (s)	0.0		0.0		27.6
Approach LOS					D

Intersection Summary					
Average Delay			0.0		
Intersection Capacity Utilization			73.5%	ICU Level of Service	D
Analysis Period (min)			15		

# HCM Unsignalized Intersection Capacity Analysis

## 3: Arlington Blvd & Cichester Lane

10/14/2013



Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Volume (veh/h)	1	73	2229	1271	19	5	31
Sign Control			Free	Free		Stop	
Grade			0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	79	2423	1382	21	5	34
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type							
Median storage (veh)							
Upstream signal (ft)							
pX, platoon unblocked	0.00						
vC, conflicting volume	0	1402				2762	701
vC1, stage 1 conf vol						1392	
vC2, stage 2 conf vol						1370	
vCu, unblocked vol	0	1402				2762	701
tC, single (s)	0.0	4.1				6.8	6.9
tC, 2 stage (s)						5.8	
tF (s)	0.0	2.2				3.5	3.3
p0 queue free %	0	84				94	91
cM capacity (veh/h)	0	483				88	381

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	79	1211	1211	921	481	39
Volume Left	79	0	0	0	0	5
Volume Right	0	0	0	0	21	34
cSH	483	1700	1700	1700	1700	261
Volume to Capacity	0.16	0.71	0.71	0.54	0.28	0.15
Queue Length 95th (ft)	15	0	0	0	0	13
Control Delay (s)	13.9	0.0	0.0	0.0	0.0	21.2
Lane LOS	B					C
Approach Delay (s)	0.4			0.0		21.2
Approach LOS						C

Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			71.6%		ICU Level of Service	C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis  
 4: Arlington Blvd & Site Access Inbound

10/14/2013



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		
Volume (veh/h)	2298	5	0	1303	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2498	5	0	1416	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage (veh)	1			1		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			2503		3209	1252
vC1, stage 1 conf vol					2501	
vC2, stage 2 conf vol					708	
vCu, unblocked vol			2503		3209	1252
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			179		40	164

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	1665	838	708	708
Volume Left	0	0	0	0
Volume Right	0	5	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.98	0.49	0.42	0.42
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS				
Approach Delay (s)	0.0		0.0	
Approach LOS				

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		73.5%	ICU Level of Service D
Analysis Period (min)		15	

Queues

1: Arlington Blvd & Barkley Gate Ln

10/14/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	11	2284	33	38	1360	18	107	176	50	20
v/c Ratio	0.28	0.81	0.03	0.52	0.47	0.01	0.69	0.85	0.40	0.10
Control Delay	122.7	14.7	1.2	41.6	8.7	2.5	115.1	116.1	98.1	26.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	122.7	14.7	1.2	41.6	8.7	2.5	115.1	116.1	98.1	26.5
Queue Length 50th (ft)	16	876	0	16	280	0	151	224	68	0
Queue Length 95th (ft)	44	1050	9	#112	445	8	228	322	121	32
Internal Link Dist (ft)		1513			1307		666		542	
Turn Bay Length (ft)	480		890	360		530		150		320
Base Capacity (vph)	40	2810	1263	73	2878	1291	185	242	148	240
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.81	0.03	0.52	0.47	0.01	0.58	0.73	0.34	0.08

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 1: Arlington Blvd & Barkley Gate Ln

10/14/2013



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↘	↕	↗		↘	↕	↗		↘	↗		↘
Volume (vph)	10	2101	30	1	34	1251	17	92	6	162	35	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		6%				-4%			0%			0%
Total Lost time (s)	6.5	7.0	7.0		7.0	7.0	7.0		7.0	7.0		7.0
Lane Util. Factor	1.00	0.95	1.00		1.00	0.95	1.00		1.00	1.00		1.00
Frt	1.00	1.00	0.85		1.00	1.00	0.85		1.00	0.85		1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00	1.00		0.96	1.00		0.96
Satd. Flow (prot)	1717	3433	1536		1805	3610	1615		1780	1583		1795
Fit Permitted	0.95	1.00	1.00		0.05	1.00	1.00		0.70	1.00		0.57
Satd. Flow (perm)	1717	3433	1536		91	3610	1615		1311	1583		1053
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)	11	2284	33	1	37	1360	18	100	7	176	38	12
RTOR Reduction (vph)	0	0	6	0	0	0	4	0	0	19	0	0
Lane Group Flow (vph)	11	2284	27	0	38	1360	14	0	107	157	0	50
Turn Type	Prot		Perm	Perm	Perm		Perm	Perm		Perm	Perm	
Protected Phases	5	2				6			8			4
Permitted Phases			2	6	6		6	8		8	4	
Actuated Green, G (s)	2.0	180.0	180.0		171.5	171.5	171.5		26.0	26.0		26.0
Effective Green, g (s)	2.0	180.0	180.0		171.5	171.5	171.5		26.0	26.0		26.0
Actuated g/C Ratio	0.01	0.82	0.82		0.78	0.78	0.78		0.12	0.12		0.12
Clearance Time (s)	6.5	7.0	7.0		7.0	7.0	7.0		7.0	7.0		7.0
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	2.0		3.0	3.0		3.0
Lane Grp Cap (vph)	16	2809	1257		71	2814	1259		155	187		124
v/s Ratio Prot	0.01	c0.67				0.38						
v/s Ratio Perm			0.02		0.42		0.01		0.08	c0.10		0.05
v/c Ratio	0.69	0.81	0.02		0.54	0.48	0.01		0.69	0.84		0.40
Uniform Delay, d1	108.7	10.9	3.7		9.2	8.6	5.4		93.1	94.9		89.8
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2	67.5	2.7	0.0		26.0	0.6	0.0		12.5	26.5		2.1
Delay (s)	176.2	13.6	3.7		35.1	9.2	5.4		105.6	121.4		92.0
Level of Service	F	B	A		D	A	A		F	F		F
Approach Delay (s)		14.2				9.8			115.4			90.2
Approach LOS		B				A			F			F

### Intersection Summary

HCM Average Control Delay	21.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	220.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	88.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 1: Arlington Blvd & Barkley Gate Ln

10/14/2013

Movement	SBR
Lane Configurations	7
Volume (vph)	18
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	7.0
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	20
RTOR Reduction (vph)	18
Lane Group Flow (vph)	2
Turn Type	Perm
Protected Phases	
Permitted Phases	4
Actuated Green, G (s)	26.0
Effective Green, g (s)	26.0
Actuated g/C Ratio	0.12
Clearance Time (s)	7.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	187
v/s Ratio Prot	
v/s Ratio Perm	0.00
v/c Ratio	0.01
Uniform Delay, d1	85.7
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	85.7
Level of Service	F
Approach Delay (s)	
Approach LOS	
<b>Intersection Summary</b>	

Queues

1: Arlington Blvd & Barkley Gate Ln

10/14/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	32	1627	68	128	2297	26	67	33	72	27
v/c Ratio	0.30	0.60	0.06	0.51	0.79	0.02	0.71	0.12	0.60	0.18
Control Delay	11.1	11.3	1.5	9.7	14.5	1.8	129.2	18.5	112.8	27.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.1	11.3	1.5	9.7	14.5	1.8	129.2	18.5	112.8	27.1
Queue Length 50th (ft)	5	426	0	23	831	0	92	0	98	0
Queue Length 95th (ft)	14	644	16	44	1124	9	153	36	159	37
Internal Link Dist (ft)		1513			1307		666		542	
Turn Bay Length (ft)	480		890	360		530		150		320
Base Capacity (vph)	150	2693	1219	373	2920	1311	174	282	219	249
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.60	0.06	0.34	0.79	0.02	0.39	0.12	0.33	0.11

Intersection Summary

# HCM Signalized Intersection Capacity Analysis

## 1: Arlington Blvd & Barkley Gate Ln

10/14/2013



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↘	↕	↗		↘	↕	↗		↘	↗		↘
Volume (vph)	29	1497	63	3	115	2113	24	54	7	30	25	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		6%				-4%			0%			0%
Total Lost time (s)	6.5	7.0	7.0		6.5	7.0	7.0		7.0	7.0		7.0
Lane Util. Factor	1.00	0.95	1.00		1.00	0.95	1.00		1.00	1.00		1.00
Frt	1.00	1.00	0.85		1.00	1.00	0.85		1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00	1.00		0.96	1.00		0.98
Satd. Flow (prot)	1717	3433	1536		1805	3610	1615		1784	1583		1828
Flt Permitted	0.04	1.00	1.00		0.12	1.00	1.00		0.66	1.00		0.82
Satd. Flow (perm)	76	3433	1536		224	3610	1615		1220	1583		1533
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)	32	1627	68	3	125	2297	26	59	8	33	27	45
RTOR Reduction (vph)	0	0	15	0	0	0	5	0	0	28	0	0
Lane Group Flow (vph)	32	1627	53	0	128	2297	21	0	67	5	0	72
Turn Type	pm+pt		Perm	custom	pm+pt		Perm	Perm		pt+ov	Perm	
Protected Phases	5	2			1	6			8	8 1!		4
Permitted Phases	2		2	1!	6		6	8			4	
Actuated Green, G (s)	169.2	164.7	164.7		177.0	168.6	168.6		16.4	31.8		16.4
Effective Green, g (s)	169.2	164.7	164.7		177.0	168.6	168.6		16.4	31.8		16.4
Actuated g/C Ratio	0.81	0.78	0.78		0.84	0.80	0.80		0.08	0.15		0.08
Clearance Time (s)	6.5	7.0	7.0		6.5	7.0	7.0		7.0			7.0
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	2.0		3.0			3.0
Lane Grp Cap (vph)	96	2692	1205		252	2898	1297		95	240		120
v/s Ratio Prot	0.01	0.47			c0.02	c0.64				0.00		
v/s Ratio Perm	0.26		0.03		0.41		0.01		c0.05			0.05
v/c Ratio	0.33	0.60	0.04		0.51	0.79	0.02		0.71	0.02		0.60
Uniform Delay, d1	20.9	9.3	5.1		9.0	11.2	4.1		94.4	75.8		93.6
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.7	1.0	0.1		0.6	2.3	0.0		21.1	0.0		7.8
Delay (s)	21.7	10.3	5.1		9.5	13.5	4.2		115.6	75.9		101.5
Level of Service	C	B	A		A	B	A		F	E		F
Approach Delay (s)		10.3				13.2			102.5			98.2
Approach LOS		B				B			F			F

### Intersection Summary

HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	210.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	89.9%	ICU Level of Service	E
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 1: Arlington Blvd & Barkley Gate Ln

10/14/2013

Movement	SBR
Lane Configurations	7
Volume (vph)	25
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	7.0
Lane Util. Factor	1.00
Fr <sub>t</sub>	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	27
RTOR Reduction (vph)	25
Lane Group Flow (vph)	2
Turn Type	Perm
Protected Phases	
Permitted Phases	4
Actuated Green, G (s)	16.4
Effective Green, g (s)	16.4
Actuated g/C Ratio	0.08
Clearance Time (s)	7.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	124
v/s Ratio Prot	
v/s Ratio Perm	0.00
v/c Ratio	0.02
Uniform Delay, d <sub>1</sub>	89.4
Progression Factor	1.00
Incremental Delay, d <sub>2</sub>	0.1
Delay (s)	89.4
Level of Service	F
Approach Delay (s)	
Approach LOS	
<b>Intersection Summary</b>	

## HCM Unsignalized Intersection Capacity Analysis 2: Arlington Blvd & Site Access Outbound

10/14/2013



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↗
Volume (veh/h)	1577	0	0	2253	0	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1714	0	0	2449	0	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage (veh)	1			1		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1714		2939	857
vC1, stage 1 conf vol					1714	
vC2, stage 2 conf vol					1224	
vCu, unblocked vol			1714		2939	857
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	98
cM capacity (veh/h)			366		82	301
<b>Direction, Lane #</b>						
	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	857	857	1224	1224	5	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	0	5	
cSH	1700	1700	1700	1700	301	
Volume to Capacity	0.50	0.50	0.72	0.72	0.02	
Queue Length 95th (ft)	0	0	0	0	1	
Control Delay (s)	0.0	0.0	0.0	0.0	17.2	
Lane LOS					C	
Approach Delay (s)	0.0		0.0		17.2	
Approach LOS					C	
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			65.6%		ICU Level of Service	C
Analysis Period (min)			15			

### HCM Unsignalized Intersection Capacity Analysis 3: Arlington Blvd & Cichester Lane

10/14/2013



Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↑↑	↑↑		↔	
Volume (veh/h)	2	21	1516	2191	7	3	60
Sign Control			Free	Free		Stop	
Grade			0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	23	1648	2382	8	3	65
<b>Pedestrians</b>							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			Raised	Raised			
Median storage (veh)			1	1			
Upstream signal (ft)							
pX, platoon unblocked	0.00						
vC, conflicting volume	0	2389				3255	1195
vC1, stage 1 conf vol						2385	
vC2, stage 2 conf vol						870	
vCu, unblocked vol	0	2389				3255	1195
tC, single (s)	0.0	4.1				6.8	6.9
tC, 2 stage (s)						5.8	
tF (s)	0.0	2.2				3.5	3.3
p0 queue free %	0	89				93	64
cM capacity (veh/h)	0	199				44	179
<b>Direction, Lane #</b>							
	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	
Volume Total	23	824	824	1588	801	68	
Volume Left	23	0	0	0	0	3	
Volume Right	0	0	0	0	8	65	
cSH	199	1700	1700	1700	1700	156	
Volume to Capacity	0.11	0.48	0.48	0.93	0.47	0.44	
Queue Length 95th (ft)	10	0	0	0	0	50	
Control Delay (s)	25.5	0.0	0.0	0.0	0.0	44.9	
Lane LOS	D					E	
Approach Delay (s)	0.3			0.0		44.9	
Approach LOS						E	
<b>Intersection Summary</b>							
Average Delay			0.9				
Intersection Capacity Utilization			71.3%		ICU Level of Service		C
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis  
 4: Arlington Blvd & Site Access Inbound

10/14/2013



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		
Volume (veh/h)	1625	5	0	2253	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1766	5	0	2449	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised		Raised			
Median storage (veh)	1		1			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1772		2993	886
vC1, stage 1 conf vol					1769	
vC2, stage 2 conf vol					1224	
vCu, unblocked vol			1772		2993	886
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			347		78	288

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	1178	594	1224	1224
Volume Left	0	0	0	0
Volume Right	0	5	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.69	0.35	0.72	0.72
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS				
Approach Delay (s)	0.0		0.0	
Approach LOS				

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		

Queues

1: Arlington Blvd & Barkley Gate Ln

10/14/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	32	1627	68	128	2297	26	67	33	72	27
v/c Ratio	0.57	0.55	0.05	0.58	0.79	0.02	0.71	0.21	0.60	0.18
Control Delay	135.8	5.3	0.7	22.1	15.4	1.8	129.2	24.9	112.8	27.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	135.8	5.3	0.7	22.1	15.4	1.8	129.2	24.9	112.8	27.1
Queue Length 50th (ft)	45	275	0	64	886	0	92	0	98	0
Queue Length 95th (ft)	#95	391	10	177	1131	9	153	41	159	37
Internal Link Dist (ft)		1513			1307		666		542	
Turn Bay Length (ft)	480		890	360		530		150		320
Base Capacity (vph)	61	2936	1323	222	2897	1301	174	254	219	249
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.55	0.05	0.58	0.79	0.02	0.39	0.13	0.33	0.11

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 1: Arlington Blvd & Barkley Gate Ln

10/14/2013



Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	29	1497	63	3	115	2113	24	54	7	30	25	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		6%				-4%			0%			0%
Total Lost time (s)	6.5	7.0	7.0		7.0	7.0	7.0		7.0	7.0		7.0
Lane Util. Factor	1.00	0.95	1.00		1.00	0.95	1.00		1.00	1.00		1.00
Frt	1.00	1.00	0.85		1.00	1.00	0.85		1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00	1.00		0.96	1.00		0.98
Satd. Flow (prot)	1717	3433	1536		1805	3610	1615		1784	1583		1828
Flt Permitted	0.95	1.00	1.00		0.14	1.00	1.00		0.66	1.00		0.82
Satd. Flow (perm)	1717	3433	1536		275	3610	1615		1220	1583		1533
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)	32	1627	68	3	125	2297	26	59	8	33	27	45
RTOR Reduction (vph)	0	0	10	0	0	0	5	0	0	30	0	0
Lane Group Flow (vph)	32	1627	58	0	128	2297	21	0	67	3	0	72
Turn Type	Prot		Perm	Perm	Perm		Perm	Perm		Perm	Perm	
Protected Phases	5	2				6			8			4
Permitted Phases			2	6	6		6	8		8	4	
Actuated Green, G (s)	5.9	179.6	179.6		167.2	167.2	167.2		16.4	16.4		16.4
Effective Green, g (s)	5.9	179.6	179.6		167.2	167.2	167.2		16.4	16.4		16.4
Actuated g/C Ratio	0.03	0.86	0.86		0.80	0.80	0.80		0.08	0.08		0.08
Clearance Time (s)	6.5	7.0	7.0		7.0	7.0	7.0		7.0	7.0		7.0
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	2.0		3.0	3.0		3.0
Lane Grp Cap (vph)	48	2936	1314		219	2874	1286		95	124		120
v/s Ratio Prot	0.02	c0.47				c0.64						
v/s Ratio Perm			0.04		0.46		0.01		c0.05	0.00		0.05
v/c Ratio	0.67	0.55	0.04		0.58	0.80	0.02		0.71	0.02		0.60
Uniform Delay, d1	101.1	4.2	2.3		8.2	12.0	4.4		94.4	89.4		93.6
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2	23.8	0.8	0.1		10.9	2.4	0.0		21.1	0.1		7.8
Delay (s)	124.9	4.9	2.4		19.1	14.4	4.4		115.6	89.5		101.5
Level of Service	F	A	A		B	B	A		F	F		F
Approach Delay (s)		7.1				14.6			106.9			98.2
Approach LOS		A				B			F			F

### Intersection Summary

HCM Average Control Delay	15.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	210.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	89.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 1: Arlington Blvd & Barkley Gate Ln

10/14/2013

Movement	SBR
Lane Configurations	7
Volume (vph)	25
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	7.0
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	27
RTOR Reduction (vph)	25
Lane Group Flow (vph)	2
Turn Type	Perm
Protected Phases	
Permitted Phases	4
Actuated Green, G (s)	16.4
Effective Green, g (s)	16.4
Actuated g/C Ratio	0.08
Clearance Time (s)	7.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	124
v/s Ratio Prot	
v/s Ratio Perm	0.00
v/c Ratio	0.02
Uniform Delay, d1	89.4
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	89.4
Level of Service	F
Approach Delay (s)	
Approach LOS	
<b>Intersection Summary</b>	