

April 3, 2023

Mr. Randy Formica  
Town of Blacksburg  
Director of Engineering and GIS Department  
400 South Main Street  
Blacksburg, Virginia 24060  
Phone: (540) 443-1300

Reference: **Glade Heights** – Traffic Impact Analysis (TIA) Addendum  
Town of Blacksburg, Virginia

Dear Mr. Formica,

Ramey Kemp Associates (RKA) has performed this addendum to the previously submitted TIA (submitted by RKA on January 11, 2023) in coordination with the Town.

It is our understanding that recent work session conversations on the Glade Heights project has resulted in the omission of the cross-connectivity to Village Way (to the north). Because of the removal of this cross-connectivity, previously re-rerouted trips from the subdivision to the north would no longer be able to use the internal roadway network within the proposed development to reach Glade Road and proposed development traffic heading to Toms Creek Road would no longer be able to access that road directly through the adjacent subdivision. See attached for the site location map and revised site plan.

## Methodology

In conjunction with the Town, it was determined that the only intersections previously studied that would be affected by this plan change are:

- Prices Fork Road and University City Boulevard
- Prices Fork Road and Old Glade Road
- University City Boulevard and Glade Road
- Glade Road and Old Glade Road
- Glade Road and Sunset Lake Road

In order to account for the removal of the cross-connectivity, the site trip distributions from the previously submitted TIA were modified based on a review of the existing traffic volumes, the adjacent roadway network, and engineering judgement (revised trip distributions are in **red**):

- 10% to / from the north on University City Boulevard (**increased to 15%**)
- 40% to / from the east on Prices Fork Road
- 30% to / from the west on Prices Fork Road (**increased to 40%**)
- 5% to / from the west on Glade Road
- 15% to / from the east on Toms Creek Road (**reduced to 0%**)

See attached for an illustration of the revised site trip distributions, site trip assignments, and build peak hour traffic volumes.

**VDOT Turn Lane Warrant Analysis**

The updated projected build-out AM and PM peak hour traffic volumes at the proposed entrance on Glade Road were compared to the turn lane warrants in the Virginia Department of Transportation (VDOT) *Access Management Design Standards for Entrances and Intersections*. A westbound right-turn lane along Glade Road is warranted at the proposed site access.

**Traffic Capacity Analysis**

Per coordination with the Town, this addendum only reanalyzed the operations at the aforementioned study intersections under the build traffic conditions. The analysis was performed utilizing the same methodology from the previously submitted TIA.

**Prices Fork Road and University City Boulevard**

Table 1 summarizes the capacity analysis results for the signalized intersection of Prices Fork Road and University City Boulevard. The Synchro outputs are enclosed for reference.

**Table 1: Level-of-Service Summary for Prices Fork Road and University City Boulevard**

CONDITION	LANE GROUP	AM PEAK HOUR				PM PEAK HOUR			
		Lane LOS	Lane Delay (sec)	Lane Queue (ft)	Overall LOS (Delay)	Lane LOS	Lane Delay (sec)	Lane Queue (ft)	Overall LOS (Delay)
No-Build (2026) Conditions <i>From previously submitted TIA</i>	EBL	E	66	240	C (30)	F	82	240	D (42)
	EBT (2)	B	16	273		C	22	287	
	EBR	B	12	200		B	17	77	
	WBL	E	72	49		E	71	217	
	WBT (2)	C	22	284		D	40	702	
	WBR	B	20	74		C	33	325	
	NBL	E	68	76		E	67	241	
	NBT/R	E	68	68		E	68	226	
	SBL (2)	E	60	446		E	57	754	
SBT/R	D	54	164	D	51	754			
Build (2026) Conditions	EBL	E	66	230	C (31)	F	82	240	D (43)
	EBT (2)	B	17	265		C	23	291	
	EBR	B	12	89		B	17	238	
	WBL	E	72	46		E	71	249	
	WBT (2)	C	23	328		D	42	695	
	WBR	C	21	132		C	34	325	
	NBL	E	68	76		E	67	172	
	NBT/R	E	68	77		E	68	203	
	SBL (2)	E	60	488		E	58	761	
SBT/R	D	53	214	D	50	755			

Capacity analysis indicates that the signalized intersection is expected to operate at an overall LOS D or better during the AM and PM peak hours for the build traffic conditions. All lane groups are expected to operate at LOS E or better, with the exception of the eastbound left-turn movement during the PM peak hour for all future traffic conditions. When comparing build to no-build conditions, all levels of service are expected to be maintained. Furthermore, the site trips are expected to increase the total volume at this intersection by approximately 2% during the AM and PM peak hours.

Due to minimal impacts from the proposed development, no improvements are recommended at this intersection at build-out of the proposed community.



**Prices Fork Road and Old Glade Road**

Table 2 summarizes the capacity analysis results for the unsignalized intersection of Prices Fork Road and Old Glade Road. The Synchro outputs are enclosed for reference.

**Table 2: Level-of-Service Summary for Prices Fork Road & Old Glade Road**

CONDITION	LANE GROUP	AM PEAK HOUR				PM PEAK HOUR			
		Lane LOS	Lane Delay (sec)	Lane Queue (ft)	Overall LOS (Delay)	Lane LOS	Lane Delay (sec)	Lane Queue (ft)	Overall LOS (Delay)
No-Build (2026) Conditions <i>From previously submitted TIA</i>	EBL <sup>2</sup>	B	10	30	N/A <sup>3</sup>	D	34	163	N/A <sup>3</sup>
	EBT (2)	--	--	--		--	--	--	
	WBT	--	--	--		--	--	--	
	WBT/R	--	--	--		--	--	--	
	SBR <sup>1</sup>	B	15	58		F	87	290	
Build (2026) Conditions	EBL <sup>2</sup>	B	11	33	N/A <sup>3</sup>	E	49	233	N/A <sup>3</sup>
	EBT (2)	--	--	--		--	--	--	
	WBT	--	--	--		--	--	--	
	WBT/R	--	--	--		--	--	--	
	SBR <sup>1</sup>	C	16	73		F	118	360	

1. Level of service for minor approach
2. Level of service for major-street left-turn movement
3. HCM methodology does not provide lane group or overall LOS, delay, and queue lengths for major street through movements or right turns at unsignalized intersections.

Capacity analysis indicates that for build traffic conditions, the minor-street approach is expected to operate at LOS C during the AM peak hour and LOS F during the PM peak hour. The major street left-turn movement is expected to operate at LOS B during the AM peak hour and LOS E during the PM peak hour. Based on SimTraffic performance reports, which calculates delay per vehicle based on simulation modeling of the study network taking into account the effect of adjacent signals, it is expected that delays in the field are significantly less than the synchro reports calculate. SimTraffic performance reports indicate that the southbound right turn and eastbound left turn delay per vehicle are expected to be less than 29.5 seconds per vehicle, which correlates to LOS C or better. The site trips are expected to increase the total volume at this intersection by approximately 3% during the AM and PM peak hours.

While increased delays are expected during the PM peak hour, less than desirable levels of operation currently exist. Additionally, no laneage improvements are expected to decrease delays and the proximity to the signalized intersection of Prices Fork Road and University City Boulevard make traffic control improvements impractical.

Based on the minimal site traffic utilizing the intersection, no improvements are recommended at this intersection at build-out of the proposed community.

**University City Boulevard and Glade Road**

Table 3 summarizes the capacity analysis results for the signalized intersection of University City Boulevard and Glade Road. The Synchro outputs are enclosed for reference.



**Table 3: Level-of-Service Summary for University City Boulevard & Glade Road/Starbucks Driveway**

CONDITION	LANE GROUP	AM PEAK HOUR				PM PEAK HOUR			
		Lane LOS	Lane Delay (sec)	Lane Queue (ft)	Overall LOS (Delay)	Lane LOS	Lane Delay (sec)	Lane Queue (ft)	Overall LOS (Delay)
No-Build (2026) Conditions <i>From previously submitted TIA</i>	EBL/T	C	27	216	B (17)	C	27	211	B (14)
	EBR	C	27	111		C	27	176	
	WBL/T/R	C	31	169		C	29	164	
	NBL	A	6	52		A	8	116	
	NBT/TR	A	4	86		A	5	154	
	SBL/T	A	9	134		B	12	162	
	SBT/R	A	9	105		B	13	159	
Build (2026) Conditions	EBL/T	C	27	197	B (18)	C	27	197	B (15)
	EBR	C	28	114		C	27	117	
	WBL/T/R	C	31	164		C	29	164	
	NBL	A	7	54		A	8	137	
	NBT/TR	A	5	79		A	6	154	
	SBL/T	A	10	124		B	13	170	
	SBT/R	A	10	104		B	14	145	

Capacity analysis indicates that the signalized intersection is expected to operate at an overall LOS B during the AM and PM peak hours for the build traffic conditions. All lane groups are expected to operate at LOS C or better during the AM and PM peak hours. When comparing build to no-build conditions, all levels of service are expected to be maintained.

Due to minimal impacts from the proposed development, no improvements are recommended at this intersection at build-out of the proposed community.



**Old Glade Road and Glade Road**

Table 4 summarizes the capacity analysis results for the unsignalized intersection of Old Glade Road and Glade Road. The Synchro outputs are enclosed for reference.

**Table 4: Level-of-Service Summary for Old Glade Road & Glade Road**

CONDITION	LANE GROUP	AM PEAK HOUR				PM PEAK HOUR			
		Lane LOS	Lane Delay (sec)	Lane Queue (ft)	Overall LOS (Delay)	Lane LOS	Lane Delay (sec)	Lane Queue (ft)	Overall LOS (Delay)
No-Build (2026) Conditions <i>From previously submitted TIA</i>	EBT	--	--	--	N/A <sup>3</sup>	--	--	--	N/A <sup>3</sup>
	EBR	--	--	--		--	--	--	
	WBL/T <sup>2</sup>	A	9	10		A	8	10	
	NBL <sup>1</sup>	B	15	20		E	37	135	
	NBR	A	10	13	A	10	15		
Build (2026) Conditions	EBT	--	--	--	N/A <sup>3</sup>	--	--	--	N/A <sup>3</sup>
	EBR	--	--	--		--	--	--	
	WBL/T <sup>2</sup>	A	9	10		A	8	13	
	NBL <sup>1</sup>	C	17	30		F	71	300	
	NBR	B	10	13	B	10	15		
Build (2026) Conditions (All-Way Stop)	EBT	B	11	35	B (11)	B	13	38	C (19)
	EBR	A	10	38		B	11	25	
	WBL/T	B	11	30		C	24	143	
	NBL	B	11	23		C	23	118	
	NBR	A	10	15		B	11	25	

1. Level of service for minor approach
2. Level of service for major-street left-turn movement
3. HCM methodology does not provide lane group or overall LOS, delay, and queue lengths for major street through movements or right turns at unsignalized intersections.

Capacity analysis indicates that for build traffic conditions, the minor-street approach is expected to operate at LOS C or better during the AM peak hour and LOS F or better during the PM peak hour. The major street left-turn movement is expected to operate at LOS A during the AM and PM peak hours. While the northbound approach is expected to increase in delays, it is not uncommon for the minor-street approach to experience higher delays during the peak hour when the mainline traffic is the highest. Based on the aforementioned SimTraffic modeling, heavy queues are not expected to be a consistent issue as the average queue is not expected to exceed 115 feet during the PM peak hour. SimTraffic performance reports calculate the northbound left delay per vehicle to be approximately 23 seconds during the PM peak hour (which correlates to LOS C or better).

As mentioned in the previously submitted TIA, this intersection is not anticipated to meet the necessary warrants for the installation of a traffic signal. It is our understanding however that the Town is considering a project to implement an all-way stop at this location.

Capacity analysis indicates that for build traffic conditions, the overall intersection is expected to operate at LOS C or better during the AM and PM peak hours. All lane groups are also expected to operate at LOS C or better.

There are no recommended improvements for the developer.



***Glade Road and Proposed Site Access***

Table 9 summarizes the capacity analysis results for the proposed intersection of Glade Road and the Site Access. The Synchro outputs are enclosed for reference.

**Table 9: Level-of-Service Summary for Glade Road and Site Access**

CONDITION	LANE GROUP	AM PEAK HOUR				PM PEAK HOUR			
		Lane LOS	Lane Delay (sec)	Lane Queue (ft)	Overall LOS (Delay)	Lane LOS	Lane Delay (sec)	Lane Queue (ft)	Overall LOS (Delay)
Build (2026) Conditions	EBL/T <sup>2</sup>	A	8	0	N/A <sup>3</sup>	A	8	0	N/A <sup>3</sup>
	WBT	--	--	--		--	--	--	
	WBR	--	--	--		--	--	--	
	SBL/R <sup>1</sup>	B	13	15		B	14	13	

**Bold indicates improvements.**

1. Level of service for minor approach
2. Level of service for major-street left-turn movement
3. HCM methodology does not provide lane group or overall LOS, delay, and queue lengths for major street through movements or right turns at unsignalized intersections.

As mentioned previously, a westbound right-turn lane is warranted and recommended. Capacity analysis indicates that with this improvement, all approaches are expected to operate at LOS B or better during the weekday AM and PM peak hours. Due to acceptable levels of service, no additional improvements are recommended.

**Recommendations**

Based on the updated traffic capacity analysis, all study intersections are expected to operate at acceptable levels at build out of the proposed community with the following improvement.

- Construct a westbound right turn lane on Glade Road at the proposed site access location. Based on the results of the TIA and the VDOT *Access Management Design Standards for Entrances and Intersections*, a turn lane with a minimum of 100 feet of storage should be provided.

See attached for an illustration of the recommended lane configurations for the study intersections.

We appreciate your attention to this matter. Please contact me at (336) 714-0112 if you have any questions about this report.

Sincerely yours,



A handwritten signature in black ink, appearing to read "Chase T. Smith".

4-3-2023

Chase Smith, PE  
*Infrastructure Consulting Services, Inc.*  
*dba*

***Ramey Kemp Associates***

License #0407008438

Enclosures: Scoping Confirmation, Figures, Synchro and SimTraffic output

Copy to: Ms. Meredith Jones, Eden & Associates, P. C.

# **TECHNICAL APPENDIX**



# **APPENDIX A**

## **Scoping Confirmation**

Chase Smith

---

From: Randy Formica <RFormica@blacksburg.gov>  
Sent: Wednesday, March 22, 2023 2:43 PM  
To: Chase Smith  
Cc: Matt Hanratty; Meredith Jones; Kinsey O'Shea  
Subject: RE: Glade Heights TIA Submittal

I think then we are good with the scope. Thanks.

Randy

Randy Formica, PE ENV SP, Director  
Engineering and GIS Department  
Town of Blacksburg  
rformica@blacksburg  
540-443-1300

From: Chase Smith <csmith@rameykemp.com>  
Sent: Wednesday, March 22, 2023 2:29 PM  
To: Randy Formica <RFormica@blacksburg.gov>  
Cc: Matt Hanratty <mhanratty@blacksburg.gov>; Meredith Jones <meredith@edenandassociates.com>; Kinsey O'Shea <KOShea@blacksburg.gov>  
Subject: Re: Glade Heights TIA Submittal

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Exactly.

Thanks,

Chase Smith

On Mar 22, 2023, at 14:22, Randy Formica <[RFormica@blacksburg.gov](mailto:RFormica@blacksburg.gov)> wrote:

Chase,

That explanation is very helpful. Thanks for the further explanation. I believe we are in agreement on the scope per your further explanation. I understand what you are saying on the Toms Creek Road intersections. I guess I didn't think those intersections through enough. Toms Creek Road without the connection is basically the 2026 No-build scenario, correct?

Randy

Randy Formica, PE ENV SP, Director

Engineering and GIS Department  
Town of Blacksburg  
rformica@blacksburg  
540-443-1300

From: Chase Smith <[csmith@rameykemp.com](mailto:csmith@rameykemp.com)>  
Sent: Wednesday, March 22, 2023 2:15 PM  
To: Randy Formica <[RFormica@blacksburg.gov](mailto:RFormica@blacksburg.gov)>  
Cc: Matt Hanratty <[mhanratty@blacksburg.gov](mailto:mhanratty@blacksburg.gov)>; Meredith Jones <[meredith@edenandassociates.com](mailto:meredith@edenandassociates.com)>;  
Kinsey O'Shea <[KOShea@blacksburg.gov](mailto:KOShea@blacksburg.gov)>  
Subject: Re: Glade Heights TIA Submittal

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Randy,

I should explained further. An addendum letter would essentially cover everything we need for this change. It would include updated exhibits, it would include explanations to why the letter is being provided, it would provide updates to the build scenario in synchro and simtraffic. It just would be much more concise version of the TIA and would not regurgitate any of the existing or no build items again.

I'm not sure why we would need to include the intersections on Tom's creek considering eliminating the cross access eliminates any proposed development traffic utilizing those intersections.

Thanks,

Chase Smith

On Mar 22, 2023, at 14:01, Randy Formica <[RFormica@blacksburg.gov](mailto:RFormica@blacksburg.gov)> wrote:

Chase,

I have a few comments on your proposed revised scope. Since the connection will be eliminated, traffic that would have utilized the connection will be re-distributed at the Toms Creek Road/Redbud and Toms Creek Road/Honeysuckle intersections so both of those intersections need to be included in the revised analysis along with the intersections you listed. Also, does your revised scope include re-analyzing the Synchro runs for the Build scenarios at each of the intersections? You did not list that specifically but the revision should include re-running the Synchro analyses and provide the revised LOS and queuing results for each intersection. I think both the applicant and Town Staff will receive questions about this scenario (from Town Council and the public) and require the revised LOS and queuing data to accurately provide answers to those questions. Based on this, I don't think just an addendum letter is enough. We will need to see the Build scenario Synchro results and any revised exhibits impacted by the elimination of the connection plus your addendum letter.

Please let me know if you have any questions.

Randy

Randy Formica, PE ENV SP, Director  
Engineering and GIS Department  
Town of Blacksburg  
rformica@blacksburg  
540-443-1300

From: Chase Smith <[csmith@rameykemp.com](mailto:csmith@rameykemp.com)>  
Sent: Wednesday, March 22, 2023 11:07 AM  
To: Randy Formica <[RFormica@blacksburg.gov](mailto:RFormica@blacksburg.gov)>  
Cc: Matt Hanratty <[mhanratty@blacksburg.gov](mailto:mhanratty@blacksburg.gov)>; Meredith Jones <[meredith@edenandassociates.com](mailto:meredith@edenandassociates.com)>; Kinsey O'Shea <[KOShea@blacksburg.gov](mailto:KOShea@blacksburg.gov)>  
Subject: RE: Glade Heights TIA Submittal

**CAUTION:** This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

Good Morning Randy,

I just talked with Meredith Jones over at Eden Associates. It sounds like there is a necessary modification of the site plan to remove any cross connectivity for this project to the subdivision to the north. I wanted to reach out to you to get the ball rolling on what exactly you need from us. In other instances, we would recommend just a simple addendum letter where we focus on the intersections in which the future build analysis has a potential to change. That would be the intersections from the site access eastward toward UCB and Prices Fork. Are you okay with us moving forward with an addendum letter built on the same assumptions from the TIA just with modified trip distributions at the intersections of:

1. Prices Fork and Old Glade
2. Prices Fork and UCB
3. UCB and Glade
4. Glade and Old Glade
5. Glade and Site Access

Let us know if you need something more formal to knock out the scope for this one.

Thanks!

Chase Smith, PE  
Traffic Engineering Project Manager

D 336 714 0112 | T 336 725 5470 | C 336 813 9289

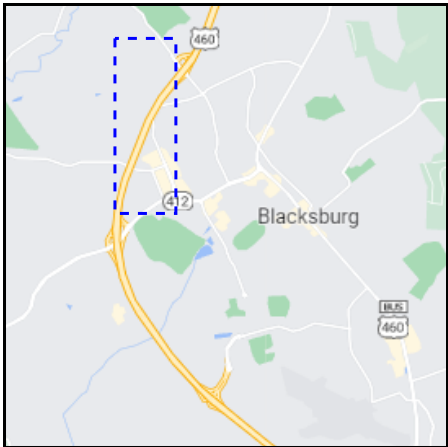
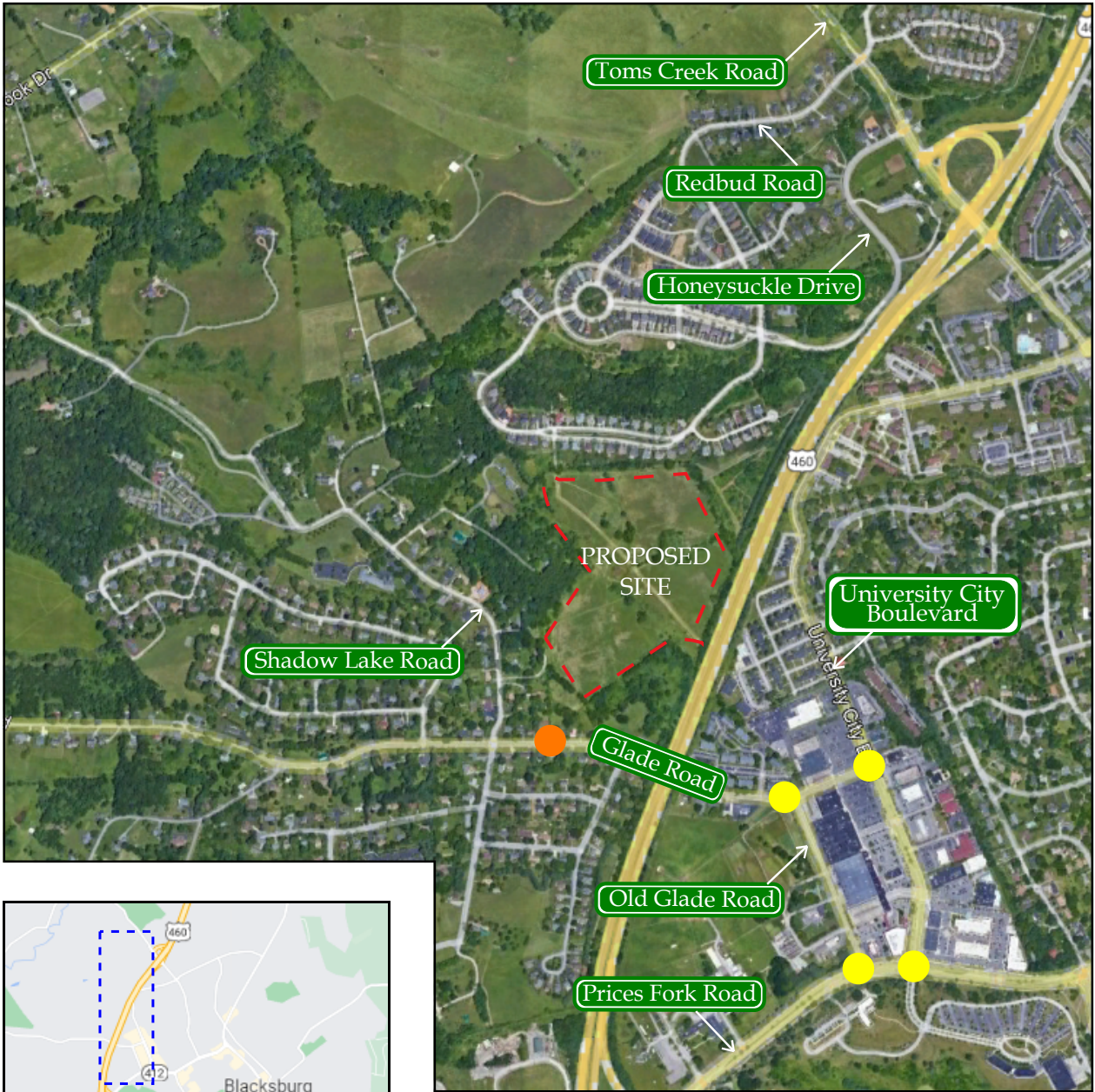
[rameykemp.com](http://rameykemp.com)

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From: Joshua Middleton <[JMiddleton@blacksburg.gov](mailto:JMiddleton@blacksburg.gov)>  
Sent: Wednesday, January 11, 2023 2:18 PM  
To: Anna Irby <[airby@rameykemp.com](mailto:airby@rameykemp.com)>

# **APPENDIX B**

## **FIGURES**



**LEGEND**

-  Proposed Site Location
-  Study Area
-  Study Intersection
-  Proposed Access

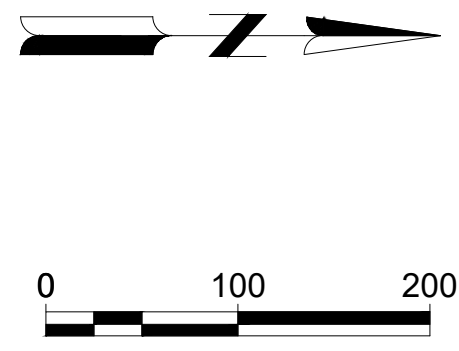
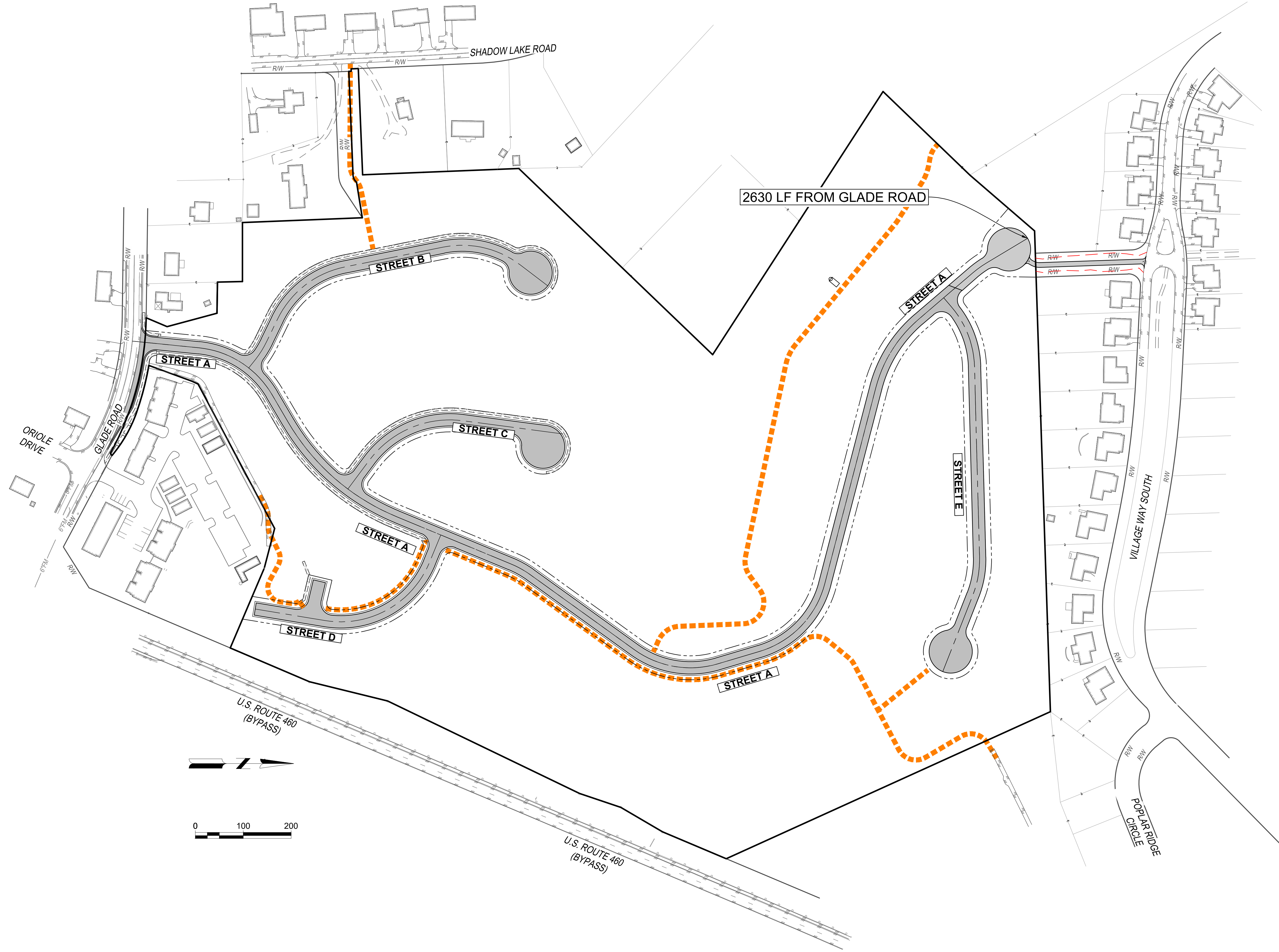


Glade Heights  
Blacksburg, VA

Site Location Map

Scale: Not to Scale    Figure 1

C:\DROPOBOX\E&A\CARY\_HOPPER\GLADE SPRING\CAD\MISC COORDINATION EXHIBITS\2023.01.26 STREET A CUL DE SAC EXHIBIT.DWG  
 3/17/2023 1:53:26 PM



No.	Revision / Issue	Date

**PRELIMINARY**

**STREET A CUL DE SAC  
 CONCEPT  
 OVERVIEW EXHIBIT**

PROPOSED DEVELOPMENT OF  
**GLADE SPRING CROSSING**  
 PROPERTY OF GLADE HGTS, LLC - TAX PARCELS  
 225-(A)-3, 225-(A)-4, & 224-(A)-57; 45.0976 AC.  
 TOWN OF BLACKSBURG - PRICES FORK DISTRICT  
 MONTGOMERY COUNTY, VIRGINIA

Drawn By: MSF	Scale: AS SHOWN
Checked By: MTJ	Date: 03/14/2023
Sheet No. 1 of 1	<b>EX1</b>

**E&A**  
 EDEN & ASSOCIATES  
 engineering • planning • development  
 1700 KRAFT DRIVE, SUITE 2350  
 BLACKSBURG, VIRGINIA 24060  
 VOICE 276-632-6231  
 FAX 276-632-3648

**LEGEND**

○ Unsignalized Intersection

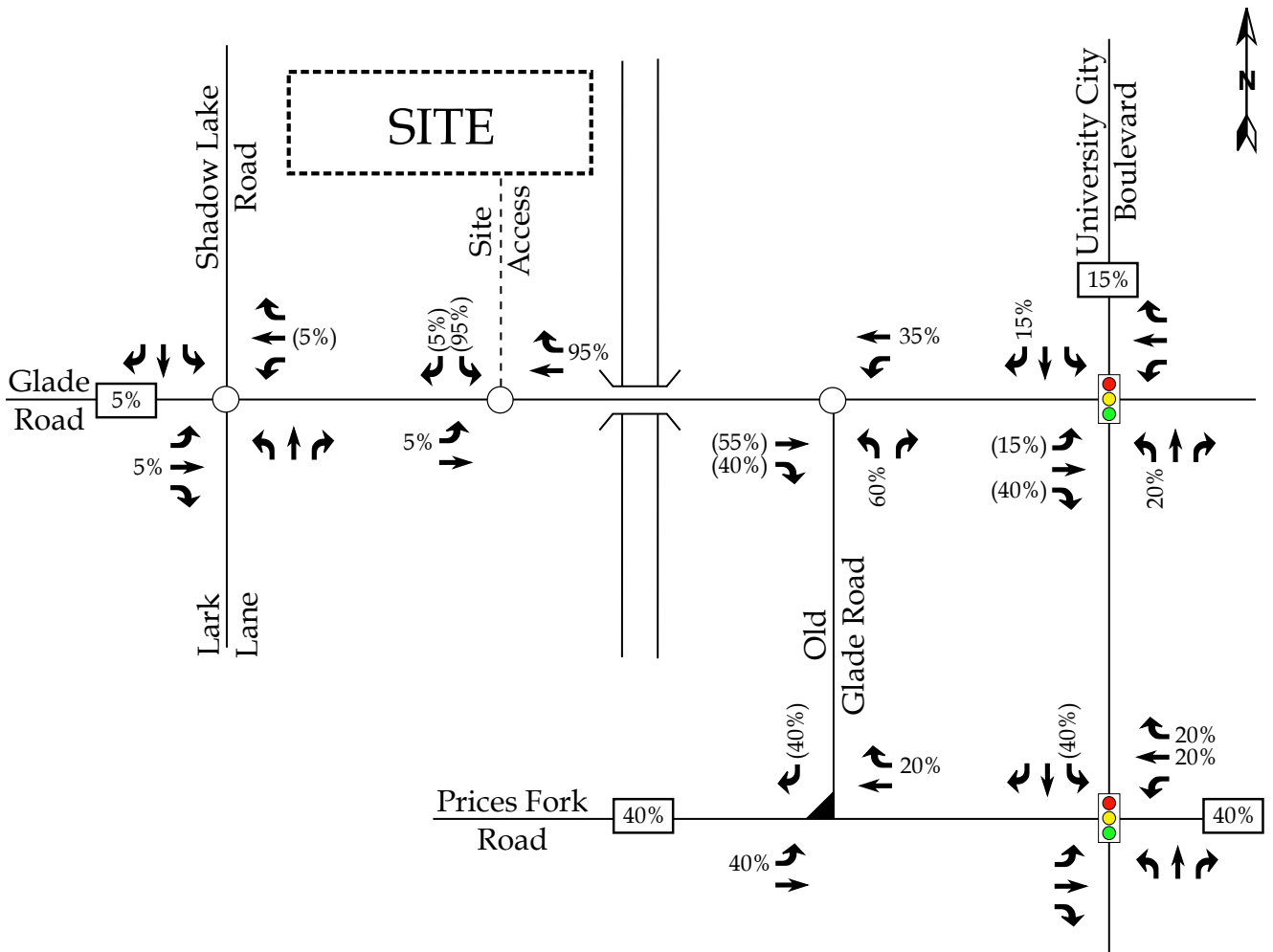
◫ Signalized Intersection

▲ Left-Over Intersection

x% → Entering Trip Distribution

(y%) → Exiting Trip Distribution

◻xx% Regional Trip Distribution



Glade Heights  
Blacksburg, VA

Site Trip Distribution

Scale: Not to Scale

Figure 3



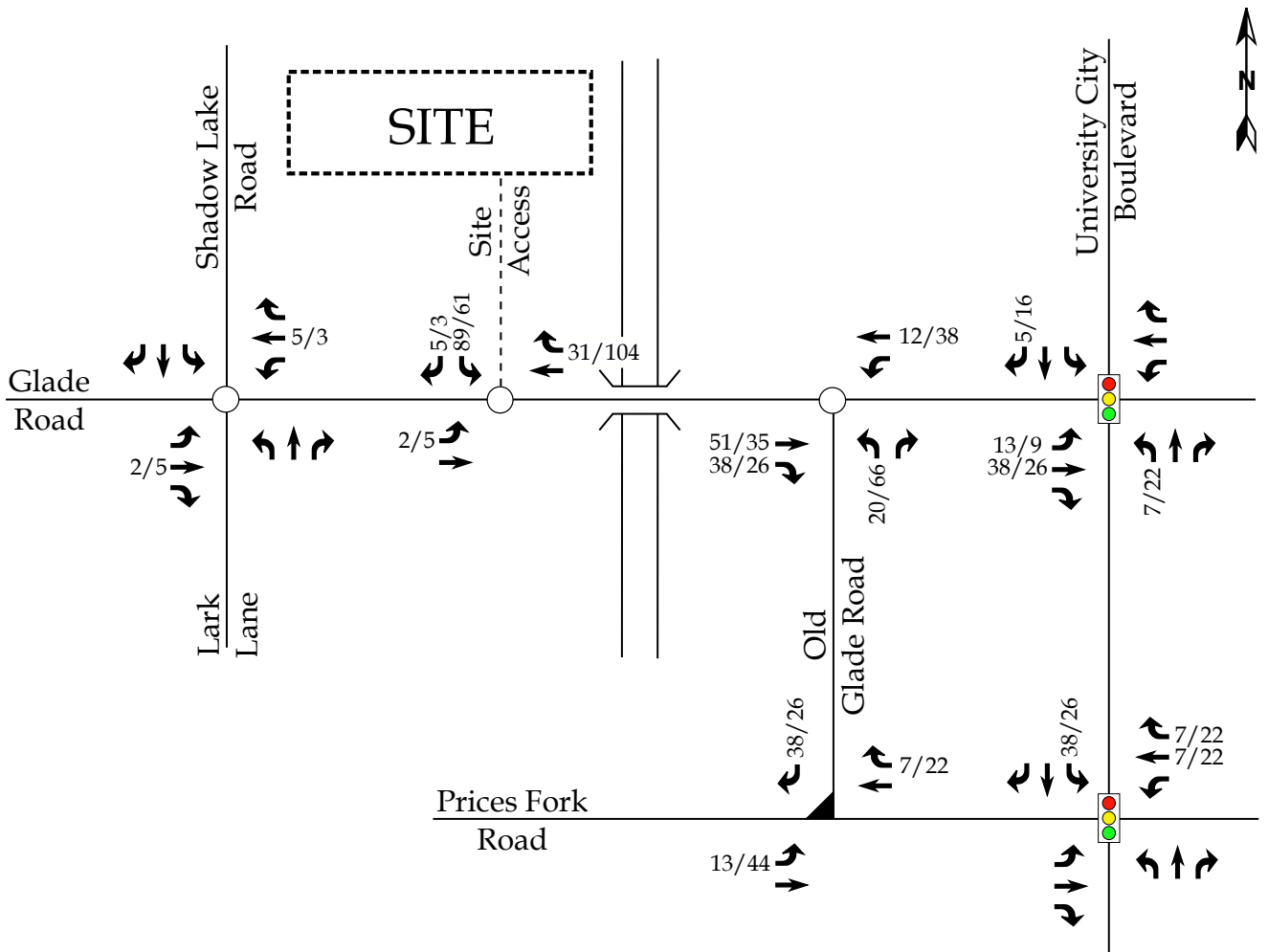
**LEGEND**

○ Unsignalized Intersection

🚦 Signalized Intersection

▲ Left-Over Intersection

X / Y → Weekday AM / PM Peak Hour Site Trips



Glade Heights  
Blacksburg, VA

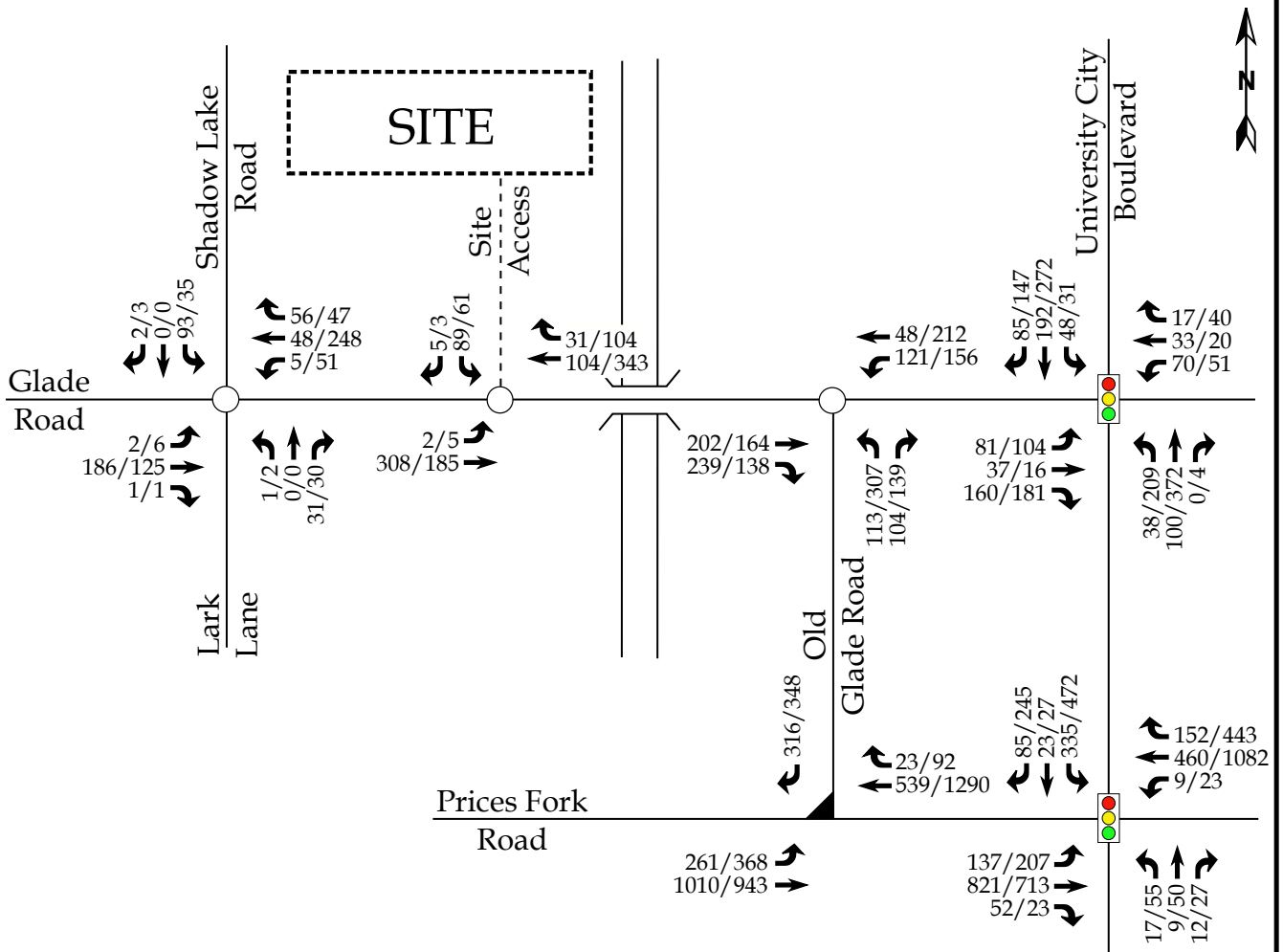
Site Trip Assignment

Scale: Not to Scale

Figure 4

### LEGEND

- Unsignalized Intersection
- 🚦 Signalized Intersection
- ▲ Left-Over Intersection
- X / Y → Weekday AM / PM Peak Hour Traffic



Glade Heights  
Blacksburg, VA

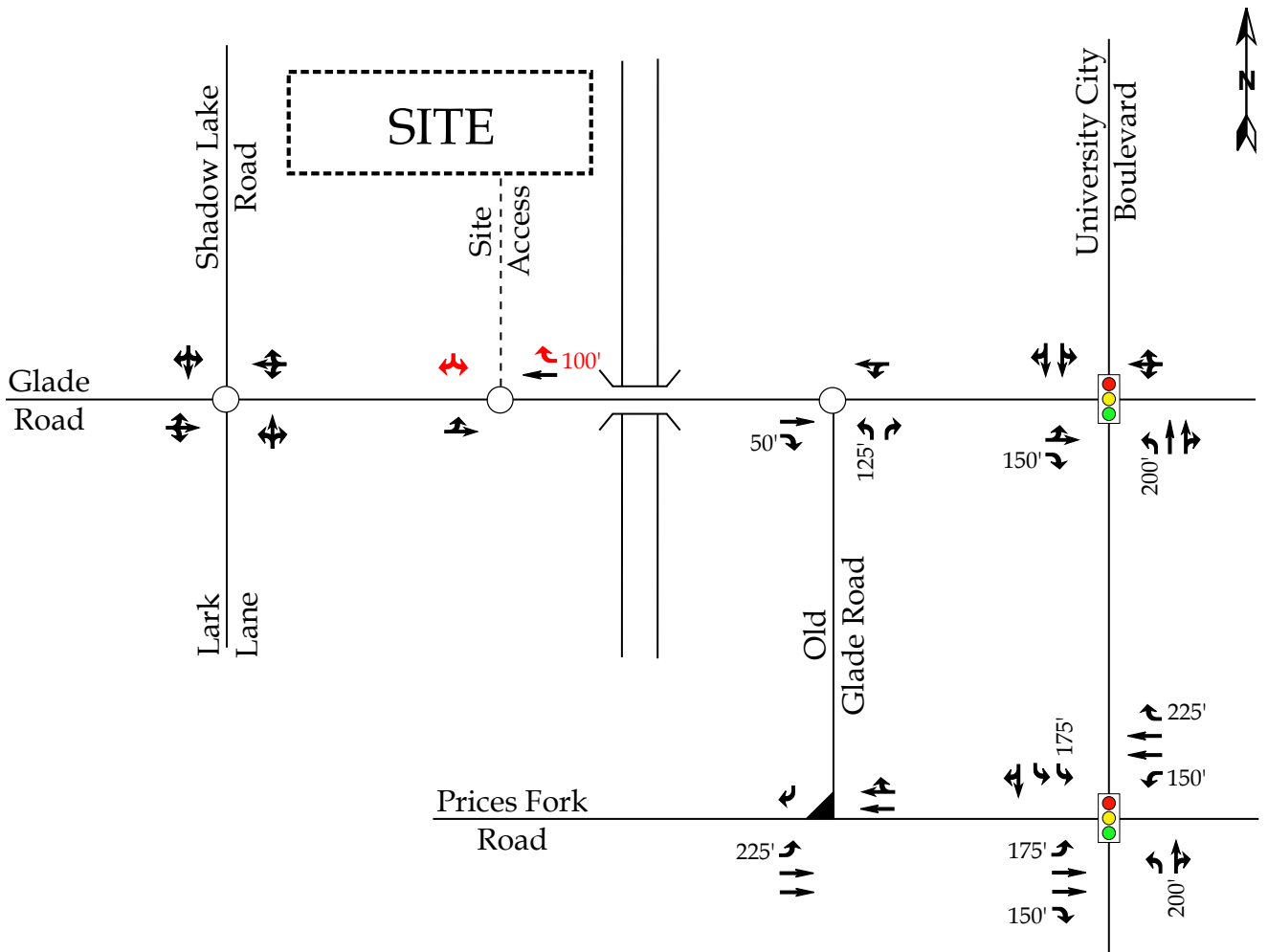
2026 Build  
Peak Hour Traffic

Scale: Not to Scale

Figure 5

**LEGEND**

- Unsignalized Intersection
- 🚦 Signalized Intersection
- ▲ Left-Over Intersection
- ➡ Existing Lane
- x' Storage (In Feet)
- ➡ Recommended Lane Configuration



Glade Heights  
Blacksburg, VA

Recommended Lane Configurations

Scale: Not to Scale	Figure 6
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# **APPENDIX C**

## **CAPACITY ANALYSIS CALCULATIONS**

**Prices Fork Road and University City  
Boulevard**

Glade Heights - Blacksburg, VA  
1: The Inn at VT/UCB & Prices Fork Road

2026 Build Conditions  
Timing Plan: AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗		↖	↗	↘	
Traffic Volume (vph)	137	821	52	9	460	152	17	9	12	335	23	85	
Future Volume (vph)	137	821	52	9	460	152	17	9	12	335	23	85	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		0.97	1.00		
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98	1.00	0.99		1.00	0.99		
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.92		1.00	0.88		
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1703	3438	1497	1805	3312	1515	1703	1602		3367	1602		
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (perm)	1703	3438	1497	1805	3312	1515	1703	1602		3367	1602		
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)	149	892	57	10	500	165	18	10	13	364	25	92	
RTOR Reduction (vph)	0	0	23	0	0	84	0	12	0	0	76	0	
Lane Group Flow (vph)	149	892	34	10	500	81	18	11	0	364	41	0	
Confl. Peds. (#/hr)			6			2			5			4	
Heavy Vehicles (%)	6%	5%	4%	0%	9%	5%	6%	17%	0%	4%	0%	4%	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA		Split	NA		
Protected Phases	1	6		5	2		3	3		4	4		
Permitted Phases			6			2							
Actuated Green, G (s)	18.9	88.2	88.2	3.4	72.1	72.1	6.9	6.9		23.7	23.7		
Effective Green, g (s)	21.3	89.9	89.9	5.2	73.8	73.8	8.7	8.7		26.2	26.2		
Actuated g/C Ratio	0.14	0.60	0.60	0.03	0.49	0.49	0.06	0.06		0.17	0.17		
Clearance Time (s)	7.4	6.7	6.7	6.8	6.7	6.7	6.8	6.8		7.5	7.5		
Vehicle Extension (s)	4.0	5.0	5.0	4.0	5.0	5.0	3.0	3.0		4.0	4.0		
Lane Grp Cap (vph)	241	2060	897	62	1629	745	98	92		588	279		
v/s Ratio Prot	c0.09	c0.26		0.01	0.15		c0.01	0.01		c0.11	0.03		
v/s Ratio Perm			0.02			0.05							
v/c Ratio	0.62	0.43	0.04	0.16	0.31	0.11	0.18	0.12		0.62	0.15		
Uniform Delay, d1	60.5	16.3	12.3	70.3	22.8	20.5	67.3	67.0		57.3	52.4		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	5.3	0.7	0.1	1.7	0.5	0.3	0.9	0.6		2.2	0.3		
Delay (s)	65.9	16.9	12.4	72.0	23.3	20.7	68.2	67.6		59.5	52.8		
Level of Service	E	B	B	E	C	C	E	E		E	D		
Approach Delay (s)		23.3			23.4			67.8			57.9		
Approach LOS		C			C			E			E		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			31.4	HCM 2000 Level of Service						C			
HCM 2000 Volume to Capacity ratio			0.49										
Actuated Cycle Length (s)			150.0	Sum of lost time (s)						20.0			
Intersection Capacity Utilization			60.8%	ICU Level of Service						B			
Analysis Period (min)			15										
c Critical Lane Group													

Glade Heights - Blacksburg, VA  
 1: The Inn at VT/UCB & Prices Fork Road

2026 Build Conditions  
 Timing Plan: PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	207	713	23	23	1082	443	55	50	27	472	27	245
Future Volume (vph)	207	713	23	23	1082	443	55	50	27	472	27	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		0.97	1.00	
Frbp, ped/bikes	1.00	1.00	0.93	1.00	1.00	0.97	1.00	0.99		1.00	0.95	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3539	1498	1805	3574	1547	1805	1774		3467	1552	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	3539	1498	1805	3574	1547	1805	1774		3467	1552	
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)	225	775	25	25	1176	482	60	54	29	513	29	266
RTOR Reduction (vph)	0	0	12	0	0	180	0	13	0	0	200	0
Lane Group Flow (vph)	225	775	13	25	1176	302	60	70	0	513	95	0
Confl. Peds. (#/hr)			20			13			22			28
Heavy Vehicles (%)	1%	2%	0%	0%	1%	1%	0%	0%	0%	1%	0%	1%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases			6			2						
Actuated Green, G (s)	20.2	76.4	76.4	5.8	61.4	61.4	10.5	10.5		29.5	29.5	
Effective Green, g (s)	22.6	78.1	78.1	7.6	63.1	63.1	12.3	12.3		32.0	32.0	
Actuated g/C Ratio	0.15	0.52	0.52	0.05	0.42	0.42	0.08	0.08		0.21	0.21	
Clearance Time (s)	7.4	6.7	6.7	6.8	6.7	6.7	6.8	6.8		7.5	7.5	
Vehicle Extension (s)	4.0	5.0	5.0	4.0	5.0	5.0	3.0	3.0		4.0	4.0	
Lane Grp Cap (vph)	269	1842	779	91	1503	650	148	145		739	331	
v/s Ratio Prot	c0.13	0.22		0.01	c0.33		0.03	c0.04		c0.15	0.06	
v/s Ratio Perm			0.01			0.20						
v/c Ratio	0.84	0.42	0.02	0.27	0.78	0.46	0.41	0.48		0.69	0.29	
Uniform Delay, d1	61.9	22.1	17.4	68.5	37.5	31.3	65.4	65.8		54.5	49.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	20.4	0.7	0.0	2.2	4.1	2.4	1.8	2.5		3.1	0.7	
Delay (s)	82.3	22.8	17.4	70.8	41.7	33.7	67.2	68.3		57.5	50.1	
Level of Service	F	C	B	E	D	C	E	E		E	D	
Approach Delay (s)		35.7			39.8			67.9			54.8	
Approach LOS		D			D			E			D	

Intersection Summary		
HCM 2000 Control Delay	43.1	HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio	0.74	
Actuated Cycle Length (s)	150.0	Sum of lost time (s) 20.0
Intersection Capacity Utilization	87.8%	ICU Level of Service E
Analysis Period (min)	15	

c Critical Lane Group

## **Prices Fork Road and Old Glade Road**



Intersection						
Int Delay, s/veh	3.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	261	1010	539	23	0	316
Future Vol, veh/h	261	1010	539	23	0	316
Conflicting Peds, #/hr	6	0	0	6	0	6
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	225	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	4	8	6	0	2
Mvmt Flow	284	1098	586	25	0	343

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	617	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.18	-	6.94
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.24	-	3.32
Pot Cap-1 Maneuver	945	-	0
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	940	-	670
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	2.2	0	15.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	940	-	-	-	670
HCM Lane V/C Ratio	0.302	-	-	-	0.513
HCM Control Delay (s)	10.5	-	-	-	15.9
HCM Lane LOS	B	-	-	-	C
HCM 95th %tile Q(veh)	1.3	-	-	-	2.9

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2: Prices Fork Road & Old Glade Road Performance by approach

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Approach	EB	WB	SB	All
Denied Delay (hr)	0.3	0.0	0.0	0.3
Total Delay (hr)	2.0	0.4	0.4	2.7

Intersection						
Int Delay, s/veh	19.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	368	943	1290	92	0	348
Future Vol, veh/h	368	943	1290	92	0	348
Conflicting Peds, #/hr	12	0	0	12	0	12
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	225	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	2	2	0	0	2
Mvmt Flow	396	1014	1387	99	0	374

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1498	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.1	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.2	-	-
Pot Cap-1 Maneuver	454	-	0 ~ 345
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	449	-	- ~ 337
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	13.7	0	117.7
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	449	-	-	-	337
HCM Lane V/C Ratio	0.881	-	-	-	1.11
HCM Control Delay (s)	48.7	-	-	-	117.7
HCM Lane LOS	E	-	-	-	F
HCM 95th %tile Q(veh)	9.3	-	-	-	14.4

Notes  
 -: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

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2: Prices Fork Road & Old Glade Road Performance by approach

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Approach	EB	WB	SB	All
Denied Del/Veh (s)	2.3	0.0	0.0	1.0
Total Del/Veh (s)	29.1	5.0	23.7	17.5

**University City Boulevard and Glade  
Road**

Glade Heights - Blacksburg, VA  
 3: UCB & Glade Road/Starbucks Driveway

2026 Build Conditions  
 Timing Plan: AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕		↖	↕			↕	↖
Traffic Volume (veh/h)	81	37	160	70	33	17	38	100	0	48	192	85
Future Volume (veh/h)	81	37	160	70	33	17	38	100	0	48	192	85
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1767	1900	1870	1885	1900	1900	1826	1707	1900	1870	1796	1781
Adj Flow Rate, veh/h	88	40	174	76	36	18	41	109	0	52	209	92
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	9	0	2	1	0	0	5	13	0	2	7	8
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	269	112	331	172	80	28	690	2128	0	269	1019	439
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.18	0.21	0.21	0.18	0.21	0.18	0.05	0.66	0.00	0.52	0.54	0.52
Unsig. Movement Delay												
Ln Grp Delay, s/veh	26.9	0.0	27.6	30.8	0.0	0.0	6.6	4.6	0.0	9.6	0.0	9.8
Ln Grp LOS	C	A	C	C	A	A	A	A	A	A	A	A
Approach Vol, veh/h		302			130			150			353	
Approach Delay, s/veh		27.3			30.8			5.2			9.7	
Approach LOS		C			C			A			A	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		1	2		4		6		8			
Case No		1.2	8.3		8.0		4.0		7.0			
Phs Duration (G+Y+Rc), s		9.0	45.2		20.8		54.2		20.8			
Change Period (Y+Rc), s		6.1	6.1		* 7.2		6.1		* 7.2			
Max Green (Gmax), s		8.9	28.9		* 18		43.9		* 18			
Max Allow Headway (MAH), s		4.5	10.6		4.7		10.5		4.6			
Max Q Clear (g_c+I1), s		2.7	6.5		12.8		2.9		9.4			
Green Ext Time (g_e), s		0.0	7.1		0.2		2.6		0.8			
Prob of Phs Call (p_c)		0.57	1.00		1.00		1.00		1.00			
Prob of Max Out (p_x)		0.13	0.00		0.84		0.00		0.17			
<b>Left-Turn Movement Data</b>												
Assigned Mvmt		1	5		7				3			
Mvmt Sat Flow, veh/h		1739	387		453				895			
<b>Through Movement Data</b>												
Assigned Mvmt			2		4		6		8			
Mvmt Sat Flow, veh/h			1899		381		3329		534			
<b>Right-Turn Movement Data</b>												
Assigned Mvmt			12		14		16		18			
Mvmt Sat Flow, veh/h			818		134		0		1572			
<b>Left Lane Group Data</b>												
Assigned Mvmt		1	5	0	7	0	0	0	3			
Lane Assignment		L (Pr/Pm)	L+T		L+T+R				L+T			

Glade Heights - Blacksburg, VA  
 3: UCB & Glade Road/Starbucks Driveway

2026 Build Conditions  
 Timing Plan: AM Peak Hour

Lanes in Grp	1	1	0	1	0	0	0	1
Grp Vol (v), veh/h	41	186	0	130	0	0	0	128
Grp Sat Flow (s), veh/h/ln	1739	1619	0	969	0	0	0	1429
Q Serve Time (g_s), s	0.7	0.0	0.0	4.9	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.7	4.1	0.0	10.8	0.0	0.0	0.0	5.9
Perm LT Sat Flow (s_l), veh/h/ln	1052	1303	0	1179	0	0	0	1364
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	1367
Perm LT Eff Green (g_p), s	40.2	39.1	0.0	13.6	0.0	0.0	0.0	13.6
Perm LT Serve Time (g_u), s	35.8	39.1	0.0	7.7	0.0	0.0	0.0	2.8
Perm LT Q Serve Time (g_ps), s	0.2	0.0	0.0	4.9	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	5.1	0.0	1.4	0.0	0.0	0.0	0.9
Serve Time pre Blk (g_fs), s	0.0	4.1	0.0	1.4	0.0	0.0	0.0	0.9
Prop LT Inside Lane (P_L)	1.00	0.28	0.00	0.58	0.00	0.00	0.00	0.69
Lane Grp Cap (c), veh/h	690	906	0	252	0	0	0	340
V/C Ratio (X)	0.06	0.21	0.00	0.52	0.00	0.00	0.00	0.38
Avail Cap (c_a), veh/h	829	906	0	329	0	0	0	424
Upstream Filter (I)	1.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	6.6	9.1	0.0	29.2	0.0	0.0	0.0	26.2
Incr Delay (d2), s/veh	0.0	0.5	0.0	1.6	0.0	0.0	0.0	0.7
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	6.6	9.6	0.0	30.8	0.0	0.0	0.0	26.9
1st-Term Q (Q1), veh/ln	0.2	1.5	0.0	2.3	0.0	0.0	0.0	2.1
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.3	1.7	0.0	2.4	0.0	0.0	0.0	2.1
%ile Storage Ratio (RO%)	0.03	0.14	0.00	0.14	0.00	0.00	0.00	0.11
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T							
Lanes in Grp	0	0	0	0	0	2	0	0
Grp Vol (v), veh/h	0	0	0	0	0	109	0	0
Grp Sat Flow (s), veh/h/ln	0	0	0	0	0	1622	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0
Lane Grp Cap (c), veh/h	0	0	0	0	0	2128	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00
Avail Cap (c_a), veh/h	0	0	0	0	0	2128	0	0
Upstream Filter (I)	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	4.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	4.6	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Glade Heights - Blacksburg, VA  
 3: UCB & Glade Road/Starbucks Driveway

2026 Build Conditions  
 Timing Plan: AM Peak Hour

3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment	T+R			R				
Lanes in Grp	0	1	0	0	0	0	0	1
Grp Vol (v), veh/h	0	167	0	0	0	0	0	174
Grp Sat Flow (s), veh/h/ln	0	1485	0	0	0	0	0	1572
Q Serve Time (g_s), s	0.0	4.5	0.0	0.0	0.0	0.0	0.0	7.4
Cycle Q Clear Time (g_c), s	0.0	4.5	0.0	0.0	0.0	0.0	0.0	7.4
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.55	0.00	0.14	0.00	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	797	0	0	0	0	0	331
V/C Ratio (X)	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.53
Avail Cap (c_a), veh/h	0	797	0	0	0	0	0	419
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	9.3	0.0	0.0	0.0	0.0	0.0	26.3
Incr Delay (d2), s/veh	0.0	0.6	0.0	0.0	0.0	0.0	0.0	1.3
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	9.8	0.0	0.0	0.0	0.0	0.0	27.6
1st-Term Q (Q1), veh/ln	0.0	1.3	0.0	0.0	0.0	0.0	0.0	2.7
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	1.5	0.0	0.0	0.0	0.0	0.0	2.8
%ile Storage Ratio (RQ%)	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.48
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	17.6
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.  
 \* HCM 6th Edition computational engine requires equal clearance times for the phases crossing the barrier.



Glade Heights - Blacksburg, VA  
 3: UCB & Glade Road/Starbucks Driveway

2026 Build Conditions  
 Timing Plan: PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕		↖	↕			↕	
Traffic Volume (veh/h)	104	16	181	51	20	40	209	372	4	31	272	147
Future Volume (veh/h)	104	16	181	51	20	40	209	372	4	31	272	147
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	0.98		0.97	0.98		0.97	0.99		0.98	0.99		0.97
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1885	1900	1900	1856	1885
Adj Flow Rate, veh/h	108	17	189	53	21	42	218	388	4	32	283	153
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	0	0	0	0	0	1	0	0	3	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	312	44	347	138	68	77	653	2342	24	118	955	491
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.19	0.22	0.22	0.19	0.22	0.19	0.11	0.65	0.63	0.46	0.47	0.46
Unsig. Movement Delay												
Ln Grp Delay, s/veh	27.1	0.0	27.2	28.7	0.0	0.0	8.3	5.6	5.6	13.1	0.0	13.7
Ln Grp LOS	C	A	C	C	A	A	A	A	A	B	A	B
Approach Vol, veh/h		314			116			610			468	
Approach Delay, s/veh		27.2			28.7			6.6			13.4	
Approach LOS		C			C			A			B	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		1	2		4		6		8			
Case No		1.2	8.3		8.0		4.0		7.0			
Phs Duration (G+Y+Rc), s		13.0	40.4		21.6		53.4		21.6			
Change Period (Y+Rc), s		6.1	6.1		* 7.2		6.1		* 7.2			
Max Green (Gmax), s		18.9	18.9		* 18		43.9		* 18			
Max Allow Headway (MAH), s		4.5	10.6		4.8		10.4		4.7			
Max Q Clear (g_c+I1), s		6.3	8.9		12.3		5.2		10.0			
Green Ext Time (g_e), s		0.7	5.3		0.2		10.1		0.8			
Prob of Phs Call (p_c)		0.99	1.00		1.00		1.00		1.00			
Prob of Max Out (p_x)		0.01	0.00		0.60		0.00		0.25			
<b>Left-Turn Movement Data</b>												
Assigned Mvmt		1	5		7				3			
Mvmt Sat Flow, veh/h		1810	135		309				1006			
<b>Through Movement Data</b>												
Assigned Mvmt			2		4		6		8			
Mvmt Sat Flow, veh/h			2026		305		3631		200			
<b>Right-Turn Movement Data</b>												
Assigned Mvmt			12		14		16		18			
Mvmt Sat Flow, veh/h			1041		349		37		1564			
<b>Left Lane Group Data</b>												
Assigned Mvmt		1	5	0	7	0	0	0	3			
Lane Assignment		L (Pr/Pm)	L+T		L+T+R				L+T			

Glade Heights - Blacksburg, VA  
 3: UCB & Glade Road/Starbucks Driveway

2026 Build Conditions  
 Timing Plan: PM Peak Hour

Lanes in Grp	1	1	0	1	0	0	0	1
Grp Vol (v), veh/h	218	252	0	116	0	0	0	125
Grp Sat Flow (s), veh/h/ln	1810	1733	0	963	0	0	0	1206
Q Serve Time (g_s), s	4.3	0.0	0.0	2.9	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	4.3	6.3	0.0	10.3	0.0	0.0	0.0	7.4
Perm LT Sat Flow (s_l), veh/h/ln	959	993	0	1173	0	0	0	1334
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	1110
Perm LT Eff Green (g_p), s	35.4	34.3	0.0	14.4	0.0	0.0	0.0	14.4
Perm LT Serve Time (g_u), s	28.4	34.3	0.0	7.0	0.0	0.0	0.0	4.1
Perm LT Q Serve Time (g_ps), s	2.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	12.4	0.0	2.3	0.0	0.0	0.0	0.3
Serve Time pre Blk (g_fs), s	0.0	6.3	0.0	2.3	0.0	0.0	0.0	0.3
Prop LT Inside Lane (P_L)	1.00	0.13	0.00	0.46	0.00	0.00	0.00	0.86
Lane Grp Cap (c), veh/h	653	845	0	255	0	0	0	321
V/C Ratio (X)	0.33	0.30	0.00	0.45	0.00	0.00	0.00	0.39
Avail Cap (c_a), veh/h	942	845	0	318	0	0	0	384
Upstream Filter (I)	1.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	8.0	12.2	0.0	27.4	0.0	0.0	0.0	26.3
Incr Delay (d2), s/veh	0.3	0.9	0.0	1.3	0.0	0.0	0.0	0.8
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	8.3	13.1	0.0	28.7	0.0	0.0	0.0	27.1
1st-Term Q (Q1), veh/ln	1.5	2.5	0.0	2.0	0.0	0.0	0.0	2.1
2nd-Term Q (Q2), veh/ln	0.1	0.2	0.0	0.1	0.0	0.0	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	1.6	2.7	0.0	2.1	0.0	0.0	0.0	2.1
%ile Storage Ratio (RO%)	0.20	0.23	0.00	0.13	0.00	0.00	0.00	0.10
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T							
Lanes in Grp	0	0	0	0	0	1	0	0
Grp Vol (v), veh/h	0	0	0	0	0	191	0	0
Grp Sat Flow (s), veh/h/ln	0	0	0	0	0	1791	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	3.2	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	3.2	0.0	0.0
Lane Grp Cap (c), veh/h	0	0	0	0	0	1155	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00
Avail Cap (c_a), veh/h	0	0	0	0	0	1155	0	0
Upstream Filter (I)	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	5.3	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	5.6	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0

Glade Heights - Blacksburg, VA  
 3: UCB & Glade Road/Starbucks Driveway

2026 Build Conditions  
 Timing Plan: PM Peak Hour

3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		T+R				T+R		R
Lanes in Grp	0	1	0	0	0	1	0	1
Grp Vol (v), veh/h	0	216	0	0	0	201	0	189
Grp Sat Flow (s), veh/h/ln	0	1469	0	0	0	1878	0	1564
Q Serve Time (g_s), s	0.0	6.9	0.0	0.0	0.0	3.2	0.0	8.0
Cycle Q Clear Time (g_c), s	0.0	6.9	0.0	0.0	0.0	3.2	0.0	8.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.71	0.00	0.36	0.00	0.02	0.00	1.00
Lane Grp Cap (c), veh/h	0	693	0	0	0	1211	0	347
V/C Ratio (X)	0.00	0.31	0.00	0.00	0.00	0.17	0.00	0.55
Avail Cap (c_a), veh/h	0	693	0	0	0	1211	0	417
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	12.6	0.0	0.0	0.0	5.3	0.0	25.8
Incr Delay (d2), s/veh	0.0	1.2	0.0	0.0	0.0	0.3	0.0	1.3
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	13.7	0.0	0.0	0.0	5.6	0.0	27.2
1st-Term Q (Q1), veh/ln	0.0	2.2	0.0	0.0	0.0	1.1	0.0	2.9
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	2.4	0.0	0.0	0.0	1.2	0.0	3.0
%ile Storage Ratio (RQ%)	0.00	0.20	0.00	0.00	0.00	0.04	0.00	0.51
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	14.7
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.  
 \* HCM 6th Edition computational engine requires equal clearance times for the phases crossing the barrier.

## **Glade Road and Old Glade Road**

Intersection						
Int Delay, s/veh	4.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↖	↖	↗
Traffic Vol, veh/h	202	239	121	48	113	104
Future Vol, veh/h	202	239	121	48	113	104
Conflicting Peds, #/hr	0	0	1	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	50	-	-	125	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	2	4	8	7	11
Mvmt Flow	220	260	132	52	123	113

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	481	0	537	222
Stage 1	-	-	-	-	221	-
Stage 2	-	-	-	-	316	-
Critical Hdwy	-	-	4.14	-	6.47	6.31
Critical Hdwy Stg 1	-	-	-	-	5.47	-
Critical Hdwy Stg 2	-	-	-	-	5.47	-
Follow-up Hdwy	-	-	2.236	-	3.563	3.399
Pot Cap-1 Maneuver	-	-	1071	-	496	796
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	728	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1070	-	433	794
Mov Cap-2 Maneuver	-	-	-	-	433	-
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	636	-

Approach	EB	WB	NB
HCM Control Delay, s	0	6.3	13.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	433	794	-	-	1070	-
HCM Lane V/C Ratio	0.284	0.142	-	-	0.123	-
HCM Control Delay (s)	16.6	10.3	-	-	8.8	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	1.2	0.5	-	-	0.4	-

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4: Old Glade Road & Glade Road Performance by approach

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Approach	EB	WB	NB	All
Denied Delay (hr)	0.0	0.0	0.0	0.0
Total Delay (hr)	0.2	0.2	0.4	0.8

Intersection						
Int Delay, s/veh	29.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↖	↖	↗
Traffic Vol, veh/h	164	138	156	212	307	139
Future Vol, veh/h	164	138	156	212	307	139
Conflicting Peds, #/hr	0	1	0	0	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	50	-	-	125	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	4	0	1	0	1
Mvmt Flow	178	150	170	230	334	151

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	329	0	750
Stage 1	-	-	-	-	179
Stage 2	-	-	-	-	571
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	1242	-	382
Stage 1	-	-	-	-	857
Stage 2	-	-	-	-	569
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1241	-	~ 321
Mov Cap-2 Maneuver	-	-	-	-	~ 321
Stage 1	-	-	-	-	856
Stage 2	-	-	-	-	479

Approach	EB	WB	NB
HCM Control Delay, s	0	3.5	70.6
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	321	865	-	-	1241	-
HCM Lane V/C Ratio	1.04	0.175	-	-	0.137	-
HCM Control Delay (s)	98.1	10	-	-	8.4	0
HCM Lane LOS	F	B	-	-	A	A
HCM 95th %tile Q(veh)	12	0.6	-	-	0.5	-

Notes  
 -: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

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4: Old Glade Road & Glade Road Performance by approach

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Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.4	0.0	0.0	0.1
Total Del/Veh (s)	1.2	2.6	16.5	7.8



Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑		↑	↑	↑
Traffic Vol, veh/h	202	239	121	48	113	104
Future Vol, veh/h	202	239	121	48	113	104
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	2	4	8	7	11
Mvmt Flow	220	260	132	52	123	113
Number of Lanes	1	1	0	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	1
HCM Control Delay	10.4	11.2	10.5
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1
Vol Left, %	100%	0%	0%	0%	72%
Vol Thru, %	0%	0%	100%	0%	28%
Vol Right, %	0%	100%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	113	104	202	239	169
LT Vol	113	0	0	0	121
Through Vol	0	0	202	0	48
RT Vol	0	104	0	239	0
Lane Flow Rate	123	113	220	260	184
Geometry Grp	7	7	7	7	4
Degree of Util (X)	0.23	0.176	0.329	0.34	0.295
Departure Headway (Hd)	6.733	5.589	5.388	4.717	5.786
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	536	645	661	753	625
Service Time	4.441	3.296	3.18	2.508	3.786
HCM Lane V/C Ratio	0.229	0.175	0.333	0.345	0.294
HCM Control Delay	11.4	9.5	10.8	10	11.2
HCM Lane LOS	B	A	B	A	B
HCM 95th-tile Q	0.9	0.6	1.4	1.5	1.2

Intersection	
Intersection Delay, s/veh	18.5
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑		↑	↑	↑
Traffic Vol, veh/h	164	138	156	212	307	139
Future Vol, veh/h	164	138	156	212	307	139
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	4	0	1	0	1
Mvmt Flow	178	150	170	230	334	151
Number of Lanes	1	1	0	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	1
HCM Control Delay	11.9	23.5	18.9
HCM LOS	B	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1
Vol Left, %	100%	0%	0%	0%	42%
Vol Thru, %	0%	0%	100%	0%	58%
Vol Right, %	0%	100%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	307	139	164	138	368
LT Vol	307	0	0	0	156
Through Vol	0	0	164	0	212
RT Vol	0	139	0	138	0
Lane Flow Rate	334	151	178	150	400
Geometry Grp	7	7	7	7	4
Degree of Util (X)	0.658	0.247	0.333	0.253	0.708
Departure Headway (Hd)	7.097	5.895	6.718	6.072	6.373
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	507	607	533	588	564
Service Time	4.858	3.655	4.493	3.847	4.435
HCM Lane V/C Ratio	0.659	0.249	0.334	0.255	0.709
HCM Control Delay	22.6	10.6	12.8	10.9	23.5
HCM Lane LOS	C	B	B	B	C
HCM 95th-tile Q	4.7	1	1.5	1	5.7

# **Glade Road and Site Access**

Intersection						
Int Delay, s/veh	2.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗	↘	
Traffic Vol, veh/h	2	308	104	31	89	5
Future Vol, veh/h	2	308	104	31	89	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	100	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	335	113	34	97	5

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	147	0	0	452	113
Stage 1	-	-	-	113	-
Stage 2	-	-	-	339	-
Critical Hdwy	4.12	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	3.518	3.318
Pot Cap-1 Maneuver	1435	-	-	565	940
Stage 1	-	-	-	912	-
Stage 2	-	-	-	722	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1435	-	-	564	940
Mov Cap-2 Maneuver	-	-	-	564	-
Stage 1	-	-	-	910	-
Stage 2	-	-	-	722	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12.6
HCM LOS			B

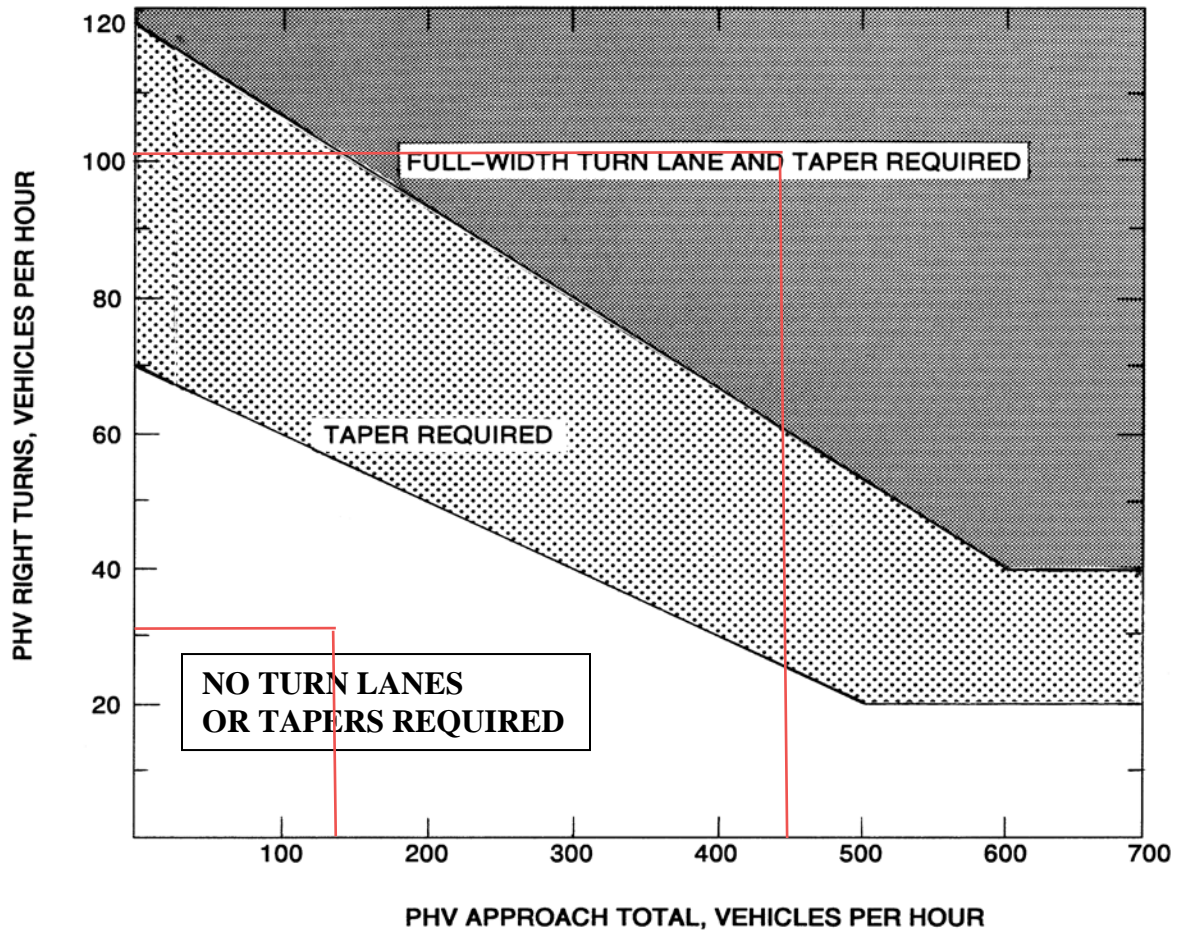
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1435	-	-	-	576
HCM Lane V/C Ratio	0.002	-	-	-	0.177
HCM Control Delay (s)	7.5	0	-	-	12.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.6

Intersection						
Int Delay, s/veh	1.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗	↘	
Traffic Vol, veh/h	5	185	343	104	61	3
Future Vol, veh/h	5	185	343	104	61	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	100	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	201	373	113	66	3

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	486	0	0	584	373
Stage 1	-	-	-	373	-
Stage 2	-	-	-	211	-
Critical Hdwy	4.12	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	3.518	3.318
Pot Cap-1 Maneuver	1077	-	-	474	673
Stage 1	-	-	-	696	-
Stage 2	-	-	-	824	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1077	-	-	472	673
Mov Cap-2 Maneuver	-	-	-	472	-
Stage 1	-	-	-	693	-
Stage 2	-	-	-	824	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	13.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1077	-	-	-	479
HCM Lane V/C Ratio	0.005	-	-	-	0.145
HCM Control Delay (s)	8.4	0	-	-	13.8
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.5



Appropriate Radius required at all Intersections and Entrances (Commercial or Private).

### LEGEND

**PHV** - Peak Hour Volume (also Design Hourly Volume equivalent)

#### Adjustment for Right Turns

For posted speeds at or under 45 mph, PHV right turns > 40, and PHV total < 300.

Adjusted right turns = PHV Right Turns - 20

If PHV is not known use formula:  $PHV = ADT \times K \times D$

K = the percent of AADT occurring in the peak hour

D = the percent of traffic in the peak direction of flow

Note: An average of 11% for K x D will suffice.

When right turn facilities are warranted, see Figure 3-1 for design criteria.\*

**FIGURE 3-26 WARRANTS FOR RIGHT TURN TREATMENT (2-LANE HIGHWAY)**

\* Rev. 1/15

# **APPENDIX D**

## **SIMTRAFFIC QUEUEING REPORTS**

Intersection: 1: The Inn at VT/UCB & Prices Fork Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	L
Maximum Queue (ft)	230	265	252	89	46	328	288	132	76	77	274	488
Average Queue (ft)	144	174	149	15	9	150	109	36	18	19	163	218
95th Queue (ft)	233	302	273	56	32	279	237	87	52	55	277	386
Link Distance (ft)		241	241			676	676		431			732
Upstream Blk Time (%)	2	7	1	0								0
Queuing Penalty (veh)	0	37	6	0								0
Storage Bay Dist (ft)	175			150	150			225		200	175	
Storage Blk Time (%)	14	13	8			11	0				8	21
Queuing Penalty (veh)	58	18	4			1	1				14	36

Intersection: 1: The Inn at VT/UCB & Prices Fork Road

Movement	SB
Directions Served	TR
Maximum Queue (ft)	214
Average Queue (ft)	65
95th Queue (ft)	160
Link Distance (ft)	732
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Prices Fork Road & Old Glade Road

Movement	EB	EB	EB	WB	WB	SB
Directions Served	L	T	T	T	TR	R
Maximum Queue (ft)	205	300	232	109	50	114
Average Queue (ft)	70	48	24	3	1	9
95th Queue (ft)	141	185	128	30	9	64
Link Distance (ft)		585	585	241	241	1197
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	225					
Storage Blk Time (%)	0	1				
Queuing Penalty (veh)	0	3				



**Intersection: 3: UCB & Glade Road/Starbucks Driveway**

Movement	EB	EB	WB	NB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	LT	TR
Maximum Queue (ft)	197	114	164	54	79	4	124	104
Average Queue (ft)	82	43	76	16	22	0	55	38
95th Queue (ft)	150	83	139	41	60	3	104	85
Link Distance (ft)	507		419		698	698	310	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)		150		200				175
Storage Blk Time (%)	1							
Queuing Penalty (veh)	2							

**Intersection: 4: Old Glade Road & Glade Road**

Movement	EB	WB	NB	NB
Directions Served	R	LT	L	R
Maximum Queue (ft)	54	77	93	85
Average Queue (ft)	7	31	45	39
95th Queue (ft)	35	66	81	68
Link Distance (ft)		507		1197
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	50		125	
Storage Blk Time (%)	0			
Queuing Penalty (veh)	0			

**Intersection: 5: Lark Lane/Shadow Lake Road & Glade Road**

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	10	27	36	74
Average Queue (ft)	0	1	18	38
95th Queue (ft)	5	13	39	61
Link Distance (ft)	692	617	770	992
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

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Intersection: 8: Glade Road & Site Access

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Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	12	69
Average Queue (ft)	0	31
95th Queue (ft)	6	55
Link Distance (ft)	617	1018
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

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Network Summary

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Network wide Queuing Penalty: 180

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Intersection: 1: The Inn at VT/UCB & Prices Fork Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	L
Maximum Queue (ft)	240	291	257	238	249	690	695	325	172	203	275	761
Average Queue (ft)	195	199	162	14	55	376	349	167	69	94	243	689
95th Queue (ft)	273	350	315	88	172	733	732	384	162	191	311	894
Link Distance (ft)		241	241			676	676		431			732
Upstream Blk Time (%)	12	21	3	0		2	3					57
Queuing Penalty (veh)	0	100	13	0		0	0					0
Storage Bay Dist (ft)	175			150	150			225		200	175	
Storage Blk Time (%)	43	20	14		0	35	23		2	2	69	77
Queuing Penalty (veh)	153	42	3		0	8	102		1	1	163	181

Intersection: 1: The Inn at VT/UCB & Prices Fork Road

Movement	SB
Directions Served	TR
Maximum Queue (ft)	755
Average Queue (ft)	641
95th Queue (ft)	948
Link Distance (ft)	732
Upstream Blk Time (%)	44
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Prices Fork Road & Old Glade Road

Movement	EB	EB	EB	WB	WB	SB
Directions Served	L	T	T	T	TR	R
Maximum Queue (ft)	325	600	562	202	199	437
Average Queue (ft)	270	359	201	30	20	204
95th Queue (ft)	401	732	552	134	101	456
Link Distance (ft)		585	585	241	241	1197
Upstream Blk Time (%)		12	0	0	0	
Queuing Penalty (veh)		0	0	1	0	
Storage Bay Dist (ft)	225					
Storage Blk Time (%)	42	8				
Queuing Penalty (veh)	202	29				

Intersection: 3: UCB & Glade Road/Starbucks Driveway

Movement	EB	EB	WB	NB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	T	TR	LT	TR
Maximum Queue (ft)	197	117	164	137	154	121	170	145
Average Queue (ft)	97	47	74	57	68	13	79	66
95th Queue (ft)	175	72	136	106	132	60	134	122
Link Distance (ft)	507		419		698	698	310	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)		150		200				175
Storage Blk Time (%)	3			0	0		0	0
Queuing Penalty (veh)	6			0	0		0	0

Intersection: 4: Old Glade Road & Glade Road

Movement	EB	WB	NB	NB
Directions Served	R	LT	L	R
Maximum Queue (ft)	41	76	215	208
Average Queue (ft)	4	33	114	59
95th Queue (ft)	26	70	213	192
Link Distance (ft)		507		1197
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	50		125	
Storage Blk Time (%)	0		14	
Queuing Penalty (veh)	0		19	

Intersection: 5: Lark Lane/Shadow Lake Road & Glade Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	43	54	40	50
Average Queue (ft)	3	7	18	24
95th Queue (ft)	19	32	40	49
Link Distance (ft)	692	617	770	992
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

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Intersection: 8: Glade Road & Site Access

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Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	45	54
Average Queue (ft)	4	24
95th Queue (ft)	22	42
Link Distance (ft)	617	1018
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

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Network Summary

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Network wide Queuing Penalty: 1025

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Intersection: 4: Old Glade Road & Glade Road

Movement	EB	EB	WB	NB	NB
Directions Served	T	R	LT	L	R
Maximum Queue (ft)	86	98	84	78	76
Average Queue (ft)	49	54	46	37	39
95th Queue (ft)	72	81	74	66	66
Link Distance (ft)	1423		507		1197
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		50		125	
Storage Blk Time (%)	3	5		0	
Queuing Penalty (veh)	8	10		0	

Intersection: 4: Old Glade Road & Glade Road

Movement	EB	EB	WB	NB	NB
Directions Served	T	R	LT	L	R
Maximum Queue (ft)	75	88	148	179	78
Average Queue (ft)	44	45	74	75	39
95th Queue (ft)	69	72	120	144	67
Link Distance (ft)	1423		507		1197
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		50		125	
Storage Blk Time (%)	3	2		2	
Queuing Penalty (veh)	4	4		3	