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MEMORANDUM

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SUBJECT: Van Buren Road Extension – NEPA Traffic Analysis
Prince William County, Virginia

DATE: July 2, 2021

INTRODUCTION

The purpose of this memorandum is to present the results of a Traffic Analysis (the "TA") associated with the preliminary design of a future roadway improvement (the "Project") as part of a NEPA document; specifically, the extension of Van Buren Road. The content of this TA is based on the VDOT *Traffic Analyses to Support NEPA Studies Consultant Resource Guidance Document* (the "Guidance Document"), dated November 18, 2016, and consistent with the Scope of Work dated November 18, 2020 (see Attachment 1).

ROADWAY NETWORK

Study Area. As scoped with the Project team, the study network consists of the following intersections:

- Dumfries Road/Four Seasons Drive
- Dumfries Road/Van Buren Road
- Dumfries Road/I-95 Southbound On-ramp
- Cardinal Drive/Benita Fitzgerald Drive/Van Buren Road

Existing Conditions. The following is a description of the roadways within the study network. The existing intersection lane use and traffic controls within the study area are shown on Figure 1.

Dumfries Road (Route 234). Dumfries Road intersects Van Buren Road at the southern endpoint of the proposed extension and is currently constructed as a six-lane, median divided highway with a posted speed limit of 45 miles per hour (mph) at the Van Buren Road intersection and transitioning to a 50 mph speed zone north of the intersection. According to VDOT, Dumfries Road is classified as a principal arterial.

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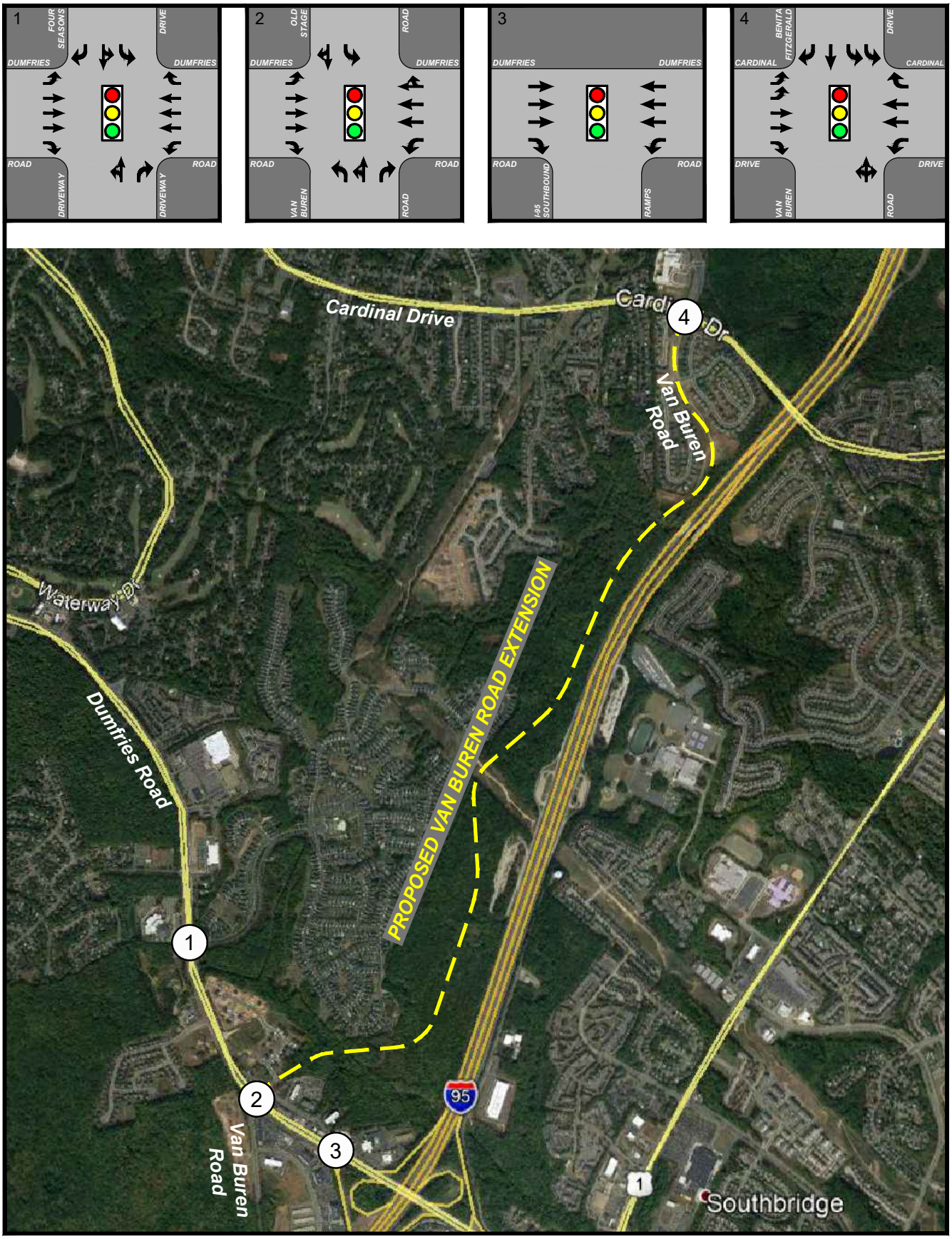

Figure 1
Existing Lane Use and Traffic Controls

Represents One Travel Lane
Signalized Intersection
Stop Sign

NORTH
Van Buren Road Extension
Prince William County, Virginia

Cardinal Drive (Route 610). Cardinal Drive intersects Van Buren Road at the northern endpoint of the proposed extension and is currently constructed as a four-lane, median divided highway with a posted speed limit of 45 mph. According to VDOT, Cardinal Drive is classified as a minor arterial.

Van Buren Road (Route 627). Van Buren Road is constructed as a two-lane, undivided local street with discontinuous segments that run parallel to Interstate 95 (I-95) and form intersections with Dumfries Road and Cardinal Drive.

Benita Fitzgerald Drive (Route 2480). Benita Fitzgerald Drive is a four-lane, median divided roadway with a posted speed limit of 40 mph. According to VDOT, Cardinal Drive is classified as a major collector.

Four Seasons Drive. Four Seasons Drive is a four-lane, median divided local street with a posted speed limit of 25 mph.

Future Proposed Conditions. The proposed roadway alignment shows the design of Van Buren Road as a major collector typical section (four lanes, median divided) that will run approximately 2.7 miles from Dumfries Road (opposite existing Van Buren Road) north to Cardinal Drive (opposite existing Benita Fitzgerald Drive), inclusive of existing interim sections at both project endpoints. The proposed plan is included as Attachment 2 and includes improvements at major signalized endpoint intersections. Other than the proposed extension of Van Buren Road, no other planned road improvements, major closures, or nearby developments which may affect the study area were identified. In order to analyze this proposed roadway extension, opening year (2025) and design year (2040) no-build and build scenarios were evaluated, along with any proposed improvements.

ANALYSIS OF EXISTING (2020) CONDITIONS

Baseline Traffic Volumes. Due to the impact of COVID-19 on local and regional travel behavior, commuting patterns and traffic volumes, the collection of new traffic counts to support traffic analyses has been suspended until further notice. To obtain recent traffic count data, W+A obtained Synchro files from VDOT which contained MIST Data with AM and PM peak hour turning movement data from 2015 for the study intersections along Dumfries Road and 2019 data for the study intersection along Cardinal Drive. To develop baseline traffic counts for current year (2020) conditions, these traffic counts were projected to 2020 by applying a 2% annual growth rate to traffic volumes along Dumfries Road, Cardinal Drive, and the I-95 Southbound Ramp. The resulting weekday AM and PM peak hour volumes as well as the average annual daily traffic (AADT) estimates are shown on Figure 2.

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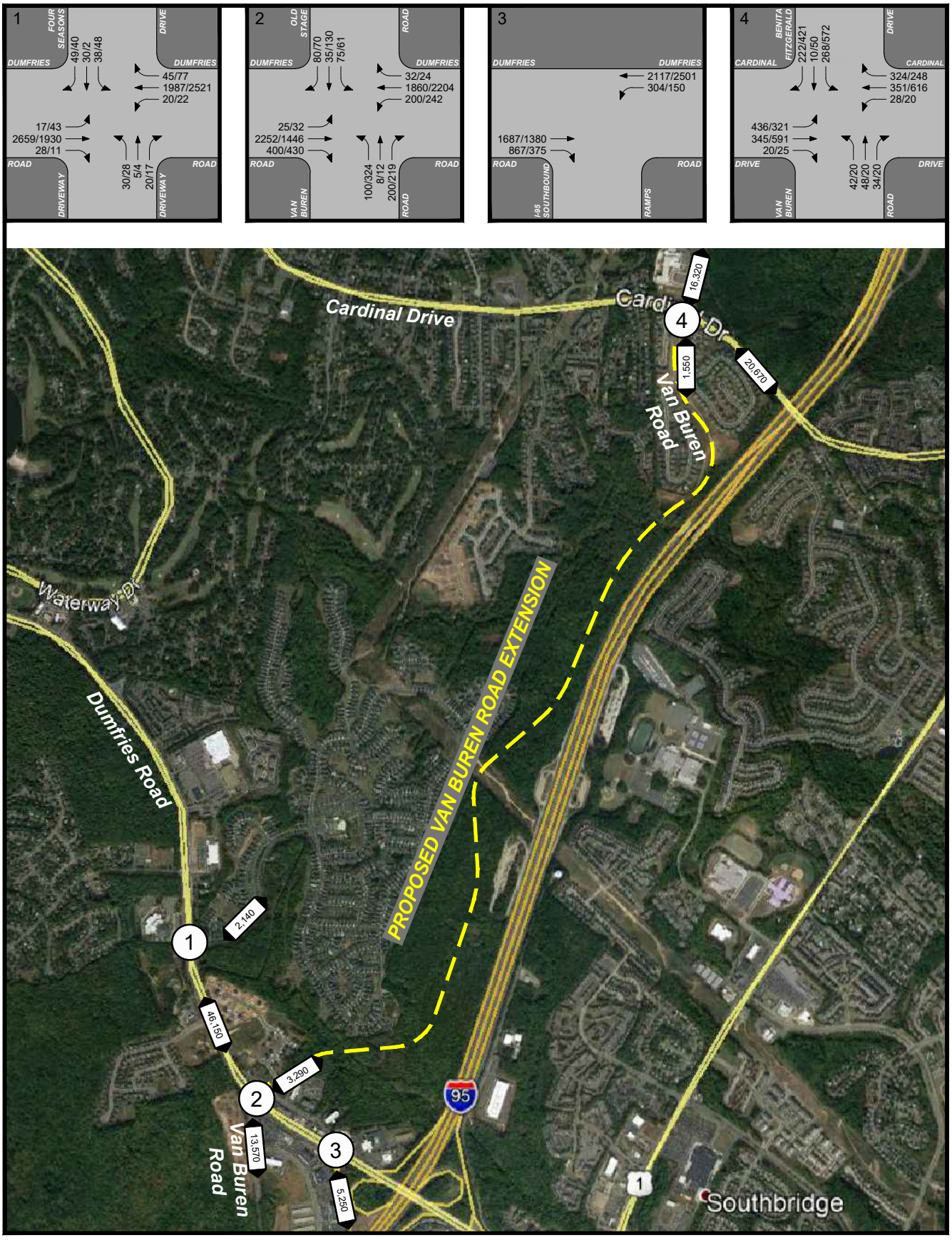

Figure 2
2020 Baseline Volumes

AM PEAK HOUR
PM PEAK HOUR
000 / 000
000/000 AADT

NORTH
Van Buren Road Extension
Prince William County, Virginia

Existing Intersection Levels of Service. The Synchro files obtained from VDOT contained the most current signal timing/phasing plans for the approved study intersections. Using Synchro, Version 10, the VDOT base Synchro files were used to build the existing transportation network of the Project study area. This Synchro model was used to perform an analysis of existing (2020) conditions for the study intersections during the weekday AM and PM peak hours. The analysis followed the procedures outlined in the VDOT Traffic Operations and Safety Analysis Manual, Version 2.0. The levels of service for the Existing (2020) Conditions are summarized on Table 1 and the Synchro reports are presented in Attachment 3.

As shown in Table 1, the existing intersections operate at overall acceptable levels of service (LOS "D" or better) with the exception of the intersection of Dumfries Road/Van Buren Road/Old Stage Road which operates at overall LOS "E" during the PM peak hour.

Existing Intersection Queuing. An analysis of intersection 95th-percentile queues was performed at the study intersections. The results of the queuing analysis, as reported by Synchro, are summarized in Table 2.

As shown in Table 2, queues at the turn bays in the study intersections are generally accommodated within the storage provided.

ANALYSIS OF FUTURE CONDITIONS – YEARS 2025 AND 2040

Traffic Forecasting Methodology. The appropriate opening year (2025) and design year (2040) was confirmed with County Staff and the Project team. Appropriate opening year (2025) and design year (2040) traffic volumes were obtained from Prince William County's (PWC) travel demand model. The data provided by PWC included AM peak period and PM peak period volumes for 2025 no-build conditions and AM peak period and PM peak period volumes for 2040 build-out conditions as well as AM and PM factors to convert peak period volumes to peak hour volumes. Under build-out conditions, the traffic forecasts accounted for the proposed Van Buren Road extension, which includes the new approach configurations at the endpoints of the proposed extension at the Dumfries Road/Van Buren Road and Cardinal Drive/Benita Fitzgerald Drive/Van Buren Road intersections.

Future Traffic Forecasts under No-Build Conditions (2025 and 2040). As stated previously, 2025 AM and PM peak hour no-build traffic volumes were derived from PWC's travel demand model. The resulting No-Build Traffic Forecasts (2025) are shown on Figure 3. In order to develop No-Build Traffic Forecasts for 2040, a 2% per year growth rate was applied to the 2025 No-Build Forecasts. The resulting No-Build Traffic Forecasts (2040) are shown on Figure 4.

Table 1
Van Buren Road Extension
Levels of Service Summary (1) (2) (3)

Intersection	Operating Condition	Street Name	Approach/ Movement	Existing AM	Existing PM	2025 No Build AM	2025 No Build PM	2025 Build AM	2025 Build PM	2040 No Build AM	2040 No Build PM	2040 Build AM	2040 Build PM
1 Dumfries Road/**Four Seasons Drive**	Signal		EBL	E (74.8)	E (67.8)	E (74.8)	E (67.8)	E (74.8)	E (67.8)	E (74.8)	E (67.8)	E (74.8)	E (67.8)
		Dumfries Road	EBT	C (30.6)	B (17.3)	B (17.3)	C (21.1)	B (17.3)	D (49.0)	C (26.2)	D (46.6)	C (24.4)	F (137.4)
			EBR	A (9.5)	A (9.2)	A (9.5)	A (9.2)	A (9.5)	A (9.2)	A (9.5)	A (9.2)	A (9.5)	A (9.2)
			WBL	E (63.5)	E (74.5)	E (67.3)	E (78.1)	E (60.5)	E (59.2)	E (60.4)	E (79.9)	D (52.5)	E (58.0)
		Dumfries Road	WBT	B (16.0)	A (8.9)	B (13.5)	A (7.9)	C (23.8)	D (55.0)	C (21.0)	F (122.7)	C (32.6)	F (167.6)
			WBR	A (8.9)	B (10.3)	A (8.9)	B (10.3)	A (8.9)	B (10.3)	A (8.9)	B (10.3)	A (8.9)	B (10.3)
		Four Seasons Drive	NBLT	E (66.8)	E (66.8)	E (66.8)	E (66.8)	E (66.8)	E (66.8)	E (66.8)	E (66.8)	E (66.8)	E (66.8)
			NBR	E (62.8)	E (63.1)	E (62.8)	E (63.1)	E (62.8)	E (63.1)	E (62.8)	E (63.1)	E (62.8)	E (63.1)
			SBL	E (63.1)	E (63.2)	E (63.1)	E (63.2)	E (63.1)	E (63.2)	E (63.1)	E (63.2)	E (63.1)	E (63.2)
		Four Seasons Drive	SBLT	E (63.1)	E (63.1)	E (63.1)	E (63.1)	E (63.1)	E (63.1)	E (63.1)	E (63.1)	E (63.1)	E (63.1)
			SBR	E (60.6)	E (61.2)	E (60.6)	E (61.2)	E (60.6)	E (61.2)	E (60.6)	E (61.2)	E (60.6)	E (61.2)
			Overall	**C (25.8)**	**B (14.8)**	**B (18.2)**	**B (16.0)**	**C (22.6)**	**D (51.8)**	**C (25.1)**	**F (86.4)**	**C (29.5)**	**F (148.4)**
2 Dumfries Road/**Van Buren Road/Old Stage Road**	Signal		EBL	E (63.7)	D (45.7)	E (68.5)	F (238.6)	N/A	N/A	E (63.9)	F (223.5)	N/A	N/A
		Dumfries Road	EBT	D (50.9)	E (61.1)	B (16.8)	E (60.8)	N/A	N/A	C (25.9)	F (185.4)	N/A	N/A
			EBR	C (31.4)	F (188.7)	C (25.4)	F (141.4)	N/A	N/A	C (27.4)	E (78.0)	N/A	N/A
		Dumfries Road	WBL	F (82.9)	F (83.5)	E (79.1)	E (76.4)	N/A	N/A	E (76.1)	E (70.9)	N/A	N/A
			WBTR	A (9.5)	D (49.5)	A (8.9)	E (56.6)	N/A	N/A	B (16.1)	F (217.4)	N/A	N/A
			NBL	E (68.8)	E (72.3)	E (66.9)	E (69.2)	N/A	N/A	E (66.9)	E (69.2)	N/A	N/A
		Van Buren Road	NBLT	E (68.4)	E (71.2)	E (66.4)	E (70.0)	N/A	N/A	E (66.4)	E (70.0)	N/A	N/A
			NBR	D (48.0)	D (36.2)	D (49.4)	D (43.3)	N/A	N/A	D (49.4)	D (43.3)	N/A	N/A
			SBL	E (67.6)	E (56.5)	E (66.7)	E (60.3)	N/A	N/A	E (66.7)	E (60.3)	N/A	N/A
		Old Stage Road	SBTR	E (64.4)	F (101.3)	E (65.0)	E (65.2)	N/A	N/A	E (65.0)	E (65.2)	N/A	N/A
			Overall	**D (36.6)**	**E (68.7)**	**C (20.2)**	**E (69.1)**	**N/A**	**N/A**	**C (25.5)**	**F (176.7)**	**N/A**	**N/A**
with Van Buren Road Extension			*EBL*	*N/A*	*N/A*	*N/A*	*N/A*	*F (96.6)*	*F (364.0)*	*N/A*	*N/A*	*F (113.8)*	*F (502.8)*
		Dumfries Road	*EBT*	*N/A*	*N/A*	*N/A*	*N/A*	*E (56.3)*	*F (441.9)*	*N/A*	*N/A*	*F (176.0)*	*F (531.4)*
			EBR	*N/A*	*N/A*	*N/A*	*N/A*	*D (48.9)*	*E (59.3)*	*N/A*	*N/A*	*D (47.0)*	*E (56.3)*
		Dumfries Road	*WBL*	*N/A*	*N/A*	*N/A*	*N/A*	*F (131.1)*	*F (466.5)*	*N/A*	*N/A*	*F (259.1)*	*F (683.3)*
			WBT	*N/A*	*N/A*	*N/A*	*N/A*	*C (31.8)*	*F (233.7)*	*N/A*	*N/A*	*F (83.4)*	*F (407.0)*
			WBR	*N/A*	*N/A*	*N/A*	*N/A*	*C (27.7)*	*B (12.0)*	*N/A*	*N/A*	*A (4.4)*	*B (12.6)*
			NBL	*N/A*	*N/A*	*N/A*	*N/A*	*F (92.0)*	*F (199.3)*	*N/A*	*N/A*	*F (93.1)*	*F (224.9)*
		Van Buren Road	*NBT*	*N/A*	*N/A*	*N/A*	*N/A*	*D (35.5)*	*C (32.0)*	*N/A*	*N/A*	*D (35.5)*	*C (33.4)*
			NBR	*N/A*	*N/A*	*N/A*	*N/A*	*C (26.8)*	*C (25.8)*	*N/A*	*N/A*	*C (26.8)*	*C (26.4)*
			SBL	*N/A*	*N/A*	*N/A*	*N/A*	*E (67.8)*	*F (303.1)*	*N/A*	*N/A*	*E (67.8)*	*F (373.0)*
		Van Buren Road	*SBT*	*N/A*	*N/A*	*N/A*	*N/A*	*E (65.4)*	*E (64.4)*	*N/A*	*N/A*	*E (65.4)*	*E (66.2)*
			SBR	*N/A*	*N/A*	*N/A*	*N/A*	*E (63.7)*	*F (490.0)*	*N/A*	*N/A*	*E (63.7)*	*F (597.3)*
			Overall	***N/A***	***N/A***	***N/A***	***N/A***	***D (54.7)***	***F (287.1)***	***N/A***	***N/A***	***F (117.5)***	***F (401.9)***
Option 1A:			*EBL*	*N/A*	*N/A*	*N/A*	*N/A*	*C (29.1)*	*F (166.0)*	*N/A*	*N/A*	*D (53.3)*	*F (300.0)*
Protected + permitted left turns		*Dumfries Road*	*EBT*	*N/A*	*N/A*	*N/A*	*N/A*	*C (24.7)*	*F (210.0)*	*N/A*	*N/A*	*F (136.0)*	*F (341.0)*
Right turn overlap phases			*EBR*	*N/A*	*N/A*	*N/A*	*N/A*	*A (1.7)*	*A (0.7)*	*N/A*	*N/A*	*A (10.0)*	*A (3.4)*
Dual NBL			*WBL*	*N/A*	*N/A*	*N/A*	*N/A*	*E (75.1)*	*F (261.7)*	*N/A*	*N/A*	*E (58.0)*	*F (475.1)*
		Dumfries Road	*WBT*	*N/A*	*N/A*	*N/A*	*N/A*	*B (16.7)*	*F (80.8)*	*N/A*	*N/A*	*C (28.6)*	*F (246.6)*
			WBR	*N/A*	*N/A*	*N/A*	*N/A*	*B (15.2)*	*A (4.7)*	*N/A*	*N/A*	*A (0.5)*	*A (5.8)*
			NBL	*N/A*	*N/A*	*N/A*	*N/A*	*E (61.8)*	*E (58.3)*	*N/A*	*N/A*	*E (59.6)*	*E (57.4)*
		Van Buren Road	*NBT*	*N/A*	*N/A*	*N/A*	*N/A*	*D (46.1)*	*D (41.5)*	*N/A*	*N/A*	*D (49.3)*	*D (41.2)*
			NBR	*N/A*	*N/A*	*N/A*	*N/A*	*D (36.5)*	*C (34.7)*	*N/A*	*N/A*	*C (31.0)*	*C (34.4)*
			SBL	*N/A*	*N/A*	*N/A*	*N/A*	*E (72.9)*	*F (303.1)*	*N/A*	*N/A*	*E (62.8)*	*F (303.1)*
		Van Buren Road	*SBT*	*N/A*	*N/A*	*N/A*	*N/A*	*E (66.0)*	*E (68.8)*	*N/A*	*N/A*	*E (66.1)*	*E (68.8)*
			SBR	*N/A*	*N/A*	*N/A*	*N/A*	*E (56.2)*	*F (135.4)*	*N/A*	*N/A*	*D (54.2)*	*F (154.4)*
			Overall	***N/A***	***N/A***	***N/A***	***N/A***	***C (28.6)***	***F (129.2)***	***N/A***	***N/A***	***E (68.5)***	***F (237.4)***
Option 1B:			*EBL*	*N/A*	*N/A*	*N/A*	*N/A*	*C (29.1)*	*F (195.1)*	*N/A*	*N/A*	*D (53.3)*	*F (299.2)*
Protected + permitted left turns		*Dumfries Road*	*EBT*	*N/A*	*N/A*	*N/A*	*N/A*	*C (24.7)*	*F (205.3)*	*N/A*	*N/A*	*F (136.0)*	*F (348.9)*
Right turn overlap phases			*EBR*	*N/A*	*N/A*	*N/A*	*N/A*	*A (1.7)*	*A (0.9)*	*N/A*	*N/A*	*A (10.0)*	*A (3.5)*
Dual NBL			*WBL*	*N/A*	*N/A*	*N/A*	*N/A*	*E (75.1)*	*F (230.9)*	*N/A*	*N/A*	*E (58.0)*	*F (428.6)*
Dual SBL		*Dumfries Road*	*WBT*	*N/A*	*N/A*	*N/A*	*N/A*	*B (16.7)*	*E (62.2)*	*N/A*	*N/A*	*C (28.6)*	*F (240.5)*
			WBR	*N/A*	*N/A*	*N/A*	*N/A*	*B (15.2)*	*A (2.3)*	*N/A*	*N/A*	*A (0.5)*	*A (5.7)*
			NBL	*N/A*	*N/A*	*N/A*	*N/A*	*E (61.8)*	*E (59.9)*	*N/A*	*N/A*	*E (59.6)*	*E (57.4)*
		Van Buren Road	*NBT*	*N/A*	*N/A*	*N/A*	*N/A*	*D (46.1)*	*D (39.4)*	*N/A*	*N/A*	*D (49.3)*	*D (40.0)*
			NBR	*N/A*	*N/A*	*N/A*	*N/A*	*D (36.5)*	*C (32.0)*	*N/A*	*N/A*	*C (31.0)*	*C (32.6)*
			SBL	*N/A*	*N/A*	*N/A*	*N/A*	*E (66.3)*	*F (205.4)*	*N/A*	*N/A*	*E (61.2)*	*F (106.8)*
		Van Buren Road	*SBT*	*N/A*	*N/A*	*N/A*	*N/A*	*E (66.0)*	*E (74.1)*	*N/A*	*N/A*	*E (66.1)*	*E (71.4)*
			SBR	*N/A*	*N/A*	*N/A*	*N/A*	*E (56.2)*	*F (173.0)*	*N/A*	*N/A*	*D (54.2)*	*F (163.3)*
			Overall	***N/A***	***N/A***	***N/A***	***N/A***	***C (28.5)***	***F (121.7)***	***N/A***	***N/A***	***E (68.5)***	***F (232.1)***
Option 2:			*EBL*	*N/A*	*N/A*	*N/A*	*N/A*	*C (27.7)*	*F (159.0)*	*N/A*	*N/A*	*D (54.0)*	*F (301.6)*
Protected + permitted left turns		*Dumfries Road*	*EBT*	*N/A*	*N/A*	*N/A*	*N/A*	*C (20.5)*	*D (54.6)*	*N/A*	*N/A*	*C (34.4)*	*F (170.0)*
Right turn overlap phases			*EBR*	*N/A*	*N/A*	*N/A*	*N/A*	*A (0.5)*	*C (23.5)*	*N/A*	*N/A*	*B (19.0)*	*B (17.0)*
Dual NBL			*WBL*	*N/A*	*N/A*	*N/A*	*N/A*	*E (63.8)*	*F (233.8)*	*N/A*	*N/A*	*E (60.2)*	*F (390.8)*
Dual SBL		*Dumfries Road*	*WBT*	*N/A*	*N/A*	*N/A*	*N/A*	*B (17.1)*	*E (64.2)*	*N/A*	*N/A*	*C (28.6)*	*F (222.2)*
Optimize network offsets			*WBR*	*N/A*	*N/A*	*N/A*	*N/A*	*B (15.4)*	*A (2.3)*	*N/A*	*N/A*	*A (0.5)*	*A (5.2)*
Add auxiliary through lane on EB approach			*NBL*	*N/A*	*N/A*	*N/A*	*N/A*	*E (61.8)*	*E (62.5)*	*N/A*	*N/A*	*E (59.6)*	*E (61.6)*
		Van Buren Road	*NBT*	*N/A*	*N/A*	*N/A*	*N/A*	*D (46.1)*	*D (40.0)*	*N/A*	*N/A*	*D (49.3)*	*D (40.0)*
			NBR	*N/A*	*N/A*	*N/A*	*N/A*	*D (37.2)*	*C (32.5)*	*N/A*	*N/A*	*C (32.4)*	*C (31.8)*
			SBL	*N/A*	*N/A*	*N/A*	*N/A*	*E (66.3)*	*F (205.4)*	*N/A*	*N/A*	*E (61.2)*	*F (172.6)*
		Van Buren Road	*SBT*	*N/A*	*N/A*	*N/A*	*N/A*	*E (65.8)*	*E (74.1)*	*N/A*	*N/A*	*E (66.1)*	*E (72.4)*
			SBR	*N/A*	*N/A*	*N/A*	*N/A*	*E (55.9)*	*F (152.7)*	*N/A*	*N/A*	*D (54.2)*	*F (169.1)*
			Overall	***N/A***	***N/A***	***N/A***	***N/A***	***C (26.6)***	***E (73.3)***	***N/A***	***N/A***	***D (35.1)***	***F (169.9)***
Option 2A:			*EBL*	*N/A*	*N/A*	*N/A*	*N/A*	*C (28.0)*	*F (163.9)*	*N/A*	*N/A*	*D (49.1)*	*F (284.9)*
Protected + permitted left turns		*Dumfries Road*	*EBT*	*N/A*	*N/A*	*N/A*	*N/A*	*C (20.1)*	*B (19.9)*	*N/A*	*N/A*	*D (37.8)*	*F (180.6)*
Right turn overlap phases			*EBR*	*N/A*	*N/A*	*N/A*	*N/A*	*A (0.7)*	*B (18.3)*	*N/A*	*N/A*	*A (8.1)*	*D (40.5)*
Dual NBL			*WBL*	*N/A*	*N/A*	*N/A*	*N/A*	*E (64.5)*	*F (330.6)*	*N/A*	*N/A*	*E (60.2)*	*F (390.4)*
Optimize network offsets		*Dumfries Road*	*WBT*	*N/A*	*N/A*	*N/A*	*N/A*	*B (17.1)*	*D (39.0)*	*N/A*	*N/A*	*C (28.6)*	*F (222.4)*
Add auxiliary through lane on EB approach			*WBR*	*N/A*	*N/A*	*N/A*	*N/A*	*B (15.4)*	*A (0.6)*	*N/A*	*N/A*	*A (0.5)*	*A (5.4)*
			NBL	*N/A*	*N/A*	*N/A*	*N/A*	*E (61.8)*	*F (111.2)*	*N/A*	*N/A*	*E (59.6)*	*E (61.6)*
		Van Buren Road	*NBT*	*N/A*	*N/A*	*N/A*	*N/A*	*D (46.1)*	*D (42.4)*	*N/A*	*N/A*	*D (49.3)*	*D (40.0)*
			NBR	*N/A*	*N/A*	*N/A*	*N/A*	*D (36.7)*	*D (37.1)*	*N/A*	*N/A*	*C (32.0)*	*C (31.8)*
			SBL	*N/A*	*N/A*	*N/A*	*N/A*	*E (60.6)*	*F (245.4)*	*N/A*	*N/A*	*E (56.1)*	*F (191.6)*
		Van Buren Road	*SBT*	*N/A*	*N/A*	*N/A*	*N/A*	*E (65.8)*	*E (67.3)*	*N/A*	*N/A*	*E (66.1)*	*E (72.4)*
			SBR	*N/A*	*N/A*	*N/A*	*N/A*	*E (55.9)*	*F (129.9)*	*N/A*	*N/A*	*D (54.2)*	*F (169.1)*
			Overall	***N/A***	***N/A***	***N/A***	***N/A***	***C (26.5)***	***E (64.1)***	***N/A***	***N/A***	***D (35.1)***	***F (174.9)***
3 **I-95 SB Entrance Ramp**/Dumfries Road	Signal	Dumfries Road	EBT	A (5.8)	A (0.8)	A (7.2)	A (1.6)	A (1.4)	A (1.6)	B (10.2)	A (2.8)	A (1.1)	A (4.6)
		I-95 SB Entrance Ramp	EBR	A (0.7)	A (0.2)	A (1.5)	A (1.4)	A (0.9)	A (1.7)	A (1.0)	A (0.3)	A (0.2)	A (1.7)
		Dumfries Road	WBL	D (44.1)	E (71.3)	C (33.1)	E (71.2)	C (28.4)	E (72.6)	D (40.5)	E (69.9)	D (37.8)	E (71.1)
			WBT	A (0.3)	A (0.5)	A (0.1)	A (0.4)	A (0.1)	A (0.3)	A (0.2)	A (0.9)	A (0.2)	A (0.6)
			Overall	**A (4.9)**	**A (3.0)**	**A (5.9)**	**A (3.4)**	**A (4.0)**	**A (3.6)**	**A (6.9)**	**A (3.2)**	**A (3.8)**	**A (4.0)**
4 **Van Buren Road/Benita Fitzgerald Drive** /Cardinal Drive	Signal		EBL	D (43.1)	D (53.8)	D (38.9)	D (42.7)	N/A	N/A	D (37.3)	D (47.6)	N/A	N/A
		Cardinal Drive	EBT	C (25.9)	C (27.5)	B (14.4)	B (17.4)	N/A	N/A	B (16.0)	B (17.8)	N/A	N/A
			EBR	C (23.1)	C (22.4)	B (13.1)	B (15.9)	N/A	N/A	B (14.1)	B (15.7)	N/A	N/A
		Cardinal Drive	WBL	D (49.1)	E (61.7)	F (263.2)	E (60.5)	N/A	N/A	D (45.0)	E (67.4)	N/A	N/A
			WBT	D (37.7)	D (40.8)	C (23.1)	C (33.5)	N/A	N/A	C (24.3)	D (36.1)	N/A	N/A
			WBR	C (22.6)	B (14.8)	B (13.7)	B (17.1)	N/A	N/A	B (14.0)	B (16.7)	N/A	N/A
		Van Buren Road	NLTR	D (45.8)	E (60.3)	D (47.5)	D (52.5)	N/A	N/A	D (46.6)	E (58.1)	N/A	N/A
			SBL	D (41.1)	D (45.8)	C (34.6)	D (39.4)	N/A	N/A	C (33.7)	D (43.0)	N/A	N/A
		Benita Fitzgerald Drive	SBT	D (37.9)	D (36.5)	C (32.2)	D (35.9)	N/A	N/A	C (31.4)	D (39.2)	N/A	N/A
			SBR	C (22.9)	C (26.7)	C (21.2)	C (25.8)	N/A	N/A	C (20.3)	C (29.3)	N/A	N/A
			Overall	**C (34.1)**	**D (36.6)**	**C (28.7)**	**C (30.5)**	**N/A**	**N/A**	**C (25.4)**	**C (32.9)**	**N/A**	**N/A**
with Van Buren Road Extension			*EBL*	*N/A*	*N/A*	*N/A*	*N/A*	*D (37.2)*	*F (88.7)*	*N/A*	*N/A*	*D (36.6)*	*F (125.4)*
		Cardinal Drive	*EBT*	*N/A*	*N/A*	*N/A*	*N/A*	*C (21.4)*	*D (44.5)*	*N/A*	*N/A*	*C (21.4)*	*D (45.2)*
			EBR	*N/A*	*N/A*	*N/A*	*N/A*	*B (19.1)*	*D (40.0)*	*N/A*	*N/A*	*B (18.9)*	*D (40.2)*
		Cardinal Drive	*WBL*	*N/A*	*N/A*	*N/A*	*N/A*	*D (40.9)*	*F (86.7)*	*N/A*	*N/A*	*D (42.1)*	*F (93.9)*
			WBT	*N/A*	*N/A*	*N/A*	*N/A*	*C (28.2)*	*E (68.6)*	*N/A*	*N/A*	*C (29.8)*	*E (70.2)*
			WBR	*N/A*	*N/A*	*N/A*	*N/A*	*B (17.3)*	*C (25.5)*	*N/A*	*N/A*	*B (18.5)*	*C (26.1)*
			NBL	*N/A*	*N/A*	*N/A*	*N/A*	*D (41.0)*	*F (86.7)*	*N/A*	*N/A*	*D (42.2)*	*F (90.4)*
		Van Buren Road	*NBT*	*N/A*	*N/A*	*N/A*	*N/A*	*D (40.2)*	*E (65.0)*	*N/A*	*N/A*	*D (41.4)*	*E (67.5)*
			NBR	*N/A*	*N/A*	*N/A*	*N/A*	*D (39.6)*	*E (63.0)*	*N/A*	*N/A*	*D (40.7)*	*E (65.3)*
			SBL	*N/A*	*N/A*	*N/A*	*N/A*	*C (34.0)*	*D (52.0)*	*N/A*	*N/A*	*D (35.1)*	*E (55.4)*
		Benita Fitzgerald Drive	*SBT*	*N/A*	*N/A*	*N/A*	*N/A*	*C (31.9)*	*D (47.5)*	*N/A*	*N/A*	*C (32.9)*	*D (50.5)*
			SBR	*N/A*	*N/A*	*N/A*	*N/A*	*B (19.9)*	*E (79.0)*	*N/A*	*N/A*	*B (19.3)*	*F (95.5)*
			Overall	***N/A***	***N/A***	***N/A***	***N/A***	***C (27.8)***	***E (64.2)***	***N/A***	***N/A***	***C (28.1)***	***E (73.3)***
Concurrent phasing			*EBL*	*N/A*	*N/A*	*N/A*	*N/A*	*D (37.2)*	*E (75.3)*	*N/A*	*N/A*	*D (39.9)*	*E (75.9)*
Protected + permitted left turns		Cardinal Drive	*EBT*	*N/A*	*N/A*	*N/A*	*N/A*	*C (21.2)*	*D (39.2)*	*N/A*	*N/A*	*C (23.5)*	*C (33.5)*
Right turn overlap phases			*EBR*	*N/A*	*N/A*	*N/A*	*N/A*	*B (15.5)*	*C (28.6)*	*N/A*	*N/A*	*B (16.0)*	*C (24.1)*
		Cardinal Drive	*WBL*	*N/A*	*N/A*	*N/A*	*N/A*	*C (23.0)*	*D (46.0)*	*N/A*	*N/A*	*C (25.9)*	*D (40.1)*
			WBT	*N/A*	*N/A*	*N/A*	*N/A*	*C (28.7)*	*E (70.9)*	*N/A*	*N/A*	*C (32.4)*	*E (66.3)*
			WBR	*N/A*	*N/A*	*N/A*	*N/A*	*B (17.1)*	*D (35.1)*	*N/A*	*N/A*	*B (18.1)*	*C (33.4)*
			NBL	*N/A*	*N/A*	*N/A*	*N/A*	*D (37.2)*	*D (45.7)*	*N/A*	*N/A*	*D (37.7)*	*D (48.7)*
		Van Buren Road	*NBT*	*N/A*	*N/A*	*N/A*	*N/A*	*D (43.0)*	*D (49.6)*	*N/A*	*N/A*	*D (45.4)*	*D (51.5)*
			NBR	*N/A*	*N/A*	*N/A*	*N/A*	*D (36.4)*	*D (41.9)*	*N/A*	*N/A*	*D (38.7)*	*D (43.2)*
			SBL	*N/A*	*N/A*	*N/A*	*N/A*	*C (32.0)*	*E (71.6)*	*N/A*	*N/A*	*C (31.3)*	*E (70.6)*
		Benita Fitzgerald Drive	*SBT*	*N/A*	*N/A*	*N/A*	*N/A*	*C (31.4)*	*D (38.4)*	*N/A*	*N/A*	*C (32.2)*	*D (40.9)*
			SBR	*N/A*	*N/A*	*N/A*	*N/A*	*B (19.4)*	*D (44.9)*	*N/A*	*N/A*	*B (19.2)*	*E (57.8)*
			Overall	***N/A***	***N/A***	***N/A***	***N/A***	***C (27.0)***	***D (53.9)***	***N/A***	***N/A***	***C (28.7)***	***D (54.7)***

Notes (1) Roadway names in bold are considered north/south for purposes of this analysis
(2) Numbers in parentheses ( ) represent delay at signalized intersections in seconds per vehicle as reported by Synchro version 10 software.
(3) Numbers in brackets [] represent delay at unsignalized intersections in seconds per vehicle as reported by Synchro version 10 software.

Table 2
Van Buren Road Extension
Queuing Summary (1) (2) (3)

Intersection	Operating Condition	Street Name	Approach/ Movement	Available Storage (ft)	Existing AM	Existing PM	2025 No Build AM	2025 No Build PM	2025 Build AM	2025 Build PM	2040 No Build AM	2040 No Build PM	2040 Build AM	2040 Build PM
1 Dumfries Road/**Four Seasons Drive**	Signal		EBL	400	43	84	43	84	43	84	43	84	43	84
		Dumfries Road	EBT	-	1283	703	721	1005	671	1469	1186	1453	1127	1913
			EBR	375	0	0	0	0	0	0	0	0	0	0
			WBL	430	33	24	36	24	26	16	30	20	20	13
		Dumfries Road	WBT	-	428	112	380	1103	594	577	1094	1122	831	558
			WBR	475	0	0	2	0	0	0	0	0	0	0
		Four Seasons Drive	NBLT	-	71	67	71	67	71	67	71	67	71	67
			NBR	-	0	0	0	0	0	0	0	0	0	0
			SBL	275	64	53	64	53	64	53	64	53	64	53
		Four Seasons Drive	SBLT	-	67	53	67	53	67	53	67	53	67	53
			SBR	-	0	0	0	0	0	0	0	0	0	0
2 Dumfries Road/**Van Buren Road/Old Stage Road**	Signal		EBL	420	31	48	33	279	N/A	N/A	26	201	N/A	N/A
		Dumfries Road	EBT	-	1066	687	325	931	N/A	N/A	1007	1397	N/A	N/A
			EBR	430	137	333	116	349	N/A	N/A	110	325	N/A	N/A
		Dumfries Road	WBL	475	287	365	154	300	N/A	N/A	152	298	N/A	N/A
			WBTR	-	273	1017	241	1173	N/A	N/A	958	1800	N/A	N/A
			NBL	265	104	253	152	223	N/A	N/A	152	223	N/A	N/A
		Van Buren Road	NBLT	-	104	252	150	226	N/A	N/A	150	226	N/A	N/A
			NBR	-	167	106	122	226	N/A	N/A	124	226	N/A	N/A
			SBL	-	129	105	60	55	N/A	N/A	60	55	N/A	N/A
		Old Stage Road	SBTR	-	121	346	54	126	N/A	N/A	54	126	N/A	N/A
with Van Buren Road Extension			*EBL*	*420*	*N/A*	*N/A*	*N/A*	*N/A*	*169*	*355*	*N/A*	*N/A*	*171*	*355*
		Dumfries Road	*EBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*621*	*1293*	*N/A*	*N/A*	*947*	*1273*
			EBR	*430*	*N/A*	*N/A*	*N/A*	*N/A*	*139*	*256*	*N/A*	*N/A*	*180*	*253*
			WBL	*475*	*N/A*	*N/A*	*N/A*	*N/A*	*379*	*614*	*N/A*	*N/A*	*555*	*842*
		Dumfries Road	*WBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*518*	*1019*	*N/A*	*N/A*	*844*	*1486*
			WBR	*237*	*N/A*	*N/A*	*N/A*	*N/A*	*0*	*28*	*N/A*	*N/A*	*0*	*53*
			NBL	*265*	*N/A*	*N/A*	*N/A*	*N/A*	*734*	*1192*	*N/A*	*N/A*	*738*	*1216*
		Van Buren Road	*NBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*55*	*118*	*N/A*	*N/A*	*55*	*121*
			NBR	-	*N/A*	*N/A*	*N/A*	*N/A*	*131*	*159*	*N/A*	*N/A*	*131*	*161*
			SBL	*225*	*N/A*	*N/A*	*N/A*	*N/A*	*73*	*395*	*N/A*	*N/A*	*73*	*407*
		Van Buren Road	*SBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*52*	*106*	*N/A*	*N/A*	*52*	*107*
			SBR	-	*N/A*	*N/A*	*N/A*	*N/A*	*11*	*511*	*N/A*	*N/A*	*12*	*527*
Option 1A:			*EBL*	*420*	*N/A*	*N/A*	*N/A*	*N/A*	*87*	*267*	*N/A*	*N/A*	*118*	*279*
Protected + permitted left turns		*Dumfries Road*	*EBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*446*	*1215*	*N/A*	*N/A*	*893*	*1219*
Right turn overlap phases			*EBR*	*430*	*N/A*	*N/A*	*N/A*	*N/A*	*0*	*0*	*N/A*	*N/A*	*0*	*0*
Dual NBL			*WBL*	*475*	*N/A*	*N/A*	*N/A*	*N/A*	*323*	*525*	*N/A*	*N/A*	*504*	*764*
		Dumfries Road	*WBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*513*	*939*	*N/A*	*N/A*	*789*	*1431*
			WBR	*237*	*N/A*	*N/A*	*N/A*	*N/A*	*0*	*14*	*N/A*	*N/A*	*1*	*32*
			NBL	*265*	*N/A*	*N/A*	*N/A*	*N/A*	*297*	*437*	*N/A*	*N/A*	*297*	*437*
		Van Buren Road	*NBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*55*	*127*	*N/A*	*N/A*	*55*	*127*
			NBR	-	*N/A*	*N/A*	*N/A*	*N/A*	*137*	*175*	*N/A*	*N/A*	*139*	*175*
			SBL	*225*	*N/A*	*N/A*	*N/A*	*N/A*	*73*	*395*	*N/A*	*N/A*	*73*	*395*
		Van Buren Road	*SBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*47*	*104*	*N/A*	*N/A*	*48*	*104*
			SBR	-	*N/A*	*N/A*	*N/A*	*N/A*	*17*	*351*	*N/A*	*N/A*	*18*	*360*
Option 1B:			*EBL*	*420*	*N/A*	*N/A*	*N/A*	*N/A*	*87*	*275*	*N/A*	*N/A*	*118*	*276*
Protected + permitted left turns		*Dumfries Road*	*EBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*446*	*1178*	*N/A*	*N/A*	*893*	*1207*
Right turn overlap phases			*EBR*	*430*	*N/A*	*N/A*	*N/A*	*N/A*	*0*	*0*	*N/A*	*N/A*	*0*	*0*
Dual NBL			*WBL*	*475*	*N/A*	*N/A*	*N/A*	*N/A*	*323*	*510*	*N/A*	*N/A*	*504*	*750*
Dual SBL		*Dumfries Road*	*WBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*513*	*876*	*N/A*	*N/A*	*789*	*1406*
			WBR	*237*	*N/A*	*N/A*	*N/A*	*N/A*	*0*	*4*	*N/A*	*N/A*	*1*	*29*
			NBL	*265*	*N/A*	*N/A*	*N/A*	*N/A*	*297*	*442*	*N/A*	*N/A*	*297*	*437*
		Van Buren Road	*NBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*55*	*127*	*N/A*	*N/A*	*55*	*127*
			NBR	-	*N/A*	*N/A*	*N/A*	*N/A*	*137*	*172*	*N/A*	*N/A*	*139*	*172*
			SBL	*225*	*N/A*	*N/A*	*N/A*	*N/A*	*36*	*190*	*N/A*	*N/A*	*36*	*167*
		Van Buren Road	*SBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*47*	*106*	*N/A*	*N/A*	*48*	*105*
			SBR	-	*N/A*	*N/A*	*N/A*	*N/A*	*17*	*387*	*N/A*	*N/A*	*18*	*378*
Option 2:			*EBL*	*420*	*N/A*	*N/A*	*N/A*	*N/A*	*91*	*248*	*N/A*	*N/A*	*130*	*274*
Protected + permitted left turns		*Dumfries Road*	*EBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*301*	*808*	*N/A*	*N/A*	*636*	*821*
Right turn overlap phases			*EBR*	*430*	*N/A*	*N/A*	*N/A*	*N/A*	*0*	*349*	*N/A*	*N/A*	*0*	*30*
Dual NBL			*WBL*	*475*	*N/A*	*N/A*	*N/A*	*N/A*	*221*	*513*	*N/A*	*N/A*	*447*	*735*
Dual SBL		*Dumfries Road*	*WBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*519*	*876*	*N/A*	*N/A*	*789*	*1375*
Optimize network offsets			*WBR*	*237*	*N/A*	*N/A*	*N/A*	*N/A*	*0*	*4*	*N/A*	*N/A*	*1*	*24*
Add auxiliary through lane on EB approach			*NBL*	*265*	*N/A*	*N/A*	*N/A*	*N/A*	*297*	*467*	*N/A*	*N/A*	*297*	*467*
		Van Buren Road	*NBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*55*	*128*	*N/A*	*N/A*	*55*	*128*
			NBR	-	*N/A*	*N/A*	*N/A*	*N/A*	*127*	*175*	*N/A*	*N/A*	*131*	*172*
			SBL	*225*	*N/A*	*N/A*	*N/A*	*N/A*	*36*	*190*	*N/A*	*N/A*	*36*	*184*
		Van Buren Road	*SBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*47*	*106*	*N/A*	*N/A*	*48*	*106*
			SBR	-	*N/A*	*N/A*	*N/A*	*N/A*	*0*	*379*	*N/A*	*N/A*	*0*	*383*
Option 2A:			*EBL*	*420*	*N/A*	*N/A*	*N/A*	*N/A*	*89*	*251*	*N/A*	*N/A*	*130*	*260*
Protected + permitted left turns		*Dumfries Road*	*EBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*301*	*752*	*N/A*	*N/A*	*636*	*863*
Right turn overlap phases			*EBR*	*430*	*N/A*	*N/A*	*N/A*	*N/A*	*0*	*150*	*N/A*	*N/A*	*0*	*518*
Dual NBL			*WBL*	*475*	*N/A*	*N/A*	*N/A*	*N/A*	*221*	*563*	*N/A*	*N/A*	*447*	*735*
Optimize network offsets		*Dumfries Road*	*WBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*519*	*836*	*N/A*	*N/A*	*789*	*1378*
Add auxiliary through lane on EB approach			*WBR*	*237*	*N/A*	*N/A*	*N/A*	*N/A*	*0*	*1*	*N/A*	*N/A*	*1*	*26*
			NBL	*265*	*N/A*	*N/A*	*N/A*	*N/A*	*297*	*549*	*N/A*	*N/A*	*297*	*467*
		Van Buren Road	*NBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*55*	*128*	*N/A*	*N/A*	*55*	*128*
			NBR	-	*N/A*	*N/A*	*N/A*	*N/A*	*107*	*182*	*N/A*	*N/A*	*113*	*172*
			SBL	*225*	*N/A*	*N/A*	*N/A*	*N/A*	*45*	*260*	*N/A*	*N/A*	*45*	*274*
		Van Buren Road	*SBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*47*	*102*	*N/A*	*N/A*	*48*	*106*
			SBR	-	*N/A*	*N/A*	*N/A*	*N/A*	*0*	*324*	*N/A*	*N/A*	*0*	*383*
3 **I-95 SB Entrance Ramp**/Dumfries Road	Signal	Dumfries Road	EBT	-	275	21	184	32	17	19	573	31	17	19
		I-95 SB Entrance Ramp	EBR	1000	441	0	551	599	661	634	499	319	433	509
		Dumfries Road	WBL	1000	206	182	122	194	83	195	187	203	167	206
			WBT	-	58	68	0	51	0	19	19	242	0	119
4 **Van Buren Road/Benita Fitzgerald Drive** /Cardinal Drive	Signal		EBL	350	314	239	230	303	N/A	N/A	230	325	N/A	N/A
		Cardinal Drive	EBT	-	202	333	137	141	N/A	N/A	184	195	N/A	N/A
			EBR	410	0	0	0	0	N/A	N/A	0	0	N/A	N/A
			WBL	390	94	63	42	48	N/A	N/A	42	51	N/A	N/A
		Cardinal Drive	WBT	-	241	410	124	277	N/A	N/A	162	388	N/A	N/A
			WBR	400	29	24	23	31	N/A	N/A	23	29	N/A	N/A
		Van Buren Road	NLTR	-	202	110	42	48	N/A	N/A	42	50	N/A	N/A
			SBL	400	175	374	111	190	N/A	N/A	111	200	N/A	N/A
		Benita Fitzgerald Drive	SBT	-	27	82	14	71	N/A	N/A	14	75	N/A	N/A
			SBR	400	47	134	25	222	N/A	N/A	25	279	N/A	N/A
with Van Buren Road Extension			*EBL*	*350*	*N/A*	*N/A*	*N/A*	*N/A*	*260*	*515*	*N/A*	*N/A*	*289*	*587*
		Cardinal Drive	*EBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*194*	*276*	*N/A*	*N/A*	*216*	*304*
			EBR	*410*	*N/A*	*N/A*	*N/A*	*N/A*	*0*	*57*	*N/A*	*N/A*	*7*	*58*
			WBL	*390*	*N/A*	*N/A*	*N/A*	*N/A*	*88*	*202*	*N/A*	*N/A*	*95*	*229*
		Cardinal Drive	*WBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*146*	*461*	*N/A*	*N/A*	*166*	*542*
			WBR	*400*	*N/A*	*N/A*	*N/A*	*N/A*	*28*	*81*	*N/A*	*N/A*	*30*	*109*
			NBL	*833*	*N/A*	*N/A*	*N/A*	*N/A*	*57*	*328*	*N/A*	*N/A*	*57*	*328*
		Van Buren Road	*NBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*42*	*117*	*N/A*	*N/A*	*42*	*117*
			NBR	*200*	*N/A*	*N/A*	*N/A*	*N/A*	*0*	*11*	*N/A*	*N/A*	*0*	*11*
			SBL	*400*	*N/A*	*N/A*	*N/A*	*N/A*	*118*	*328*	*N/A*	*N/A*	*119*	*329*
		Benita Fitzgerald Drive	*SBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*27*	*155*	*N/A*	*N/A*	*28*	*155*
			SBR	*400*	*N/A*	*N/A*	*N/A*	*N/A*	*35*	*1177*	*N/A*	*N/A*	*34*	*1193*
Concurrent phasing			*EBL*	*350*	*N/A*	*N/A*	*N/A*	*N/A*	*258*	*424*	*N/A*	*N/A*	*286*	*432*
Protected + permitted left turns		*Cardinal Drive*	*EBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*184*	*244*	*N/A*	*N/A*	*205*	*229*
Right turn overlap phases			*EBR*	*410*	*N/A*	*N/A*	*N/A*	*N/A*	*0*	*42*	*N/A*	*N/A*	*3*	*39*
			WBL	*390*	*N/A*	*N/A*	*N/A*	*N/A*	*47*	*115*	*N/A*	*N/A*	*51*	*109*
		Cardinal Drive	*WBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*144*	*475*	*N/A*	*N/A*	*165*	*477*
			WBR	*400*	*N/A*	*N/A*	*N/A*	*N/A*	*98*	*156*	*N/A*	*N/A*	*141*	*256*
			NBL	*833*	*N/A*	*N/A*	*N/A*	*N/A*	*36*	*219*	*N/A*	*N/A*	*36*	*206*
		Van Buren Road	*NBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*42*	*112*	*N/A*	*N/A*	*42*	*104*
			NBR	*200*	*N/A*	*N/A*	*N/A*	*N/A*	*0*	*14*	*N/A*	*N/A*	*0*	*0*
			SBL	*400*	*N/A*	*N/A*	*N/A*	*N/A*	*117*	*354*	*N/A*	*N/A*	*119*	*308*
		Benita Fitzgerald Drive	*SBT*	-	*N/A*	*N/A*	*N/A*	*N/A*	*27*	*137*	*N/A*	*N/A*	*28*	*130*
			SBR	*400*	*N/A*	*N/A*	*N/A*	*N/A*	*34*	*909*	*N/A*	*N/A*	*33*	*893*

Notes (1) Queue length is based on the 95th percentile queue in feet as reported by Synchro, Version 10.
(2) Roadway names in bold are considered north/south for purposes of this analysis
(3) For available storage, " - " indicate the lane extends back to the immediate upstream intersection.

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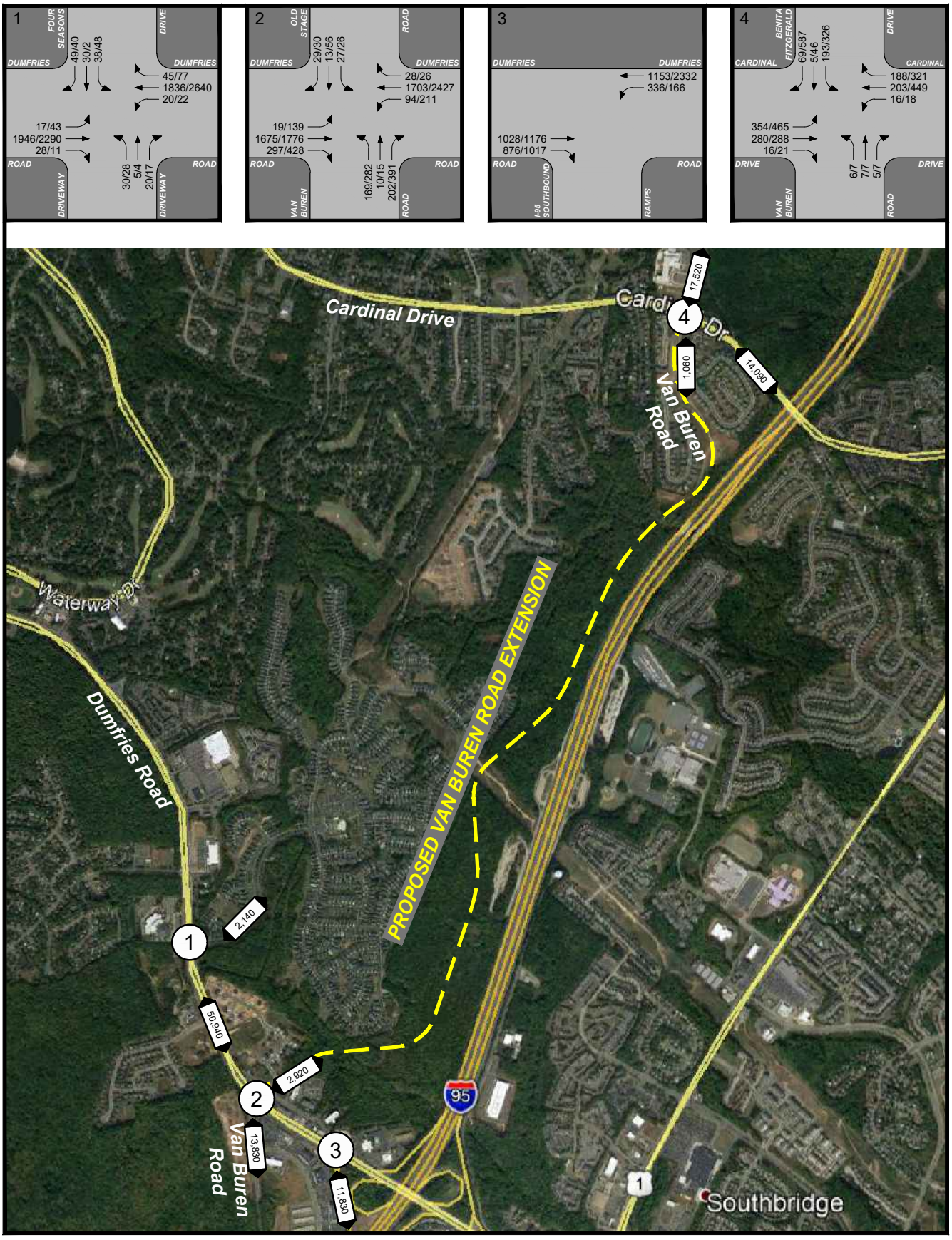

Figure 3
No Build Traffic Forecasts (2025)

AM PEAK HOUR
PM PEAK HOUR
000 / 000
000/000 AADT

NORTH
Van Buren Road Extension
Prince William County, Virginia

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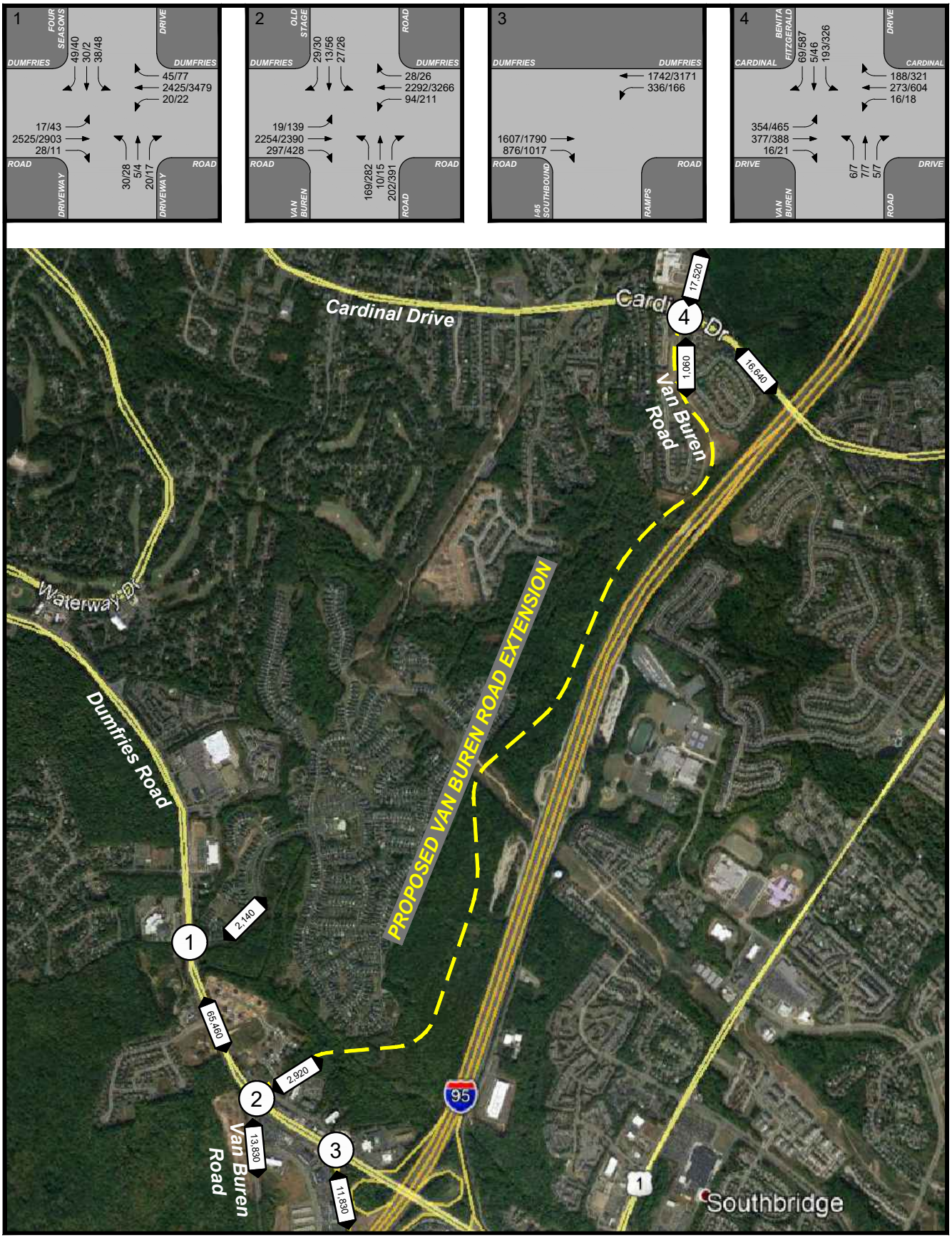

Figure 4

No Build Traffic Forecasts (2040)

AM PEAK HOUR
PM PEAK HOUR
000 / 000

000/000 AADT

NORTH

Van Buren Road Extension
Prince William County, Virginia

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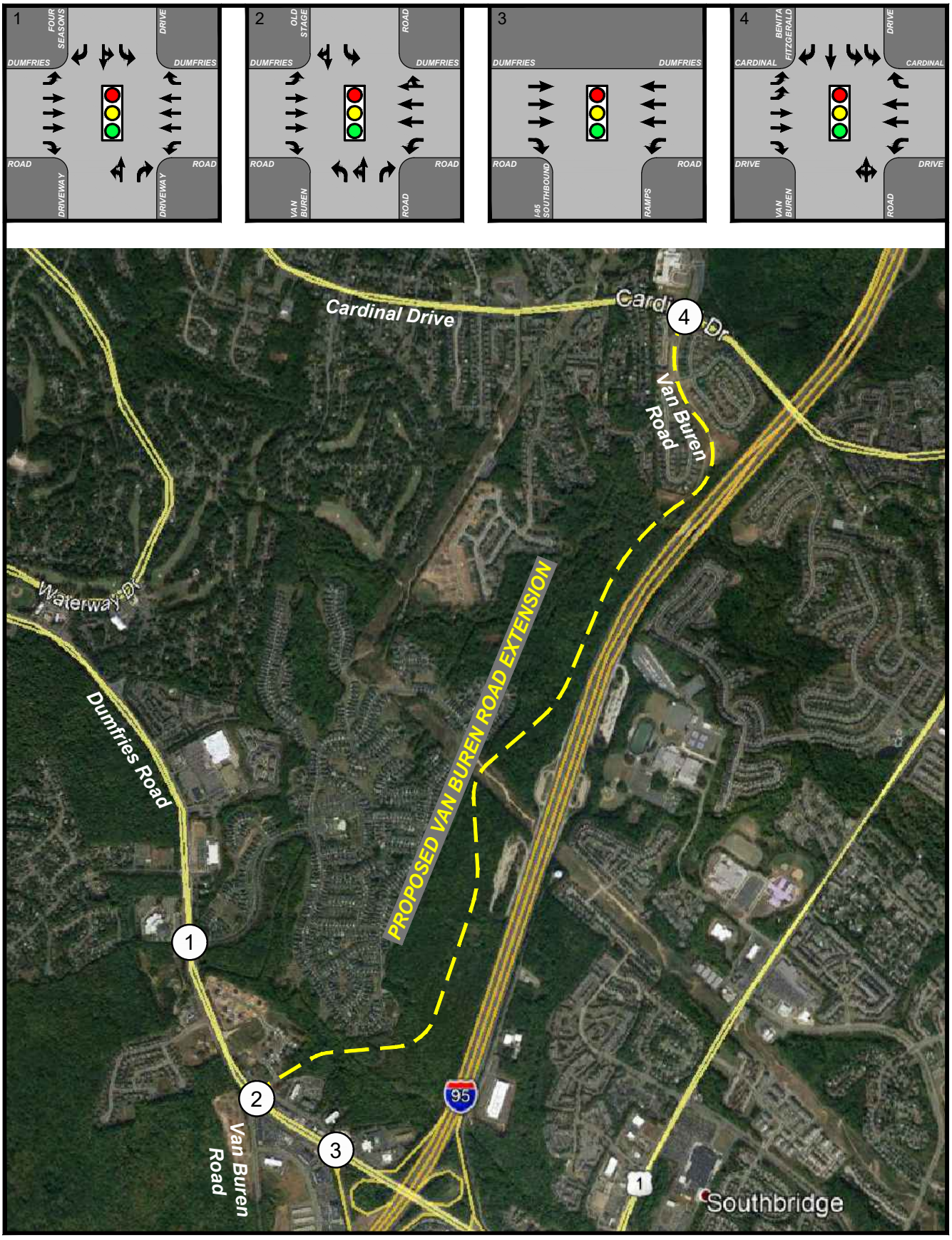

Figure 5

No Build Lane Use and Traffic Controls

Represents One Travel Lane

Signalized Intersection

Stop Sign

NORTH

Van Buren Road Extension

Prince William County, Virginia

Levels of Service under No-Build Conditions (2025 and 2040). The capacity analyses of future traffic conditions without the Project were conducted based on the lane use and traffic controls depicted on Figure 5 and the No-Build Traffic Forecasts shown on Figure 3 and Figure 4. The levels of service are summarized in Table 1 and the Synchro reports are presented in Attachment 4.

As shown in Table 1, under no-build conditions (year 2025), intersections within the study area operate at overall acceptable levels of service (LOS "D" or better) with the exception of the intersection of Dumfries Road/Van Buren Road/Old Stage Road which operates at overall LOS "E" during the PM peak hour. Under future no-build conditions (year 2040), delays increase but the LOS remains generally the same, except at the following locations:

- Dumfries Road/Four Seasons Drive: LOS "F" during the PM peak hour (2040) in comparisons to LOS B (2025)
- Dumfries Road/Van Buren Road/Old Stage Road: LOS "F" during the PM peak hour (2040) in comparisons to LOS E (2025).

Queues under No-Build Conditions (2025 and 2040). An analysis of intersection 95th-percentile queues was performed at the study intersections. The results of the queuing analysis, as reported by Synchro, are summarized in Table 2. Queues at the turn bays in the study intersections are generally accommodated within the storage provided under no-build conditions (year 2025 and 2040).

Traffic Forecasts under Build Conditions (2025 and 2040). As stated previously, 2040 AM and PM peak hour build-out traffic forecasts were derived from PWC's travel demand model. The resulting Build Traffic Forecasts (2040) are shown on Figure 7. In order to develop 2025 Build Traffic Forecasts, the No-Build Traffic Forecasts (2040) shown on Figure 4 and the Build Traffic Forecasts (2040) shown on Figure 7 were compared to determine how the turning movements changed between future no-build and build conditions. These adjustments were then applied to the No-Build Traffic Forecasts (2025) to arrive at Build Traffic Forecasts (2025) as shown on Figure 6.

Levels of Service under Build Conditions (2025 and 2040). The capacity analyses of future traffic conditions with the Project were conducted utilizing "baseline" geometries depicted in early concepts of the Van Buren Road extension as shown on Figure 8 and the Build Traffic Forecasts for 2025 and 2040 shown on Figure 6 and Figure 7, respectively. New pedestrian crossings were assumed across the westbound and northbound approaches of the Dumfries Road/Van Buren Road intersection and the signal timings were adjusted to account for the pedestrian signal crossing times. The levels of service are summarized in Table 1 and the Synchro reports are presented in Attachment 5.

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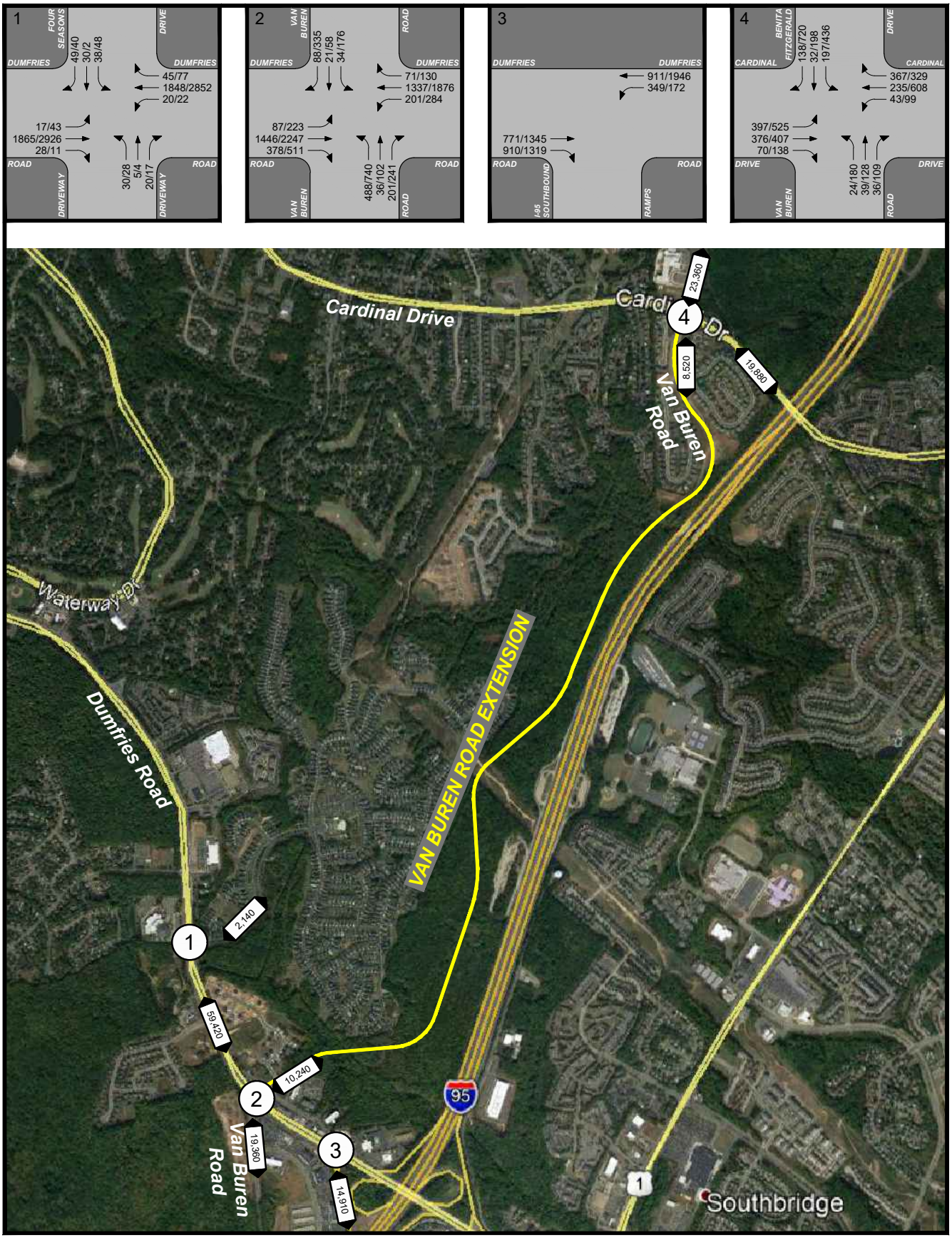

Figure 6
Build Traffic Forecasts (2025)

AM PEAK HOUR
PM PEAK HOUR
000 / 000
000/000 AADT

NORTH
Van Buren Road Extension
Prince William County, Virginia

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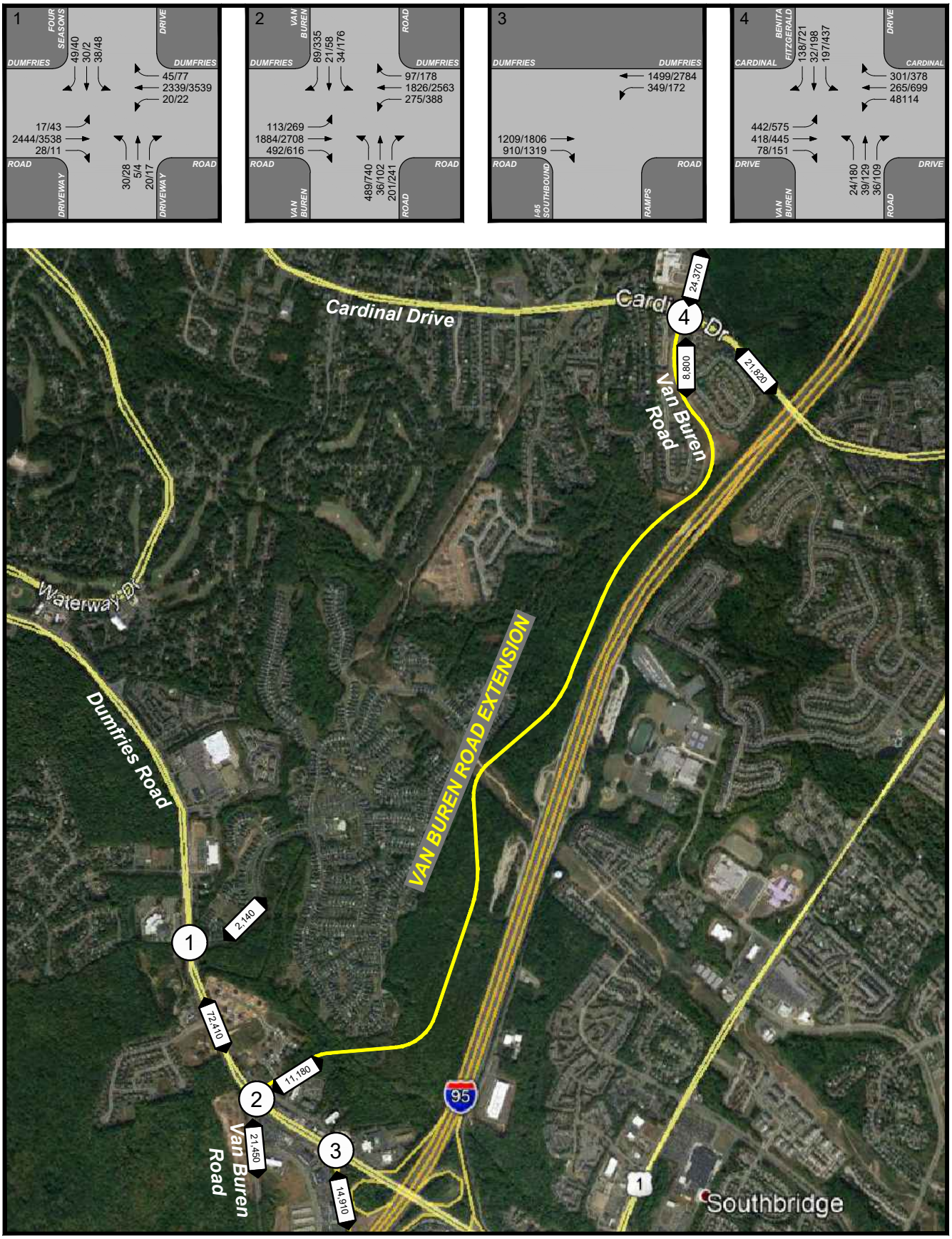

Figure 7
Build Traffic Forecasts (2040)

AM PEAK HOUR
PM PEAK HOUR
000 / 000
000/000 AADT

NORTH
Van Buren Road Extension
Prince William County, Virginia

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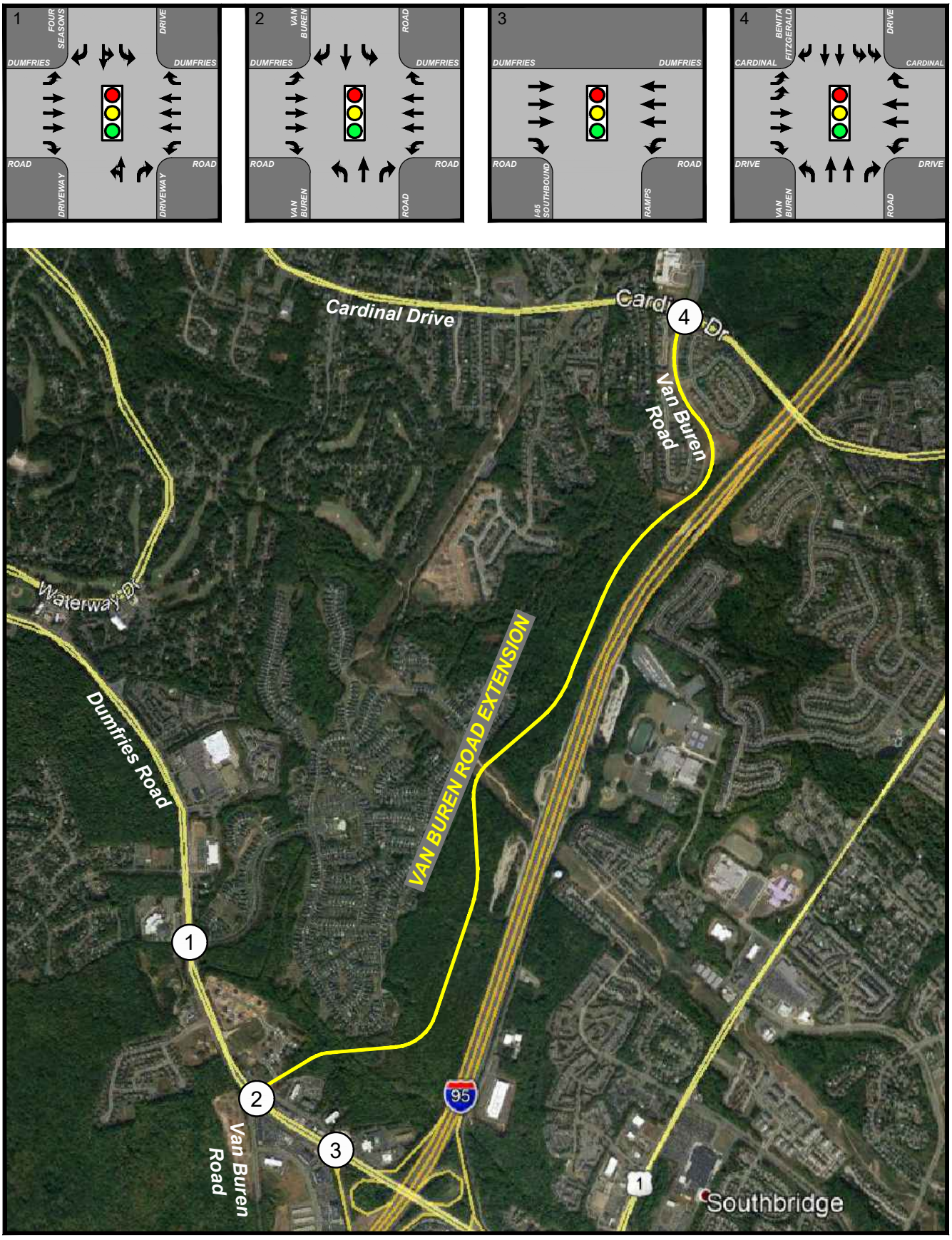

Figure 8
Build Lane Use and Traffic Controls

Represents One Travel Lane
Signalized Intersection
Stop Sign

NORTH
Van Buren Road Extension
Prince William County, Virginia

As shown on Table 1, under build conditions (year 2025), intersections within the study area operate at overall acceptable levels of service (LOS "D" or better) with the exception of the intersection of Dumfries Road/Van Buren Road/Old Stage Road which operates at overall LOS "F" during the PM peak hour, and the intersection of Van Buren Road/Cardinal Drive/Benita Fitzgerald Drive which operates at overall LOS "E" during the PM peak hour. Under build conditions (year 2040), delays increase but LOS remains generally consistent with no-build conditions (year 2040), except at the following locations:

- Dumfries Road/Van Buren Road/Old Stage Road: LOS "F" during the AM peak hour (2040)
- Van Buren Road/Cardinal Drive/Benita Fitzgerald Drive: LOS "E" during the PM peak hour (2040)

Queues under Build Conditions (2025 and 2040). An analysis of intersection 95th-percentile queues was performed at the study intersections. The results of the queuing analysis, as reported by Synchro, are summarized in Table 2.

As shown in Table 2, under 2025 build conditions, turning movement queues are generally contained within the storage bays at the study intersections, with the following exceptions:

- #2 Dumfries Road/Van Buren Road (WBL during PM peak hour, NBL during AM and PM peak hours, and SBL during PM peak hour)
- #4 Van Buren Road/Cardinal Drive/Benita Fitzgerald (EBL during PM peak hour and SBR during PM peak hour)

Under 2040 build conditions, queues remain generally consistent with 2025 build conditions, however, vehicle queues at the Dumfries Road/Van Buren Road intersection exceed storage bays at the westbound left turning movement during the AM peak hour.

Proposed Intersection Configuration. In order to accommodate build out of the Van Buren Road Extension, several options were analyzed at the intersections of Van Buren Road/Dumfries Road and Van Buren Road/Cardinal Drive/Benita Fitzgerald Drive.

At the **Van Buren Road/Dumfries Road intersection**, a number of options were evaluated in a tiered approach to determine the necessary mitigation. The options are described in the following sections and sketches for each option are included in Attachment 6.

Option 1A. Adjust signal phasing to allow for protected/permitted left turn movements on the eastbound, westbound, and southbound approaches, add right turn overlap phases to all approaches, and construct a second northbound left turn lane.

Option 1B. All Option 1A improvements and construct a second southbound left turn lane.

Option 2. All Option 1B improvements, construct an auxiliary through lane on the eastbound approach leading to the I-95 southbound on-ramp, and optimize network offsets.

Option 2A (Preferred). All Option 2 improvements, except the second southbound left turn lane (Adjust signal phasing to allow for protected/permitted left turn movements on the eastbound, westbound, and southbound approaches, add right turn overlap phases to all approaches, construct a second northbound left turn lane, construct an auxiliary through lane on the eastbound approach leading to the I-95 southbound on-ramp, and optimize network offsets).

At the **Van Buren Road/Cardinal Drive/Benita Fitzgerald Drive intersection**, it is recommended that the signal phasing be adjusted to allow for concurrent movements between the northbound and southbound approaches, allow for protected/permitted left turn movements on the westbound and northbound approaches, and add right turn overlap phases to the eastbound and northbound approaches.

Figure 9 illustrates the intersection configuration that is recommended in order to mitigate the impacts associated with the Van Buren Road extension.

As shown on Table 1, with the recommended signal phasing adjustments at Van Buren Road/Cardinal Drive/Benita Fitzgerald Drive and the preferred intersection configuration (Option 2A) at Van Buren Road/Dumfries Road, intersection operations are at acceptable levels of service under 2025 Build Conditions, except for the intersection of Van Buren Road/Dumfries Road during the PM peak hour, which operates at an LOS "E" (consistent with the 2025 No Build LOS "E"). Under 2040 Build Conditions, the Van Buren Road/Dumfries Road PM peak hour operates at an LOS "F" (consistent with 2040 No Build LOS "F"). For both of these intersections in the PM peak hour, the LOS is consistent with the No Build Conditions, however, delay does improve slightly.

ACCESS ROAD

As shown on the concept plans for the Van Buren Road extension, the intersection of Old Stage Road/Van Buren Road will be converted to allow right-in/right-out movements only. To continue to provide access to Dumfries Road for vehicles from Old Stage Road, a proposed access road is shown connecting Old Stage Road to the proposed Van Buren Road extension. The proposed Access Road was modeled in Synchro to perform an analysis of Build Conditions (2025 and 2040) during the AM and PM peak hours. The levels of service and 95th-percentile queues are summarized below on Table 3 and the Synchro reports are presented in Attachment 7. As shown on Table 3, turning movements on the access road operate at an LOS "D" or better, with the exception of the WBLR turning movement during the 2040 Build PM peak hour, which operates at an LOS "E". Queues are not anticipated to exceed the proposed storage bays.

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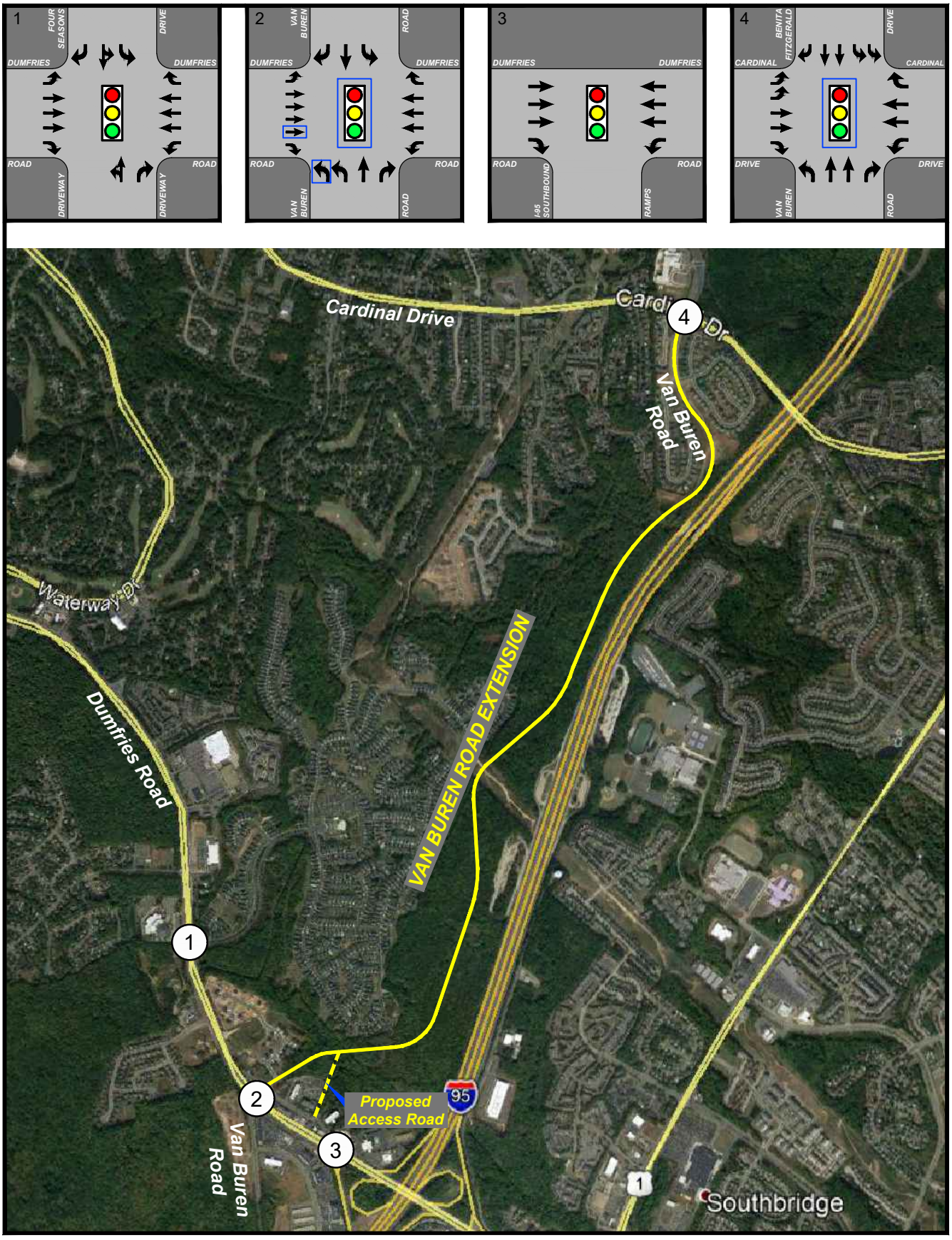


Figure 9
Recommended Intersection Configurations

Represents One Travel Lane
Signalized Intersection
Stop Sign
Recommended Lane Configuration/ Signal Phasing Modification

NORTH

Van Buren Road Extension
Prince William County, Virginia

Table 3
Access Road/Van Buren Road Level of Service and 95th-percentile Queue Summary

Street Name	Approach/ Movement	2025 Build LOS AM	2025 Build LOS PM	2025 Build Queues AM	2025 Build Queues PM	2040 Build LOS AM	2040 Build LOS PM	2040 Build Queues AM	2040 Build Queues PM
Access Road	WBLR	B [10.1]	D [33.8]	11	133	B [10.3]	E [40.9]	12	158
Van Buren Road	NBT	A [0.0]	A [0.0]	0	0	A [0.0]	A [0.0]	0	0
Van Buren Road	NBR	A [0.0]	A [0.0]	0	0	A [0.0]	A [0.0]	0	0
Van Buren Road	SBL	A [7.4]	A [8.3]	2	6	A [7.5]	A [8.4]	2	7
Van Buren Road	SBT	A [0.0]	A [0.0]	0	0	A [0.0]	A [0.0]	0	0

CRASH ANALYSIS

Historic crash data was obtained from VDOT at both of the Project endpoints for the period from September 2015 through September 2020. Copies of the VDOT crash data are provided in Attachment 8. The crash data were sorted by intersection location and the results for the most recent five-year period are summarized on Table 4. Table 4 summarizes the crash incidents by collision type and location. For purposes of this analysis, accidents occurring within 250 feet of the specified intersection are counted towards the crash rate at the intersection. According to VDOT's *Crash Data Analysis Manual*, Version 1, 250 feet is the typical intersection node off-set for network level screening. The crash history at each location was reviewed and broken down into the following categories:

- Primary Collision Type – The total number of crashes that occurred in each primary collision category at the study intersection are identified, then the number that occurred in each category by severity are tallied. The number of crashes in all the primary crash categories should sum up to the total number of crashes.

- Crash Severity – Determine the number of total crashes and a breakdown of crashes by severity broken down by the KABCO scale. The KABCO scale for crash severity defines levels of injury severity as follows:

  K (Fatal)
  A (Incapacitating Injury)
  B+C (Minor Injury)
  O (Property Damage Only)

If several people are injured in a crash, the most severe injury level is used to set crash severity. "K" Fatal injuries include deaths which occur within thirty days following injury in a motor vehicle crash. The crash severity by location is summarized on Table 5.

Table 4
Van Buren Road Extension

Crash Summary [1][2]

September 2015 - September 2020					Crash Severity			Collision Type					
Intersection	Legs	Control	Years Studied		Fatal & Injury	Property Damage Only (PDO)	Total	Rear End	Angle	Head On	Sideswipe	Pedestrian & Bicycle	Fixed Object
Dumfries Road/	4	Signalized	5		17	45	62	33	19	2	8	0	0
Van Buren Road/Old Stage Road				Crashes/Year	3.400	9.000	12.400	6.600	3.800	0.400	1.600	0.000	0.000
				Predicted Frequency	3.335	5.620	8.955	3.968	2.375	0.312	0.477	0.167	0.306
Cardinal Drive/	4	Signalized	5		7	11	18	8	6	0	0	0	4
Van Buren Road/Benita Fitzgerald Drive				Crashes/Year	1.400	2.200	3.600	1.600	1.200	0.000	0.000	0.000	0.800
				Predicted Frequency	2.151	3.843	5.994	2.613	1.550	0.203	0.306	0.159	0.248

Notes:

(1). Expected value data based on AASHTO's Highway Safety Manual as reported by the VDOT Extended HSM Spreadsheets.

(2) This analysis compares the most recent five years of crash data provided by VDOT.

Table 5
Van Buren Road Extension

Accident Analysis: KABCO Severity

September 2015 - September 2020	KABCO Severity Code					
Intersection	(K) Fatal	(A) Incapacitating Injury	(B) Non-incapacitating Injury	(C) Possible Injury	(O) No Injury	Total
Dumfries Road/ Van Buren Road/Old Stage Road	0	3	13	1	45	**62**
Cardinal Drive/ Van Buren Road/Benita Fitzgerald Drive	0	0	7	0	11	**18**

Collision Type. As shown on Table 4 over the past five years, a total of 80 incidents have occurred at the two (2) intersections. The highest accident location with 62 crashes occurred at the intersection #2, Dumfries Road/Van Buren Road. This location also had the highest number of accidents per year, 12.40. The intersection of Van Buren Road/Cardinal Drive/Benita Fitzgerald Drive experienced a relatively low number of accidents with 3.6 accidents per year.

The intersection of Van Buren Road/Cardinal Drive/Benita Fitzgerald Drive did not exhibit a relatively high number of incidents per year, based on VDOT's Extended HSM Spreadsheets, which incorporates the AASHTO Highway Safety Manual (HSM). This intersection experienced overall crashes below the expected number of incidents for these types of facilities.

At Dumfries Road/Van Buren Road, the majority of collisions were classified as rear end types. A review of the collision reports showed that the majority of rear end incidents at this location involved driver inattention with the following driver either failing to notice the lead driver stopped or the following driver accelerating too soon upon the signal indicating green.

Crash Severity. Although these intersections reveal some degree of injury associated with the crashes reported, the majority of the injuries were non-incapacitating. In Virginia, a non-incapacitating (or minor/possible) injury is defined as an injury that results in bruising, swelling, abrasions, limping, etc. Possible injuries include those that have a complaint of pain or momentary unconsciousness. As shown on Table 5, of the total number of accidents reported, only 3.8% (or 3) resulted in serious (incapacitating) injury and no fatalities were reported at any of the subject intersections.

With the signal phasing and timing adjustments, additional intersection capacity provided by the recommended intersection configuration, and the introduction of marked crosswalks, there should be no major safety concerns at the endpoints of the proposed Van Buren Road extension.

ENVIRONMENTAL TRAFFIC DATA

The traffic volume and geometric data collected and developed as part of this traffic analysis was used as inputs into the VDOT ENvironmental TRAffic Data Abstract (ENTRADA) worksheets which are used to standardize the data for air quality and noise analyses. The inputs for the ENTRADA worksheets include existing (baseline), opening year, and design year (build and no-build) AADT volumes, percent hourly traffic variation (K-factors), percent directional distribution (D-factors), percent of heavy vehicles (%HV), and basic roadway geometric parameters (e.g. number of lanes, lane widths, access density, terrain, and speed).

The ENTRADA data were developed using VDOT's online web tool which was used to generate a formatted spreadsheet in order to be used in generating noise and environmental reports. The ENTRADA output was submitted to the Project team for that purpose. A copy of the ENTRADA

output for Van Buren Road (under existing, no-build, and build conditions) is provided in Attachment 9.

SUMMARY

Based on the analyses documented herein, it is recommended that Option 2A (the "Preferred Alternative") proposed at the intersection of Dumfries Road/Van Buren Drive as described herein and depicted in Attachment 6, should be implemented in conjunction with the Van Buren Road Extension Project. Furthermore, the signal phasing proposed at the intersection of Van Buren Road/Cardinal Drive/Benita Fitzgerald Drive should also be implemented.

We trust that the analysis and information provided herein addresses the NEPA Traffic Analysis for the proposed Van Buren Road Extension Project. Any comments or questions on this memorandum should be directed to Will Johnson at wfjohnson@wellsandassociates.com or 703-676-3653.

Attachments: a/s

ATTACHMENT 1

WELLS + ASSOCIATES

MEMORANDUM

11220 Assett Loop
Suite 202,
Manassas, VA 20109
703-365-9262
WellsandAssociates.com

TO: Shelley Wynne, P.E.
Dewberry

FROM: William F. Johnson, P.E.
Lester E. Adkins, P.E.
Andrew C. Buntua, P.E.

SUBJECT: Van Buren Road Extension
Prince William County, Virginia

RE: NEPA Traffic Analysis – Scope of Work

DATE: November 18, 2020

INTRODUCTION

The purpose of this memorandum is to establish the scope of work for a Traffic Analysis associated with the preliminary design of a future roadway improvement (the "Project"); specifically, the extension of Van Buren Road. Dewberry will be leading the preparation of a National Environmental Policy Act (NEPA) Document with Wells + Associates preparing the Traffic Analysis ("TA") element of the NEPA Document.

VAN BUREN ROAD EXTENSION

The roadway alignment layout provided by Dewberry shows the design of Van Buren Road as a major collector typical section (four lanes, median divided) that will run approximately 2.7 miles from Dumfries Road (opposite existing Van Buren Road) north to Cardinal Drive (opposite existing Benita Fitzgerald Drive), inclusive of existing interim sections at both project endpoints. The proposed plan includes improvements at major signalized endpoint intersections. The overall project scope includes roadway concept preparation/refinement and some final design of the preferred alternative.

PROPOSED TRAFFIC ANALYSIS CONTENT

The content of this analysis will be based on the VDOT *Traffic Analyses to Support NEPA Studies Consultant Resource Guidance Document* (the "Guidance Document"), dated November 18, 2016. The TA will be based on the following:

Study Area. In coordination with VDOT, the TA will include an operational analysis within the study limits. Figure 1 shows the study area boundary and proposed key intersections in the project area under consideration for the traffic and operational analysis. These intersections include the following:

1. Dumfries Road/Van Buren Road
2. Cardinal Drive/Benita Fitzgerald Drive/Van Buren Road

Traffic Data Collection. Due to the impact of COVID-19 on local and regional travel behavior, commuting patterns and traffic volumes, the collection of new traffic counts to support traffic analyses has been suspended until further notice. Therefore W+A will collaborate with County and VDOT staff, as necessary, to determine what recent traffic count data exist for the Dumfries Road/Van Buren Road and Cardinal Drive/Benita Fitzgerald Drive/Van Buren Road intersections that will be used for the baseline (existing) conditions traffic analysis. The traffic count data source and methodology will be confirmed with VDOT and County staff.

Base Synchro files will be obtained from VDOT – Northern Region Operations (NRO) which will contain the most current signal timing/phasing plans for the approved study intersections.

Historic crash data will be obtained from VDOT for existing roadways within the immediate study area.

External Factors That Could Affect Project. Any planned road improvements, major closures, or other nearby developments which may affect the study area will be identified with County Staff and the Project team for inclusion in the Traffic Analysis, as may be appropriate.

Traffic Forecasting Methodology. The appropriate opening year and design year will be confirmed with County Staff and the Project team. Appropriate opening year and design year no-build and build traffic volumes will be obtained from Prince William County's travel demand model. Under no-build conditions, forecasts should account for other approved/funded transportation improvement projects that are anticipated to be constructed within the forecast horizon, referencing the Constrained Long-Range Plan (CLRP), as appropriate. Under build-out conditions, the traffic forecasts will account for the proposed Van Buren Road improvements, including the associated improvements at the Dumfries Road/Van Buren Road and Cardinal Drive/Benita Fitzgerald Drive/Van Buren Road intersections. Traffic forecasts should include the weekday AM and PM peak hours as well as the average annual daily traffic (AADT) estimates.

These forecasts may be further adjusted based on feedback from the County and VDOT prior to completing the analysis and report. Any post-processing will generally follow the procedure outlined in the NCHRP Report 765 *Analytical Travel Forecasting Approaches for Project-Level Planning and Design* and will entail a review of the existing traffic count data to refine the model forecasts, as necessary.

R:\PROJECTS\7944A PWC ON-CALL -- VAN BUREN ROAD EXTENSION\GRAPHICS\7944A SCOPING GRAPHICS.DWG

Figure 1
Study Area

XX Proposed Study Intersection

NORTH

Van Buren Road Extension
Prince William County, Virginia

Existing Conditions. Using Synchro, Version 10, the VDOT base Synchro files will be used to build the existing transportation network of the Project study area. This Synchro model will be used to perform an analysis of existing (2020) conditions for the study area during the weekday AM and PM peak hours. The analysis will follow the procedures outlined in the VDOT Traffic Operations and Safety Analysis Manual, Version 2.0 and will extract the following turning movement and aggregate Measures of Effectiveness ("MOEs") for the study intersections:

- Average Vehicle Delay
- 95th-Percentile Queue
- Level of Service

Future conditions without the Project. The Synchro model used to perform the existing conditions analysis will be modified to account for current relevant programmed/ approved/ funded improvement projects in order to perform the opening year and design year no-build analysis for weekday AM and PM peak hours. The MOEs will be extracted from the model and summarized.

Future conditions with the Project. The Synchro model will be modified to include the proposed Van Buren Road extension based on plans provided by Dewberry to perform the opening year and design year build analysis for weekday AM and PM peak hours. The MOEs will be extracted from the model and summarized.

Operational Analysis. The MOEs for the various conditions will be analyzed to determine the benefits of any potential improvements.

Traffic Report. The procedure, analyses, and results of the data collection, traffic forecasting, and traffic analysis items will be documented in a technical report or memorandum (the "Traffic Report") which will be included as part of the NEPA Document.

Crash analysis. The crash data obtained from VDOT will be reviewed and compared with expected crash values based on the use of the VDOT Extended Highway Safety Manual (HSM) Spreadsheets to determine any current adverse safety conditions within the immediate study network. The Traffic Report will include a summary and evaluation of the existing crash data as well as a qualitative discussion of the potential safety impacts of the proposed Van Buren roadway Project.

Environmental Traffic Data Reporting and Analysis. The traffic volume and geometric data collected and developed as part of this traffic analysis will be used to input the VDOT ENvironmental TRAffic Data Abstract (ENTRADA) worksheets which will be used to standardize the data for air quality and noise analyses. The inputs for the ENTRADA worksheets include existing (baseline), opening year, and design year (build and no-build) AADT volumes, percent

hourly traffic variation (K-factors), percent directional distribution (D-factors), percent of heavy vehicles (%HV), and basic roadway geometric parameters (e.g. number of lanes, lane widths, access density, terrain, and speed).

The ENTRADA worksheets will be included as an appendix to the Traffic Report.

SUMMARY

Wells + Associates requests VDOT and PWCDOT's concurrence with the proposed approach to developing the NEPA Traffic Analysis for the Van Buren Road extension Project as described herein. The Traffic Analysis document will follow VDOT guidance and the Applicant and its consultants will perform all related studies and design work associated with this effort.

Attachments: a/s

ATTACHMENT 2

Prince William County

Proposed Van Buren Road Concept Alignment

From Route 234 (Dumfries Road) to Cardinal Drive

July 2021

Project Location

Prince William County, VA

North Arrow & Scale

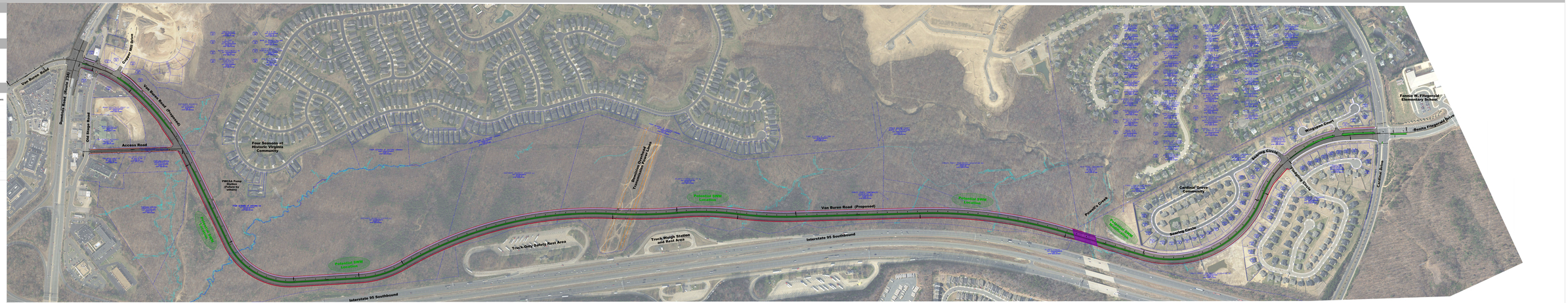
SCALE
0 500 1,000 2,000

Legend

- Existing Wetlands or Streams
- Existing Right of Way & Property Lines
- Conceptual Right of Way Limits
- Potential Stormwater Management Facility
- Proposed Travel Lanes
- Proposed Bridges
- Proposed Shared Use Path
- Proposed Sidewalk
- Proposed Grass Median/Buffer

Project Team Members:

Dewberry



Queues
1: Dumfries Rd & Four Seasons Dr.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	18	2890	30	22	2160	49	38	22	36	38	53
v/c Ratio	0.19	0.87	0.03	0.23	0.63	0.04	0.34	0.09	0.26	0.27	0.20
Control Delay	67.8	26.3	0.0	62.5	16.4	0.6	70.3	0.8	62.3	62.2	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	26.3	0.0	62.5	16.4	0.6	70.3	0.8	62.3	62.2	1.7
Queue Length 50th (ft)	16	861	0	20	234	0	34	0	33	35	0
Queue Length 95th (ft)	43	#1283	0	m33	428	m0	71	0	64	67	0
Internal Link Dist (ft)		1071			1361		306			408	
Turn Bay Length (ft)	400		375	430		475			275		
Base Capacity (vph)	112	3332	1135	109	3451	1170	165	281	277	290	384
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.87	0.03	0.20	0.63	0.04	0.23	0.08	0.13	0.13	0.14

Intersection Summary

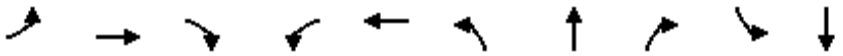
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Dumfries Rd & Four Seasons Dr.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	2659	28	20	1987	45	30	5	20	38	30	49
Future Volume (vph)	17	2659	28	20	1987	45	30	5	20	38	30	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.1	6.6	6.6	8.3	6.3	6.3		7.0	7.0	7.1	7.1	7.1
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.99	1.00
Satd. Flow (prot)	1770	4848	1583	1770	4848	1583		1785	1583	1681	1758	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.99	1.00
Satd. Flow (perm)	1770	4848	1583	1770	4848	1583		1785	1583	1681	1758	1583
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)	18	2890	30	22	2160	49	33	5	22	41	33	53
RTOR Reduction (vph)	0	0	11	0	0	17	0	0	21	0	0	49
Lane Group Flow (vph)	18	2890	19	22	2160	32	0	38	1	36	38	4
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases			6			2			3			4
Actuated Green, G (s)	3.3	88.7	88.7	4.8	90.7	90.7		7.5	7.5	10.0	10.0	10.0
Effective Green, g (s)	3.3	88.7	88.7	4.8	90.7	90.7		7.5	7.5	10.0	10.0	10.0
Actuated g/C Ratio	0.02	0.63	0.63	0.03	0.65	0.65		0.05	0.05	0.07	0.07	0.07
Clearance Time (s)	8.1	6.6	6.6	8.3	6.3	6.3		7.0	7.0	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	41	3071	1002	60	3140	1025		95	84	120	125	113
v/s Ratio Prot	0.01	c0.60		c0.01	0.45			c0.02		0.02	c0.02	
v/s Ratio Perm			0.01			0.02			0.00			0.00
v/c Ratio	0.44	0.94	0.02	0.37	0.69	0.03		0.40	0.01	0.30	0.30	0.03
Uniform Delay, d1	67.4	23.3	9.5	66.1	15.7	8.9		64.1	62.7	61.7	61.7	60.5
Progression Factor	1.00	1.00	1.00	0.92	0.96	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.3	7.3	0.0	2.9	1.0	0.0		2.8	0.1	1.4	1.4	0.1
Delay (s)	74.8	30.6	9.5	63.5	16.0	8.9		66.8	62.8	63.1	63.1	60.6
Level of Service	E	C	A	E	B	A		E	E	E	E	E
Approach Delay (s)		30.7			16.3			65.4			62.1	
Approach LOS		C			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	25.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	29.0
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues
2: Van Buren Rd/Old Stage Rd & Dumfries Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	27	2448	435	217	2057	59	59	217	82	125
v/c Ratio	0.26	1.01	0.44	0.77	0.65	0.47	0.46	0.45	0.58	0.65
Control Delay	62.2	45.4	6.4	87.8	9.6	73.5	73.1	28.0	77.8	46.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.2	45.4	6.4	87.8	9.6	73.5	73.1	28.0	77.8	46.3
Queue Length 50th (ft)	26	~896	52	199	217	55	54	101	73	53
Queue Length 95th (ft)	m31	#1066	m137	287	273	104	104	167	129	121
Internal Link Dist (ft)		940			1309		1346			140
Turn Bay Length (ft)	420		430	475		265				
Base Capacity (vph)	115	2422	984	303	3167	208	210	496	169	218
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	0.23	1.01	0.44	0.72	0.65	0.28	0.28	0.44	0.49	0.57

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2: Van Buren Rd/Old Stage Rd & Dumfries Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	2252	400	200	1860	32	100	8	200	75	35	80
Future Volume (vph)	25	2252	400	200	1860	32	100	8	200	75	35	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	6.4	7.8	6.1		7.6	7.6	7.8	6.5	6.5	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1752	4799	1567	1787	4888		1681	1698	1583	1761	1660	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1752	4799	1567	1787	4888		1681	1698	1583	1761	1660	
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)	27	2448	435	217	2022	35	109	9	217	82	38	87
RTOR Reduction (vph)	0	0	197	0	1	0	0	0	60	0	60	0
Lane Group Flow (vph)	27	2448	238	217	2056	0	59	59	157	82	65	0
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	pm+ov	Split	NA	
Protected Phases	1	6		5	2		4	4	5	3	3	
Permitted Phases			6						4			
Actuated Green, G (s)	5.4	69.2	69.2	22.1	86.0		9.1	9.1	31.2	11.3	11.3	
Effective Green, g (s)	5.4	69.2	69.2	22.1	86.0		9.1	9.1	31.2	11.3	11.3	
Actuated g/C Ratio	0.04	0.49	0.49	0.16	0.61		0.06	0.06	0.22	0.08	0.08	
Clearance Time (s)	8.0	6.4	6.4	7.8	6.1		7.6	7.6	7.8	6.5	6.5	
Vehicle Extension (s)	3.0	4.0	4.0	3.5	4.0		3.0	3.0	3.5	3.0	3.0	
Lane Grp Cap (vph)	67	2372	774	282	3002		109	110	352	142	133	
v/s Ratio Prot	0.02	c0.51		c0.12	c0.42		c0.04	0.03	0.07	c0.05	0.04	
v/s Ratio Perm			0.15						0.03			
v/c Ratio	0.40	1.03	0.31	0.77	0.68		0.54	0.54	0.45	0.58	0.49	
Uniform Delay, d1	65.7	35.4	21.1	56.5	18.0		63.4	63.4	46.9	62.0	61.6	
Progression Factor	0.94	0.81	1.47	1.27	0.47		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.0	22.3	0.5	11.1	1.2		5.4	5.0	1.1	5.6	2.8	
Delay (s)	63.7	50.9	31.4	82.9	9.5		68.8	68.4	48.0	67.6	64.4	
Level of Service	E	D	C	F	A		E	E	D	E	E	
Approach Delay (s)		48.1			16.5			55.3			65.7	
Approach LOS		D			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	36.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	82.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Queues
3: I-95 SB Entrance Ramp & Dumfries Rd

Lane Group	EBT	EBR	WBL	WBT
Lane Group Flow (vph)	1834	942	330	2301
v/c Ratio	0.57	0.62	0.79	0.47
Control Delay	6.2	8.8	47.3	1.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	6.2	8.8	47.3	1.5
Queue Length 50th (ft)	62	335	230	46
Queue Length 95th (ft)	m275	m441	206	58
Internal Link Dist (ft)	1309			2173
Turn Bay Length (ft)		1000	1000	
Base Capacity (vph)	3202	1517	692	4872
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.57	0.62	0.48	0.47

Intersection Summary

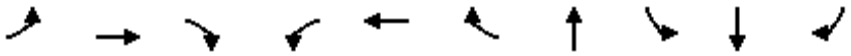
m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1687	867	304	2117	0	0
Future Volume (vph)	1687	867	304	2117	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-1%			-1%	0%	
Total Lost time (s)	5.8	4.0	7.8	7.0		
Lane Util. Factor	0.91	1.00	1.00	0.91		
Frt	1.00	0.85	1.00	1.00		
Flt Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	4872	1517	1695	4872		
Flt Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	4872	1517	1695	4872		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1834	942	330	2301	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1834	942	330	2301	0	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%
Turn Type	NA	Free	Prot	NA		
Protected Phases	6		5	2		
Permitted Phases		Free				
Actuated Green, G (s)	92.0	140.0	34.4	140.0		
Effective Green, g (s)	92.0	140.0	34.4	140.0		
Actuated g/C Ratio	0.66	1.00	0.25	1.00		
Clearance Time (s)	5.8		7.8	7.0		
Vehicle Extension (s)	3.0		4.0	3.0		
Lane Grp Cap (vph)	3201	1517	416	4872		
v/s Ratio Prot	0.38		c0.19	0.47		
v/s Ratio Perm		c0.62				
v/c Ratio	0.57	0.62	0.79	0.47		
Uniform Delay, d1	13.2	0.0	49.5	0.0		
Progression Factor	0.42	1.00	0.68	1.00		
Incremental Delay, d2	0.3	0.7	10.3	0.3		
Delay (s)	5.8	0.7	44.1	0.3		
Level of Service	A	A	D	A		
Approach Delay (s)	4.1			5.8	0.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	13.6
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues
4: Van Buren Road/Benita Fitzgerald Drive & Cardinal Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	474	375	22	47	382	352	135	291	11	241
v/c Ratio	0.71	0.31	0.04	0.33	0.56	0.46	0.56	0.49	0.03	0.28
Control Delay	48.9	29.4	0.1	61.0	44.5	3.3	53.8	44.2	41.7	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.9	29.4	0.1	61.0	44.5	3.3	53.8	44.2	41.7	3.3
Queue Length 50th (ft)	139	93	0	28	115	0	73	86	6	0
Queue Length 95th (ft)	314	202	0	94	241	29	202	175	27	47
Internal Link Dist (ft)		6294			2111		682		816	
Turn Bay Length (ft)	350		410	390		400		400		400
Base Capacity (vph)	1016	2130	1004	354	1807	1091	524	1562	847	926
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	0.47	0.18	0.02	0.13	0.21	0.32	0.26	0.19	0.01	0.26

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Van Buren Road/Benita Fitzgerald Drive & Cardinal Drive

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	436	345	20	16	28	351	324	42	48	34	268	10
Future Volume (vph)	436	345	20	16	28	351	324	42	48	34	268	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%				-1%			0%			-3%
Total Lost time (s)	8.0	5.5	5.5		8.5	6.0	9.0		8.0		9.0	9.0
Lane Util. Factor	0.97	0.95	1.00		1.00	0.95	1.00		1.00		0.97	1.00
Frt	1.00	1.00	0.85		1.00	1.00	0.85		0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00	1.00		0.98		0.95	1.00
Satd. Flow (prot)	3399	3504	1567		1778	3557	1591		1764		3485	1891
Flt Permitted	0.95	1.00	1.00		0.95	1.00	1.00		0.98		0.95	1.00
Satd. Flow (perm)	3399	3504	1567		1778	3557	1591		1764		3485	1891
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)	474	375	22	17	30	382	352	46	52	37	291	11
RTOR Reduction (vph)	0	0	14	0	0	0	218	0	8	0	0	0
Lane Group Flow (vph)	474	375	8	0	47	382	134	0	127	0	291	11
Turn Type	Prot	NA	Perm	Prot	Prot	NA	pm+ov	Split	NA		Split	NA
Protected Phases	5	2		1	1	6	4	3	3		4	4
Permitted Phases			2				6					
Actuated Green, G (s)	21.0	36.9	36.9		6.8	22.7	40.7		14.3		18.0	18.0
Effective Green, g (s)	21.0	36.9	36.9		6.8	22.7	40.7		14.3		18.0	18.0
Actuated g/C Ratio	0.20	0.34	0.34		0.06	0.21	0.38		0.13		0.17	0.17
Clearance Time (s)	8.0	5.5	5.5		8.5	6.0	9.0		8.0		9.0	9.0
Vehicle Extension (s)	2.0	3.0	3.0		2.0	3.0	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	667	1208	540		112	754	605		235		586	318
v/s Ratio Prot	c0.14	0.11			0.03	c0.11	0.04		c0.07		c0.08	0.01
v/s Ratio Perm			0.00				0.05					
v/c Ratio	0.71	0.31	0.01		0.42	0.51	0.22		0.54		0.50	0.03
Uniform Delay, d1	40.2	25.7	23.1		48.2	37.2	22.4		43.3		40.4	37.2
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00
Incremental Delay, d2	3.0	0.1	0.0		0.9	0.5	0.2		2.5		0.7	0.0
Delay (s)	43.1	25.9	23.1		49.1	37.7	22.6		45.8		41.1	37.3
Level of Service	D	C	C		D	D	C		D		D	D
Approach Delay (s)		35.2				31.6			45.8			32.9
Approach LOS		D				C			D			C

Intersection Summary			
HCM 2000 Control Delay	34.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	107.0	Sum of lost time (s)	31.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	222
Future Volume (vph)	222
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	8.0
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1607
Flt Permitted	1.00
Satd. Flow (perm)	1607
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	241
RTOR Reduction (vph)	153
Lane Group Flow (vph)	88
Turn Type	pm+ov
Protected Phases	5
Permitted Phases	4
Actuated Green, G (s)	39.0
Effective Green, g (s)	39.0
Actuated g/C Ratio	0.36
Clearance Time (s)	8.0
Vehicle Extension (s)	2.0
Lane Grp Cap (vph)	585
v/s Ratio Prot	0.03
v/s Ratio Perm	0.03
v/c Ratio	0.15
Uniform Delay, d1	22.9
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	22.9
Level of Service	C
Approach Delay (s)	
Approach LOS	

Intersection Summary

Queues
1: Dumfries Rd & Four Seasons Dr.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	47	2098	12	24	2740	84	34	18	27	27	43
v/c Ratio	0.41	0.63	0.01	0.24	0.85	0.08	0.31	0.08	0.21	0.21	0.17
Control Delay	72.4	18.5	0.0	72.0	11.1	0.1	69.7	0.6	61.6	61.5	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.4	18.5	0.0	72.0	11.1	0.1	69.7	0.6	61.6	61.5	1.4
Queue Length 50th (ft)	42	436	0	21	163	0	30	0	25	25	0
Queue Length 95th (ft)	84	703	0	m24	m#1112	m0	67	0	53	53	0
Internal Link Dist (ft)		1071			1361		306			408	
Turn Bay Length (ft)	400		375	430		475			275		
Base Capacity (vph)	150	3354	1142	147	3215	1100	191	301	274	276	381
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.63	0.01	0.16	0.85	0.08	0.18	0.06	0.10	0.10	0.11

Intersection Summary

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

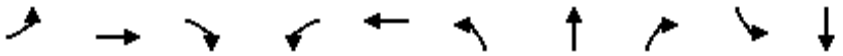
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Dumfries Rd & Four Seasons Dr.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	1930	11	22	2521	77	28	4	17	48	2	40
Future Volume (vph)	43	1930	11	22	2521	77	28	4	17	48	2	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.1	6.6	6.6	8.3	6.3	6.3		7.0	7.0	7.1	7.1	7.1
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.96	1.00
Satd. Flow (prot)	1770	4848	1583	1770	4848	1583		1784	1583	1681	1691	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.96	1.00
Satd. Flow (perm)	1770	4848	1583	1770	4848	1583		1784	1583	1681	1691	1583
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)	47	2098	12	24	2740	84	30	4	18	52	2	43
RTOR Reduction (vph)	0	0	4	0	0	32	0	0	17	0	0	40
Lane Group Flow (vph)	47	2098	8	24	2740	52	0	34	1	27	27	3
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases			6			2			3			4
Actuated Green, G (s)	7.8	89.4	89.4	5.1	87.2	87.2		7.2	7.2	9.3	9.3	9.3
Effective Green, g (s)	7.8	89.4	89.4	5.1	87.2	87.2		7.2	7.2	9.3	9.3	9.3
Actuated g/C Ratio	0.06	0.64	0.64	0.04	0.62	0.62		0.05	0.05	0.07	0.07	0.07
Clearance Time (s)	8.1	6.6	6.6	8.3	6.3	6.3		7.0	7.0	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	98	3095	1010	64	3019	985		91	81	111	112	105
v/s Ratio Prot	c0.03	0.43		0.01	c0.57			c0.02		c0.02	0.02	
v/s Ratio Perm			0.00			0.03			0.00			0.00
v/c Ratio	0.48	0.68	0.01	0.38	0.91	0.05		0.37	0.01	0.24	0.24	0.03
Uniform Delay, d1	64.1	16.1	9.2	65.9	22.9	10.3		64.2	63.0	62.0	62.0	61.1
Progression Factor	1.00	1.00	1.00	1.11	0.31	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.7	1.2	0.0	1.3	1.9	0.0		2.6	0.1	1.1	1.1	0.1
Delay (s)	67.8	17.3	9.2	74.5	8.9	10.3		66.8	63.1	63.2	63.1	61.2
Level of Service	E	B	A	E	A	B		E	E	E	E	E
Approach Delay (s)		18.4			9.5			65.5			62.3	
Approach LOS		B			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	29.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues
2: Van Buren Rd/Old Stage Rd & Dumfries Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	35	1572	467	263	2422	183	182	238	66	217
v/c Ratio	0.35	0.91	0.54	0.85	1.00	0.77	0.76	0.35	0.30	0.93
Control Delay	49.6	60.9	20.2	86.7	44.3	78.5	77.5	11.0	59.8	99.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.6	60.9	20.2	86.7	44.3	78.5	77.5	11.0	59.8	99.4
Queue Length 50th (ft)	31	394	96	241	~866	170	169	46	56	185
Queue Length 95th (ft)	m48	#687	333	#365	#1017	253	252	106	105	#346
Internal Link Dist (ft)		940			1309		1346			140
Turn Bay Length (ft)	420		430	475		265				
Base Capacity (vph)	112	1720	861	334	2424	292	294	704	220	233
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	0.31	0.91	0.54	0.79	1.00	0.63	0.62	0.34	0.30	0.93

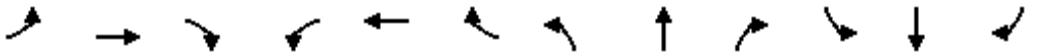
Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2: Van Buren Rd/Old Stage Rd & Dumfries Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	1446	430	242	2204	24	324	12	219	61	130	70
Future Volume (vph)	32	1446	430	242	2204	24	324	12	219	61	130	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	6.4	7.8	6.1		7.6	7.6	7.8	6.5	6.5	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1752	4799	1567	1787	4891		1681	1691	1583	1761	1756	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1752	4799	1567	1787	4891		1681	1691	1583	1761	1756	
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)	35	1572	467	263	2396	26	352	13	238	66	141	76
RTOR Reduction (vph)	0	0	300	0	1	0	0	0	109	0	14	0
Lane Group Flow (vph)	35	1572	167	263	2421	0	183	182	129	66	203	0
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	pm+ov	Split	NA	
Protected Phases	1	6		5	2		4	4	5	3	3	
Permitted Phases			6						4			
Actuated Green, G (s)	6.7	50.2	50.2	24.2	67.8		19.8	19.8	44.0	17.5	17.5	
Effective Green, g (s)	6.7	50.2	50.2	24.2	67.8		19.8	19.8	44.0	17.5	17.5	
Actuated g/C Ratio	0.05	0.36	0.36	0.17	0.48		0.14	0.14	0.31	0.12	0.12	
Clearance Time (s)	8.0	6.4	6.4	7.8	6.1		7.6	7.6	7.8	6.5	6.5	
Vehicle Extension (s)	3.0	4.0	4.0	3.5	4.0		3.0	3.0	3.5	3.0	3.0	
Lane Grp Cap (vph)	83	1720	561	308	2368		237	239	497	220	219	
v/s Ratio Prot	0.02	0.33		c0.15	c0.50		c0.11	0.11	0.04	0.04	c0.12	
v/s Ratio Perm			0.11						0.04			
v/c Ratio	0.42	0.91	0.30	0.85	1.02		0.77	0.76	0.26	0.30	0.93	
Uniform Delay, d1	64.8	42.8	32.3	56.2	36.1		57.9	57.8	35.8	55.7	60.6	
Progression Factor	0.66	1.25	5.82	1.17	0.74		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.7	7.4	1.1	17.6	22.9		14.4	13.3	0.3	0.8	40.7	
Delay (s)	45.7	61.1	188.7	83.5	49.5		72.3	71.2	36.2	56.5	101.3	
Level of Service	D	E	F	F	D		E	E	D	E	F	
Approach Delay (s)		89.5			52.8			57.7			90.8	
Approach LOS		F			D			E			F	

Intersection Summary			
HCM 2000 Control Delay	68.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	92.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Queues
3: I-95 SB Entrance Ramp & Dumfries Rd

Lane Group	EBT	EBR	WBL	WBT
Lane Group Flow (vph)	1500	408	163	2718
v/c Ratio	0.41	0.27	0.67	0.56
Control Delay	0.8	0.2	76.8	2.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	0.8	0.2	76.8	2.3
Queue Length 50th (ft)	15	0	133	102
Queue Length 95th (ft)	21	m0	182	68
Internal Link Dist (ft)	1309			2173
Turn Bay Length (ft)		1000	1000	
Base Capacity (vph)	3700	1517	329	4872
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.41	0.27	0.50	0.56

Intersection Summary

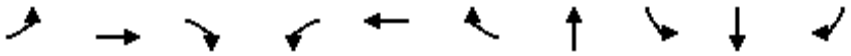
m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1380	375	150	2501	0	0
Future Volume (vph)	1380	375	150	2501	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-1%			-1%	0%	
Total Lost time (s)	5.8	4.0	7.8	7.0		
Lane Util. Factor	0.91	1.00	1.00	0.91		
Frt	1.00	0.85	1.00	1.00		
Flt Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	4872	1517	1695	4872		
Flt Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	4872	1517	1695	4872		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1500	408	163	2718	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1500	408	163	2718	0	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%
Turn Type	NA	Free	Prot	NA		
Protected Phases	6		5	2		
Permitted Phases		Free				
Actuated Green, G (s)	106.3	140.0	20.1	140.0		
Effective Green, g (s)	106.3	140.0	20.1	140.0		
Actuated g/C Ratio	0.76	1.00	0.14	1.00		
Clearance Time (s)	5.8		7.8	7.0		
Vehicle Extension (s)	3.0		4.0	3.0		
Lane Grp Cap (vph)	3699	1517	243	4872		
v/s Ratio Prot	0.31		0.10	c0.56		
v/s Ratio Perm		0.27				
v/c Ratio	0.41	0.27	0.67	0.56		
Uniform Delay, d1	5.9	0.0	56.8	0.0		
Progression Factor	0.10	1.00	1.12	1.00		
Incremental Delay, d2	0.2	0.2	7.6	0.5		
Delay (s)	0.8	0.2	71.3	0.5		
Level of Service	A	A	E	A		
Approach Delay (s)	0.7			4.5	0.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	13.6
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
4: Van Buren Road/Benita Fitzgerald Drive & Cardinal Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	349	642	27	22	670	270	66	622	54	458
v/c Ratio	0.66	0.43	0.04	0.19	0.72	0.28	0.41	0.68	0.11	0.47
Control Delay	57.9	29.6	0.1	69.0	47.6	1.8	59.6	46.7	39.9	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.9	29.6	0.1	69.0	47.6	1.8	59.6	46.7	39.9	6.3
Queue Length 50th (ft)	134	207	0	17	253	0	41	229	33	38
Queue Length 95th (ft)	239	331	0	55	410	24	110	374	82	134
Internal Link Dist (ft)		6294			2111		682		816	
Turn Bay Length (ft)	350		410	390		400		400		400
Base Capacity (vph)	901	1872	898	314	1572	1092	472	1386	752	998
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	0.39	0.34	0.03	0.07	0.43	0.25	0.14	0.45	0.07	0.46

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Van Buren Road/Benita Fitzgerald Drive & Cardinal Drive

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	321	591	25	20	616	248	20	20	20	572	50	421
Future Volume (vph)	321	591	25	20	616	248	20	20	20	572	50	421
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-1%			0%			-3%	
Total Lost time (s)	8.0	5.5	5.5	8.5	6.0	9.0		8.0		9.0	9.0	8.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00		1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98		0.95	1.00	1.00
Satd. Flow (prot)	3399	3504	1567	1778	3557	1591		1750		3485	1891	1607
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.98		0.95	1.00	1.00
Satd. Flow (perm)	3399	3504	1567	1778	3557	1591		1750		3485	1891	1607
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)	349	642	27	22	670	270	22	22	22	622	54	458
RTOR Reduction (vph)	0	0	16	0	0	124	0	11	0	0	0	220
Lane Group Flow (vph)	349	642	11	22	670	146	0	55	0	622	54	238
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Split	NA		Split	NA	pm+ov
Protected Phases	5	2		1	6	4	3	3		4	4	5
Permitted Phases			2			6						4
Actuated Green, G (s)	18.9	51.2	51.2	4.0	36.3	67.9		8.1		31.6	31.6	50.5
Effective Green, g (s)	18.9	51.2	51.2	4.0	36.3	67.9		8.1		31.6	31.6	50.5
Actuated g/C Ratio	0.15	0.41	0.41	0.03	0.29	0.54		0.06		0.25	0.25	0.40
Clearance Time (s)	8.0	5.5	5.5	8.5	6.0	9.0		8.0		9.0	9.0	8.0
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0	3.0		3.0		3.0	3.0	2.0
Lane Grp Cap (vph)	510	1424	637	56	1025	858		112		874	474	644
v/s Ratio Prot	c0.10	0.18		0.01	c0.19	0.04		c0.03		c0.18	0.03	0.06
v/s Ratio Perm			0.01			0.05						0.09
v/c Ratio	0.68	0.45	0.02	0.39	0.65	0.17		0.49		0.71	0.11	0.37
Uniform Delay, d1	50.7	27.1	22.3	59.8	39.3	14.7		56.9		43.0	36.4	26.5
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	3.0	0.2	0.0	1.7	1.5	0.1		3.3		2.8	0.1	0.1
Delay (s)	53.7	27.4	22.3	61.4	40.8	14.8		60.2		45.8	36.5	26.6
Level of Service	D	C	C	E	D	B		E		D	D	C
Approach Delay (s)		36.3			34.0			60.2			37.6	
Approach LOS		D			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	36.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	125.9	Sum of lost time (s)	31.0
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Dumfries Rd & Four Seasons Dr.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	18	2115	30	22	1996	49	38	22	36	38	53
v/c Ratio	0.19	0.63	0.03	0.23	0.58	0.04	0.34	0.09	0.26	0.27	0.20
Control Delay	67.8	19.1	0.0	66.2	13.9	0.5	70.3	0.8	62.3	62.2	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	19.1	0.0	66.2	13.9	0.5	70.3	0.8	62.3	62.2	1.7
Queue Length 50th (ft)	16	451	0	21	159	0	34	0	33	35	0
Queue Length 95th (ft)	43	721	0	m36	380	m2	71	0	64	67	0
Internal Link Dist (ft)		1071			1361		306			408	
Turn Bay Length (ft)	400		375	430		475			275		
Base Capacity (vph)	112	3332	1135	109	3451	1170	165	281	277	290	384
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.63	0.03	0.20	0.58	0.04	0.23	0.08	0.13	0.13	0.14

Intersection Summary

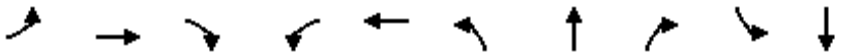
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Dumfries Rd & Four Seasons Dr.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	1946	28	20	1836	45	30	5	20	38	30	49
Future Volume (vph)	17	1946	28	20	1836	45	30	5	20	38	30	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.1	6.6	6.6	8.3	6.3	6.3		7.0	7.0	7.1	7.1	7.1
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.99	1.00
Satd. Flow (prot)	1770	4848	1583	1770	4848	1583		1785	1583	1681	1758	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.99	1.00
Satd. Flow (perm)	1770	4848	1583	1770	4848	1583		1785	1583	1681	1758	1583
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)	18	2115	30	22	1996	49	33	5	22	41	33	53
RTOR Reduction (vph)	0	0	11	0	0	17	0	0	21	0	0	49
Lane Group Flow (vph)	18	2115	19	22	1996	32	0	38	1	36	38	4
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases			6			2			3			4
Actuated Green, G (s)	3.3	88.7	88.7	4.8	90.7	90.7		7.5	7.5	10.0	10.0	10.0
Effective Green, g (s)	3.3	88.7	88.7	4.8	90.7	90.7		7.5	7.5	10.0	10.0	10.0
Actuated g/C Ratio	0.02	0.63	0.63	0.03	0.65	0.65		0.05	0.05	0.07	0.07	0.07
Clearance Time (s)	8.1	6.6	6.6	8.3	6.3	6.3		7.0	7.0	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	41	3071	1002	60	3140	1025		95	84	120	125	113
v/s Ratio Prot	0.01	c0.44		c0.01	0.41			c0.02		0.02	c0.02	
v/s Ratio Perm			0.01			0.02			0.00			0.00
v/c Ratio	0.44	0.69	0.02	0.37	0.64	0.03		0.40	0.01	0.30	0.30	0.03
Uniform Delay, d1	67.4	16.7	9.5	66.1	14.8	8.9		64.1	62.7	61.7	61.7	60.5
Progression Factor	1.00	1.00	1.00	0.97	0.86	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.3	1.3	0.0	3.1	0.8	0.0		2.8	0.1	1.4	1.4	0.1
Delay (s)	74.8	18.0	9.5	67.3	13.5	8.9		66.8	62.8	63.1	63.1	60.6
Level of Service	E	B	A	E	B	A		E	E	E	E	E
Approach Delay (s)		18.3			14.0			65.4			62.1	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	29.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
2: Van Buren Rd/Old Stage Rd & Dumfries Rd

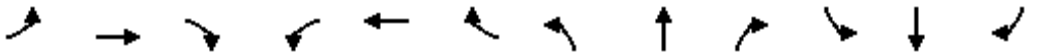


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	21	1821	323	102	1881	98	97	220	29	46
v/c Ratio	0.22	0.67	0.32	0.58	0.59	0.60	0.60	0.44	0.28	0.36
Control Delay	67.2	17.8	4.1	86.4	9.0	75.6	74.7	17.4	69.2	35.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.2	17.8	4.1	86.4	9.0	75.6	74.7	17.4	69.2	35.8
Queue Length 50th (ft)	20	150	0	95	183	91	90	57	26	12
Queue Length 95th (ft)	m33	325	116	154	241	152	150	122	60	54
Internal Link Dist (ft)		940			1309		1346			140
Turn Bay Length (ft)	420		430	475		265				
Base Capacity (vph)	113	2698	1022	283	3176	211	213	587	169	189
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	0.19	0.67	0.32	0.36	0.59	0.46	0.46	0.37	0.17	0.24

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2: Van Buren Rd/Old Stage Rd & Dumfries Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	1675	297	94	1703	28	169	10	202	27	13	29
Future Volume (vph)	19	1675	297	94	1703	28	169	10	202	27	13	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	6.4	7.8	6.1		7.6	7.6	7.8	6.5	6.5	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1752	4799	1567	1787	4888		1681	1694	1583	1761	1660	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1752	4799	1567	1787	4888		1681	1694	1583	1761	1660	
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)	21	1821	323	102	1851	30	184	11	220	29	14	32
RTOR Reduction (vph)	0	0	144	0	1	0	0	0	113	0	30	0
Lane Group Flow (vph)	21	1821	179	102	1880	0	98	97	107	29	16	0
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	pm+ov	Split	NA	
Protected Phases	1	6		5	2		4	4	5	3	3	
Permitted Phases			6						4			
Actuated Green, G (s)	5.0	77.4	77.4	13.9	86.4		13.5	13.5	27.4	6.9	6.9	
Effective Green, g (s)	5.0	77.4	77.4	13.9	86.4		13.5	13.5	27.4	6.9	6.9	
Actuated g/C Ratio	0.04	0.55	0.55	0.10	0.62		0.10	0.10	0.20	0.05	0.05	
Clearance Time (s)	8.0	6.4	6.4	7.8	6.1		7.6	7.6	7.8	6.5	6.5	
Vehicle Extension (s)	3.0	4.0	4.0	3.5	4.0		3.0	3.0	3.5	3.0	3.0	
Lane Grp Cap (vph)	62	2653	866	177	3016		162	163	309	86	81	
v/s Ratio Prot	0.01	c0.38		c0.06	c0.38		c0.06	0.06	0.03	c0.02	0.01	
v/s Ratio Perm			0.11						0.03			
v/c Ratio	0.34	0.69	0.21	0.58	0.62		0.60	0.60	0.34	0.34	0.19	
Uniform Delay, d1	65.9	22.6	15.8	60.2	16.7		60.7	60.6	48.6	64.3	63.9	
Progression Factor	1.00	0.69	1.58	1.23	0.48		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.5	1.2	0.4	4.8	1.0		6.2	5.7	0.8	2.3	1.2	
Delay (s)	68.5	16.8	25.4	79.1	8.9		66.9	66.4	49.4	66.7	65.0	
Level of Service	E	B	C	E	A		E	E	D	E	E	
Approach Delay (s)		18.5			12.5			57.5			65.7	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues
3: I-95 SB Entrance Ramp & Dumfries Rd

Lane Group	EBT	EBR	WBL	WBT
Lane Group Flow (vph)	1117	952	365	1253
v/c Ratio	0.36	0.63	0.81	0.26
Control Delay	7.7	9.6	36.1	0.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	7.7	9.6	36.1	0.1
Queue Length 50th (ft)	95	249	179	0
Queue Length 95th (ft)	184	551	122	0
Internal Link Dist (ft)	1309			2173
Turn Bay Length (ft)		1000	1000	
Base Capacity (vph)	3099	1517	692	4872
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.36	0.63	0.53	0.26

Intersection Summary

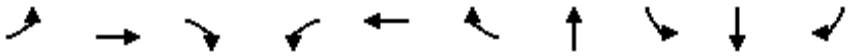
HCM Signalized Intersection Capacity Analysis
3: I-95 SB Entrance Ramp & Dumfries Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1028	876	336	1153	0	0
Future Volume (vph)	1028	876	336	1153	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-1%			-1%	0%	
Total Lost time (s)	5.8	4.0	7.8	7.0		
Lane Util. Factor	0.91	1.00	1.00	0.91		
Frt	1.00	0.85	1.00	1.00		
Flt Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	4872	1517	1695	4872		
Flt Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	4872	1517	1695	4872		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1117	952	365	1253	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1117	952	365	1253	0	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%
Turn Type	NA	Free	Prot	NA		
Protected Phases	6		5	2		
Permitted Phases		Free				
Actuated Green, G (s)	89.1	140.0	37.3	140.0		
Effective Green, g (s)	89.1	140.0	37.3	140.0		
Actuated g/C Ratio	0.64	1.00	0.27	1.00		
Clearance Time (s)	5.8		7.8	7.0		
Vehicle Extension (s)	3.0		4.0	3.0		
Lane Grp Cap (vph)	3100	1517	451	4872		
v/s Ratio Prot	0.23		c0.22	0.26		
v/s Ratio Perm		c0.63				
v/c Ratio	0.36	0.63	0.81	0.26		
Uniform Delay, d1	12.0	0.0	48.0	0.0		
Progression Factor	0.58	1.00	0.48	1.00		
Incremental Delay, d2	0.3	1.5	10.1	0.1		
Delay (s)	7.2	1.5	33.1	0.1		
Level of Service	A	A	C	A		
Approach Delay (s)	4.6			7.6	0.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	5.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	13.6
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

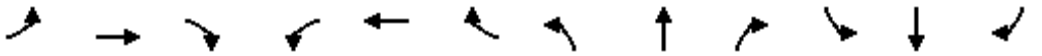
Queues
4: Van Buren Road/Benita Fitzgerald Drive & Cardinal Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	385	304	17	17	221	204	20	210	5	75
v/c Ratio	0.61	0.16	0.02	0.09	0.25	0.24	0.11	0.33	0.01	0.09
Control Delay	37.7	14.6	0.1	48.2	28.9	2.1	41.4	31.4	32.0	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.7	14.6	0.1	48.2	28.9	2.1	41.4	31.4	32.0	4.0
Queue Length 50th (ft)	66	23	0	6	35	0	5	36	2	0
Queue Length 95th (ft)	230	137	0	42	124	23	42	111	14	25
Internal Link Dist (ft)		6294			2111		682		816	
Turn Bay Length (ft)	350		410	390		400		400		400
Base Capacity (vph)	1452	2923	1329	506	2584	1231	746	2233	1212	1132
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	0.27	0.10	0.01	0.03	0.09	0.17	0.03	0.09	0.00	0.07

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Van Buren Road/Benita Fitzgerald Drive & Cardinal Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	354	280	16	16	203	188	6	7	5	193	5	69
Future Volume (vph)	354	280	16	16	203	188	6	7	5	193	5	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-1%			0%			-3%	
Total Lost time (s)	8.0	5.5	5.5	8.5	6.0	9.0		8.0		9.0	9.0	8.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00		1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98		0.95	1.00	1.00
Satd. Flow (prot)	3399	3504	1567	1778	3557	1591		1769		3485	1891	1607
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.98		0.95	1.00	1.00
Satd. Flow (perm)	3399	3504	1567	1778	3557	1591		1769		3485	1891	1607
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)	385	304	17	17	221	204	7	8	5	210	5	75
RTOR Reduction (vph)	0	0	9	0	0	108	0	5	0	0	0	51
Lane Group Flow (vph)	385	304	8	17	221	96	0	15	0	210	5	24
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Split	NA		Split	NA	pm+ov
Protected Phases	5	2		1	6	4	3	3		4	4	5
Permitted Phases			2			6						4
Actuated Green, G (s)	14.8	42.0	42.0	0.9	28.1	42.5		2.4		14.4	14.4	29.2
Effective Green, g (s)	14.8	42.0	42.0	0.9	28.1	42.5		2.4		14.4	14.4	29.2
Actuated g/C Ratio	0.16	0.46	0.46	0.01	0.31	0.47		0.03		0.16	0.16	0.32
Clearance Time (s)	8.0	5.5	5.5	8.5	6.0	9.0		8.0		9.0	9.0	8.0
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0	3.0		3.0		3.0	3.0	2.0
Lane Grp Cap (vph)	554	1622	725	17	1102	745		46		553	300	517
v/s Ratio Prot	c0.11	c0.09		0.01	0.06	0.02		c0.01		c0.06	0.00	0.01
v/s Ratio Perm			0.01			0.04						0.01
v/c Ratio	0.69	0.19	0.01	1.00	0.20	0.13		0.33		0.38	0.02	0.05
Uniform Delay, d1	35.8	14.3	13.1	44.9	23.0	13.6		43.4		34.2	32.2	21.2
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	3.1	0.1	0.0	218.3	0.1	0.1		4.2		0.4	0.0	0.0
Delay (s)	38.9	14.4	13.1	263.2	23.1	13.7		47.5		34.6	32.2	21.2
Level of Service	D	B	B	F	C	B		D		C	C	C
Approach Delay (s)		27.7			28.0			47.5			31.1	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	28.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	90.7	Sum of lost time (s)	31.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Dumfries Rd & Four Seasons Dr.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	47	2489	12	24	2870	84	34	18	27	27	43
v/c Ratio	0.41	0.74	0.01	0.24	0.89	0.08	0.31	0.08	0.21	0.21	0.17
Control Delay	72.4	21.4	0.0	75.2	10.3	0.0	69.7	0.6	61.6	61.5	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.4	21.4	0.0	75.2	10.3	0.0	69.7	0.6	61.6	61.5	1.4
Queue Length 50th (ft)	42	603	0	22	127	0	30	0	25	25	0
Queue Length 95th (ft)	84	#1005	0	m24	m#1103	m0	67	0	53	53	0
Internal Link Dist (ft)		1071			1361		306			408	
Turn Bay Length (ft)	400		375	430		475			275		
Base Capacity (vph)	150	3354	1142	147	3215	1100	191	301	274	276	381
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.74	0.01	0.16	0.89	0.08	0.18	0.06	0.10	0.10	0.11

Intersection Summary

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

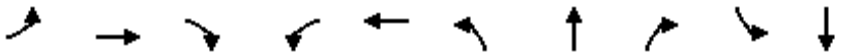
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Dumfries Rd & Four Seasons Dr.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	2290	11	22	2640	77	28	4	17	48	2	40
Future Volume (vph)	43	2290	11	22	2640	77	28	4	17	48	2	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.1	6.6	6.6	8.3	6.3	6.3		7.0	7.0	7.1	7.1	7.1
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.96	1.00
Satd. Flow (prot)	1770	4848	1583	1770	4848	1583		1784	1583	1681	1691	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.96	1.00
Satd. Flow (perm)	1770	4848	1583	1770	4848	1583		1784	1583	1681	1691	1583
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)	47	2489	12	24	2870	84	30	4	18	52	2	43
RTOR Reduction (vph)	0	0	4	0	0	32	0	0	17	0	0	40
Lane Group Flow (vph)	47	2489	8	24	2870	52	0	34	1	27	27	3
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases			6			2			3			4
Actuated Green, G (s)	7.8	89.4	89.4	5.1	87.2	87.2		7.2	7.2	9.3	9.3	9.3
Effective Green, g (s)	7.8	89.4	89.4	5.1	87.2	87.2		7.2	7.2	9.3	9.3	9.3
Actuated g/C Ratio	0.06	0.64	0.64	0.04	0.62	0.62		0.05	0.05	0.07	0.07	0.07
Clearance Time (s)	8.1	6.6	6.6	8.3	6.3	6.3		7.0	7.0	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	98	3095	1010	64	3019	985		91	81	111	112	105
v/s Ratio Prot	c0.03	0.51		0.01	c0.59			c0.02		c0.02	0.02	
v/s Ratio Perm			0.00			0.03			0.00			0.00
v/c Ratio	0.48	0.80	0.01	0.38	0.95	0.05		0.37	0.01	0.24	0.24	0.03
Uniform Delay, d1	64.1	18.8	9.2	65.9	24.4	10.3		64.2	63.0	62.0	62.0	61.1
Progression Factor	1.00	1.00	1.00	1.17	0.23	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.7	2.3	0.0	0.9	2.4	0.0		2.6	0.1	1.1	1.1	0.1
Delay (s)	67.8	21.1	9.2	78.1	7.9	10.3		66.8	63.1	63.2	63.1	61.2
Level of Service	E	C	A	E	A	B		E	E	E	E	E
Approach Delay (s)		21.9			8.6			65.5			62.3	
Approach LOS		C			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	29.0
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues
2: Van Buren Rd/Old Stage Rd & Dumfries Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	151	1930	465	229	2666	160	163	425	28	94
v/c Ratio	1.35	0.96	0.51	0.79	1.05	0.72	0.73	0.60	0.19	0.58
Control Delay	229.1	59.7	20.9	80.9	58.4	75.7	76.2	18.5	60.7	64.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	229.1	59.7	20.9	80.9	58.4	75.7	76.2	18.5	60.7	64.4
Queue Length 50th (ft)	~181	514	117	208	~955	149	151	137	24	69
Queue Length 95th (ft)	m#279	#931	349	300	#1173	223	226	226	55	126
Internal Link Dist (ft)		940			1309		1346			140
Turn Bay Length (ft)	420		430	475		265				
Base Capacity (vph)	112	2009	915	334	2529	292	295	738	220	233
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	1.35	0.96	0.51	0.69	1.05	0.55	0.55	0.58	0.13	0.40

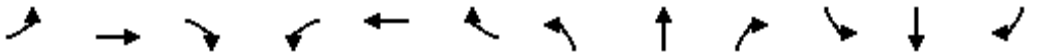
Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2: Van Buren Rd/Old Stage Rd & Dumfries Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	139	1776	428	211	2427	26	282	15	391	26	56	30
Future Volume (vph)	139	1776	428	211	2427	26	282	15	391	26	56	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	6.4	7.8	6.1		7.6	7.6	7.8	6.5	6.5	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1752	4799	1567	1787	4891		1681	1693	1583	1761	1756	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1752	4799	1567	1787	4891		1681	1693	1583	1761	1756	
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)	151	1930	465	229	2638	28	307	16	425	28	61	33
RTOR Reduction (vph)	0	0	260	0	0	0	0	0	166	0	15	0
Lane Group Flow (vph)	151	1930	205	229	2666	0	160	163	259	28	79	0
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	pm+ov	Split	NA	
Protected Phases	1	6		5	2		4	4	5	3	3	
Permitted Phases			6						4			
Actuated Green, G (s)	9.0	58.7	58.7	22.7	72.5		18.5	18.5	41.2	11.8	11.8	
Effective Green, g (s)	9.0	58.7	58.7	22.7	72.5		18.5	18.5	41.2	11.8	11.8	
Actuated g/C Ratio	0.06	0.42	0.42	0.16	0.52		0.13	0.13	0.29	0.08	0.08	
Clearance Time (s)	8.0	6.4	6.4	7.8	6.1		7.6	7.6	7.8	6.5	6.5	
Vehicle Extension (s)	3.0	4.0	4.0	3.5	4.0		3.0	3.0	3.5	3.0	3.0	
Lane Grp Cap (vph)	112	2012	657	289	2532		222	223	465	148	148	
v/s Ratio Prot	c0.09	0.40		0.13	c0.55		0.10	c0.10	0.09	0.02	c0.05	
v/s Ratio Perm			0.13						0.07			
v/c Ratio	1.35	0.96	0.31	0.79	1.05		0.72	0.73	0.56	0.19	0.54	
Uniform Delay, d1	65.5	39.5	27.2	56.4	33.8		58.3	58.4	41.7	59.6	61.5	
Progression Factor	0.72	1.30	5.17	1.12	0.70		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	191.1	9.4	0.8	13.0	33.0		10.9	11.6	1.6	0.6	3.7	
Delay (s)	238.6	60.8	141.4	76.4	56.6		69.2	70.0	43.3	60.3	65.2	
Level of Service	F	E	F	E	E		E	E	D	E	E	
Approach Delay (s)		86.1			58.1			54.7			64.1	
Approach LOS		F			E			D			E	

Intersection Summary			
HCM 2000 Control Delay	69.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	88.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Queues
3: I-95 SB Entrance Ramp & Dumfries Rd

Lane Group	EBT	EBR	WBL	WBT
Lane Group Flow (vph)	1278	1105	180	2535
v/c Ratio	0.35	0.73	0.71	0.52
Control Delay	1.7	17.9	76.5	1.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	1.7	17.9	76.5	1.9
Queue Length 50th (ft)	17	386	142	73
Queue Length 95th (ft)	m32	m599	194	51
Internal Link Dist (ft)	1309			2173
Turn Bay Length (ft)		1000	1000	
Base Capacity (vph)	3665	1517	329	4872
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.35	0.73	0.55	0.52

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

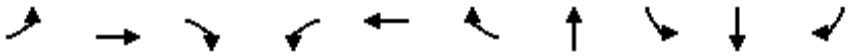
HCM Signalized Intersection Capacity Analysis
3: I-95 SB Entrance Ramp & Dumfries Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1176	1017	166	2332	0	0
Future Volume (vph)	1176	1017	166	2332	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-1%			-1%	0%	
Total Lost time (s)	5.8	4.0	7.8	7.0		
Lane Util. Factor	0.91	1.00	1.00	0.91		
Frt	1.00	0.85	1.00	1.00		
Flt Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	4872	1517	1695	4872		
Flt Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	4872	1517	1695	4872		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1278	1105	180	2535	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1278	1105	180	2535	0	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%
Turn Type	NA	Free	Prot	NA		
Protected Phases	6		5	2		
Permitted Phases		Free				
Actuated Green, G (s)	105.3	140.0	21.1	140.0		
Effective Green, g (s)	105.3	140.0	21.1	140.0		
Actuated g/C Ratio	0.75	1.00	0.15	1.00		
Clearance Time (s)	5.8		7.8	7.0		
Vehicle Extension (s)	3.0		4.0	3.0		
Lane Grp Cap (vph)	3664	1517	255	4872		
v/s Ratio Prot	0.26		0.11	0.52		
v/s Ratio Perm		c0.73				
v/c Ratio	0.35	0.73	0.71	0.52		
Uniform Delay, d1	5.8	0.0	56.5	0.0		
Progression Factor	0.26	1.00	1.10	1.00		
Incremental Delay, d2	0.1	1.4	9.1	0.4		
Delay (s)	1.6	1.4	71.2	0.4		
Level of Service	A	A	E	A		
Approach Delay (s)	1.5			5.1	0.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	13.6
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

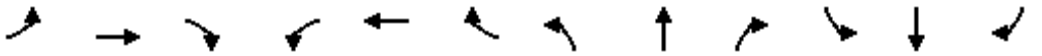
Queues
4: Van Buren Road/Benita Fitzgerald Drive & Cardinal Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	505	313	23	20	488	349	24	354	50	638
v/c Ratio	0.66	0.18	0.03	0.14	0.60	0.38	0.16	0.48	0.12	0.60
Control Delay	43.2	19.0	0.0	58.7	40.4	2.3	45.7	38.5	37.0	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.2	19.0	0.0	58.7	40.4	2.3	45.7	38.5	37.0	7.7
Queue Length 50th (ft)	152	53	0	12	151	0	10	106	27	67
Queue Length 95th (ft)	303	141	0	48	277	31	48	190	71	222
Internal Link Dist (ft)		6294			2111		682		816	
Turn Bay Length (ft)	350		410	390		400		400		400
Base Capacity (vph)	1124	2318	1081	391	1960	1144	584	1729	938	1116
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	0.45	0.14	0.02	0.05	0.25	0.31	0.04	0.20	0.05	0.57

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Van Buren Road/Benita Fitzgerald Drive & Cardinal Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	465	288	21	18	449	321	7	7	7	326	46	587
Future Volume (vph)	465	288	21	18	449	321	7	7	7	326	46	587
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-1%			0%			-3%	
Total Lost time (s)	8.0	5.5	5.5	8.5	6.0	9.0		8.0		9.0	9.0	8.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00		1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98		0.95	1.00	1.00
Satd. Flow (prot)	3399	3504	1567	1778	3557	1591		1750		3485	1891	1607
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.98		0.95	1.00	1.00
Satd. Flow (perm)	3399	3504	1567	1778	3557	1591		1750		3485	1891	1607
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)	505	313	23	20	488	349	8	8	8	354	50	638
RTOR Reduction (vph)	0	0	12	0	0	186	0	8	0	0	0	266
Lane Group Flow (vph)	505	313	11	20	488	163	0	16	0	354	50	372
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Split	NA		Split	NA	pm+ov
Protected Phases	5	2		1	6	4	3	3		4	4	5
Permitted Phases			2			6						4
Actuated Green, G (s)	22.3	49.3	49.3	2.3	29.3	50.4		4.0		21.1	21.1	43.4
Effective Green, g (s)	22.3	49.3	49.3	2.3	29.3	50.4		4.0		21.1	21.1	43.4
Actuated g/C Ratio	0.21	0.46	0.46	0.02	0.27	0.47		0.04		0.20	0.20	0.40
Clearance Time (s)	8.0	5.5	5.5	8.5	6.0	9.0		8.0		9.0	9.0	8.0
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0	3.0		3.0		3.0	3.0	2.0
Lane Grp Cap (vph)	703	1603	717	37	967	744		64		682	370	647
v/s Ratio Prot	c0.15	0.09		0.01	c0.14	0.04		c0.01		0.10	0.03	c0.12
v/s Ratio Perm			0.01			0.06						0.11
v/c Ratio	0.72	0.20	0.01	0.54	0.50	0.22		0.25		0.52	0.14	0.58
Uniform Delay, d1	39.8	17.4	15.9	52.2	33.1	17.0		50.4		38.8	35.8	25.0
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	2.9	0.1	0.0	8.4	0.4	0.1		2.1		0.7	0.2	0.8
Delay (s)	42.7	17.4	15.9	60.5	33.5	17.1		52.5		39.4	35.9	25.8
Level of Service	D	B	B	E	C	B		D		D	D	C
Approach Delay (s)		32.6			27.5			52.5			30.9	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	30.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	107.7	Sum of lost time (s)	31.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Dumfries Rd & Four Seasons Dr.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	18	2745	30	22	2636	49	38	22	36	38	53
v/c Ratio	0.19	0.82	0.03	0.23	0.76	0.04	0.34	0.09	0.26	0.27	0.20
Control Delay	67.8	24.5	0.0	59.1	20.0	0.5	70.3	0.8	62.3	62.2	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	24.5	0.0	59.1	20.0	0.5	70.3	0.8	62.3	62.2	1.7
Queue Length 50th (ft)	16	761	0	21	336	0	34	0	33	35	0
Queue Length 95th (ft)	43	#1186	0	m30	#1094	m0	71	0	64	67	0
Internal Link Dist (ft)		1071			1361		306			408	
Turn Bay Length (ft)	400		375	430		475			275		
Base Capacity (vph)	112	3332	1135	109	3451	1170	165	281	277	290	384
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.82	0.03	0.20	0.76	0.04	0.23	0.08	0.13	0.13	0.14

Intersection Summary

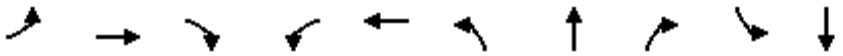
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Dumfries Rd & Four Seasons Dr.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	2525	28	20	2425	45	30	5	20	38	30	49
Future Volume (vph)	17	2525	28	20	2425	45	30	5	20	38	30	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.1	6.6	6.6	8.3	6.3	6.3		7.0	7.0	7.1	7.1	7.1
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.99	1.00
Satd. Flow (prot)	1770	4848	1583	1770	4848	1583		1785	1583	1681	1758	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.99	1.00
Satd. Flow (perm)	1770	4848	1583	1770	4848	1583		1785	1583	1681	1758	1583
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)	18	2745	30	22	2636	49	33	5	22	41	33	53
RTOR Reduction (vph)	0	0	11	0	0	17	0	0	21	0	0	49
Lane Group Flow (vph)	18	2745	19	22	2636	32	0	38	1	36	38	4
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases			6			2			3			4
Actuated Green, G (s)	3.3	88.7	88.7	4.8	90.7	90.7		7.5	7.5	10.0	10.0	10.0
Effective Green, g (s)	3.3	88.7	88.7	4.8	90.7	90.7		7.5	7.5	10.0	10.0	10.0
Actuated g/C Ratio	0.02	0.63	0.63	0.03	0.65	0.65		0.05	0.05	0.07	0.07	0.07
Clearance Time (s)	8.1	6.6	6.6	8.3	6.3	6.3		7.0	7.0	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	41	3071	1002	60	3140	1025		95	84	120	125	113
v/s Ratio Prot	0.01	c0.57		c0.01	0.54			c0.02		0.02	c0.02	
v/s Ratio Perm			0.01			0.02			0.00			0.00
v/c Ratio	0.44	0.89	0.02	0.37	0.84	0.03		0.40	0.01	0.30	0.30	0.03
Uniform Delay, d1	67.4	21.7	9.5	66.1	19.0	8.9		64.1	62.7	61.7	61.7	60.5
Progression Factor	1.00	1.00	1.00	0.88	1.01	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.3	4.5	0.0	2.4	1.8	0.0		2.8	0.1	1.4	1.4	0.1
Delay (s)	74.8	26.2	9.5	60.4	21.0	8.9		66.8	62.8	63.1	63.1	60.6
Level of Service	E	C	A	E	C	A		E	E	E	E	E
Approach Delay (s)		26.3			21.1			65.4			62.1	
Approach LOS		C			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	29.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues
2: Van Buren Rd/Old Stage Rd & Dumfries Rd

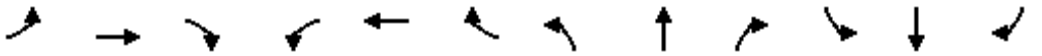


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	21	2450	323	102	2521	98	97	220	29	46
v/c Ratio	0.22	0.91	0.32	0.58	0.79	0.60	0.60	0.44	0.28	0.36
Control Delay	62.3	26.6	6.3	83.3	16.1	75.6	74.7	17.8	69.2	35.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.3	26.6	6.3	83.3	16.1	75.6	74.7	17.8	69.2	35.8
Queue Length 50th (ft)	20	260	27	93	745	91	90	59	26	12
Queue Length 95th (ft)	m26	#1007	m110	152	#958	152	150	124	60	54
Internal Link Dist (ft)		940			1309		1346			140
Turn Bay Length (ft)	420		430	475		265				
Base Capacity (vph)	113	2698	1008	283	3175	211	213	585	169	189
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	0.19	0.91	0.32	0.36	0.79	0.46	0.46	0.38	0.17	0.24

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2: Van Buren Rd/Old Stage Rd & Dumfries Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	2254	297	94	2292	28	169	10	202	27	13	29
Future Volume (vph)	19	2254	297	94	2292	28	169	10	202	27	13	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	6.4	7.8	6.1		7.6	7.6	7.8	6.5	6.5	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1752	4799	1567	1787	4890		1681	1694	1583	1761	1660	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1752	4799	1567	1787	4890		1681	1694	1583	1761	1660	
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)	21	2450	323	102	2491	30	184	11	220	29	14	32
RTOR Reduction (vph)	0	0	130	0	1	0	0	0	112	0	30	0
Lane Group Flow (vph)	21	2450	193	102	2520	0	98	97	108	29	16	0
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	pm+ov	Split	NA	
Protected Phases	1	6		5	2		4	4	5	3	3	
Permitted Phases			6						4			
Actuated Green, G (s)	5.0	77.4	77.4	13.9	86.4		13.5	13.5	27.4	6.9	6.9	
Effective Green, g (s)	5.0	77.4	77.4	13.9	86.4		13.5	13.5	27.4	6.9	6.9	
Actuated g/C Ratio	0.04	0.55	0.55	0.10	0.62		0.10	0.10	0.20	0.05	0.05	
Clearance Time (s)	8.0	6.4	6.4	7.8	6.1		7.6	7.6	7.8	6.5	6.5	
Vehicle Extension (s)	3.0	4.0	4.0	3.5	4.0		3.0	3.0	3.5	3.0	3.0	
Lane Grp Cap (vph)	62	2653	866	177	3017		162	163	309	86	81	
v/s Ratio Prot	0.01	c0.51		c0.06	c0.52		c0.06	0.06	0.03	c0.02	0.01	
v/s Ratio Perm			0.12						0.03			
v/c Ratio	0.34	0.92	0.22	0.58	0.84		0.60	0.60	0.35	0.34	0.19	
Uniform Delay, d1	65.9	28.6	16.0	60.2	21.2		60.7	60.6	48.6	64.3	63.9	
Progression Factor	0.94	0.76	1.70	1.19	0.62		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.8	4.1	0.3	4.7	2.8		6.2	5.7	0.8	2.3	1.2	
Delay (s)	63.9	25.9	27.4	76.1	16.1		66.9	66.4	49.4	66.7	65.0	
Level of Service	E	C	C	E	B		E	E	D	E	E	
Approach Delay (s)		26.4			18.4			57.5			65.7	
Approach LOS		C			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Queues
3: I-95 SB Entrance Ramp & Dumfries Rd

Lane Group	EBT	EBR	WBL	WBT
Lane Group Flow (vph)	1747	952	365	1893
v/c Ratio	0.56	0.63	0.81	0.39
Control Delay	11.0	8.2	43.5	0.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.0	8.2	43.5	0.7
Queue Length 50th (ft)	313	50	250	12
Queue Length 95th (ft)	573	m499	187	19
Internal Link Dist (ft)	1309			2173
Turn Bay Length (ft)		1000	1000	
Base Capacity (vph)	3099	1517	692	4872
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.56	0.63	0.53	0.39

Intersection Summary

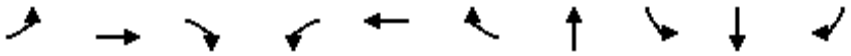
m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1607	876	336	1742	0	0
Future Volume (vph)	1607	876	336	1742	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-1%			-1%	0%	
Total Lost time (s)	5.8	4.0	7.8	7.0		
Lane Util. Factor	0.91	1.00	1.00	0.91		
Frt	1.00	0.85	1.00	1.00		
Flt Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	4872	1517	1695	4872		
Flt Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	4872	1517	1695	4872		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1747	952	365	1893	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1747	952	365	1893	0	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%
Turn Type	NA	Free	Prot	NA		
Protected Phases	6		5	2		
Permitted Phases		Free				
Actuated Green, G (s)	89.1	140.0	37.3	140.0		
Effective Green, g (s)	89.1	140.0	37.3	140.0		
Actuated g/C Ratio	0.64	1.00	0.27	1.00		
Clearance Time (s)	5.8		7.8	7.0		
Vehicle Extension (s)	3.0		4.0	3.0		
Lane Grp Cap (vph)	3100	1517	451	4872		
v/s Ratio Prot	0.36		c0.22	0.39		
v/s Ratio Perm		c0.63				
v/c Ratio	0.56	0.63	0.81	0.39		
Uniform Delay, d1	14.4	0.0	48.0	0.0		
Progression Factor	0.68	1.00	0.62	1.00		
Incremental Delay, d2	0.4	1.0	10.5	0.2		
Delay (s)	10.2	1.0	40.5	0.2		
Level of Service	B	A	D	A		
Approach Delay (s)	6.9			6.7	0.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	13.6
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

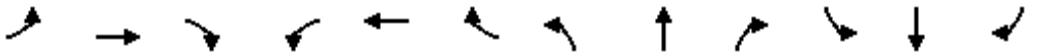
Queues
4: Van Buren Road/Benita Fitzgerald Drive & Cardinal Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	385	410	17	17	297	204	20	210	5	75
v/c Ratio	0.60	0.24	0.02	0.10	0.34	0.24	0.11	0.33	0.01	0.09
Control Delay	37.6	17.6	0.1	48.6	29.6	2.1	41.6	31.4	32.2	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.6	17.6	0.1	48.6	29.6	2.1	41.6	31.4	32.2	3.9
Queue Length 50th (ft)	66	32	0	6	49	0	5	36	2	0
Queue Length 95th (ft)	230	184	0	42	162	23	42	111	14	25
Internal Link Dist (ft)		6294			2111		682		816	
Turn Bay Length (ft)	350		410	390		400		400		400
Base Capacity (vph)	1447	2913	1325	504	2575	1229	743	2226	1208	1129
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	0.27	0.14	0.01	0.03	0.12	0.17	0.03	0.09	0.00	0.07

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Van Buren Road/Benita Fitzgerald Drive & Cardinal Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	354	377	16	16	273	188	6	7	5	193	5	69
Future Volume (vph)	354	377	16	16	273	188	6	7	5	193	5	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-1%			0%			-3%	
Total Lost time (s)	8.0	5.5	5.5	8.5	6.0	9.0		8.0		9.0	9.0	8.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00		1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98		0.95	1.00	1.00
Satd. Flow (prot)	3399	3504	1567	1778	3557	1591		1769		3485	1891	1607
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.98		0.95	1.00	1.00
Satd. Flow (perm)	3399	3504	1567	1778	3557	1591		1769		3485	1891	1607
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)	385	410	17	17	297	204	7	8	5	210	5	75
RTOR Reduction (vph)	0	0	10	0	0	111	0	5	0	0	0	50
Lane Group Flow (vph)	385	410	7	17	297	93	0	15	0	210	5	25
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Split	NA		Split	NA	pm+ov
Protected Phases	5	2		1	6	4	3	3		4	4	5
Permitted Phases			2			6						4
Actuated Green, G (s)	15.0	39.1	39.1	2.2	26.3	40.8		2.4		14.5	14.5	29.5
Effective Green, g (s)	15.0	39.1	39.1	2.2	26.3	40.8		2.4		14.5	14.5	29.5
Actuated g/C Ratio	0.17	0.44	0.44	0.02	0.29	0.46		0.03		0.16	0.16	0.33
Clearance Time (s)	8.0	5.5	5.5	8.5	6.0	9.0		8.0		9.0	9.0	8.0
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0	3.0		3.0		3.0	3.0	2.0
Lane Grp Cap (vph)	571	1535	686	43	1048	727		47		566	307	531
v/s Ratio Prot	c0.11	c0.12		0.01	0.08	0.02		c0.01		c0.06	0.00	0.01
v/s Ratio Perm			0.00			0.04						0.01
v/c Ratio	0.67	0.27	0.01	0.40	0.28	0.13		0.32		0.37	0.02	0.05
Uniform Delay, d1	34.8	15.9	14.1	42.8	24.2	13.9		42.6		33.3	31.4	20.3
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	2.5	0.1	0.0	2.2	0.1	0.1		4.0		0.4	0.0	0.0
Delay (s)	37.3	16.0	14.1	45.0	24.3	14.0		46.6		33.7	31.4	20.3
Level of Service	D	B	B	D	C	B		D		C	C	C
Approach Delay (s)		26.1			21.0			46.6			30.2	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	25.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	89.2	Sum of lost time (s)	31.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Dumfries Rd & Four Seasons Dr.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	47	3155	12	24	3782	84	34	18	27	27	43
v/c Ratio	0.41	0.94	0.01	0.24	1.18	0.08	0.31	0.08	0.21	0.21	0.17
Control Delay	72.4	31.0	0.0	76.7	96.2	0.0	69.7	0.6	61.6	61.5	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.4	31.0	0.0	76.7	96.2	0.0	69.7	0.6	61.6	61.5	1.4
Queue Length 50th (ft)	42	~1134	0	22	~1570	0	30	0	25	25	0
Queue Length 95th (ft)	84	#1453	0	m20	m#1122	m0	67	0	53	53	0
Internal Link Dist (ft)		1071			1361		306			408	
Turn Bay Length (ft)	400		375	430		475			275		
Base Capacity (vph)	150	3354	1142	147	3215	1100	191	301	274	276	381
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.94	0.01	0.16	1.18	0.08	0.18	0.06	0.10	0.10	0.11

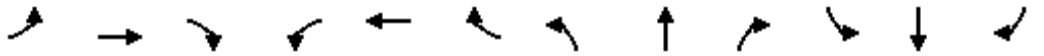
Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

m Volume for 95th percentile queue is metered by upstream signal.

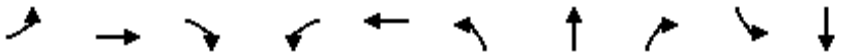
HCM Signalized Intersection Capacity Analysis
1: Dumfries Rd & Four Seasons Dr.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	2903	11	22	3479	77	28	4	17	48	2	40
Future Volume (vph)	43	2903	11	22	3479	77	28	4	17	48	2	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.1	6.6	6.6	8.3	6.3	6.3		7.0	7.0	7.1	7.1	7.1
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.96	1.00
Satd. Flow (prot)	1770	4848	1583	1770	4848	1583		1784	1583	1681	1691	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.96	1.00
Satd. Flow (perm)	1770	4848	1583	1770	4848	1583		1784	1583	1681	1691	1583
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)	47	3155	12	24	3782	84	30	4	18	52	2	43
RTOR Reduction (vph)	0	0	4	0	0	32	0	0	17	0	0	40
Lane Group Flow (vph)	47	3155	8	24	3782	52	0	34	1	27	27	3
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases			6			2			3			4
Actuated Green, G (s)	7.8	89.4	89.4	5.1	87.2	87.2		7.2	7.2	9.3	9.3	9.3
Effective Green, g (s)	7.8	89.4	89.4	5.1	87.2	87.2		7.2	7.2	9.3	9.3	9.3
Actuated g/C Ratio	0.06	0.64	0.64	0.04	0.62	0.62		0.05	0.05	0.07	0.07	0.07
Clearance Time (s)	8.1	6.6	6.6	8.3	6.3	6.3		7.0	7.0	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	98	3095	1010	64	3019	985		91	81	111	112	105
v/s Ratio Prot	c0.03	0.65		0.01	c0.78			c0.02		c0.02	0.02	
v/s Ratio Perm			0.00			0.03			0.00			0.00
v/c Ratio	0.48	1.02	0.01	0.38	1.25	0.05		0.37	0.01	0.24	0.24	0.03
Uniform Delay, d1	64.1	25.3	9.2	65.9	26.4	10.3		64.2	63.0	62.0	62.0	61.1
Progression Factor	1.00	1.00	1.00	1.21	0.33	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.7	21.3	0.0	0.3	114.0	0.0		2.6	0.1	1.1	1.1	0.1
Delay (s)	67.8	46.6	9.2	79.9	122.7	10.3		66.8	63.1	63.2	63.1	61.2
Level of Service	E	D	A	E	F	B		E	E	E	E	E
Approach Delay (s)		46.7			120.0			65.5			62.3	
Approach LOS		D			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	86.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	29.0
Intersection Capacity Utilization	95.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues
2: Van Buren Rd/Old Stage Rd & Dumfries Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	151	2598	465	229	3578	160	163	425	28	94
v/c Ratio	1.35	1.29	0.55	0.79	1.41	0.72	0.73	0.60	0.19	0.58
Control Delay	214.7	174.4	28.0	74.9	215.0	75.7	76.2	18.5	60.7	64.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	214.7	174.4	28.0	74.9	215.0	75.7	76.2	18.5	60.7	64.4
Queue Length 50th (ft)	~177	~1117	195	207	~1600	149	151	137	24	69
Queue Length 95th (ft)	m#201	#1397	m325	298	#1800	223	226	226	55	126
Internal Link Dist (ft)		940			1309		1346			140
Turn Bay Length (ft)	420		430	475		265				
Base Capacity (vph)	112	2009	848	334	2532	292	295	738	220	233
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	1.35	1.29	0.55	0.69	1.41	0.55	0.55	0.58	0.13	0.40

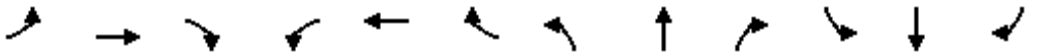
Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2: Van Buren Rd/Old Stage Rd & Dumfries Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	139	2390	428	211	3266	26	282	15	391	26	56	30
Future Volume (vph)	139	2390	428	211	3266	26	282	15	391	26	56	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	6.4	7.8	6.1		7.6	7.6	7.8	6.5	6.5	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1752	4799	1567	1787	4892		1681	1693	1583	1761	1756	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1752	4799	1567	1787	4892		1681	1693	1583	1761	1756	
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)	151	2598	465	229	3550	28	307	16	425	28	61	33
RTOR Reduction (vph)	0	0	193	0	0	0	0	0	166	0	15	0
Lane Group Flow (vph)	151	2598	272	229	3578	0	160	163	259	28	79	0
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	pm+ov	Split	NA	
Protected Phases	1	6		5	2		4	4	5	3	3	
Permitted Phases			6						4			
Actuated Green, G (s)	9.0	58.7	58.7	22.7	72.5		18.5	18.5	41.2	11.8	11.8	
Effective Green, g (s)	9.0	58.7	58.7	22.7	72.5		18.5	18.5	41.2	11.8	11.8	
Actuated g/C Ratio	0.06	0.42	0.42	0.16	0.52		0.13	0.13	0.29	0.08	0.08	
Clearance Time (s)	8.0	6.4	6.4	7.8	6.1		7.6	7.6	7.8	6.5	6.5	
Vehicle Extension (s)	3.0	4.0	4.0	3.5	4.0		3.0	3.0	3.5	3.0	3.0	
Lane Grp Cap (vph)	112	2012	657	289	2533		222	223	465	148	148	
v/s Ratio Prot	c0.09	0.54		0.13	c0.73		0.10	c0.10	0.09	0.02	c0.05	
v/s Ratio Perm			0.17						0.07			
v/c Ratio	1.35	1.29	0.41	0.79	1.41		0.72	0.73	0.56	0.19	0.54	
Uniform Delay, d1	65.5	40.6	28.6	56.4	33.8		58.3	58.4	41.7	59.6	61.5	
Progression Factor	0.70	1.30	2.70	1.06	0.89		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	177.5	132.5	0.7	11.1	187.4		10.9	11.6	1.6	0.6	3.7	
Delay (s)	223.5	185.4	78.0	70.9	217.4		69.2	70.0	43.3	60.3	65.2	
Level of Service	F	F	E	E	F		E	E	D	E	E	
Approach Delay (s)		171.6			208.5			54.7			64.1	
Approach LOS		F			F			D			E	

Intersection Summary			
HCM 2000 Control Delay	176.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	104.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Queues
3: I-95 SB Entrance Ramp & Dumfries Rd

Lane Group	EBT	EBR	WBL	WBT
Lane Group Flow (vph)	1946	1105	180	3447
v/c Ratio	0.53	0.73	0.71	0.71
Control Delay	3.0	17.5	75.3	4.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	3.0	17.5	75.3	4.2
Queue Length 50th (ft)	21	403	145	267
Queue Length 95th (ft)	m31	m319	203	242
Internal Link Dist (ft)	1309			2173
Turn Bay Length (ft)		1000	1000	
Base Capacity (vph)	3665	1517	329	4872
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.53	0.73	0.55	0.71

Intersection Summary

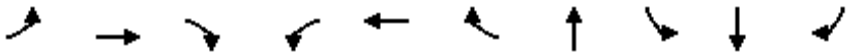
m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1790	1017	166	3171	0	0
Future Volume (vph)	1790	1017	166	3171	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-1%			-1%	0%	
Total Lost time (s)	5.8	4.0	7.8	7.0		
Lane Util. Factor	0.91	1.00	1.00	0.91		
Frt	1.00	0.85	1.00	1.00		
Flt Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	4872	1517	1695	4872		
Flt Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	4872	1517	1695	4872		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1946	1105	180	3447	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1946	1105	180	3447	0	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%
Turn Type	NA	Free	Prot	NA		
Protected Phases	6		5	2		
Permitted Phases		Free				
Actuated Green, G (s)	105.3	140.0	21.1	140.0		
Effective Green, g (s)	105.3	140.0	21.1	140.0		
Actuated g/C Ratio	0.75	1.00	0.15	1.00		
Clearance Time (s)	5.8		7.8	7.0		
Vehicle Extension (s)	3.0		4.0	3.0		
Lane Grp Cap (vph)	3664	1517	255	4872		
v/s Ratio Prot	0.40		0.11	0.71		
v/s Ratio Perm		c0.73				
v/c Ratio	0.53	0.73	0.71	0.71		
Uniform Delay, d1	7.2	0.0	56.5	0.0		
Progression Factor	0.38	1.00	1.08	1.00		
Incremental Delay, d2	0.1	0.3	9.1	0.9		
Delay (s)	2.8	0.3	69.9	0.9		
Level of Service	A	A	E	A		
Approach Delay (s)	1.9			4.3	0.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	13.6
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

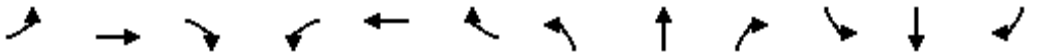
Queues
4: Van Buren Road/Benita Fitzgerald Drive & Cardinal Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	505	422	23	20	657	349	24	354	50	638
v/c Ratio	0.68	0.23	0.03	0.16	0.70	0.36	0.18	0.48	0.12	0.62
Control Delay	48.4	19.2	0.0	64.8	43.2	2.1	50.1	42.0	40.3	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.4	19.2	0.0	64.8	43.2	2.1	50.1	42.0	40.3	9.8
Queue Length 50th (ft)	173	78	0	14	228	0	11	119	30	107
Queue Length 95th (ft)	325	195	0	51	388	29	50	200	75	279
Internal Link Dist (ft)		6294			2111		682		816	
Turn Bay Length (ft)	350		410	390		400		400		400
Base Capacity (vph)	1021	2133	1005	356	1781	1103	531	1570	852	1061
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	0.49	0.20	0.02	0.06	0.37	0.32	0.05	0.23	0.06	0.60

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Van Buren Road/Benita Fitzgerald Drive & Cardinal Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	465	388	21	18	604	321	7	7	7	326	46	587
Future Volume (vph)	465	388	21	18	604	321	7	7	7	326	46	587
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-1%			0%			-3%	
Total Lost time (s)	8.0	5.5	5.5	8.5	6.0	9.0		8.0		9.0	9.0	8.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00		1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98		0.95	1.00	1.00
Satd. Flow (prot)	3399	3504	1567	1778	3557	1591		1750		3485	1891	1607
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.98		0.95	1.00	1.00
Satd. Flow (perm)	3399	3504	1567	1778	3557	1591		1750		3485	1891	1607
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)	505	422	23	20	657	349	8	8	8	354	50	638
RTOR Reduction (vph)	0	0	12	0	0	174	0	8	0	0	0	245
Lane Group Flow (vph)	505	422	11	20	657	175	0	16	0	354	50	393
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Split	NA		Split	NA	pm+ov
Protected Phases	5	2		1	6	4	3	3		4	4	5
Permitted Phases			2			6						4
Actuated Green, G (s)	23.9	57.3	57.3	2.4	35.8	59.1		4.0		23.3	23.3	47.2
Effective Green, g (s)	23.9	57.3	57.3	2.4	35.8	59.1		4.0		23.3	23.3	47.2
Actuated g/C Ratio	0.20	0.49	0.49	0.02	0.30	0.50		0.03		0.20	0.20	0.40
Clearance Time (s)	8.0	5.5	5.5	8.5	6.0	9.0		8.0		9.0	9.0	8.0
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0	3.0		3.0		3.0	3.0	2.0
Lane Grp Cap (vph)	688	1701	760	36	1079	796		59		688	373	642
v/s Ratio Prot	c0.15	0.12		0.01	c0.18	0.04		c0.01		0.10	0.03	c0.12
v/s Ratio Perm			0.01			0.07						0.12
v/c Ratio	0.73	0.25	0.01	0.56	0.61	0.22		0.28		0.51	0.13	0.61
Uniform Delay, d1	44.1	17.8	15.7	57.3	35.1	16.5		55.6		42.3	39.0	28.1
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	3.5	0.1	0.0	10.1	1.0	0.1		2.5		0.7	0.2	1.2
Delay (s)	47.6	17.8	15.7	67.4	36.1	16.7		58.1		43.0	39.2	29.3
Level of Service	D	B	B	E	D	B		E		D	D	C
Approach Delay (s)		33.6			30.1			58.1			34.4	
Approach LOS		C			C			E			C	

Intersection Summary			
HCM 2000 Control Delay	32.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	118.0	Sum of lost time (s)	31.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

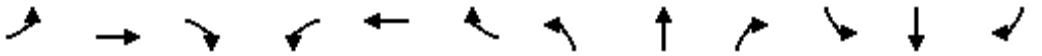
Queues
1: Dumfries Rd & Four Seasons Dr.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	18	2027	30	22	2009	49	38	22	36	38	53
v/c Ratio	0.19	0.61	0.03	0.23	0.58	0.04	0.34	0.09	0.26	0.27	0.20
Control Delay	67.8	18.5	0.0	59.1	24.9	1.1	70.3	0.8	62.3	62.2	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	18.5	0.0	59.1	24.9	1.1	70.3	0.8	62.3	62.2	1.7
Queue Length 50th (ft)	16	419	0	21	359	0	34	0	33	35	0
Queue Length 95th (ft)	43	671	0	m26	m594	m0	71	0	64	67	0
Internal Link Dist (ft)		1071			1361		306			408	
Turn Bay Length (ft)	400		375	430		475			275		
Base Capacity (vph)	112	3332	1135	109	3451	1170	165	281	277	290	384
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.61	0.03	0.20	0.58	0.04	0.23	0.08	0.13	0.13	0.14

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

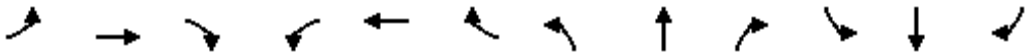
HCM Signalized Intersection Capacity Analysis
1: Dumfries Rd & Four Seasons Dr.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	1865	28	20	1848	45	30	5	20	38	30	49
Future Volume (vph)	17	1865	28	20	1848	45	30	5	20	38	30	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.1	6.6	6.6	8.3	6.3	6.3		7.0	7.0	7.1	7.1	7.1
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.99	1.00
Satd. Flow (prot)	1770	4848	1583	1770	4848	1583		1785	1583	1681	1758	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.99	1.00
Satd. Flow (perm)	1770	4848	1583	1770	4848	1583		1785	1583	1681	1758	1583
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)	18	2027	30	22	2009	49	33	5	22	41	33	53
RTOR Reduction (vph)	0	0	11	0	0	17	0	0	21	0	0	49
Lane Group Flow (vph)	18	2027	19	22	2009	32	0	38	1	36	38	4
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases			6			2			3			4
Actuated Green, G (s)	3.3	88.7	88.7	4.8	90.7	90.7		7.5	7.5	10.0	10.0	10.0
Effective Green, g (s)	3.3	88.7	88.7	4.8	90.7	90.7		7.5	7.5	10.0	10.0	10.0
Actuated g/C Ratio	0.02	0.63	0.63	0.03	0.65	0.65		0.05	0.05	0.07	0.07	0.07
Clearance Time (s)	8.1	6.6	6.6	8.3	6.3	6.3		7.0	7.0	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	41	3071	1002	60	3140	1025		95	84	120	125	113
v/s Ratio Prot	0.01	c0.42		c0.01	0.41			c0.02		0.02	c0.02	
v/s Ratio Perm			0.01			0.02			0.00			0.00
v/c Ratio	0.44	0.66	0.02	0.37	0.64	0.03		0.40	0.01	0.30	0.30	0.03
Uniform Delay, d1	67.4	16.2	9.5	66.1	14.8	8.9		64.1	62.7	61.7	61.7	60.5
Progression Factor	1.00	1.00	1.00	0.88	1.57	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.3	1.1	0.0	2.0	0.5	0.0		2.8	0.1	1.4	1.4	0.1
Delay (s)	74.8	17.3	9.5	60.5	23.8	8.9		66.8	62.8	63.1	63.1	60.6
Level of Service	E	B	A	E	C	A		E	E	E	E	E
Approach Delay (s)		17.7			23.8			65.4			62.1	
Approach LOS		B			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	29.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
2: Van Buren Rd/Van Buren Road & Dumfries Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	95	1572	411	218	1453	77	530	39	218	37	23	96
v/c Ratio	0.73	0.99	0.52	1.00	0.79	0.11	1.01	0.07	0.28	0.42	0.25	0.44
Control Delay	105.5	56.6	6.3	129.3	32.1	0.4	91.2	36.1	15.1	79.3	70.9	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	105.5	56.6	6.3	129.3	32.1	0.4	91.2	36.1	15.1	79.3	70.9	7.9
Queue Length 50th (ft)	92	524	26	179	463	2	~495	26	73	33	21	0
Queue Length 95th (ft)	m#169	#621	139	#379	518	0	#734	55	131	73	52	11
Internal Link Dist (ft)		940			1309			1346			140	
Turn Bay Length (ft)	420		430	475		237	265			225		
Base Capacity (vph)	137	1580	791	219	1849	696	523	550	789	88	92	219
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.99	0.52	1.00	0.79	0.11	1.01	0.07	0.28	0.42	0.25	0.44

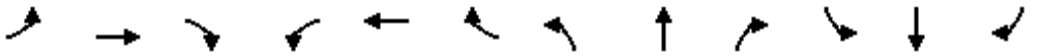
Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2: Van Buren Rd/Van Buren Road & Dumfries Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	1446	378	201	1337	71	488	36	201	34	21	88
Future Volume (vph)	87	1446	378	201	1337	71	488	36	201	34	21	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	6.4	7.8	6.1	6.1	7.6	7.6	7.8	6.5	6.5	6.5
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	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	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	4799	1567	1787	4896	1599	1770	1863	1583	1761	1853	1575
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1752	4799	1567	1787	4896	1599	1770	1863	1583	1761	1853	1575
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)	95	1572	411	218	1453	77	530	39	218	37	23	96
RTOR Reduction (vph)	0	0	276	0	0	48	0	0	45	0	0	91
Lane Group Flow (vph)	95	1572	135	218	1453	29	530	39	173	37	23	5
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	pm+ov	Split	NA	Perm
Protected Phases	1	6		5	2		4	4	5	3	3	
Permitted Phases			6			2			4			3
Actuated Green, G (s)	10.5	46.1	46.1	17.2	52.9	52.9	41.4	41.4	58.6	7.0	7.0	7.0
Effective Green, g (s)	10.5	46.1	46.1	17.2	52.9	52.9	41.4	41.4	58.6	7.0	7.0	7.0
Actuated g/C Ratio	0.08	0.33	0.33	0.12	0.38	0.38	0.30	0.30	0.42	0.05	0.05	0.05
Clearance Time (s)	8.0	6.4	6.4	7.8	6.1	6.1	7.6	7.6	7.8	6.5	6.5	6.5
Vehicle Extension (s)	3.0	4.0	4.0	3.5	4.0	4.0	3.0	3.0	3.5	3.0	3.0	3.0
Lane Grp Cap (vph)	131	1580	515	219	1849	604	523	550	662	88	92	78
v/s Ratio Prot	0.05	c0.33		c0.12	c0.30		c0.30	0.02	0.03	c0.02	0.01	
v/s Ratio Perm			0.09			0.02			0.08			0.00
v/c Ratio	0.73	0.99	0.26	1.00	0.79	0.05	1.01	0.07	0.26	0.42	0.25	0.06
Uniform Delay, d1	63.3	46.8	34.5	61.4	38.5	27.6	49.3	35.5	26.6	64.5	64.0	63.4
Progression Factor	1.29	0.79	1.39	1.17	0.74	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.9	19.2	1.0	59.2	3.4	0.2	42.7	0.1	0.3	3.2	1.4	0.3
Delay (s)	96.6	56.3	48.9	131.1	31.8	27.7	92.0	35.5	26.8	67.8	65.4	63.7
Level of Service	F	E	D	F	C	C	F	D	C	E	E	E
Approach Delay (s)		56.7			44.0			71.2			64.9	
Approach LOS		E			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	54.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	90.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Queues
3: I-95 SB Entrance Ramp & Dumfries Rd

Lane Group	EBT	EBR	WBL	WBT
Lane Group Flow (vph)	838	989	379	990
v/c Ratio	0.27	0.65	0.81	0.20
Control Delay	1.5	18.8	31.2	0.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	1.5	18.8	31.2	0.1
Queue Length 50th (ft)	12	638	80	0
Queue Length 95th (ft)	m17	m661	83	0
Internal Link Dist (ft)	1309			2173
Turn Bay Length (ft)		1000	1000	
Base Capacity (vph)	3059	1517	692	4872
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.27	0.65	0.55	0.20

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

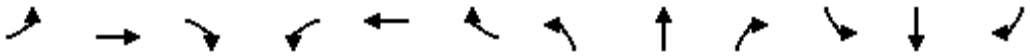
HCM Signalized Intersection Capacity Analysis
3: I-95 SB Entrance Ramp & Dumfries Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	771	910	349	911	0	0
Future Volume (vph)	771	910	349	911	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-1%			-1%	0%	
Total Lost time (s)	5.8	4.0	7.8	7.0		
Lane Util. Factor	0.91	1.00	1.00	0.91		
Frt	1.00	0.85	1.00	1.00		
Flt Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	4872	1517	1695	4872		
Flt Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	4872	1517	1695	4872		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	838	989	379	990	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	838	989	379	990	0	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%
Turn Type	NA	Free	Prot	NA		
Protected Phases	6		5	2		
Permitted Phases		Free				
Actuated Green, G (s)	87.9	140.0	38.5	140.0		
Effective Green, g (s)	87.9	140.0	38.5	140.0		
Actuated g/C Ratio	0.63	1.00	0.28	1.00		
Clearance Time (s)	5.8		7.8	7.0		
Vehicle Extension (s)	3.0		4.0	3.0		
Lane Grp Cap (vph)	3058	1517	466	4872		
v/s Ratio Prot	0.17		c0.22	0.20		
v/s Ratio Perm		c0.65				
v/c Ratio	0.27	0.65	0.81	0.20		
Uniform Delay, d1	11.7	0.0	47.4	0.0		
Progression Factor	0.11	1.00	0.39	1.00		
Incremental Delay, d2	0.1	0.9	9.8	0.1		
Delay (s)	1.4	0.9	28.4	0.1		
Level of Service	A	A	C	A		
Approach Delay (s)	1.1			7.9	0.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	13.6
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

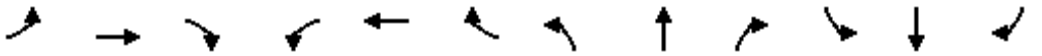
Queues
4: Van Buren Road/Benita Fitzgerald Drive & Cardinal Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	432	409	76	47	255	290	26	42	39	215	35	150
v/c Ratio	0.68	0.32	0.12	0.27	0.33	0.37	0.16	0.13	0.13	0.37	0.06	0.18
Control Delay	42.1	25.2	0.4	50.6	33.8	2.6	49.8	47.2	0.9	35.8	34.0	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.1	25.2	0.4	50.6	33.8	2.6	49.8	47.2	0.9	35.8	34.0	3.1
Queue Length 50th (ft)	103	84	0	22	58	0	12	10	0	51	7	0
Queue Length 95th (ft)	260	194	0	88	146	28	57	42	0	118	27	35
Internal Link Dist (ft)		6294			2111			370			816	
Turn Bay Length (ft)	350		410	390		400	833		200	400		400
Base Capacity (vph)	1272	2603	1198	443	2264	1145	651	1303	688	1957	2017	1042
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.16	0.06	0.11	0.11	0.25	0.04	0.03	0.06	0.11	0.02	0.14

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Van Buren Road/Benita Fitzgerald Drive & Cardinal Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	397	376	70	43	235	267	24	39	36	198	32	138
Future Volume (vph)	397	376	70	43	235	267	24	39	36	198	32	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-1%			0%			-3%	
Total Lost time (s)	8.0	5.5	5.5	8.5	6.0	9.0	8.0	8.0	8.0	9.0	9.0	8.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3399	3504	1567	1778	3557	1591	1770	3539	1583	3485	3592	1607
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3399	3504	1567	1778	3557	1591	1770	3539	1583	3485	3592	1607
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)	432	409	76	47	255	290	26	42	39	215	35	150
RTOR Reduction (vph)	0	0	49	0	0	172	0	0	36	0	0	98
Lane Group Flow (vph)	432	409	27	47	255	118	26	42	3	215	35	52
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Split	NA	Perm	Split	NA	pm+ov
Protected Phases	5	2		1	6	4	3	3		4	4	5
Permitted Phases			2			6			3			4
Actuated Green, G (s)	16.6	32.2	32.2	6.3	21.9	36.8	6.0	6.0	6.0	14.9	14.9	31.5
Effective Green, g (s)	16.6	32.2	32.2	6.3	21.9	36.8	6.0	6.0	6.0	14.9	14.9	31.5
Actuated g/C Ratio	0.18	0.36	0.36	0.07	0.24	0.41	0.07	0.07	0.07	0.16	0.16	0.35
Clearance Time (s)	8.0	5.5	5.5	8.5	6.0	9.0	8.0	8.0	8.0	9.0	9.0	8.0
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.0
Lane Grp Cap (vph)	624	1248	558	123	861	647	117	234	105	574	592	559
v/s Ratio Prot	c0.13	c0.12		0.03	0.07	0.03	c0.01	0.01		c0.06	0.01	0.02
v/s Ratio Perm			0.02			0.04			0.00			0.02
v/c Ratio	0.69	0.33	0.05	0.38	0.30	0.18	0.22	0.18	0.02	0.37	0.06	0.09
Uniform Delay, d1	34.5	21.2	19.1	40.2	28.0	17.2	40.0	39.9	39.5	33.6	31.8	19.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.7	0.2	0.0	0.7	0.2	0.1	1.0	0.4	0.1	0.4	0.0	0.0
Delay (s)	37.2	21.4	19.1	40.9	28.2	17.3	41.0	40.2	39.6	34.0	31.9	19.9
Level of Service	D	C	B	D	C	B	D	D	D	C	C	B
Approach Delay (s)		28.6			23.8			40.2			28.5	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	27.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	90.4	Sum of lost time (s)	31.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Dumfries Rd & Four Seasons Dr.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	47	3180	12	24	3100	84	34	18	27	27	43
v/c Ratio	0.41	0.95	0.01	0.24	0.96	0.08	0.31	0.08	0.21	0.21	0.17
Control Delay	72.4	31.8	0.0	56.9	39.5	3.6	69.7	0.6	61.6	61.5	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.4	31.8	0.0	56.9	39.5	3.6	69.7	0.6	61.6	61.5	1.4
Queue Length 50th (ft)	42	~1151	0	22	~929	5	30	0	25	25	0
Queue Length 95th (ft)	84	#1469	0	m16	m577	m0	67	0	53	53	0
Internal Link Dist (ft)		1071			1361		306			408	
Turn Bay Length (ft)	400		375	430		475			275		
Base Capacity (vph)	150	3354	1142	147	3215	1100	191	301	274	276	381
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.95	0.01	0.16	0.96	0.08	0.18	0.06	0.10	0.10	0.11

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

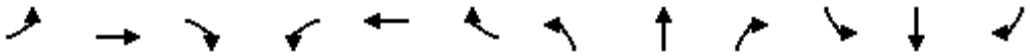
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Dumfries Rd & Four Seasons Dr.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	2926	11	22	2852	77	28	4	17	48	2	40
Future Volume (vph)	43	2926	11	22	2852	77	28	4	17	48	2	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.1	6.6	6.6	8.3	6.3	6.3		7.0	7.0	7.1	7.1	7.1
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.96	1.00
Satd. Flow (prot)	1770	4848	1583	1770	4848	1583		1784	1583	1681	1691	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.96	1.00
Satd. Flow (perm)	1770	4848	1583	1770	4848	1583		1784	1583	1681	1691	1583
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)	47	3180	12	24	3100	84	30	4	18	52	2	43
RTOR Reduction (vph)	0	0	4	0	0	32	0	0	17	0	0	40
Lane Group Flow (vph)	47	3180	8	24	3100	52	0	34	1	27	27	3
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases			6			2			3			4
Actuated Green, G (s)	7.8	89.4	89.4	5.1	87.2	87.2		7.2	7.2	9.3	9.3	9.3
Effective Green, g (s)	7.8	89.4	89.4	5.1	87.2	87.2		7.2	7.2	9.3	9.3	9.3
Actuated g/C Ratio	0.06	0.64	0.64	0.04	0.62	0.62		0.05	0.05	0.07	0.07	0.07
Clearance Time (s)	8.1	6.6	6.6	8.3	6.3	6.3		7.0	7.0	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	98	3095	1010	64	3019	985		91	81	111	112	105
v/s Ratio Prot	c0.03	c0.66		0.01	0.64			c0.02		c0.02	0.02	
v/s Ratio Perm			0.00			0.03			0.00			0.00
v/c Ratio	0.48	1.03	0.01	0.38	1.03	0.05		0.37	0.01	0.24	0.24	0.03
Uniform Delay, d1	64.1	25.3	9.2	65.9	26.4	10.3		64.2	63.0	62.0	62.0	61.1
Progression Factor	1.00	1.00	1.00	0.89	1.56	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.7	23.7	0.0	0.3	13.9	0.0		2.6	0.1	1.1	1.1	0.1
Delay (s)	67.8	49.0	9.2	59.2	55.0	10.3		66.8	63.1	63.2	63.1	61.2
Level of Service	E	D	A	E	E	B		E	E	E	E	E
Approach Delay (s)		49.1			53.9			65.5			62.3	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	51.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	29.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues
2: Van Buren Rd/Van Buren Road & Dumfries Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	242	2442	555	309	2039	141	804	111	262	191	63	364
v/c Ratio	1.61	1.80	0.76	1.84	1.43	0.25	1.32	0.17	0.32	1.45	0.46	1.40
Control Delay	330.7	391.4	18.8	433.6	226.9	2.5	190.9	32.8	15.8	281.9	73.2	227.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	330.7	391.4	18.8	433.6	226.9	2.5	190.9	32.8	15.8	281.9	73.2	227.3
Queue Length 50th (ft)	~325	~1217	150	~418	~919	15	~941	70	96	~236	56	~306
Queue Length 95th (ft)	m#355	#1293	m256	#614	#1019	28	#1192	118	159	#395	106	#511
Internal Link Dist (ft)		940			1309			1346			140	
Turn Bay Length (ft)	420		430	475		237	265			225		
Base Capacity (vph)	150	1357	733	168	1430	572	611	644	821	132	138	260
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.61	1.80	0.76	1.84	1.43	0.25	1.32	0.17	0.32	1.45	0.46	1.40

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2: Van Buren Rd/Van Buren Road & Dumfries Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	2247	511	284	1876	130	740	102	241	176	58	335
Future Volume (vph)	223	2247	511	284	1876	130	740	102	241	176	58	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	6.4	7.8	6.1	6.1	7.6	7.6	7.8	6.5	6.5	6.5
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	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	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	4799	1567	1787	4896	1599	1770	1863	1583	1761	1853	1575
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1752	4799	1567	1787	4896	1599	1770	1863	1583	1761	1853	1575
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)	242	2442	555	309	2039	141	804	111	262	191	63	364
RTOR Reduction (vph)	0	0	290	0	0	100	0	0	43	0	0	142
Lane Group Flow (vph)	242	2442	265	309	2039	41	804	111	219	191	63	222
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	pm+ov	Split	NA	Perm
Protected Phases	1	6		5	2		4	4	5	3	3	
Permitted Phases			6			2			4			3
Actuated Green, G (s)	12.0	39.6	39.6	13.2	40.9	40.9	48.4	48.4	61.6	10.5	10.5	10.5
Effective Green, g (s)	12.0	39.6	39.6	13.2	40.9	40.9	48.4	48.4	61.6	10.5	10.5	10.5
Actuated g/C Ratio	0.09	0.28	0.28	0.09	0.29	0.29	0.35	0.35	0.44	0.08	0.08	0.08
Clearance Time (s)	8.0	6.4	6.4	7.8	6.1	6.1	7.6	7.6	7.8	6.5	6.5	6.5
Vehicle Extension (s)	3.0	4.0	4.0	3.5	4.0	4.0	3.0	3.0	3.5	3.0	3.0	3.0
Lane Grp Cap (vph)	150	1357	443	168	1430	467	611	644	696	132	138	118
v/s Ratio Prot	0.14	c0.51		c0.17	0.42		c0.45	0.06	0.03	0.11	0.03	
v/s Ratio Perm			0.17			0.03			0.11			c0.14
v/c Ratio	1.61	1.80	0.60	1.84	1.43	0.09	1.32	0.17	0.31	1.45	0.46	1.88
Uniform Delay, d1	64.0	50.2	43.3	63.4	49.5	36.0	45.8	31.9	25.5	64.8	62.0	64.8
Progression Factor	1.20	1.02	1.32	1.07	0.77	0.32	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	287.1	360.9	2.2	398.7	195.6	0.4	153.5	0.1	0.3	238.4	2.4	425.2
Delay (s)	364.0	411.9	59.3	466.5	233.7	12.0	199.3	32.0	25.8	303.1	64.4	490.0
Level of Service	F	F	E	F	F	B	F	C	C	F	E	F
Approach Delay (s)		347.9			250.1			144.9			388.8	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	287.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.60		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	125.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Queues
3: I-95 SB Entrance Ramp & Dumfries Rd

Lane Group	EBT	EBR	WBL	WBT
Lane Group Flow (vph)	1462	1434	187	2115
v/c Ratio	0.40	0.95	0.72	0.43
Control Delay	1.7	40.2	77.8	1.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	1.7	40.2	77.8	1.2
Queue Length 50th (ft)	27	1218	143	39
Queue Length 95th (ft)	m19	m634	195	19
Internal Link Dist (ft)	1309			2173
Turn Bay Length (ft)		1000	1000	
Base Capacity (vph)	3654	1517	329	4872
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.40	0.95	0.57	0.43

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

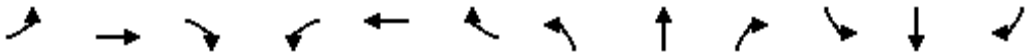
HCM Signalized Intersection Capacity Analysis
3: I-95 SB Entrance Ramp & Dumfries Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1345	1319	172	1946	0	0
Future Volume (vph)	1345	1319	172	1946	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-1%			-1%	0%	
Total Lost time (s)	5.8	4.0	7.8	7.0		
Lane Util. Factor	0.91	1.00	1.00	0.91		
Frt	1.00	0.85	1.00	1.00		
Flt Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	4872	1517	1695	4872		
Flt Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	4872	1517	1695	4872		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1462	1434	187	2115	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1462	1434	187	2115	0	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%
Turn Type	NA	Free	Prot	NA		
Protected Phases	6		5	2		
Permitted Phases		Free				
Actuated Green, G (s)	105.0	140.0	21.4	140.0		
Effective Green, g (s)	105.0	140.0	21.4	140.0		
Actuated g/C Ratio	0.75	1.00	0.15	1.00		
Clearance Time (s)	5.8		7.8	7.0		
Vehicle Extension (s)	3.0		4.0	3.0		
Lane Grp Cap (vph)	3654	1517	259	4872		
v/s Ratio Prot	0.30		0.11	0.43		
v/s Ratio Perm		c0.95				
v/c Ratio	0.40	0.95	0.72	0.43		
Uniform Delay, d1	6.3	0.0	56.5	0.0		
Progression Factor	0.25	1.00	1.11	1.00		
Incremental Delay, d2	0.0	1.7	10.0	0.3		
Delay (s)	1.6	1.7	72.6	0.3		
Level of Service	A	A	E	A		
Approach Delay (s)	1.6			6.2	0.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	13.6
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
4: Van Buren Road/Benita Fitzgerald Drive & Cardinal Drive

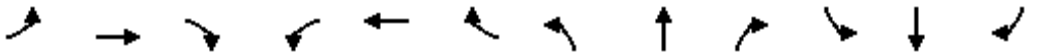


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	571	442	150	108	661	358	196	139	118	474	215	783
v/c Ratio	0.93	0.39	0.25	0.71	0.82	0.41	0.80	0.28	0.33	0.50	0.22	0.91
Control Delay	90.5	46.5	6.8	100.8	71.3	7.0	94.8	67.0	3.7	55.7	50.4	49.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	90.5	46.5	6.8	100.8	71.3	7.0	94.8	67.0	3.7	55.7	50.4	49.1
Queue Length 50th (ft)	322	200	0	117	367	46	211	72	0	228	97	700
Queue Length 95th (ft)	#515	276	57	202	461	81	328	117	11	328	155	#1177
Internal Link Dist (ft)		6294			2111			370			816	
Turn Bay Length (ft)	350		410	390		400	833		200	400		400
Base Capacity (vph)	611	1261	660	213	1067	972	318	636	421	941	970	863
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.35	0.23	0.51	0.62	0.37	0.62	0.22	0.28	0.50	0.22	0.91

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
4: Van Buren Road/Benita Fitzgerald Drive & Cardinal Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	525	407	138	99	608	329	180	128	109	436	198	720
Future Volume (vph)	525	407	138	99	608	329	180	128	109	436	198	720
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-1%			0%			-3%	
Total Lost time (s)	8.0	5.5	5.5	8.5	6.0	9.0	8.0	8.0	8.0	9.0	9.0	8.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3399	3504	1567	1778	3557	1591	1770	3539	1583	3485	3592	1607
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3399	3504	1567	1778	3557	1591	1770	3539	1583	3485	3592	1607
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)	571	442	150	108	661	358	196	139	118	474	215	783
RTOR Reduction (vph)	0	0	102	0	0	106	0	0	102	0	0	59
Lane Group Flow (vph)	571	442	48	108	661	252	196	139	16	474	215	724
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Split	NA	Perm	Split	NA	pm+ov
Protected Phases	5	2		1	6	4	3	3		4	4	5
Permitted Phases			2			6			3			4
Actuated Green, G (s)	30.2	53.6	53.6	14.4	37.8	83.1	23.2	23.2	23.2	45.3	45.3	75.5
Effective Green, g (s)	30.2	53.6	53.6	14.4	37.8	83.1	23.2	23.2	23.2	45.3	45.3	75.5
Actuated g/C Ratio	0.18	0.32	0.32	0.09	0.23	0.50	0.14	0.14	0.14	0.27	0.27	0.45
Clearance Time (s)	8.0	5.5	5.5	8.5	6.0	9.0	8.0	8.0	8.0	9.0	9.0	8.0
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.0
Lane Grp Cap (vph)	612	1121	501	152	802	789	245	490	219	942	971	724
v/s Ratio Prot	0.17	0.13		0.06	c0.19	0.09	c0.11	0.04		0.14	0.06	c0.18
v/s Ratio Perm			0.03			0.07			0.01			0.27
v/c Ratio	0.93	0.39	0.10	0.71	0.82	0.32	0.80	0.28	0.07	0.50	0.22	1.00
Uniform Delay, d1	67.7	44.3	40.0	74.5	61.7	25.3	69.9	64.7	62.8	51.6	47.4	46.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	21.1	0.2	0.1	12.2	6.9	0.2	16.8	0.3	0.1	0.4	0.1	33.0
Delay (s)	88.7	44.5	40.0	86.7	68.6	25.5	86.7	65.0	63.0	52.0	47.5	79.0
Level of Service	F	D	D	F	E	C	F	E	E	D	D	E
Approach Delay (s)		65.7			56.6			73.9			65.7	
Approach LOS		E			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	64.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	167.5	Sum of lost time (s)	31.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Dumfries Rd & Four Seasons Dr.

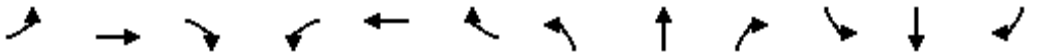
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	18	2657	30	22	2542	49	38	22	36	38	53
v/c Ratio	0.19	0.80	0.03	0.23	0.74	0.04	0.34	0.09	0.26	0.27	0.20
Control Delay	67.8	23.5	0.0	50.6	30.5	1.3	70.3	0.8	62.3	62.2	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	23.5	0.0	50.6	30.5	1.3	70.3	0.8	62.3	62.2	1.7
Queue Length 50th (ft)	16	708	0	20	661	0	34	0	33	35	0
Queue Length 95th (ft)	43	#1127	0	m20	m#831	m0	71	0	64	67	0
Internal Link Dist (ft)		1071			1361		306			408	
Turn Bay Length (ft)	400		375	430		475			275		
Base Capacity (vph)	112	3332	1135	109	3451	1170	165	281	277	290	384
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.80	0.03	0.20	0.74	0.04	0.23	0.08	0.13	0.13	0.14

Intersection Summary

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

m Volume for 95th percentile queue is metered by upstream signal.

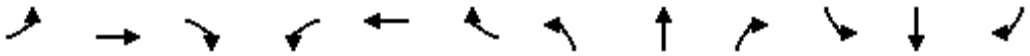
HCM Signalized Intersection Capacity Analysis
1: Dumfries Rd & Four Seasons Dr.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	2444	28	20	2339	45	30	5	20	38	30	49
Future Volume (vph)	17	2444	28	20	2339	45	30	5	20	38	30	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.1	6.6	6.6	8.3	6.3	6.3		7.0	7.0	7.1	7.1	7.1
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.99	1.00
Satd. Flow (prot)	1770	4848	1583	1770	4848	1583		1785	1583	1681	1758	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.99	1.00
Satd. Flow (perm)	1770	4848	1583	1770	4848	1583		1785	1583	1681	1758	1583
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)	18	2657	30	22	2542	49	33	5	22	41	33	53
RTOR Reduction (vph)	0	0	11	0	0	17	0	0	21	0	0	49
Lane Group Flow (vph)	18	2657	19	22	2542	32	0	38	1	36	38	4
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases			6			2			3			4
Actuated Green, G (s)	3.3	88.7	88.7	4.8	90.7	90.7		7.5	7.5	10.0	10.0	10.0
Effective Green, g (s)	3.3	88.7	88.7	4.8	90.7	90.7		7.5	7.5	10.0	10.0	10.0
Actuated g/C Ratio	0.02	0.63	0.63	0.03	0.65	0.65		0.05	0.05	0.07	0.07	0.07
Clearance Time (s)	8.1	6.6	6.6	8.3	6.3	6.3		7.0	7.0	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	41	3071	1002	60	3140	1025		95	84	120	125	113
v/s Ratio Prot	0.01	c0.55		c0.01	0.52			c0.02		0.02	c0.02	
v/s Ratio Perm			0.01			0.02			0.00			0.00
v/c Ratio	0.44	0.87	0.02	0.37	0.81	0.03		0.40	0.01	0.30	0.30	0.03
Uniform Delay, d1	67.4	20.8	9.5	66.1	18.3	8.9		64.1	62.7	61.7	61.7	60.5
Progression Factor	1.00	1.00	1.00	0.79	1.77	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.3	3.6	0.0	0.3	0.2	0.0		2.8	0.1	1.4	1.4	0.1
Delay (s)	74.8	24.4	9.5	52.5	32.6	8.9		66.8	62.8	63.1	63.1	60.6
Level of Service	E	C	A	D	C	A		E	E	E	E	E
Approach Delay (s)		24.5			32.3			65.4			62.1	
Approach LOS		C			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	29.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	29.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues
2: Van Buren Rd/Van Buren Road & Dumfries Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	123	2048	535	299	1985	105	532	39	218	37	23	97
v/c Ratio	0.90	1.30	0.63	1.37	1.08	0.15	1.02	0.07	0.28	0.42	0.25	0.44
Control Delay	115.8	170.4	7.7	238.8	82.4	0.6	92.1	36.1	15.1	79.3	70.9	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	115.8	170.4	7.7	238.8	82.4	0.6	92.1	36.1	15.1	79.3	70.9	8.1
Queue Length 50th (ft)	119	~858	30	~349	~748	3	~511	26	73	33	21	0
Queue Length 95th (ft)	m#171	#947	180	#555	#844	0	#738	55	131	73	52	12
Internal Link Dist (ft)		940			1309			1346			140	
Turn Bay Length (ft)	420		430	475		237	265			225		
Base Capacity (vph)	137	1580	850	219	1832	691	523	550	789	88	92	219
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	1.30	0.63	1.37	1.08	0.15	1.02	0.07	0.28	0.42	0.25	0.44

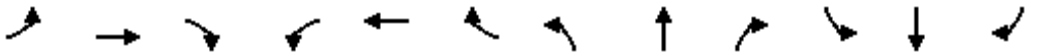
Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2: Van Buren Rd/Van Buren Road & Dumfries Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	1884	492	275	1826	97	489	36	201	34	21	89
Future Volume (vph)	113	1884	492	275	1826	97	489	36	201	34	21	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	6.4	7.8	6.1	6.1	7.6	7.6	7.8	6.5	6.5	6.5
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	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	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	4799	1567	1787	4896	1599	1770	1863	1583	1761	1853	1575
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1752	4799	1567	1787	4896	1599	1770	1863	1583	1761	1853	1575
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)	123	2048	535	299	1985	105	532	39	218	37	23	97
RTOR Reduction (vph)	0	0	334	0	0	66	0	0	45	0	0	92
Lane Group Flow (vph)	123	2048	201	299	1985	39	532	39	173	37	23	5
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	pm+ov	Split	NA	Perm
Protected Phases	1	6		5	2		4	4	5	3	3	
Permitted Phases			6			2			4			3
Actuated Green, G (s)	11.0	46.1	46.1	17.2	52.4	52.4	41.4	41.4	58.6	7.0	7.0	7.0
Effective Green, g (s)	11.0	46.1	46.1	17.2	52.4	52.4	41.4	41.4	58.6	7.0	7.0	7.0
Actuated g/C Ratio	0.08	0.33	0.33	0.12	0.37	0.37	0.30	0.30	0.42	0.05	0.05	0.05
Clearance Time (s)	8.0	6.4	6.4	7.8	6.1	6.1	7.6	7.6	7.8	6.5	6.5	6.5
Vehicle Extension (s)	3.0	4.0	4.0	3.5	4.0	4.0	3.0	3.0	3.5	3.0	3.0	3.0
Lane Grp Cap (vph)	137	1580	515	219	1832	598	523	550	662	88	92	78
v/s Ratio Prot	0.07	c0.43		c0.17	c0.41		c0.30	0.02	0.03	c0.02	0.01	
v/s Ratio Perm			0.13			0.02			0.08			0.00
v/c Ratio	0.90	1.30	0.39	1.37	1.08	0.07	1.02	0.07	0.26	0.42	0.25	0.06
Uniform Delay, d1	63.9	47.0	36.1	61.4	43.8	28.1	49.3	35.5	26.6	64.5	64.0	63.4
Progression Factor	1.26	0.85	1.26	1.12	0.82	0.15	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	33.2	136.2	1.3	190.5	47.5	0.2	43.8	0.1	0.3	3.2	1.4	0.3
Delay (s)	113.8	176.0	47.0	259.1	83.4	4.4	93.1	35.5	26.8	67.8	65.4	63.7
Level of Service	F	F	D	F	F	A	F	D	C	E	E	E
Approach Delay (s)		147.7			101.9			71.9			64.9	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	117.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	103.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Queues
3: I-95 SB Entrance Ramp & Dumfries Rd

Lane Group	EBT	EBR	WBL	WBT
Lane Group Flow (vph)	1314	989	379	1629
v/c Ratio	0.43	0.65	0.81	0.33
Control Delay	1.2	18.7	40.7	0.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	1.2	18.7	40.7	0.3
Queue Length 50th (ft)	15	647	250	0
Queue Length 95th (ft)	m17	m435	167	0
Internal Link Dist (ft)	1309			2173
Turn Bay Length (ft)		1000	1000	
Base Capacity (vph)	3059	1517	692	4872
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.43	0.65	0.55	0.33

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

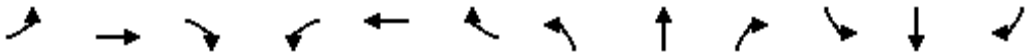
HCM Signalized Intersection Capacity Analysis
3: I-95 SB Entrance Ramp & Dumfries Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1209	910	349	1499	0	0
Future Volume (vph)	1209	910	349	1499	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-1%			-1%	0%	
Total Lost time (s)	5.8	4.0	7.8	7.0		
Lane Util. Factor	0.91	1.00	1.00	0.91		
Frt	1.00	0.85	1.00	1.00		
Flt Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	4872	1517	1695	4872		
Flt Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	4872	1517	1695	4872		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1314	989	379	1629	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1314	989	379	1629	0	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%
Turn Type	NA	Free	Prot	NA		
Protected Phases	6		5	2		
Permitted Phases		Free				
Actuated Green, G (s)	87.9	140.0	38.5	140.0		
Effective Green, g (s)	87.9	140.0	38.5	140.0		
Actuated g/C Ratio	0.63	1.00	0.28	1.00		
Clearance Time (s)	5.8		7.8	7.0		
Vehicle Extension (s)	3.0		4.0	3.0		
Lane Grp Cap (vph)	3058	1517	466	4872		
v/s Ratio Prot	0.27		c0.22	0.33		
v/s Ratio Perm		c0.65				
v/c Ratio	0.43	0.65	0.81	0.33		
Uniform Delay, d1	13.3	0.0	47.4	0.0		
Progression Factor	0.08	1.00	0.58	1.00		
Incremental Delay, d2	0.0	0.2	10.5	0.2		
Delay (s)	1.1	0.2	37.8	0.2		
Level of Service	A	A	D	A		
Approach Delay (s)	0.7			7.3	0.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	13.6
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

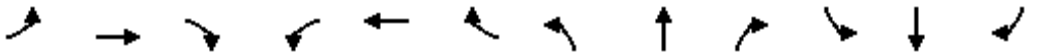
c Critical Lane Group

Queues
4: Van Buren Road/Benita Fitzgerald Drive & Cardinal Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	480	454	85	52	288	327	26	42	39	214	35	150
v/c Ratio	0.68	0.34	0.13	0.30	0.38	0.41	0.16	0.13	0.13	0.37	0.06	0.18
Control Delay	41.3	25.2	1.2	51.9	35.5	2.8	51.2	48.5	0.9	36.9	35.0	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.3	25.2	1.2	51.9	35.5	2.8	51.2	48.5	0.9	36.9	35.0	3.0
Queue Length 50th (ft)	116	96	0	26	69	0	13	10	0	52	8	0
Queue Length 95th (ft)	289	216	7	95	166	30	57	42	0	119	28	34
Internal Link Dist (ft)		6294			2111			370			816	
Turn Bay Length (ft)	350		410	390		400	833		200	400		400
Base Capacity (vph)	1236	2550	1176	431	2199	1135	633	1266	673	1901	1960	1021
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.18	0.07	0.12	0.13	0.29	0.04	0.03	0.06	0.11	0.02	0.15

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	442	418	78	48	265	301	24	39	36	197	32	138
Future Volume (vph)	442	418	78	48	265	301	24	39	36	197	32	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-1%			0%			-3%	
Total Lost time (s)	8.0	5.5	5.5	8.5	6.0	9.0	8.0	8.0	8.0	9.0	9.0	8.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3399	3504	1567	1778	3557	1591	1770	3539	1583	3485	3592	1607
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3399	3504	1567	1778	3557	1591	1770	3539	1583	3485	3592	1607
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)	480	454	85	52	288	327	26	42	39	214	35	150
RTOR Reduction (vph)	0	0	54	0	0	197	0	0	36	0	0	95
Lane Group Flow (vph)	480	454	31	52	288	130	26	42	3	214	35	55
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Split	NA	Perm	Split	NA	pm+ov
Protected Phases	5	2		1	6	4	3	3		4	4	5
Permitted Phases			2			6			3			4
Actuated Green, G (s)	18.9	34.2	34.2	6.5	21.8	36.8	6.0	6.0	6.0	15.0	15.0	33.9
Effective Green, g (s)	18.9	34.2	34.2	6.5	21.8	36.8	6.0	6.0	6.0	15.0	15.0	33.9
Actuated g/C Ratio	0.20	0.37	0.37	0.07	0.24	0.40	0.06	0.06	0.06	0.16	0.16	0.37
Clearance Time (s)	8.0	5.5	5.5	8.5	6.0	9.0	8.0	8.0	8.0	9.0	9.0	8.0
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.0
Lane Grp Cap (vph)	693	1292	578	124	836	631	114	229	102	563	581	587
v/s Ratio Prot	c0.14	c0.13		0.03	0.08	0.03	c0.01	0.01		c0.06	0.01	0.02
v/s Ratio Perm			0.02			0.05			0.00			0.02
v/c Ratio	0.69	0.35	0.05	0.42	0.34	0.21	0.23	0.18	0.02	0.38	0.06	0.09
Uniform Delay, d1	34.2	21.2	18.8	41.3	29.5	18.4	41.2	41.0	40.6	34.7	32.9	19.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.4	0.2	0.0	0.8	0.2	0.2	1.0	0.4	0.1	0.4	0.0	0.0
Delay (s)	36.6	21.4	18.9	42.1	29.8	18.5	42.2	41.4	40.7	35.1	32.9	19.3
Level of Service	D	C	B	D	C	B	D	D	D	D	C	B
Approach Delay (s)		28.4			25.2			41.3			29.0	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	28.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	92.7	Sum of lost time (s)	31.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Dumfries Rd & Four Seasons Dr.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	47	3846	12	24	3847	84	34	18	27	27	43
v/c Ratio	0.41	1.15	0.01	0.24	1.20	0.08	0.31	0.08	0.21	0.21	0.17
Control Delay	72.4	94.5	0.0	55.7	124.2	3.6	69.7	0.6	61.6	61.5	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.4	94.5	0.0	55.7	124.2	3.6	69.7	0.6	61.6	61.5	1.4
Queue Length 50th (ft)	42	~1612	0	22	~1588	5	30	0	25	25	0
Queue Length 95th (ft)	84	#1913	0	m13	m#558	m0	67	0	53	53	0
Internal Link Dist (ft)		1071			1361		306			408	
Turn Bay Length (ft)	400		375	430		475			275		
Base Capacity (vph)	150	3354	1142	147	3215	1100	191	301	274	276	381
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	1.15	0.01	0.16	1.20	0.08	0.18	0.06	0.10	0.10	0.11

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

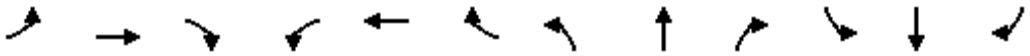
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Dumfries Rd & Four Seasons Dr.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	3538	11	22	3539	77	28	4	17	48	2	40
Future Volume (vph)	43	3538	11	22	3539	77	28	4	17	48	2	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.1	6.6	6.6	8.3	6.3	6.3		7.0	7.0	7.1	7.1	7.1
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.96	1.00
Satd. Flow (prot)	1770	4848	1583	1770	4848	1583		1784	1583	1681	1691	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00	0.95	0.96	1.00
Satd. Flow (perm)	1770	4848	1583	1770	4848	1583		1784	1583	1681	1691	1583
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)	47	3846	12	24	3847	84	30	4	18	52	2	43
RTOR Reduction (vph)	0	0	4	0	0	32	0	0	17	0	0	40
Lane Group Flow (vph)	47	3846	8	24	3847	52	0	34	1	27	27	3
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases			6			2			3			4
Actuated Green, G (s)	7.8	89.4	89.4	5.1	87.2	87.2		7.2	7.2	9.3	9.3	9.3
Effective Green, g (s)	7.8	89.4	89.4	5.1	87.2	87.2		7.2	7.2	9.3	9.3	9.3
Actuated g/C Ratio	0.06	0.64	0.64	0.04	0.62	0.62		0.05	0.05	0.07	0.07	0.07
Clearance Time (s)	8.1	6.6	6.6	8.3	6.3	6.3		7.0	7.0	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	98	3095	1010	64	3019	985		91	81	111	112	105
v/s Ratio Prot	c0.03	0.79		0.01	c0.79			c0.02		c0.02	0.02	
v/s Ratio Perm			0.00			0.03			0.00			0.00
v/c Ratio	0.48	1.24	0.01	0.38	1.27	0.05		0.37	0.01	0.24	0.24	0.03
Uniform Delay, d1	64.1	25.3	9.2	65.9	26.4	10.3		64.2	63.0	62.0	62.0	61.1
Progression Factor	1.00	1.00	1.00	0.88	1.67	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.7	112.1	0.0	0.3	123.7	0.0		2.6	0.1	1.1	1.1	0.1
Delay (s)	67.8	137.4	9.2	58.0	167.6	10.3		66.8	63.1	63.2	63.1	61.2
Level of Service	E	F	A	E	F	B		E	E	E	E	E
Approach Delay (s)		136.2			163.6			65.5			62.3	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	148.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	29.0
Intersection Capacity Utilization	97.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues
2: Van Buren Rd/Van Buren Road & Dumfries Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	292	2943	670	422	2786	193	804	111	262	191	63	364
v/c Ratio	1.95	2.07	0.89	2.33	1.81	0.32	1.37	0.18	0.32	1.61	0.50	1.48
Control Delay	462.9	506.7	22.7	641.0	395.3	4.5	214.8	34.3	16.2	347.1	77.4	261.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	462.9	506.7	22.7	641.0	395.3	4.5	214.8	34.3	16.2	347.1	77.4	261.2
Queue Length 50th (ft)	~422	~1541	205	~627	~1406	12	~965	72	97	~248	56	~322
Queue Length 95th (ft)	m#355	m#1273	m253	#842	#1486	53	#1216	121	161	#407	107	#527
Internal Link Dist (ft)		940			1309			1346			140	
Turn Bay Length (ft)	420		430	475		237	265			225		
Base Capacity (vph)	150	1425	756	181	1535	603	586	617	810	119	125	246
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.95	2.07	0.89	2.33	1.81	0.32	1.37	0.18	0.32	1.61	0.50	1.48

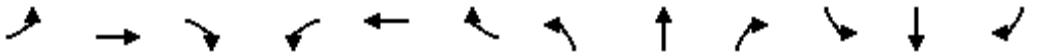
Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2: Van Buren Rd/Van Buren Road & Dumfries Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	269	2708	616	388	2563	178	740	102	241	176	58	335
Future Volume (vph)	269	2708	616	388	2563	178	740	102	241	176	58	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	6.4	7.8	6.1	6.1	7.6	7.6	7.8	6.5	6.5	6.5
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	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	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	4799	1567	1787	4896	1599	1770	1863	1583	1761	1853	1575
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1752	4799	1567	1787	4896	1599	1770	1863	1583	1761	1853	1575
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)	292	2943	670	422	2786	193	804	111	262	191	63	364
RTOR Reduction (vph)	0	0	291	0	0	102	0	0	44	0	0	140
Lane Group Flow (vph)	292	2943	379	422	2786	91	804	111	218	191	63	224
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	pm+ov	Split	NA	Perm
Protected Phases	1	6		5	2		4	4	5	3	3	
Permitted Phases			6			2			4			3
Actuated Green, G (s)	12.0	41.6	41.6	14.2	43.9	43.9	46.4	46.4	60.6	9.5	9.5	9.5
Effective Green, g (s)	12.0	41.6	41.6	14.2	43.9	43.9	46.4	46.4	60.6	9.5	9.5	9.5
Actuated g/C Ratio	0.09	0.30	0.30	0.10	0.31	0.31	0.33	0.33	0.43	0.07	0.07	0.07
Clearance Time (s)	8.0	6.4	6.4	7.8	6.1	6.1	7.6	7.6	7.8	6.5	6.5	6.5
Vehicle Extension (s)	3.0	4.0	4.0	3.5	4.0	4.0	3.0	3.0	3.5	3.0	3.0	3.0
Lane Grp Cap (vph)	150	1425	465	181	1535	501	586	617	685	119	125	106
v/s Ratio Prot	0.17	c0.61		c0.24	0.57		c0.45	0.06	0.03	0.11	0.03	
v/s Ratio Perm			0.24			0.06			0.11			c0.14
v/c Ratio	1.95	2.07	0.82	2.33	1.81	0.18	1.37	0.18	0.32	1.61	0.50	2.11
Uniform Delay, d1	64.0	49.2	45.6	62.9	48.1	35.0	46.8	33.3	26.1	65.2	63.0	65.2
Progression Factor	1.17	1.05	1.20	1.11	0.79	0.34	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	428.2	479.6	1.5	613.5	368.9	0.7	178.1	0.1	0.3	307.8	3.2	532.1
Delay (s)	502.8	531.4	56.3	683.3	407.0	12.6	224.9	33.4	26.4	373.0	66.2	597.3
Level of Service	F	F	E	F	F	B	F	C	C	F	E	F
Approach Delay (s)		447.7			418.9			162.6			473.9	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	401.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.81		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	139.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Queues
3: I-95 SB Entrance Ramp & Dumfries Rd

Lane Group	EBT	EBR	WBL	WBT
Lane Group Flow (vph)	1963	1434	187	3026
v/c Ratio	0.54	0.95	0.72	0.62
Control Delay	4.9	40.3	76.3	2.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	4.9	40.3	76.3	2.9
Queue Length 50th (ft)	95	1198	149	153
Queue Length 95th (ft)	m19	m509	206	119
Internal Link Dist (ft)	1309			2173
Turn Bay Length (ft)		1000	1000	
Base Capacity (vph)	3654	1517	329	4872
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.54	0.95	0.57	0.62

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

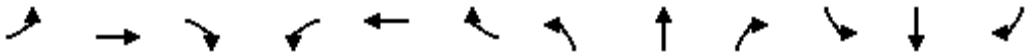
HCM Signalized Intersection Capacity Analysis
3: I-95 SB Entrance Ramp & Dumfries Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1806	1319	172	2784	0	0
Future Volume (vph)	1806	1319	172	2784	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-1%			-1%	0%	
Total Lost time (s)	5.8	4.0	7.8	7.0		
Lane Util. Factor	0.91	1.00	1.00	0.91		
Frt	1.00	0.85	1.00	1.00		
Flt Protected	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	4872	1517	1695	4872		
Flt Permitted	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	4872	1517	1695	4872		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1963	1434	187	3026	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1963	1434	187	3026	0	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%
Turn Type	NA	Free	Prot	NA		
Protected Phases	6		5	2		
Permitted Phases		Free				
Actuated Green, G (s)	105.0	140.0	21.4	140.0		
Effective Green, g (s)	105.0	140.0	21.4	140.0		
Actuated g/C Ratio	0.75	1.00	0.15	1.00		
Clearance Time (s)	5.8		7.8	7.0		
Vehicle Extension (s)	3.0		4.0	3.0		
Lane Grp Cap (vph)	3654	1517	259	4872		
v/s Ratio Prot	0.40		0.11	0.62		
v/s Ratio Perm		c0.95				
v/c Ratio	0.54	0.95	0.72	0.62		
Uniform Delay, d1	7.3	0.0	56.5	0.0		
Progression Factor	0.62	1.00	1.08	1.00		
Incremental Delay, d2	0.1	1.7	10.1	0.6		
Delay (s)	4.6	1.7	71.1	0.6		
Level of Service	A	A	E	A		
Approach Delay (s)	3.4			4.7	0.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	13.6
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues
4: Van Buren Road/Benita Fitzgerald Drive & Cardinal Drive



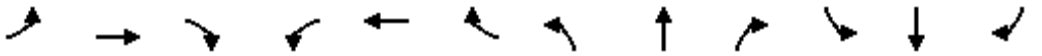
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	625	484	164	124	760	411	196	139	118	475	215	784
v/c Ratio	1.06	0.42	0.26	0.77	0.86	0.46	0.81	0.29	0.33	0.52	0.23	0.94
Control Delay	119.6	47.3	6.6	106.9	73.1	8.4	97.8	69.2	3.8	59.0	53.2	57.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	119.6	47.3	6.6	106.9	73.1	8.4	97.8	69.2	3.8	59.0	53.2	57.8
Queue Length 50th (ft)	~413	228	0	142	441	66	222	76	0	246	104	794
Queue Length 95th (ft)	#587	304	58	229	542	109	328	117	11	329	155	#1193
Internal Link Dist (ft)		6294			2111			370			816	
Turn Bay Length (ft)	350		410	390		400	833		200	400		400
Base Capacity (vph)	590	1217	651	205	1029	945	307	614	413	907	935	831
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.06	0.40	0.25	0.60	0.74	0.43	0.64	0.23	0.29	0.52	0.23	0.94

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis
4: Van Buren Road/Benita Fitzgerald Drive & Cardinal Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	575	445	151	114	699	378	180	128	109	437	198	721
Future Volume (vph)	575	445	151	114	699	378	180	128	109	437	198	721
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-1%			0%			-3%	
Total Lost time (s)	8.0	5.5	5.5	8.5	6.0	9.0	8.0	8.0	8.0	9.0	9.0	8.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3399	3504	1567	1778	3557	1591	1770	3539	1583	3485	3592	1607
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3399	3504	1567	1778	3557	1591	1770	3539	1583	3485	3592	1607
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)	625	484	164	124	760	411	196	139	118	475	215	784
RTOR Reduction (vph)	0	0	110	0	0	103	0	0	102	0	0	55
Lane Group Flow (vph)	625	484	54	124	760	308	196	139	16	475	215	729
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Split	NA	Perm	Split	NA	pm+ov
Protected Phases	5	2		1	6	4	3	3		4	4	5
Permitted Phases			2			6			3			4
Actuated Green, G (s)	30.1	57.5	57.5	15.9	43.3	88.5	23.8	23.8	23.8	45.2	45.2	75.3
Effective Green, g (s)	30.1	57.5	57.5	15.9	43.3	88.5	23.8	23.8	23.8	45.2	45.2	75.3
Actuated g/C Ratio	0.17	0.33	0.33	0.09	0.25	0.51	0.14	0.14	0.14	0.26	0.26	0.43
Clearance Time (s)	8.0	5.5	5.5	8.5	6.0	9.0	8.0	8.0	8.0	9.0	9.0	8.0
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.0
Lane Grp Cap (vph)	590	1161	519	163	888	812	242	485	217	908	936	697
v/s Ratio Prot	c0.18	0.14		0.07	c0.21	0.10	c0.11	0.04		0.14	0.06	c0.18
v/s Ratio Perm			0.03			0.09			0.01			0.27
v/c Ratio	1.06	0.42	0.10	0.76	0.86	0.38	0.81	0.29	0.07	0.52	0.23	1.05
Uniform Delay, d1	71.7	44.9	40.1	76.9	62.1	25.8	72.6	67.2	65.2	54.9	50.4	49.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	53.8	0.2	0.1	17.0	8.1	0.3	17.8	0.3	0.1	0.5	0.1	46.5
Delay (s)	125.4	45.2	40.2	93.9	70.2	26.1	90.4	67.5	65.3	55.4	50.5	95.5
Level of Service	F	D	D	F	E	C	F	E	E	E	D	F
Approach Delay (s)		83.9			58.5			76.9			76.1	
Approach LOS		F			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	73.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	173.4	Sum of lost time (s)	31.0
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Rte. 234 and Van Buren Road - Option 1A

SCALE
0 25' 50' 75' 100'

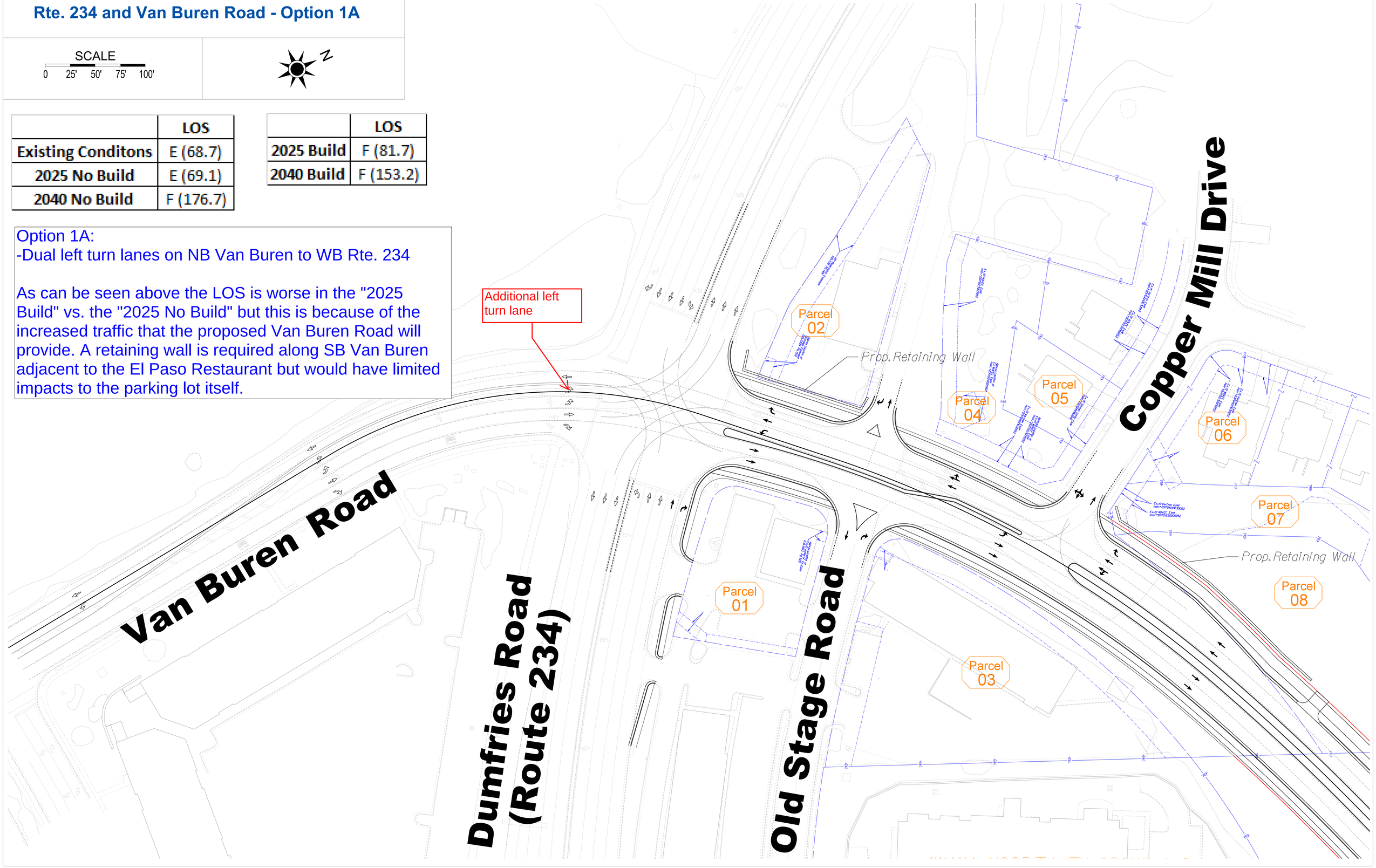
N

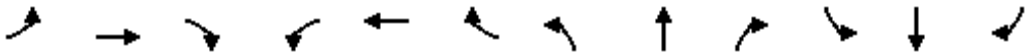
	LOS
Existing Conditons	E (68.7)
2025 No Build	E (69.1)
2040 No Build	F (176.7)

	LOS
2025 Build	F (81.7)
2040 Build	F (153.2)

Option 1A:
-Dual left turn lanes on NB Van Buren to WB Rte. 234

As can be seen above the LOS is worse in the "2025 Build" vs. the "2025 No Build" but this is because of the increased traffic that the proposed Van Buren Road will provide. A retaining wall is required along SB Van Buren adjacent to the El Paso Restaurant but would have limited impacts to the parking lot itself.





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	95	1572	411	218	1453	77	530	39	218	37	23	96
v/c Ratio	0.45	0.72	0.34	0.77	0.57	0.07	0.81	0.12	0.38	0.42	0.19	0.29
Control Delay	27.5	25.2	0.8	69.1	17.2	0.2	64.3	43.7	21.5	79.3	63.0	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.5	25.2	0.8	69.1	17.2	0.2	64.3	43.7	21.5	79.3	63.0	4.3
Queue Length 50th (ft)	20	433	0	127	367	0	237	29	85	33	21	0
Queue Length 95th (ft)	m87	#446	0	#323	513	0	297	55	137	73	47	17
Internal Link Dist (ft)		940			1309			1346			140	
Turn Bay Length (ft)	420		430	475		237	265			225		
Base Capacity (vph)	222	2183	1240	286	2535	1038	742	545	572	88	234	340
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.72	0.33	0.76	0.57	0.07	0.71	0.07	0.38	0.42	0.10	0.28

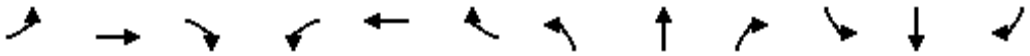
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	1446	378	201	1337	71	488	36	201	34	21	88
Future Volume (vph)	87	1446	378	201	1337	71	488	36	201	34	21	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.97	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	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	4799	1567	1787	4896	1599	3433	1863	1583	1761	1853	1575
Flt Permitted	0.13	1.00	1.00	0.07	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	238	4799	1567	126	4896	1599	3433	1863	1583	1761	1853	1575
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)	95	1572	411	218	1453	77	530	39	218	37	23	96
RTOR Reduction (vph)	0	0	153	0	0	35	0	0	52	0	0	86
Lane Group Flow (vph)	95	1572	258	218	1453	42	530	39	166	37	23	10
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases	6		6	2		2			4			8
Actuated Green, G (s)	69.7	61.2	87.9	86.5	70.0	75.6	26.7	27.7	44.9	5.6	6.6	15.1
Effective Green, g (s)	69.7	61.2	87.9	86.5	70.0	75.6	26.7	27.7	44.9	5.6	6.6	15.1
Actuated g/C Ratio	0.50	0.44	0.63	0.62	0.50	0.54	0.19	0.20	0.32	0.04	0.05	0.11
Clearance Time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Vehicle Extension (s)	3.0	4.0	3.0	3.5	4.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0
Lane Grp Cap (vph)	210	2097	983	281	2448	863	654	368	507	70	87	169
v/s Ratio Prot	0.03	0.33	0.05	c0.09	c0.30	0.00	c0.15	0.02	c0.04	0.02	0.01	0.00
v/s Ratio Perm	0.20		0.11	c0.38		0.02			0.06			0.00
v/c Ratio	0.45	0.75	0.26	0.78	0.59	0.05	0.81	0.11	0.33	0.53	0.26	0.06
Uniform Delay, d1	19.8	33.0	11.6	37.6	24.9	15.2	54.2	46.0	36.1	65.9	64.4	56.1
Progression Factor	1.41	0.69	0.13	1.65	0.63	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	2.0	0.1	12.9	1.1	0.0	7.5	0.1	0.4	7.0	1.6	0.2
Delay (s)	29.1	24.7	1.7	75.1	16.7	15.2	61.8	46.1	36.5	72.9	66.0	56.2
Level of Service	C	C	A	E	B	B	E	D	D	E	E	E
Approach Delay (s)		20.3			24.0			54.0			61.6	
Approach LOS		C			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	28.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	242	2442	555	309	2039	141	804	111	262	191	63	364
v/c Ratio	1.20	1.33	0.48	1.40	1.06	0.16	0.87	0.24	0.39	1.45	0.47	0.90
Control Delay	149.5	185.9	0.8	241.9	71.2	0.9	60.4	41.3	21.2	281.9	72.9	60.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	149.5	185.9	0.8	241.9	71.2	0.9	60.4	41.3	21.2	281.9	72.9	60.1
Queue Length 50th (ft)	~231	~1101	0	~325	~800	4	356	78	111	~236	56	209
Queue Length 95th (ft)	m#267	#1215	m0	#525	#939	14	437	127	175	#395	104	#351
Internal Link Dist (ft)		940			1309			1346			140	
Turn Bay Length (ft)	420		430	475		237	265			225		
Base Capacity (vph)	202	1834	1182	221	1917	892	961	558	671	132	176	403
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.20	1.33	0.47	1.40	1.06	0.16	0.84	0.20	0.39	1.45	0.36	0.90

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

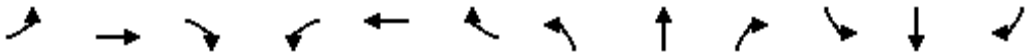
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	2247	511	284	1876	130	740	102	241	176	58	335
Future Volume (vph)	223	2247	511	284	1876	130	740	102	241	176	58	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.97	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	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	4799	1567	1787	4896	1599	3433	1863	1583	1761	1853	1575
Flt Permitted	0.08	1.00	1.00	0.07	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	141	4799	1567	141	4896	1599	3433	1863	1583	1761	1853	1575
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)	242	2442	555	309	2039	141	804	111	262	191	63	364
RTOR Reduction (vph)	0	0	90	0	0	77	0	0	50	0	0	116
Lane Group Flow (vph)	242	2442	465	309	2039	64	804	111	212	191	63	248
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases	6		6	2		2			4			8
Actuated Green, G (s)	64.2	52.2	89.7	66.7	53.5	64.0	37.5	35.8	49.0	10.5	8.8	20.8
Effective Green, g (s)	64.2	52.2	89.7	66.7	53.5	64.0	37.5	35.8	49.0	10.5	8.8	20.8
Actuated g/C Ratio	0.46	0.37	0.64	0.48	0.38	0.46	0.27	0.26	0.35	0.08	0.06	0.15
Clearance Time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Vehicle Extension (s)	3.0	4.0	3.0	3.5	4.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0
Lane Grp Cap (vph)	202	1789	1003	222	1870	730	919	476	554	132	116	234
v/s Ratio Prot	0.10	0.51	0.12	c0.13	0.42	0.01	c0.23	0.06	0.04	c0.11	0.03	c0.09
v/s Ratio Perm	0.44		0.17	c0.53		0.03			0.10			0.07
v/c Ratio	1.20	1.37	0.46	1.39	1.09	0.09	0.87	0.23	0.38	1.45	0.54	1.06
Uniform Delay, d1	42.1	43.9	12.9	43.6	43.2	21.5	49.0	41.2	34.1	64.8	63.6	59.6
Progression Factor	1.43	1.01	0.05	1.41	0.72	0.21	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	105.7	165.6	0.1	200.3	49.7	0.0	9.3	0.3	0.5	238.4	5.1	75.8
Delay (s)	166.0	210.0	0.7	261.7	80.8	4.7	58.3	41.5	34.7	303.1	68.8	135.4
Level of Service	F	F	A	F	F	A	E	D	C	F	E	F
Approach Delay (s)		170.9			99.0			51.5			180.4	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	129.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	105.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	123	2048	535	299	1985	105	532	39	218	37	23	97
v/c Ratio	0.65	1.15	0.46	0.72	0.82	0.10	0.79	0.12	0.31	0.29	0.19	0.27
Control Delay	53.9	106.6	1.3	55.8	28.4	0.2	62.3	43.2	17.9	71.0	63.3	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.9	106.6	1.3	55.8	28.4	0.2	62.3	43.2	17.9	71.0	63.3	4.1
Queue Length 50th (ft)	69	~805	16	189	654	0	236	29	78	33	21	0
Queue Length 95th (ft)	m#118	#893	0	#504	#789	1	297	55	139	73	48	18
Internal Link Dist (ft)		940			1309			1346			140	
Turn Bay Length (ft)	420		430	475		237	265			225		
Base Capacity (vph)	189	1775	1190	417	2429	1038	755	545	694	127	227	355
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	1.15	0.45	0.72	0.82	0.10	0.70	0.07	0.31	0.29	0.10	0.27

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

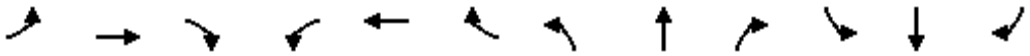
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	1884	492	275	1826	97	489	36	201	34	21	89
Future Volume (vph)	113	1884	492	275	1826	97	489	36	201	34	21	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.97	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	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	4799	1567	1787	4896	1599	3433	1863	1583	1761	1853	1575
Flt Permitted	0.08	1.00	1.00	0.07	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	150	4799	1567	131	4896	1599	3433	1863	1583	1761	1853	1575
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)	123	2048	535	299	1985	105	532	39	218	37	23	97
RTOR Reduction (vph)	0	0	242	0	0	47	0	0	48	0	0	85
Lane Group Flow (vph)	123	2048	293	299	1985	58	532	39	170	37	23	12
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases	6		6	2		2			4			8
Actuated Green, G (s)	60.1	49.2	76.7	85.8	66.9	77.0	27.5	23.9	52.4	10.1	6.5	17.4
Effective Green, g (s)	60.1	49.2	76.7	85.8	66.9	77.0	27.5	23.9	52.4	10.1	6.5	17.4
Actuated g/C Ratio	0.43	0.35	0.55	0.61	0.48	0.55	0.20	0.17	0.37	0.07	0.05	0.12
Clearance Time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Vehicle Extension (s)	3.0	4.0	3.0	3.5	4.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0
Lane Grp Cap (vph)	189	1686	858	417	2339	879	674	318	592	127	86	195
v/s Ratio Prot	0.05	c0.43	0.07	c0.15	c0.41	0.00	c0.15	0.02	c0.06	0.02	0.01	0.00
v/s Ratio Perm	0.23		0.12	0.29		0.03			0.05			0.00
v/c Ratio	0.65	1.21	0.34	0.72	0.85	0.07	0.79	0.12	0.29	0.29	0.27	0.06
Uniform Delay, d1	28.5	45.4	17.6	39.6	32.1	14.7	53.5	49.2	30.7	61.6	64.5	54.1
Progression Factor	1.70	0.79	0.56	1.31	0.77	0.03	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.8	100.1	0.1	5.9	4.0	0.0	6.1	0.2	0.3	1.3	1.7	0.1
Delay (s)	53.3	136.0	10.0	58.0	28.6	0.5	59.6	49.3	31.0	62.8	66.1	54.2
Level of Service	D	F	A	E	C	A	E	D	C	E	E	D
Approach Delay (s)		107.3			31.1			51.2			58.0	
Approach LOS		F			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	68.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	90.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	292	2943	670	422	2786	193	804	111	262	191	63	364
v/c Ratio	1.54	1.61	0.58	1.91	1.43	0.21	0.87	0.24	0.39	1.45	0.47	0.93
Control Delay	280.2	307.4	1.9	450.4	226.2	1.8	59.6	41.1	21.1	281.9	72.9	64.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	280.2	307.4	1.9	450.4	226.2	1.8	59.6	41.1	21.1	281.9	72.9	64.8
Queue Length 50th (ft)	~340	~1449	0	~546	~1313	3	356	78	111	~236	56	212
Queue Length 95th (ft)	m#279	m#1219	m0	#764	#1431	32	437	127	175	#395	104	#360
Internal Link Dist (ft)		940			1309			1346			140	
Turn Bay Length (ft)	420		430	475		237	265			225		
Base Capacity (vph)	190	1824	1179	221	1942	900	961	558	674	132	176	393
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.54	1.61	0.57	1.91	1.43	0.21	0.84	0.20	0.39	1.45	0.36	0.93

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	269	2708	616	388	2563	178	740	102	241	176	58	335
Future Volume (vph)	269	2708	616	388	2563	178	740	102	241	176	58	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.97	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	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	4799	1567	1787	4896	1599	3433	1863	1583	1761	1853	1575
Flt Permitted	0.08	1.00	1.00	0.07	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	142	4799	1567	139	4896	1599	3433	1863	1583	1761	1853	1575
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)	292	2943	670	422	2786	193	804	111	262	191	63	364
RTOR Reduction (vph)	0	0	89	0	0	84	0	0	50	0	0	117
Lane Group Flow (vph)	292	2943	581	422	2786	109	804	111	212	191	63	247
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases	6		6	2		2			4			8
Actuated Green, G (s)	62.9	51.9	89.7	67.4	54.2	64.7	37.8	36.1	49.3	10.5	8.8	19.8
Effective Green, g (s)	62.9	51.9	89.7	67.4	54.2	64.7	37.8	36.1	49.3	10.5	8.8	19.8
Actuated g/C Ratio	0.45	0.37	0.64	0.48	0.39	0.46	0.27	0.26	0.35	0.08	0.06	0.14
Clearance Time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Vehicle Extension (s)	3.0	4.0	3.0	3.5	4.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0
Lane Grp Cap (vph)	190	1779	1003	222	1895	738	926	480	557	132	116	222
v/s Ratio Prot	0.12	0.61	0.16	c0.18	0.57	0.01	c0.23	0.06	0.04	c0.11	0.03	c0.09
v/s Ratio Perm	0.57		0.21	c0.74		0.06			0.10			0.07
v/c Ratio	1.54	1.65	0.58	1.90	1.47	0.15	0.87	0.23	0.38	1.45	0.54	1.11
Uniform Delay, d1	41.0	44.1	14.4	43.7	42.9	21.7	48.7	41.0	33.9	64.8	63.6	60.1
Progression Factor	1.37	1.05	0.23	1.28	0.76	0.26	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	244.0	294.7	0.1	419.3	214.1	0.1	8.7	0.2	0.5	238.4	5.1	94.3
Delay (s)	300.0	341.0	3.4	475.1	246.6	5.8	57.4	41.2	34.4	303.1	68.8	154.4
Level of Service	F	F	A	F	F	A	E	D	C	F	E	F
Approach Delay (s)		280.0			261.3			50.8			191.6	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	237.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.55		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	119.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Rte. 234 and Van Buren Road - Option 1B

SCALE
0 25' 50' 75' 100'

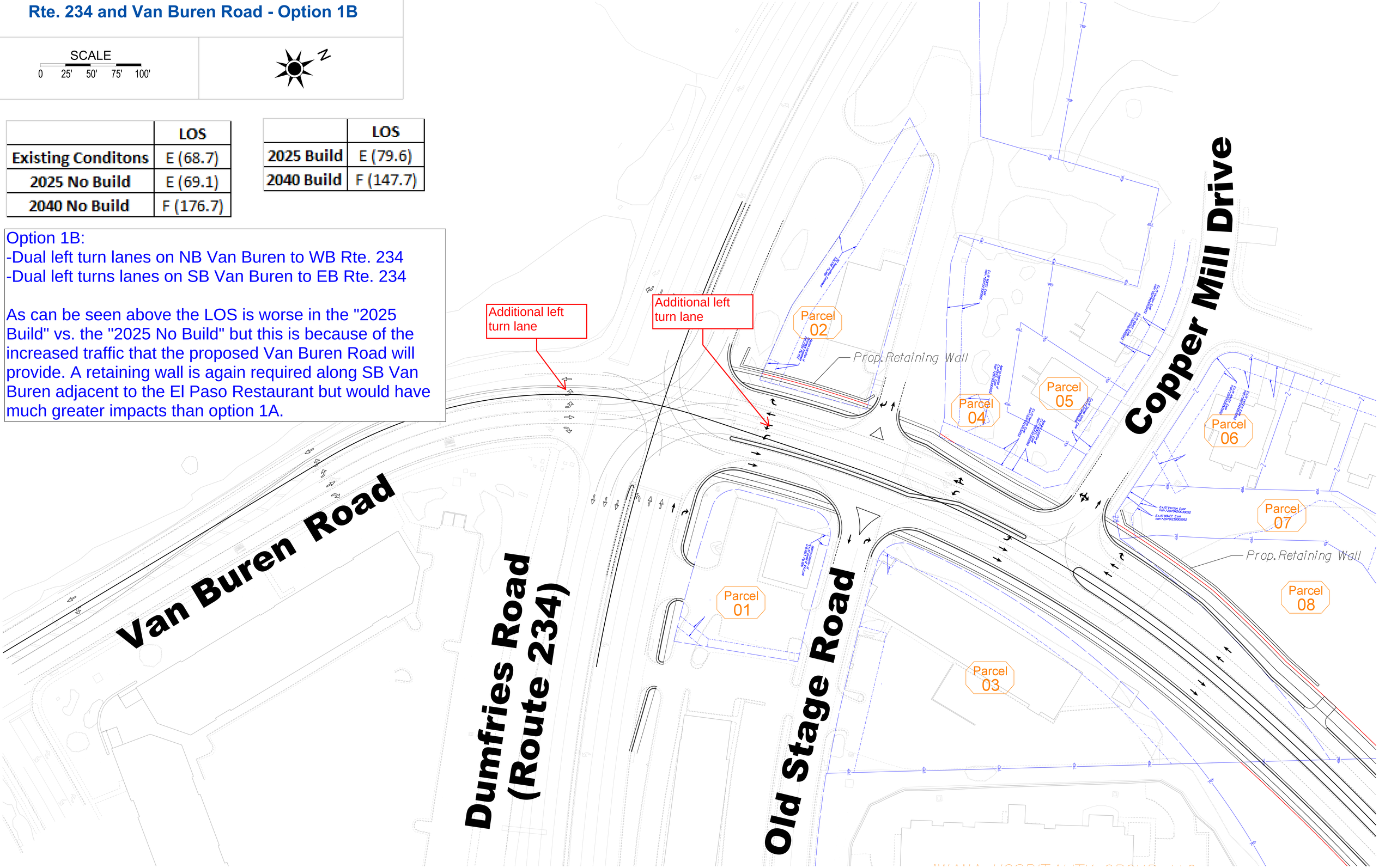
N

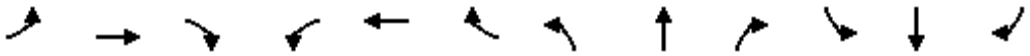
	LOS
Existing Conditons	E (68.7)
2025 No Build	E (69.1)
2040 No Build	F (176.7)

	LOS
2025 Build	E (79.6)
2040 Build	F (147.7)

Option 1B:
-Dual left turn lanes on NB Van Buren to WB Rte. 234
-Dual left turns lanes on SB Van Buren to EB Rte. 234

As can be seen above the LOS is worse in the "2025 Build" vs. the "2025 No Build" but this is because of the increased traffic that the proposed Van Buren Road will provide. A retaining wall is again required along SB Van Buren adjacent to the El Paso Restaurant but would have much greater impacts than option 1A.

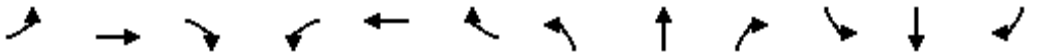




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	95	1572	411	218	1453	77	530	39	218	37	23	96
v/c Ratio	0.45	0.72	0.34	0.77	0.57	0.07	0.81	0.12	0.38	0.22	0.19	0.29
Control Delay	27.5	25.2	0.8	69.1	17.2	0.2	64.3	43.7	21.5	67.1	63.0	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.5	25.2	0.8	69.1	17.2	0.2	64.3	43.7	21.5	67.1	63.0	4.3
Queue Length 50th (ft)	20	433	0	127	367	0	237	29	85	17	21	0
Queue Length 95th (ft)	m87	#446	0	#323	513	0	297	55	137	36	47	17
Internal Link Dist (ft)		940			1309			1346			140	
Turn Bay Length (ft)	420		430	475		237	265			225		
Base Capacity (vph)	222	2183	1240	286	2535	1038	742	545	572	170	234	340
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.72	0.33	0.76	0.57	0.07	0.71	0.07	0.38	0.22	0.10	0.28

Intersection Summary

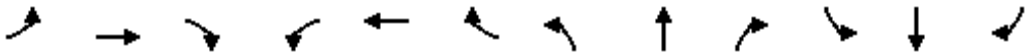
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	1446	378	201	1337	71	488	36	201	34	21	88
Future Volume (vph)	87	1446	378	201	1337	71	488	36	201	34	21	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	4799	1567	1787	4896	1599	3433	1863	1583	3416	1853	1575
Flt Permitted	0.13	1.00	1.00	0.07	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	238	4799	1567	126	4896	1599	3433	1863	1583	3416	1853	1575
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)	95	1572	411	218	1453	77	530	39	218	37	23	96
RTOR Reduction (vph)	0	0	153	0	0	35	0	0	52	0	0	86
Lane Group Flow (vph)	95	1572	258	218	1453	42	530	39	166	37	23	10
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases	6		6	2		2			4			8
Actuated Green, G (s)	69.7	61.2	87.9	86.5	70.0	75.6	26.7	27.7	44.9	5.6	6.6	15.1
Effective Green, g (s)	69.7	61.2	87.9	86.5	70.0	75.6	26.7	27.7	44.9	5.6	6.6	15.1
Actuated g/C Ratio	0.50	0.44	0.63	0.62	0.50	0.54	0.19	0.20	0.32	0.04	0.05	0.11
Clearance Time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Vehicle Extension (s)	3.0	4.0	3.0	3.5	4.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0
Lane Grp Cap (vph)	210	2097	983	281	2448	863	654	368	507	136	87	169
v/s Ratio Prot	0.03	0.33	0.05	c0.09	c0.30	0.00	c0.15	0.02	c0.04	0.01	0.01	0.00
v/s Ratio Perm	0.20		0.11	c0.38		0.02			0.06			0.00
v/c Ratio	0.45	0.75	0.26	0.78	0.59	0.05	0.81	0.11	0.33	0.27	0.26	0.06
Uniform Delay, d1	19.8	33.0	11.6	37.6	24.9	15.2	54.2	46.0	36.1	65.2	64.4	56.1
Progression Factor	1.41	0.69	0.13	1.65	0.63	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	2.0	0.1	12.9	1.1	0.0	7.5	0.1	0.4	1.1	1.6	0.2
Delay (s)	29.1	24.7	1.7	75.1	16.7	15.2	61.8	46.1	36.5	66.3	66.0	56.2
Level of Service	C	C	A	E	B	B	E	D	D	E	E	E
Approach Delay (s)		20.3			24.0			54.0			60.1	
Approach LOS		C			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	28.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	242	2442	555	309	2039	141	804	111	262	191	63	364
v/c Ratio	1.27	1.32	0.48	1.32	1.02	0.16	0.89	0.23	0.37	1.21	0.51	0.95
Control Delay	179.8	181.6	0.9	211.5	55.5	0.6	62.1	39.6	19.6	192.4	77.7	70.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	179.8	181.6	0.9	211.5	55.5	0.6	62.1	39.6	19.6	192.4	77.7	70.0
Queue Length 50th (ft)	~244	~1101	0	~313	~775	2	360	76	104	~108	56	212
Queue Length 95th (ft)	m#275	#1178	m0	#510	#876	4	#442	127	172	#190	106	#387
Internal Link Dist (ft)		940			1309			1346			140	
Turn Bay Length (ft)	420		430	475		237	265			225		
Base Capacity (vph)	190	1848	1158	234	2001	876	936	558	710	158	136	383
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.27	1.32	0.48	1.32	1.02	0.16	0.86	0.20	0.37	1.21	0.46	0.95

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

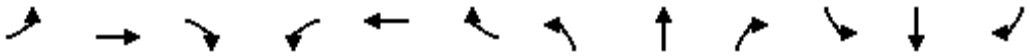
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	2247	511	284	1876	130	740	102	241	176	58	335
Future Volume (vph)	223	2247	511	284	1876	130	740	102	241	176	58	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	4799	1567	1787	4896	1599	3433	1863	1583	3416	1853	1575
Flt Permitted	0.08	1.00	1.00	0.07	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	140	4799	1567	135	4896	1599	3433	1863	1583	3416	1853	1575
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)	242	2442	555	309	2039	141	804	111	262	191	63	364
RTOR Reduction (vph)	0	0	67	0	0	78	0	0	48	0	0	118
Lane Group Flow (vph)	242	2442	488	309	2039	63	804	111	214	191	63	246
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases	6		6	2		2			4			8
Actuated Green, G (s)	63.6	52.6	89.6	70.1	55.9	62.4	37.0	38.4	52.6	6.5	7.9	18.9
Effective Green, g (s)	63.6	52.6	89.6	70.1	55.9	62.4	37.0	38.4	52.6	6.5	7.9	18.9
Actuated g/C Ratio	0.45	0.38	0.64	0.50	0.40	0.45	0.26	0.27	0.38	0.05	0.06	0.13
Clearance Time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Vehicle Extension (s)	3.0	4.0	3.0	3.5	4.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0
Lane Grp Cap (vph)	190	1803	1002	235	1954	712	907	510	594	158	104	212
v/s Ratio Prot	0.10	0.51	0.13	c0.13	0.42	0.00	c0.23	0.06	0.04	0.06	0.03	c0.09
v/s Ratio Perm	0.48		0.18	c0.53		0.04			0.10			0.07
v/c Ratio	1.27	1.35	0.49	1.31	1.04	0.09	0.89	0.22	0.36	1.21	0.61	1.16
Uniform Delay, d1	41.2	43.7	13.2	44.8	42.0	22.4	49.5	39.2	31.6	66.8	64.5	60.5
Progression Factor	1.40	1.02	0.06	1.42	0.71	0.10	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	137.6	160.9	0.1	167.3	32.3	0.1	10.4	0.2	0.4	138.7	9.6	112.4
Delay (s)	195.1	205.3	0.9	230.9	62.2	2.3	59.9	39.4	32.0	205.4	74.1	173.0
Level of Service	F	F	A	F	E	A	E	D	C	F	E	F
Approach Delay (s)		169.5			79.8			51.7			172.9	
Approach LOS		F			E			D			F	

Intersection Summary			
HCM 2000 Control Delay	121.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	105.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group



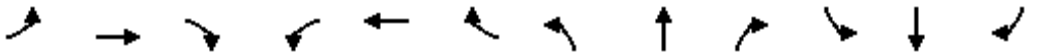
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	123	2048	535	299	1985	105	532	39	218	37	23	97
v/c Ratio	0.65	1.15	0.46	0.72	0.82	0.10	0.79	0.12	0.31	0.15	0.19	0.27
Control Delay	53.9	106.6	1.3	55.8	28.4	0.2	62.3	43.2	17.9	65.5	63.3	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.9	106.6	1.3	55.8	28.4	0.2	62.3	43.2	17.9	65.5	63.3	4.1
Queue Length 50th (ft)	69	~805	16	189	654	0	236	29	78	17	21	0
Queue Length 95th (ft)	m#118	#893	0	#504	#789	1	297	55	139	36	48	18
Internal Link Dist (ft)		940			1309			1346			140	
Turn Bay Length (ft)	420		430	475		237	265			225		
Base Capacity (vph)	189	1775	1190	417	2429	1038	755	545	694	245	227	355
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	1.15	0.45	0.72	0.82	0.10	0.70	0.07	0.31	0.15	0.10	0.27

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

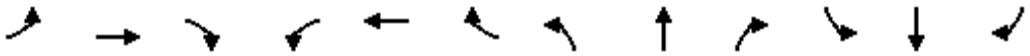
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	1884	492	275	1826	97	489	36	201	34	21	89
Future Volume (vph)	113	1884	492	275	1826	97	489	36	201	34	21	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	4799	1567	1787	4896	1599	3433	1863	1583	3416	1853	1575
Flt Permitted	0.08	1.00	1.00	0.07	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	150	4799	1567	131	4896	1599	3433	1863	1583	3416	1853	1575
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)	123	2048	535	299	1985	105	532	39	218	37	23	97
RTOR Reduction (vph)	0	0	242	0	0	47	0	0	48	0	0	85
Lane Group Flow (vph)	123	2048	293	299	1985	58	532	39	170	37	23	12
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases	6		6	2		2			4			8
Actuated Green, G (s)	60.1	49.2	76.7	85.8	66.9	77.0	27.5	23.9	52.4	10.1	6.5	17.4
Effective Green, g (s)	60.1	49.2	76.7	85.8	66.9	77.0	27.5	23.9	52.4	10.1	6.5	17.4
Actuated g/C Ratio	0.43	0.35	0.55	0.61	0.48	0.55	0.20	0.17	0.37	0.07	0.05	0.12
Clearance Time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Vehicle Extension (s)	3.0	4.0	3.0	3.5	4.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0
Lane Grp Cap (vph)	189	1686	858	417	2339	879	674	318	592	246	86	195
v/s Ratio Prot	0.05	c0.43	0.07	c0.15	c0.41	0.00	c0.15	0.02	c0.06	0.01	0.01	0.00
v/s Ratio Perm	0.23		0.12	0.29		0.03			0.05			0.00
v/c Ratio	0.65	1.21	0.34	0.72	0.85	0.07	0.79	0.12	0.29	0.15	0.27	0.06
Uniform Delay, d1	28.5	45.4	17.6	39.6	32.1	14.7	53.5	49.2	30.7	60.9	64.5	54.1
Progression Factor	1.70	0.79	0.56	1.31	0.77	0.03	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.8	100.1	0.1	5.9	4.0	0.0	6.1	0.2	0.3	0.3	1.7	0.1
Delay (s)	53.3	136.0	10.0	58.0	28.6	0.5	59.6	49.3	31.0	61.2	66.1	54.2
Level of Service	D	F	A	E	C	A	E	D	C	E	E	D
Approach Delay (s)		107.3			31.1			51.2			57.6	
Approach LOS		F			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	68.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	90.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	292	2943	670	422	2786	193	804	111	262	191	63	364
v/c Ratio	1.54	1.63	0.59	1.80	1.42	0.22	0.87	0.23	0.37	0.92	0.49	0.94
Control Delay	279.4	314.2	2.1	406.6	220.5	1.8	59.6	40.1	19.9	109.8	75.5	67.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	279.4	314.2	2.1	406.6	220.5	1.8	59.6	40.1	19.9	109.8	75.5	67.4
Queue Length 50th (ft)	~341	~1462	0	~532	~1313	3	356	76	106	90	56	212
Queue Length 95th (ft)	m#276	m#1207	m0	#750	#1406	29	437	127	172	#167	105	#378
Internal Link Dist (ft)		940			1309			1346			140	
Turn Bay Length (ft)	420		430	475		237	265			225		
Base Capacity (vph)	190	1807	1159	234	1959	884	961	558	701	207	149	388
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.54	1.63	0.58	1.80	1.42	0.22	0.84	0.20	0.37	0.92	0.42	0.94

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	269	2708	616	388	2563	178	740	102	241	176	58	335
Future Volume (vph)	269	2708	616	388	2563	178	740	102	241	176	58	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	4799	1567	1787	4896	1599	3433	1863	1583	3416	1853	1575
Flt Permitted	0.08	1.00	1.00	0.07	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	144	4799	1567	138	4896	1599	3433	1863	1583	3416	1853	1575
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)	292	2943	670	422	2786	193	804	111	262	191	63	364
RTOR Reduction (vph)	0	0	71	0	0	86	0	0	49	0	0	117
Lane Group Flow (vph)	292	2943	599	422	2786	107	804	111	213	191	63	247
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases	6		6	2		2			4			8
Actuated Green, G (s)	62.4	51.4	89.2	68.9	54.7	63.2	37.8	37.6	51.8	8.5	8.3	19.3
Effective Green, g (s)	62.4	51.4	89.2	68.9	54.7	63.2	37.8	37.6	51.8	8.5	8.3	19.3
Actuated g/C Ratio	0.45	0.37	0.64	0.49	0.39	0.45	0.27	0.27	0.37	0.06	0.06	0.14
Clearance Time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Vehicle Extension (s)	3.0	4.0	3.0	3.5	4.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0
Lane Grp Cap (vph)	190	1761	998	235	1912	721	926	500	585	207	109	217
v/s Ratio Prot	0.12	0.61	0.16	c0.18	0.57	0.01	c0.23	0.06	0.04	0.06	0.03	c0.09
v/s Ratio Perm	0.56		0.22	c0.70		0.06			0.10			0.07
v/c Ratio	1.54	1.67	0.60	1.80	1.46	0.15	0.87	0.22	0.36	0.92	0.58	1.14
Uniform Delay, d1	40.9	44.3	14.9	44.6	42.6	22.6	48.7	39.8	32.1	65.4	64.1	60.4
Progression Factor	1.35	1.05	0.23	1.27	0.76	0.25	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	244.0	302.3	0.1	372.1	208.2	0.1	8.7	0.2	0.5	41.4	7.2	102.9
Delay (s)	299.2	348.9	3.5	428.6	240.5	5.7	57.4	40.0	32.6	106.8	71.4	163.3
Level of Service	F	F	A	F	F	A	E	D	C	F	E	F
Approach Delay (s)		286.0			250.6			50.2			136.4	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	232.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.48		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	119.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Rte. 234 and Van Buren Road - Option 2

SCALE
0 25' 50' 75' 100'

N

	LOS
Existing Conditons	E (68.7)
2025 No Build	E (69.1)
2040 No Build	F (176.7)

	LOS
2025 Build	D (54.1)
2040 Build	F (98.0)

Option 2:
-Dual left turn lanes on NB Van Buren to WB Rte. 234
-Dual left turns lanes on SB Van Buren to EB Rte. 234
-Add auxiliary lane along EB Route 234

As can be seen above the LOS improves significantly in both the "2025 Build" and the "2040 Build". A retaining wall is again required along SB Van Buren adjacent to the El Paso Restaurant and would have significant impacts to the parking lot. The roadway widening for the auxiliary lane along EB Route 234 would have minimal impacts.

**Possibility that VDOT has plans for improvements on Rte. 234 which could include this continuous auxiliary lane.

Continuous auxiliary lane to I-95

Additional left turn lane

Additional left turn lane

Continuous auxiliary lane to I-95

Van Buren Road

Dumfries Road (Route 234)

Old Stage Road

Copper Mill Drive

Parcel 01

Parcel 02

Parcel 03

Parcel 04

Parcel 05

Parcel 06

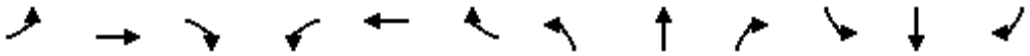
Parcel 07

Parcel 08

Prop. Retaining Wall

Prop. Retaining Wall

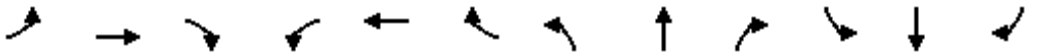
AWANA HOSPITALITY GROUP LLC
Inst.# 201610030080427
3.0504 AC.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	95	1572	411	218	1453	77	530	39	218	37	23	96
v/c Ratio	0.44	0.56	0.34	0.77	0.58	0.07	0.81	0.12	0.39	0.22	0.18	0.25
Control Delay	27.0	21.3	0.6	64.3	17.5	0.2	64.3	43.7	21.7	67.1	63.0	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	21.3	0.6	64.3	17.5	0.2	64.3	43.7	21.7	67.1	63.0	1.5
Queue Length 50th (ft)	20	141	0	122	371	0	237	29	88	17	21	0
Queue Length 95th (ft)	m91	301	0	#221	519	0	297	55	127	36	47	0
Internal Link Dist (ft)		940			1309			1346			140	
Turn Bay Length (ft)	420		430	475		237	265			225		
Base Capacity (vph)	231	2795	1248	325	2525	1036	742	545	593	173	235	401
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.56	0.33	0.67	0.58	0.07	0.71	0.07	0.37	0.21	0.10	0.24

Intersection Summary

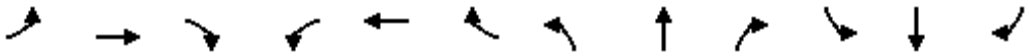
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	1446	378	201	1337	71	488	36	201	34	21	88
Future Volume (vph)	87	1446	378	201	1337	71	488	36	201	34	21	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Lane Util. Factor	1.00	0.86	1.00	1.00	0.91	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	6047	1567	1787	4896	1599	3433	1863	1583	3416	1853	1575
Flt Permitted	0.13	1.00	1.00	0.08	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	232	6047	1567	156	4896	1599	3433	1863	1583	3416	1853	1575
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)	95	1572	411	218	1453	77	530	39	218	37	23	96
RTOR Reduction (vph)	0	0	150	0	0	36	0	0	53	0	0	85
Lane Group Flow (vph)	95	1572	261	218	1453	41	530	39	165	37	23	11
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases	6		6	2		2			4			8
Actuated Green, G (s)	70.9	62.1	88.8	85.8	69.6	75.2	26.7	27.8	44.0	5.6	6.7	15.5
Effective Green, g (s)	70.9	62.1	88.8	85.8	69.6	75.2	26.7	27.8	44.0	5.6	6.7	15.5
Actuated g/C Ratio	0.51	0.44	0.63	0.61	0.50	0.54	0.19	0.20	0.31	0.04	0.05	0.11
Clearance Time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Vehicle Extension (s)	3.0	4.0	3.0	3.5	4.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0
Lane Grp Cap (vph)	213	2682	993	284	2434	858	654	369	497	136	88	174
v/s Ratio Prot	0.03	0.26	0.05	c0.09	c0.30	0.00	c0.15	0.02	c0.04	0.01	0.01	0.00
v/s Ratio Perm	0.20		0.12	c0.38		0.02			0.07			0.00
v/c Ratio	0.45	0.59	0.26	0.77	0.60	0.05	0.81	0.11	0.33	0.27	0.26	0.06
Uniform Delay, d1	19.4	29.3	11.2	30.7	25.2	15.4	54.2	45.9	36.8	65.2	64.3	55.7
Progression Factor	1.37	0.68	0.03	1.68	0.63	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.8	0.1	12.1	1.1	0.0	7.5	0.1	0.5	1.1	1.6	0.1
Delay (s)	27.7	20.5	0.5	63.8	17.1	15.4	61.8	46.1	37.2	66.3	65.8	55.9
Level of Service	C	C	A	E	B	B	E	D	D	E	E	E
Approach Delay (s)		16.9			22.8			54.2			59.8	
Approach LOS		B			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



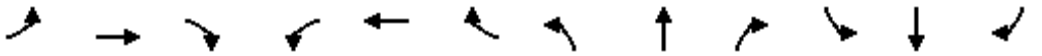
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	242	2442	555	309	2039	141	804	111	262	191	63	364
v/c Ratio	1.20	1.04	0.49	1.32	1.02	0.16	0.90	0.23	0.37	1.21	0.52	0.93
Control Delay	147.2	47.0	12.8	212.5	57.2	0.6	64.4	40.3	20.0	192.4	77.9	64.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	147.2	47.0	12.8	212.5	57.2	0.6	64.4	40.3	20.0	192.4	77.9	64.7
Queue Length 50th (ft)	~221	~745	343	~316	~777	2	363	76	106	~108	56	209
Queue Length 95th (ft)	m#248	#808	m349	#513	#876	4	#467	128	175	#190	106	#379
Internal Link Dist (ft)		940			1309			1346			140	
Turn Bay Length (ft)	420		430	475		237	265			225		
Base Capacity (vph)	202	2359	1153	234	1990	872	914	545	702	158	135	393
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.20	1.04	0.48	1.32	1.02	0.16	0.88	0.20	0.37	1.21	0.47	0.93

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

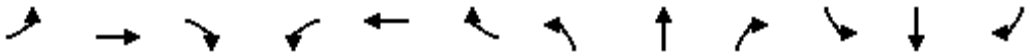
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	2247	511	284	1876	130	740	102	241	176	58	335
Future Volume (vph)	223	2247	511	284	1876	130	740	102	241	176	58	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Lane Util. Factor	1.00	0.86	1.00	1.00	0.91	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	6047	1567	1787	4896	1599	3433	1863	1583	3416	1853	1575
Flt Permitted	0.08	1.00	1.00	0.07	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	138	6047	1567	135	4896	1599	3433	1863	1583	3416	1853	1575
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)	242	2442	555	309	2039	141	804	111	262	191	63	364
RTOR Reduction (vph)	0	0	64	0	0	78	0	0	48	0	0	117
Lane Group Flow (vph)	242	2442	491	309	2039	63	804	111	214	191	63	247
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases	6		6	2		2			4			8
Actuated Green, G (s)	65.3	53.3	89.6	69.8	55.6	62.1	36.3	37.7	51.9	6.5	7.9	19.9
Effective Green, g (s)	65.3	53.3	89.6	69.8	55.6	62.1	36.3	37.7	51.9	6.5	7.9	19.9
Actuated g/C Ratio	0.47	0.38	0.64	0.50	0.40	0.44	0.26	0.27	0.37	0.05	0.06	0.14
Clearance Time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Vehicle Extension (s)	3.0	4.0	3.0	3.5	4.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0
Lane Grp Cap (vph)	202	2302	1002	234	1944	709	890	501	586	158	104	223
v/s Ratio Prot	0.10	0.40	0.13	c0.13	0.42	0.00	c0.23	0.06	0.04	0.06	0.03	c0.09
v/s Ratio Perm	0.45		0.19	c0.52		0.04			0.10			0.06
v/c Ratio	1.20	1.06	0.49	1.32	1.05	0.09	0.90	0.22	0.36	1.21	0.61	1.11
Uniform Delay, d1	42.4	43.4	13.2	44.7	42.2	22.6	50.2	39.7	32.0	66.8	64.5	60.0
Progression Factor	1.26	0.53	1.77	1.43	0.71	0.10	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	105.7	31.7	0.1	169.7	34.1	0.1	12.4	0.2	0.5	138.7	9.6	92.6
Delay (s)	159.0	54.6	23.5	233.8	64.2	2.3	62.5	40.0	32.5	205.4	74.1	152.7
Level of Service	F	D	C	F	E	A	E	D	C	F	E	F
Approach Delay (s)		57.1			81.8			53.7			161.0	
Approach LOS		E			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	73.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	96.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



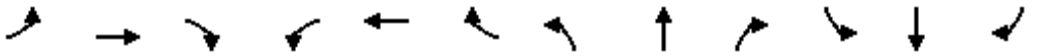
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	123	2048	535	299	1985	105	532	39	218	37	23	97
v/c Ratio	0.65	0.88	0.45	0.76	0.82	0.10	0.79	0.12	0.32	0.15	0.19	0.24
Control Delay	58.6	32.4	1.9	59.0	28.4	0.2	62.3	43.2	17.6	65.5	63.3	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.6	32.4	1.9	59.0	28.4	0.2	62.3	43.2	17.6	65.5	63.3	1.4
Queue Length 50th (ft)	75	~575	62	173	654	0	236	29	73	17	21	0
Queue Length 95th (ft)	m#130	#636	0	#447	#789	1	297	55	131	36	48	0
Internal Link Dist (ft)		940			1309			1346			140	
Turn Bay Length (ft)	420		430	475		237	265			225		
Base Capacity (vph)	190	2323	1206	391	2429	1038	755	545	673	245	227	407
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.88	0.44	0.76	0.82	0.10	0.70	0.07	0.32	0.15	0.10	0.24

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

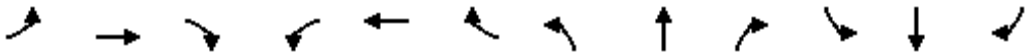
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	1884	492	275	1826	97	489	36	201	34	21	89
Future Volume (vph)	113	1884	492	275	1826	97	489	36	201	34	21	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Lane Util. Factor	1.00	0.86	1.00	1.00	0.91	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	6047	1567	1787	4896	1599	3433	1863	1583	3416	1853	1575
Flt Permitted	0.08	1.00	1.00	0.07	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	144	6047	1567	127	4896	1599	3433	1863	1583	3416	1853	1575
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)	123	2048	535	299	1985	105	532	39	218	37	23	97
RTOR Reduction (vph)	0	0	234	0	0	47	0	0	49	0	0	85
Lane Group Flow (vph)	123	2048	301	299	1985	58	532	39	169	37	23	12
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases	6		6	2		2			4			8
Actuated Green, G (s)	62.1	51.2	78.7	85.8	66.9	77.0	27.5	23.9	50.4	10.1	6.5	17.4
Effective Green, g (s)	62.1	51.2	78.7	85.8	66.9	77.0	27.5	23.9	50.4	10.1	6.5	17.4
Actuated g/C Ratio	0.44	0.37	0.56	0.61	0.48	0.55	0.20	0.17	0.36	0.07	0.05	0.12
Clearance Time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Vehicle Extension (s)	3.0	4.0	3.0	3.5	4.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0
Lane Grp Cap (vph)	189	2211	880	392	2339	879	674	318	569	246	86	195
v/s Ratio Prot	0.05	c0.34	0.07	c0.14	c0.41	0.00	c0.15	0.02	c0.06	0.01	0.01	0.00
v/s Ratio Perm	0.24		0.12	0.32		0.03			0.05			0.00
v/c Ratio	0.65	0.93	0.34	0.76	0.85	0.07	0.79	0.12	0.30	0.15	0.27	0.06
Uniform Delay, d1	27.9	42.6	16.6	40.6	32.1	14.7	53.5	49.2	32.1	60.9	64.5	54.1
Progression Factor	1.77	0.68	1.13	1.27	0.77	0.03	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.8	5.3	0.1	8.7	4.0	0.0	6.1	0.2	0.3	0.3	1.7	0.1
Delay (s)	54.0	34.4	19.0	60.2	28.6	0.5	59.6	49.3	32.4	61.2	66.1	54.2
Level of Service	D	C	B	E	C	A	E	D	C	E	E	D
Approach Delay (s)		32.2			31.3			51.6			57.6	
Approach LOS		C			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	35.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	81.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



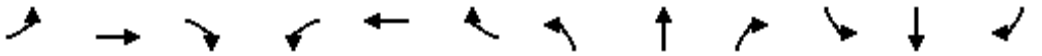
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	292	2943	670	422	2786	193	804	111	262	191	63	364
v/c Ratio	1.54	1.28	0.59	1.71	1.38	0.22	0.90	0.23	0.37	1.12	0.50	0.95
Control Delay	281.1	153.9	9.9	365.9	203.8	1.6	63.8	40.4	19.6	163.9	76.8	69.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	281.1	153.9	9.9	365.9	203.8	1.6	63.8	40.4	19.6	163.9	76.8	69.0
Queue Length 50th (ft)	~328	~1028	385	~521	~1289	1	363	77	105	~103	56	212
Queue Length 95th (ft)	m#274	m#821	m30	#735	#1375	24	#467	128	172	#184	106	#383
Internal Link Dist (ft)		940			1309			1346			140	
Turn Bay Length (ft)	420		430	475		237	265			225		
Base Capacity (vph)	190	2300	1141	247	2012	884	914	545	712	170	141	385
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.54	1.28	0.59	1.71	1.38	0.22	0.88	0.20	0.37	1.12	0.45	0.95

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	269	2708	616	388	2563	178	740	102	241	176	58	335
Future Volume (vph)	269	2708	616	388	2563	178	740	102	241	176	58	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Lane Util. Factor	1.00	0.86	1.00	1.00	0.91	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	6047	1567	1787	4896	1599	3433	1863	1583	3416	1853	1575
Flt Permitted	0.08	1.00	1.00	0.07	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	142	6047	1567	134	4896	1599	3433	1863	1583	3416	1853	1575
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)	292	2943	670	422	2786	193	804	111	262	191	63	364
RTOR Reduction (vph)	0	0	67	0	0	86	0	0	48	0	0	117
Lane Group Flow (vph)	292	2943	603	422	2786	107	804	111	214	191	63	247
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases	6		6	2		2			4			8
Actuated Green, G (s)	62.9	51.9	88.4	71.4	56.2	63.2	36.5	37.6	52.8	7.0	8.1	19.1
Effective Green, g (s)	62.9	51.9	88.4	71.4	56.2	63.2	36.5	37.6	52.8	7.0	8.1	19.1
Actuated g/C Ratio	0.45	0.37	0.63	0.51	0.40	0.45	0.26	0.27	0.38	0.05	0.06	0.14
Clearance Time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Vehicle Extension (s)	3.0	4.0	3.0	3.5	4.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0
Lane Grp Cap (vph)	190	2241	989	247	1965	721	895	500	597	170	107	214
v/s Ratio Prot	0.12	0.49	0.16	c0.18	0.57	0.01	c0.23	0.06	0.04	0.06	0.03	c0.09
v/s Ratio Perm	0.57		0.23	c0.68		0.06			0.10			0.07
v/c Ratio	1.54	1.31	0.61	1.71	1.42	0.15	0.90	0.22	0.36	1.12	0.59	1.15
Uniform Delay, d1	41.0	44.1	15.5	45.4	41.9	22.6	50.0	39.8	31.4	66.5	64.3	60.4
Progression Factor	1.40	0.65	1.10	1.27	0.75	0.23	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	244.0	141.3	0.1	333.0	190.6	0.1	11.7	0.2	0.4	106.1	8.0	108.6
Delay (s)	301.6	170.0	17.0	390.8	222.2	5.2	61.6	40.0	31.8	172.6	72.4	169.1
Level of Service	F	F	B	F	F	A	E	D	C	F	E	F
Approach Delay (s)		153.6			230.8			53.0			160.3	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	169.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.47		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	110.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Rte. 234 and Van Buren Road - Option 2A

SCALE
0 25' 50' 75' 100'

N

	LOS
Existing Conditons	E (68.7)
2025 No Build	E (69.1)
2040 No Build	F (176.7)

	LOS
2025 Build	D (54.2)
2040 Build	F (101.8)

Option 2A:
-Dual left turn lanes on NB Van Buren
-Add auxiliary lane along EB Route 234

As can be seen above the LOS improves significantly in both the "2025 Build" and the "2040 Build" compared to the existing conditions. A retaining wall is required along SB Van Buren adjacent to the El Paso Restaurant but would have limited impacts to the parking lot itself. The roadway widening for the auxiliary lane along EB Route 234 would also have minimal impacts.

The left turn bay in this design along SB Van Buren to Rte. 234 is 188' which is short of the 95th percentile queue of 220' for this movement. The left turn lane in this design along NB Van Buren to Copper Mill Drive is 72'.

**Possibility that VDOT has plans for improvements on Rte. 234 which could include this continuous auxiliary lane.

Continuous auxiliary lane to I-95

188' turn bay length (meets 90th percentile queue)

Continuous auxiliary lane to I-95

Van Buren Road

Dumfries Road (Route 234)

Old Stage Road

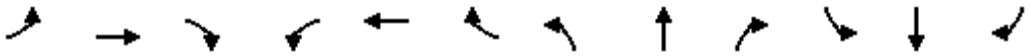
Copper Mill Drive

Parcel 01
Parcel 02
Parcel 03
Parcel 04
Parcel 05
Parcel 06
Parcel 07
Parcel 08

Prop. Retaining Wall

Prop. Retaining Wall

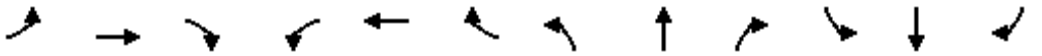
AWANA HOSPITALITY GROUP LLC
Inst.# 201610030080427
3.0504 AC.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	95	1572	411	218	1453	77	530	39	218	37	23	96
v/c Ratio	0.44	0.56	0.34	0.78	0.58	0.07	0.81	0.12	0.38	0.24	0.18	0.25
Control Delay	27.3	20.9	0.7	65.3	17.5	0.2	64.3	43.7	15.7	40.7	63.0	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.3	20.9	0.7	65.3	17.5	0.2	64.3	43.7	15.7	40.7	63.0	1.5
Queue Length 50th (ft)	20	152	0	122	371	0	237	29	65	24	21	0
Queue Length 95th (ft)	m89	301	0	#221	519	0	297	55	107	45	47	0
Internal Link Dist (ft)		940			1309			1346			140	
Turn Bay Length (ft)	420		430	475		237	265			225		
Base Capacity (vph)	231	2804	1250	325	2525	1036	742	545	615	153	235	401
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.56	0.33	0.67	0.58	0.07	0.71	0.07	0.35	0.24	0.10	0.24

Intersection Summary

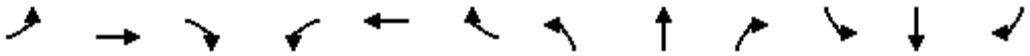
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	1446	378	201	1337	71	488	36	201	34	21	88
Future Volume (vph)	87	1446	378	201	1337	71	488	36	201	34	21	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Lane Util. Factor	1.00	0.86	1.00	1.00	0.91	1.00	0.97	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	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	6047	1567	1787	4896	1599	3433	1863	1583	1761	1853	1575
Flt Permitted	0.13	1.00	1.00	0.08	1.00	1.00	0.95	1.00	1.00	0.73	1.00	1.00
Satd. Flow (perm)	231	6047	1567	157	4896	1599	3433	1863	1583	1356	1853	1575
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)	95	1572	411	218	1453	77	530	39	218	37	23	96
RTOR Reduction (vph)	0	0	150	0	0	36	0	0	76	0	0	85
Lane Group Flow (vph)	95	1572	261	218	1453	41	530	39	142	37	23	11
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases	6		6	2		2			4	8		8
Actuated Green, G (s)	71.1	62.3	89.0	85.6	69.6	75.2	26.7	27.8	43.8	12.3	6.7	15.5
Effective Green, g (s)	71.1	62.3	89.0	85.6	69.6	75.2	26.7	27.8	43.8	12.3	6.7	15.5
Actuated g/C Ratio	0.51	0.44	0.64	0.61	0.50	0.54	0.19	0.20	0.31	0.09	0.05	0.11
Clearance Time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Vehicle Extension (s)	3.0	4.0	3.0	3.5	4.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0
Lane Grp Cap (vph)	212	2690	996	282	2434	858	654	369	495	135	88	174
v/s Ratio Prot	0.03	0.26	0.05	c0.09	c0.30	0.00	c0.15	0.02	c0.03	0.01	0.01	0.00
v/s Ratio Perm	0.20		0.12	c0.38		0.02			0.06	0.01		0.00
v/c Ratio	0.45	0.58	0.26	0.77	0.60	0.05	0.81	0.11	0.29	0.27	0.26	0.06
Uniform Delay, d1	19.3	29.1	11.1	30.6	25.2	15.4	54.2	45.9	36.3	59.5	64.3	55.7
Progression Factor	1.39	0.66	0.05	1.69	0.63	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.8	0.1	12.7	1.1	0.0	7.5	0.1	0.4	1.1	1.6	0.1
Delay (s)	28.0	20.1	0.7	64.5	17.1	15.4	61.8	46.1	36.7	60.6	65.8	55.9
Level of Service	C	C	A	E	B	B	E	D	D	E	E	E
Approach Delay (s)		16.6			22.9			54.0			58.5	
Approach LOS		B			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	242	2442	555	309	2039	141	804	111	262	191	63	364
v/c Ratio	1.20	0.91	0.46	1.58	0.95	0.16	1.08	0.25	0.41	1.32	0.45	0.89
Control Delay	147.6	20.4	6.9	315.5	37.0	0.4	107.3	42.7	23.2	222.9	71.0	58.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	147.6	20.4	6.9	315.5	37.0	0.4	107.3	42.7	23.2	222.9	71.0	58.2
Queue Length 50th (ft)	~215	506	176	~356	465	1	~420	81	118	~165	56	209
Queue Length 95th (ft)	m#251	#752	m150	#563	#836	1	#549	128	182	#260	102	324
Internal Link Dist (ft)		940			1309			1346			140	
Turn Bay Length (ft)	420		430	475		237	265			225		
Base Capacity (vph)	202	2685	1197	195	2149	902	745	545	639	145	205	407
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.20	0.91	0.46	1.58	0.95	0.16	1.08	0.20	0.41	1.32	0.31	0.89

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

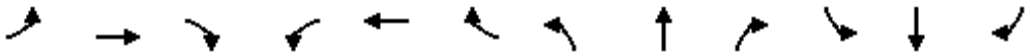
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	2247	511	284	1876	130	740	102	241	176	58	335
Future Volume (vph)	223	2247	511	284	1876	130	740	102	241	176	58	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Lane Util. Factor	1.00	0.86	1.00	1.00	0.91	1.00	0.97	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	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	6047	1567	1787	4896	1599	3433	1863	1583	1761	1853	1575
Flt Permitted	0.07	1.00	1.00	0.07	1.00	1.00	0.95	1.00	1.00	0.69	1.00	1.00
Satd. Flow (perm)	121	6047	1567	125	4896	1599	3433	1863	1583	1270	1853	1575
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)	242	2442	555	309	2039	141	804	111	262	191	63	364
RTOR Reduction (vph)	0	0	106	0	0	75	0	0	52	0	0	115
Lane Group Flow (vph)	242	2442	449	309	2039	66	804	111	210	191	63	249
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases	6		6	2		2			4	8		8
Actuated Green, G (s)	72.9	60.9	91.3	71.4	60.2	65.1	30.4	34.7	45.9	14.1	9.2	21.2
Effective Green, g (s)	72.9	60.9	91.3	71.4	60.2	65.1	30.4	34.7	45.9	14.1	9.2	21.2
Actuated g/C Ratio	0.52	0.43	0.65	0.51	0.43	0.46	0.22	0.25	0.33	0.10	0.07	0.15
Clearance Time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Vehicle Extension (s)	3.0	4.0	3.0	3.5	4.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0
Lane Grp Cap (vph)	202	2630	1021	196	2105	743	745	461	518	145	121	238
v/s Ratio Prot	0.10	0.40	0.10	c0.13	0.42	0.00	c0.23	0.06	0.03	0.05	0.03	0.09
v/s Ratio Perm	0.52		0.19	c0.68		0.04			0.10	c0.09		0.07
v/c Ratio	1.20	0.93	0.44	1.58	0.97	0.09	1.08	0.24	0.41	1.32	0.52	1.04
Uniform Delay, d1	43.7	37.5	11.9	41.8	39.0	20.9	54.8	42.1	36.5	62.4	63.3	59.4
Progression Factor	1.33	0.45	1.53	1.18	0.67	0.02	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	105.7	3.0	0.1	281.4	13.0	0.0	56.4	0.3	0.6	183.0	4.0	70.5
Delay (s)	163.9	19.9	18.3	330.6	39.0	0.6	111.2	42.4	37.1	245.4	67.3	129.9
Level of Service	F	B	B	F	D	A	F	D	D	F	E	F
Approach Delay (s)		30.4			73.0			88.2			159.2	
Approach LOS		C			E			F			F	

Intersection Summary			
HCM 2000 Control Delay	64.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.41		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	96.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	123	2048	535	299	1985	105	532	39	218	37	23	97
v/c Ratio	0.65	0.88	0.45	0.76	0.82	0.10	0.79	0.12	0.32	0.19	0.19	0.24
Control Delay	54.3	35.4	1.2	59.0	28.4	0.2	62.3	43.2	13.7	39.2	63.3	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.3	35.4	1.2	59.0	28.4	0.2	62.3	43.2	13.7	39.2	63.3	1.4
Queue Length 50th (ft)	75	~565	34	173	654	0	236	29	58	24	21	0
Queue Length 95th (ft)	m#130	#636	0	#447	#789	1	297	55	113	45	48	0
Internal Link Dist (ft)		940			1309			1346			140	
Turn Bay Length (ft)	420		430	475		237	265			225		
Base Capacity (vph)	190	2323	1206	391	2429	1038	755	545	689	190	227	407
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.88	0.44	0.76	0.82	0.10	0.70	0.07	0.32	0.19	0.10	0.24

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

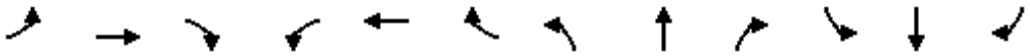
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	1884	492	275	1826	97	489	36	201	34	21	89
Future Volume (vph)	113	1884	492	275	1826	97	489	36	201	34	21	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Lane Util. Factor	1.00	0.86	1.00	1.00	0.91	1.00	0.97	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	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	6047	1567	1787	4896	1599	3433	1863	1583	1761	1853	1575
Flt Permitted	0.08	1.00	1.00	0.07	1.00	1.00	0.95	1.00	1.00	0.73	1.00	1.00
Satd. Flow (perm)	144	6047	1567	127	4896	1599	3433	1863	1583	1356	1853	1575
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)	123	2048	535	299	1985	105	532	39	218	37	23	97
RTOR Reduction (vph)	0	0	234	0	0	47	0	0	67	0	0	85
Lane Group Flow (vph)	123	2048	301	299	1985	58	532	39	151	37	23	12
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases	6		6	2		2			4	8		8
Actuated Green, G (s)	62.1	51.2	78.7	85.8	66.9	77.0	27.5	23.9	50.4	16.6	6.5	17.4
Effective Green, g (s)	62.1	51.2	78.7	85.8	66.9	77.0	27.5	23.9	50.4	16.6	6.5	17.4
Actuated g/C Ratio	0.44	0.37	0.56	0.61	0.48	0.55	0.20	0.17	0.36	0.12	0.05	0.12
Clearance Time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Vehicle Extension (s)	3.0	4.0	3.0	3.5	4.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0
Lane Grp Cap (vph)	189	2211	880	392	2339	879	674	318	569	190	86	195
v/s Ratio Prot	0.05	c0.34	0.07	c0.14	c0.41	0.00	c0.15	0.02	c0.05	0.01	0.01	0.00
v/s Ratio Perm	0.24		0.12	0.32		0.03			0.05	0.01		0.00
v/c Ratio	0.65	0.93	0.34	0.76	0.85	0.07	0.79	0.12	0.27	0.19	0.27	0.06
Uniform Delay, d1	27.9	42.6	16.6	40.6	32.1	14.7	53.5	49.2	31.7	55.6	64.5	54.1
Progression Factor	1.59	0.76	0.48	1.27	0.77	0.03	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.8	5.3	0.1	8.7	4.0	0.0	6.1	0.2	0.3	0.5	1.7	0.1
Delay (s)	49.1	37.8	8.1	60.2	28.6	0.5	59.6	49.3	32.0	56.1	66.1	54.2
Level of Service	D	D	A	E	C	A	E	D	C	E	E	D
Approach Delay (s)		32.4			31.3			51.5			56.4	
Approach LOS		C			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	35.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	81.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



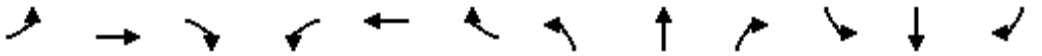
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	292	2943	670	422	2786	193	804	111	262	191	63	364
v/c Ratio	1.54	1.28	0.59	1.71	1.38	0.22	0.90	0.23	0.37	1.19	0.50	0.95
Control Delay	275.0	159.8	23.3	365.8	203.9	1.7	63.8	40.4	19.6	170.0	76.8	69.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	275.0	159.8	23.3	365.8	203.9	1.7	63.8	40.4	19.6	170.0	76.8	69.0
Queue Length 50th (ft)	~328	~1065	498	~519	~1293	2	363	77	105	~128	56	212
Queue Length 95th (ft)	m#260	m#863	m518	#735	#1378	26	#467	128	172	#274	106	#383
Internal Link Dist (ft)		940			1309			1346			140	
Turn Bay Length (ft)	420		430	475		237	265			225		
Base Capacity (vph)	190	2300	1141	247	2012	884	914	545	712	161	141	385
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.54	1.28	0.59	1.71	1.38	0.22	0.88	0.20	0.37	1.19	0.45	0.95

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

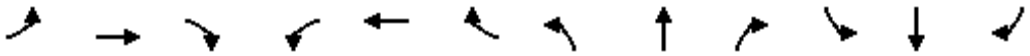
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	269	2708	616	388	2563	178	740	102	241	176	58	335
Future Volume (vph)	269	2708	616	388	2563	178	740	102	241	176	58	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			0%			1%	
Total Lost time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Lane Util. Factor	1.00	0.86	1.00	1.00	0.91	1.00	0.97	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	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	6047	1567	1787	4896	1599	3433	1863	1583	1761	1853	1575
Flt Permitted	0.08	1.00	1.00	0.07	1.00	1.00	0.95	1.00	1.00	0.69	1.00	1.00
Satd. Flow (perm)	142	6047	1567	134	4896	1599	3433	1863	1583	1270	1853	1575
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)	292	2943	670	422	2786	193	804	111	262	191	63	364
RTOR Reduction (vph)	0	0	67	0	0	86	0	0	48	0	0	117
Lane Group Flow (vph)	292	2943	603	422	2786	107	804	111	214	191	63	247
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases	6		6	2		2			4	8		8
Actuated Green, G (s)	62.9	51.9	88.4	71.4	56.2	63.2	36.5	37.6	52.8	15.1	8.1	19.1
Effective Green, g (s)	62.9	51.9	88.4	71.4	56.2	63.2	36.5	37.6	52.8	15.1	8.1	19.1
Actuated g/C Ratio	0.45	0.37	0.63	0.51	0.40	0.45	0.26	0.27	0.38	0.11	0.06	0.14
Clearance Time (s)	8.0	6.4	7.6	7.8	6.1	6.5	7.6	7.6	7.8	6.5	6.5	8.0
Vehicle Extension (s)	3.0	4.0	3.0	3.5	4.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0
Lane Grp Cap (vph)	190	2241	989	247	1965	721	895	500	597	161	107	214
v/s Ratio Prot	0.12	0.49	0.16	c0.18	0.57	0.01	c0.23	0.06	0.04	0.06	0.03	0.09
v/s Ratio Perm	0.57		0.23	c0.68		0.06			0.10	c0.07		0.07
v/c Ratio	1.54	1.31	0.61	1.71	1.42	0.15	0.90	0.22	0.36	1.19	0.59	1.15
Uniform Delay, d1	41.0	44.1	15.5	45.4	41.9	22.6	50.0	39.8	31.4	61.8	64.3	60.4
Progression Factor	1.00	0.89	2.61	1.27	0.76	0.24	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	244.0	141.3	0.1	333.0	190.6	0.1	11.7	0.2	0.4	129.8	8.0	108.6
Delay (s)	284.9	180.6	40.5	390.4	222.4	5.4	61.6	40.0	31.8	191.6	72.4	169.1
Level of Service	F	F	D	F	F	A	E	D	C	F	E	F
Approach Delay (s)		164.3			230.9			53.0			166.2	
Approach LOS		F			F			D			F	

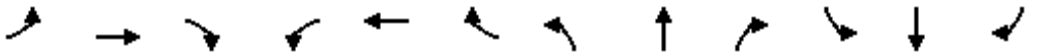
Intersection Summary			
HCM 2000 Control Delay	174.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.47		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	28.3
Intersection Capacity Utilization	110.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



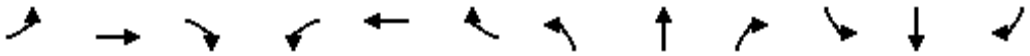
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	432	409	76	47	255	290	26	42	39	215	35	150
v/c Ratio	0.66	0.31	0.08	0.14	0.33	0.33	0.11	0.13	0.09	0.31	0.06	0.18
Control Delay	41.0	23.7	0.2	18.6	33.2	7.1	26.5	47.3	0.4	33.1	33.5	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.0	23.7	0.2	18.6	33.2	7.1	26.5	47.3	0.4	33.1	33.5	3.1
Queue Length 50th (ft)	102	84	0	13	58	35	9	10	0	51	7	0
Queue Length 95th (ft)	258	184	0	47	144	98	36	42	0	117	27	34
Internal Link Dist (ft)		6294			2111			370			816	
Turn Bay Length (ft)	350		410	390		400	833		200	400		400
Base Capacity (vph)	1969	3196	972	437	2127	1396	330	490	508	2238	2306	1157
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.13	0.08	0.11	0.12	0.21	0.08	0.09	0.08	0.10	0.02	0.13

Intersection Summary



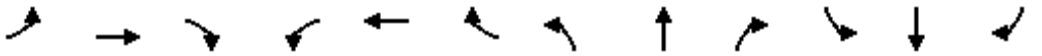
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	397	376	70	43	235	267	24	39	36	198	32	138
Future Volume (vph)	397	376	70	43	235	267	24	39	36	198	32	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-1%			0%			-3%	
Total Lost time (s)	8.0	5.5	8.0	8.5	6.0	9.0	8.0	8.0	8.5	9.0	9.0	8.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3399	3504	1567	1778	3557	1591	1770	3539	1583	3485	3592	1607
Flt Permitted	0.95	1.00	1.00	0.51	1.00	1.00	0.98	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3399	3504	1567	958	3557	1591	1817	3539	1583	3485	3592	1607
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)	432	409	76	47	255	290	26	42	39	215	35	150
RTOR Reduction (vph)	0	0	44	0	0	100	0	0	35	0	0	96
Lane Group Flow (vph)	432	409	32	47	255	190	26	42	4	215	35	54
Turn Type	Prot	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8	1	7	4	5
Permitted Phases			2	6		6	8		8			4
Actuated Green, G (s)	16.9	32.9	38.6	27.4	21.7	39.2	9.8	4.1	9.8	17.5	15.9	32.8
Effective Green, g (s)	16.9	32.9	38.6	27.4	21.7	39.2	9.8	4.1	9.8	17.5	15.9	32.8
Actuated g/C Ratio	0.19	0.36	0.42	0.30	0.24	0.43	0.11	0.04	0.11	0.19	0.17	0.36
Clearance Time (s)	8.0	5.5	8.0	8.5	6.0	9.0	8.0	8.0	8.5	9.0	9.0	8.0
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0	3.0	3.0	3.0	2.0	3.0	3.0	2.0
Lane Grp Cap (vph)	629	1264	663	339	846	683	192	159	170	668	626	577
v/s Ratio Prot	c0.13	c0.12	0.00	0.01	0.07	0.05	0.01	c0.01	0.00	c0.06	0.01	0.02
v/s Ratio Perm			0.02	0.03		0.07	0.01		0.00			0.02
v/c Ratio	0.69	0.32	0.05	0.14	0.30	0.28	0.14	0.26	0.02	0.32	0.06	0.09
Uniform Delay, d1	34.7	21.1	15.5	22.9	28.5	16.8	36.9	42.1	36.4	31.7	31.4	19.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.5	0.1	0.0	0.1	0.2	0.2	0.3	0.9	0.0	0.3	0.0	0.0
Delay (s)	37.2	21.2	15.5	23.0	28.7	17.1	37.2	43.0	36.4	32.0	31.4	19.4
Level of Service	D	C	B	C	C	B	D	D	D	C	C	B
Approach Delay (s)		28.3			22.6			39.2			27.2	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	27.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	91.2	Sum of lost time (s)	31.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



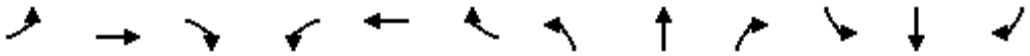
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	571	442	150	108	661	358	196	139	118	474	215	783
v/c Ratio	0.88	0.36	0.19	0.39	0.87	0.44	0.51	0.17	0.18	0.80	0.18	0.81
Control Delay	80.5	40.3	4.0	35.9	75.3	10.7	41.6	54.6	2.1	77.3	40.8	33.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.5	40.3	4.0	35.9	75.3	10.7	41.6	54.6	2.1	77.3	40.8	33.0
Queue Length 50th (ft)	326	195	0	73	384	71	132	65	0	268	88	604
Queue Length 95th (ft)	424	244	42	115	475	156	219	112	14	354	137	909
Internal Link Dist (ft)		6294			2111			370			816	
Turn Bay Length (ft)	350		410	390		400	833		200	400		400
Base Capacity (vph)	815	1637	790	288	1033	883	388	864	647	757	1361	962
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.27	0.19	0.38	0.64	0.41	0.51	0.16	0.18	0.63	0.16	0.81

Intersection Summary



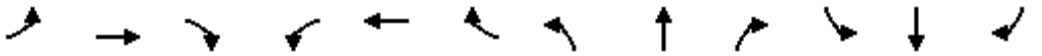
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	525	407	138	99	608	329	180	128	109	436	198	720
Future Volume (vph)	525	407	138	99	608	329	180	128	109	436	198	720
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-1%			0%			-3%	
Total Lost time (s)	8.0	5.5	8.0	9.0	6.0	8.5	8.0	8.0	9.0	8.5	9.0	8.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3399	3504	1567	1778	3557	1591	1770	3539	1583	3485	3592	1607
Flt Permitted	0.95	1.00	1.00	0.50	1.00	1.00	0.62	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3399	3504	1567	928	3557	1591	1150	3539	1583	3485	3592	1607
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)	571	442	150	108	661	358	196	139	118	474	215	783
RTOR Reduction (vph)	0	0	87	0	0	158	0	0	84	0	0	37
Lane Group Flow (vph)	571	442	63	108	661	200	196	139	34	474	215	746
Turn Type	Prot	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8	1	7	4	5
Permitted Phases			2	6		6	8		8			4
Actuated Green, G (s)	31.1	56.5	67.5	43.7	34.8	62.4	48.5	37.5	46.4	27.6	53.6	84.7
Effective Green, g (s)	31.1	56.5	67.5	43.7	34.8	62.4	48.5	37.5	46.4	27.6	53.6	84.7
Actuated g/C Ratio	0.19	0.35	0.42	0.27	0.22	0.39	0.30	0.23	0.29	0.17	0.33	0.52
Clearance Time (s)	8.0	5.5	8.0	9.0	6.0	8.5	8.0	8.0	9.0	8.5	9.0	8.0
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0	3.0	3.0	3.0	2.0	3.0	3.0	2.0
Lane Grp Cap (vph)	654	1225	654	297	766	614	387	821	454	595	1192	842
v/s Ratio Prot	0.17	0.13	0.01	0.02	c0.19	0.06	0.03	0.04	0.00	c0.14	0.06	c0.17
v/s Ratio Perm			0.03	0.08		0.07	0.12		0.02			0.29
v/c Ratio	0.87	0.36	0.10	0.36	0.86	0.33	0.51	0.17	0.07	0.80	0.18	0.89
Uniform Delay, d1	63.3	39.1	28.5	45.7	61.1	34.8	44.6	49.6	41.9	64.3	38.3	34.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.0	0.2	0.1	0.3	9.9	0.3	1.0	0.1	0.0	7.3	0.1	10.8
Delay (s)	75.3	39.2	28.6	46.0	70.9	35.1	45.7	49.6	41.9	71.6	38.4	44.9
Level of Service	E	D	C	D	E	D	D	D	D	E	D	D
Approach Delay (s)		55.6			57.2			45.9			52.5	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	53.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	161.5	Sum of lost time (s)	31.5
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



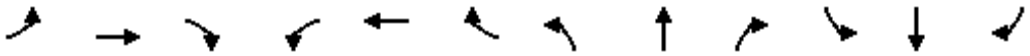
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	480	454	85	52	288	327	26	42	39	214	35	150
v/c Ratio	0.70	0.35	0.10	0.17	0.40	0.37	0.11	0.14	0.09	0.27	0.06	0.18
Control Delay	42.1	24.1	0.5	19.1	35.5	9.4	27.6	48.8	0.4	33.4	34.6	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.1	24.1	0.5	19.1	35.5	9.4	27.6	48.8	0.4	33.4	34.6	2.9
Queue Length 50th (ft)	116	95	0	14	68	57	9	10	0	52	8	0
Queue Length 95th (ft)	286	205	3	51	165	141	36	42	0	119	28	33
Internal Link Dist (ft)		6294			2111			370			816	
Turn Bay Length (ft)	350		410	390		400	833		200	400		400
Base Capacity (vph)	1814	3167	933	397	1960	1397	305	451	488	2062	2125	1086
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.14	0.09	0.13	0.15	0.23	0.09	0.09	0.08	0.10	0.02	0.14

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	442	418	78	48	265	301	24	39	36	197	32	138
Future Volume (vph)	442	418	78	48	265	301	24	39	36	197	32	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-1%			0%			-3%	
Total Lost time (s)	8.0	5.5	8.0	8.5	6.0	9.0	8.0	8.0	8.5	9.0	9.0	8.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3399	3504	1567	1778	3557	1591	1770	3539	1583	3485	3592	1607
Flt Permitted	0.95	1.00	1.00	0.49	1.00	1.00	0.93	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3399	3504	1567	917	3557	1591	1733	3539	1583	3485	3592	1607
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)	480	454	85	52	288	327	26	42	39	214	35	150
RTOR Reduction (vph)	0	0	48	0	0	87	0	0	35	0	0	93
Lane Group Flow (vph)	480	454	37	52	288	240	26	42	4	214	35	57
Turn Type	Prot	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8	1	7	4	5
Permitted Phases			2	6		6	8		8			4
Actuated Green, G (s)	18.7	33.8	41.5	26.9	21.0	42.4	12.0	4.3	10.2	21.4	18.0	36.7
Effective Green, g (s)	18.7	33.8	41.5	26.9	21.0	42.4	12.0	4.3	10.2	21.4	18.0	36.7
Actuated g/C Ratio	0.19	0.35	0.43	0.28	0.22	0.44	0.12	0.04	0.11	0.22	0.19	0.38
Clearance Time (s)	8.0	5.5	8.0	8.5	6.0	9.0	8.0	8.0	8.5	9.0	9.0	8.0
Vehicle Extension (s)	2.0	3.0	3.0	2.0	3.0	3.0	3.0	3.0	2.0	3.0	3.0	2.0
Lane Grp Cap (vph)	659	1228	674	308	774	699	218	157	167	773	670	611
v/s Ratio Prot	c0.14	c0.13	0.00	0.01	0.08	c0.08	0.01	c0.01	0.00	0.06	0.01	0.02
v/s Ratio Perm			0.02	0.04		0.07	0.01		0.00			0.02
v/c Ratio	0.73	0.37	0.05	0.17	0.37	0.34	0.12	0.27	0.02	0.28	0.05	0.09
Uniform Delay, d1	36.5	23.4	16.0	25.8	32.1	17.8	37.5	44.5	38.6	31.1	32.2	19.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.4	0.2	0.0	0.1	0.3	0.3	0.2	0.9	0.0	0.2	0.0	0.0
Delay (s)	39.9	23.5	16.0	25.9	32.4	18.1	37.7	45.4	38.7	31.3	32.2	19.2
Level of Service	D	C	B	C	C	B	D	D	D	C	C	B
Approach Delay (s)		30.6			24.9			41.1			26.8	
Approach LOS		C			C			D			C	

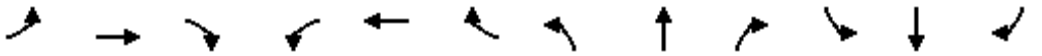
Intersection Summary			
HCM 2000 Control Delay	28.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	96.4	Sum of lost time (s)	31.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	625	484	164	124	760	411	196	139	118	475	215	784
v/c Ratio	0.92	0.36	0.19	0.41	0.89	0.51	0.58	0.21	0.19	0.83	0.21	0.86
Control Delay	78.6	34.1	3.3	29.7	69.2	18.8	46.5	55.8	0.7	74.8	42.9	37.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.6	34.1	3.3	29.7	69.2	18.8	46.5	55.8	0.7	74.8	42.9	37.9
Queue Length 50th (ft)	322	181	0	68	395	173	134	64	0	246	88	616
Queue Length 95th (ft)	#432	229	39	109	477	256	206	104	0	308	130	#893
Internal Link Dist (ft)		6294			2111			370			816	
Turn Bay Length (ft)	350		410	390		400	833		200	400		400
Base Capacity (vph)	746	1527	844	311	994	855	338	678	618	707	1051	904
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.32	0.19	0.40	0.76	0.48	0.58	0.21	0.19	0.67	0.20	0.87

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	575	445	151	114	699	378	180	128	109	437	198	721
Future Volume (vph)	575	445	151	114	699	378	180	128	109	437	198	721
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-1%			0%			-3%	
Total Lost time (s)	8.0	5.5	8.0	8.5	6.0	8.5	8.0	8.0	8.5	8.5	9.0	8.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3399	3504	1567	1778	3557	1591	1770	3539	1583	3485	3592	1607
Flt Permitted	0.95	1.00	1.00	0.48	1.00	1.00	0.62	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3399	3504	1567	891	3557	1591	1150	3539	1583	3485	3592	1607
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)	625	484	164	124	760	411	196	139	118	475	215	784
RTOR Reduction (vph)	0	0	90	0	0	100	0	0	88	0	0	38
Lane Group Flow (vph)	625	484	74	124	760	311	196	139	30	475	215	746
Turn Type	Prot	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8	1	7	4	5
Permitted Phases			2	6		6	8		8			4
Actuated Green, G (s)	30.3	57.8	67.7	45.3	36.4	61.2	38.9	29.0	37.9	24.8	43.4	73.7
Effective Green, g (s)	30.3	57.8	67.7	45.3	36.4	61.2	38.9	29.0	37.9	24.8	43.4	73.7
Actuated g/C Ratio	0.20	0.38	0.45	0.30	0.24	0.41	0.26	0.19	0.25	0.16	0.29	0.49
Clearance Time (s)	8.0	5.5	8.0	8.5	6.0	8.5	8.0	8.0	8.5	8.5	9.0	8.0
Vehicle Extension (s)	2.0	3.0	2.0	2.0	3.0	2.0	2.0	3.0	2.0	2.0	3.0	2.0
Lane Grp Cap (vph)	682	1341	702	319	857	644	336	679	397	572	1032	784
v/s Ratio Prot	0.18	0.14	0.01	0.02	c0.21	0.08	0.04	0.04	0.00	c0.14	0.06	c0.19
v/s Ratio Perm			0.04	0.09		0.12	0.11		0.01			0.27
v/c Ratio	0.92	0.36	0.10	0.39	0.89	0.48	0.58	0.20	0.07	0.83	0.21	0.95
Uniform Delay, d1	59.1	33.4	24.1	39.8	55.3	33.2	47.1	51.3	43.2	61.1	40.8	36.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	16.8	0.2	0.0	0.3	10.9	0.2	1.7	0.2	0.0	9.5	0.1	20.8
Delay (s)	75.9	33.5	24.1	40.1	66.3	33.4	48.7	51.5	43.2	70.6	40.9	57.8
Level of Service	E	C	C	D	E	C	D	D	D	E	D	E
Approach Delay (s)		53.1			53.3			48.1			59.4	
Approach LOS		D			D			D			E	

Intersection Summary			
HCM 2000 Control Delay	54.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	151.0	Sum of lost time (s)	31.0
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
14: Van Buren Road & Access Road

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	77	20	75	5	29	66
Future Volume (Veh/h)	77	20	75	5	29	66
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	84	22	82	5	32	72
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	182	41			87	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	182	41			87	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	89	98			98	
cM capacity (veh/h)	773	1021			1507	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	106	41	41	5	32	36	36
Volume Left	84	0	0	0	32	0	0
Volume Right	22	0	0	5	0	0	0
cSH	814	1700	1700	1700	1507	1700	1700
Volume to Capacity	0.13	0.02	0.02	0.00	0.02	0.02	0.02
Queue Length 95th (ft)	11	0	0	0	2	0	0
Control Delay (s)	10.1	0.0	0.0	0.0	7.4	0.0	0.0
Lane LOS	B				A		
Approach Delay (s)	10.1	0.0			2.3		
Approach LOS	B						

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	20.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
14: Van Buren Road & Access Road

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	173	83	331	5	87	396
Future Volume (Veh/h)	173	83	331	5	87	396
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	188	90	360	5	95	430
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	765	180			365	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	765	180			365	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	40	89			92	
cM capacity (veh/h)	312	832			1190	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	278	180	180	5	95	215	215
Volume Left	188	0	0	0	95	0	0
Volume Right	90	0	0	5	0	0	0
cSH	392	1700	1700	1700	1190	1700	1700
Volume to Capacity	0.71	0.11	0.11	0.00	0.08	0.13	0.13
Queue Length 95th (ft)	133	0	0	0	6	0	0
Control Delay (s)	33.8	0.0	0.0	0.0	8.3	0.0	0.0
Lane LOS	D				A		
Approach Delay (s)	33.8	0.0			1.5		
Approach LOS	D						

Intersection Summary			
Average Delay	8.7		
Intersection Capacity Utilization	38.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
14: Van Buren Road & Access Road

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	78	24	86	5	32	76
Future Volume (Veh/h)	78	24	86	5	32	76
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	85	26	93	5	35	83
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	204	46			98	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	204	46			98	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	89	97			98	
cM capacity (veh/h)	747	1013			1493	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	111	46	46	5	35	42	42
Volume Left	85	0	0	0	35	0	0
Volume Right	26	0	0	5	0	0	0
cSH	796	1700	1700	1700	1493	1700	1700
Volume to Capacity	0.14	0.03	0.03	0.00	0.02	0.02	0.02
Queue Length 95th (ft)	12	0	0	0	2	0	0
Control Delay (s)	10.3	0.0	0.0	0.0	7.5	0.0	0.0
Lane LOS	B				A		
Approach Delay (s)	10.3	0.0			2.2		
Approach LOS	B						

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	20.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
14: Van Buren Road & Access Road

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	173	88	355	5	93	418
Future Volume (Veh/h)	173	88	355	5	93	418
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	188	96	386	5	101	454
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	815	193			391	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	815	193			391	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	35	88			91	
cM capacity (veh/h)	288	816			1164	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	284	193	193	5	101	227	227
Volume Left	188	0	0	0	101	0	0
Volume Right	96	0	0	5	0	0	0
cSH	369	1700	1700	1700	1164	1700	1700
Volume to Capacity	0.77	0.11	0.11	0.00	0.09	0.13	0.13
Queue Length 95th (ft)	158	0	0	0	7	0	0
Control Delay (s)	40.9	0.0	0.0	0.0	8.4	0.0	0.0
Lane LOS	E				A		
Approach Delay (s)	40.9	0.0			1.5		
Approach LOS	E						

Intersection Summary			
Average Delay	10.1		
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

ATTACHMENT 8

Document Number	Crash Date	Crash Time	Day Of Week	Collision Type	Crash Description	First Harmful Event	First Harmful Event Location	KABCO Severity Code	Route Name	Route Number	Secondary Location	Route Or Street Name	Crash Severity	Pedestrian Fatality Count	Non Pedestrian Fatality Count	Pedestrian Injury Cnt	Non Pedestrian Injury Count	Work Zone Related
153175164	10/17/2015	16:05	Sat	1. Rear End	B15 2507; VEHICLE 2 WAS SITTING IN THE RIGHT MOST STRAIGHT LANE STOPPED AT THE RED LIGHT AT THE INTERSECTION OF DUMFRIES ROAD AT VAN BUREN DRIVE. VEHICLE 1 WAS APPROACHING THE INTERSECTION ON DUMFRIES ROAD IN THE RIGHT MOST STRAIGHT LANE. VEHICLE 1 DID NOT DECELERATE QUICKLY ENOUGH. VEHICLE 1, USING THE FRONT END, STRUCK VEHICLE 2 IN THE REAR END OF THE VEHICLE. THE THREE INJURED PASSENGERS IN VEHICLE 2 ONLY SUSTAINED MINOR INJURIES.	20. Motor Vehicle In Transport	1. On Roadway	Non-Incapacitating Injury (B)	VA-234S	234	0627 VAN BUREN ROAD	234 DUMFRIES ROAD	injury crash	0	0	0	3	2. No
152955134	10/19/2015	7:30	Mon	4. Sideswipe - Same Direction	B15 RD# 2507 VEHICLES 1 & 2 WERE WESTBOUND ON RT# 234, V1 WAS IN THE LEFT THROUGH LANE, AND VEHICLE 2 WAS IN THE CENTER LANE. DRIVER 1 MANEUVERED RIGHT TO THE CENTER LANE, AND WAS STRUCK BY V2 THAT WAS IN HER BLIND SPOT. DRIVER 1 WAS CITED FOR UNSAFE LANE CHANGE.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234N	234	x	0234 DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
153125279	11/6/2015	19:53	Fri	1. Rear End	VEHICLE #1 AND #2 TRAVELING VAN BUREN ROAD NORTHBOUND. VEHICLE #2 STOPPED WITH TRAFFIC WAS REAR ENDED BY VEHICLE #1. VEHICLE #1 SLOWING WITH TRAFFIC. THE PROGRAM WILL NOT ACCEPT ZERO AS VEHICLE #2 SPEED. VEHICLE #2 SPEED IS ZERO.	20. Motor Vehicle In Transport	1. On Roadway	Possible Injury (C)	SC-627N (Prince William County)	627	ROUTE 234	VAN BUREN ROAD	injury crash	0	0	0	1	2. No
153275285	11/19/2015	10:04	Thu	1. Rear End	BEAT:2507 RD: B15 V1 AND V2 WERE HEADING WEST ON DUMFRIES RD. V1 STATED THERE WERE TRUCKS BESIDE HIM DISTRACTING HIS VIEW. V1 WAS NOT PAYING ATTENTION TO V2 AHEAD OF HIM, CAUSING V1 TO REAR END V2.	20. Motor Vehicle In Transport	1. On Roadway	Non-Incapacitating Injury (B)	VA-234N	234	0627VAN BUREN RD	0234DUMFRIES RD	injury crash	0	0	0	2	2. No
153345294	11/19/2015	12:00	Thu	2. Angle	BEAT:2507 RD:B15 V1 AND V2 WERE HEADING WEST ON DUMFRIES RD. V1 MADE A RIGHT TURN FROM THE LANE NEXT TO V2, CROSSING INTO V2 LANE. V2 WENT STRIGHT WHEN THE LIGHT TURNED GREEN STRIKING V1 ON THE REAR PASSENGER DOOR SIDE ABOVE THE WHEEL.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234S	234	0627VAN BUREN RD	0234DUMFRIES RD	property damage crash	0	0	0	0	2. No
153625225	12/18/2015	17:30	Fri	1. Rear End	BEAT=B15 RD=2507 VEHICLE 1 WAS STOPPED BEHIND VEHICLE 2 WHICH WAS STOPPED BEHIND VEHICLE 3 ON DUMFRIES ROAD FACING WESTBOUND TOWARDS THE INTERSECTION OF VAN BUREN ROAD AT A RED TRAFFIC SIGNAL. VEHICLE 1 PROCEEDED TO ACCELERATE AND STRIKE THE REAR BUMPER OF VEHICLE 2 WHICH THEN CAUSED VEHICLE 2 TO STRIKE THE REAR BUMPER OF VEHICLE 3. VEHICLE 1 PROCEEDED TO THEN DRIVE AROUND THE OTHER TWO VEHICLES AND LEAVE THE SCENE. VEHICLE 2 AND VEHICLE 3 BOTH HAD MINOR DAMAGE. THE DRIVER OF VEHICLE 3 WAS TRANSPORTED TO THE HOSPITAL WITH MINOR NECK PAIN.	20. Motor Vehicle In Transport	1. On Roadway	Non-Incapacitating Injury (B)	VA-234S	234	0627 VAN BUREN ROAD	0234 DUMFRIES ROAD	injury crash	0	0	0	1	2. No
160475109	2/7/2016	15:42	Sun	1. Rear End	B15 RD2506 VEHICLE ONE WAS TRAVELLING SOUTH ON DUMFRIES ROAD IN THE RIGHT LANE. VEHICLE 2 WAS STOPPED IN TRAFFIC IN THE RIGHT SOUTHBOUND LANE. VEHICLE 1 STRUCK THE REAR OF VEHICLE 2.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234S	234	0627 VAN BUREN DRIVE	0234 DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
160475120	2/13/2016	5:53	Sat	2. Angle	B15 RD2506 : V2 WAS TRAVELING LEFT LANE DUMFRIES RD, EASTBOUND, CROSSING VAN BUREN RD, WITH A GREEN LIGHT. V1 WAS TRAVELING ON VAN BUREN RD, RIGHT LANE, NORTHBOUND, PREPARING TO MAKE A RIGHT TURN ONTO DUMFRIES RD EASTBOUND. UPON STOPING AT THE INTERSECTION OF VAN BUREN RD AND DUMFRIES RD, V1 FAILED TO MAINTAIN CONTROL OF THE VEHICLE, THEREFORE CROSSED THE INTERSECTION, CAUSING V2 TO MAKE CONTACT WITH V1 ON ITS LEFT SIDE. V1 SUSTAINED DAMAGES TO ITS DRIVER DOOR AND REAR LEFT PASSENGER DOOR. V2 SUSTAINED DAMAGES TO ITS FRONT RIGHT WHEEL, BUMPER AND ENGINE BLOCK.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234S	234	0627 VAN BUREN ROAD	0234 DUMFRUES RD	property damage crash	0	0	0	0	2. No
160495067	2/15/2016	10:42	Mon	1. Rear End	B15 RD 2507 V2 AND V3 WERE STOPPED FOR A RED LIGHT AT THE INTERSECTION OF DUMFRIES ROAD AND VAN BUREN ROAD. V1 WAS TRAVELING EASTBOUND ON DUMFRIES ROAD APPROACHING THE INTERSECTION. V1 APPLIED ITS BREAKS BUT COULD NOT STOP IN TIME DUE TO THE SLICK CONDITIONS. V1 COLLIDED INTO THE REAR OF V2, BOUNCED OFF AND STRUCK V3. THERE WERE NO INJURIES TO ANY PARTYS INVOLVED.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234S	234	VAN BUREN ROAD ROUTE 0627	DUMFRIES ROAD ROUTE 0234	property damage crash	0	0	0	0	2. No
160685046	3/5/2016	14:45	Sat	4. Sideswipe - Same Direction	B15 RD2506 V1 WAS TRAVELING IN LEFT MOST THROUGH LANE ON EB 234/DUMFRIES ROAD DIRECTLY BEHIND A VEHICLE WHICH WAS SLOWING FOR A YELLOW SIGNAL. V1 SWERVED INTO THE MIDDLE THROUGH LANE STRIKING V2 ON THE DRIVER'S SIDE.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234S	234	0627 VAN BUREN ROAD	0234 DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
161545132	5/27/2016	16:45	Fri	2. Angle	B15 / 2507 VEHICLE #1 & #2 WERE WEST BOUND ON DUMFRIES ROAD APPROACHING VAN BUREN ROAD. VEHICLE #1 ENTERED THE LEFT HAND TURN LANE OF DUMFRIES ROAD TO MAKE THE TURN ONTO VAN BUREN ROAD. DRIVER #2 STATED SHE SWERVED TO AVOID SOMETHING IN THE ROADWAY; VEHICLE #1 COLLIDED INTO THE REAR RIGHT BUMPER OF VEHICLE #2. VEHICLE #1 ACCELERATED FROM THE LEFT HAND TURN LANE ACROSS ALL LANES OF TRAVEL WHERE IT STRUCK THE CURB; VEHICLE #1 RAN UP ONTO THE GRASS OF THE SHOULDER WHERE IT STRUCK A VDOT LIGHT BOX AND CAME TO REST. VEHICLE #1 LIFTED THE VDOT LIGHT POWER BOX OFF ITS FOUNDATION AND CAUSE A BLACK OUT WITH THE LIGHTS WITHIN THE INTERSECTION.	20. Motor Vehicle In Transport	1. On Roadway	Incapacitating Injury (A)	VA-234N	234	0627 VAN BUREN ROAD	234 DUMFRIES ROAD	injury crash	0	0	0	4	2. No
162435086	6/4/2016	2:56	Sat	2. Angle	B15 // 2507 VEHICLE ONE WAS TRAVELLING EAST ON RT. 234. VEHICLE TWO WAS PROCEEDING THROUGH THE INTERSECTION, MAKING A LEFT ONTO RT. 234 FROM VAN BUREN RD. VEHICLE ONE FAILED TO STOP AT THE RED LIGHT, AND CONTINUED THROUGH THE INTERSECTION, STRIKING VEHICLE TWO ON THE DRIVER'S SIDE AS IT WAS DRIVING THROUGH THE INTERSECTION WITH A GREEN LIGHT. THE DRIVER OF VEHICLE ONE WAS ARRESTED FOR DUI.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234S	234	0627 / VAN BUREN ROAD	RT. 234 / DUMFRIES RD	property damage crash	0	0	0	0	2. No
161675284	6/10/2016	11:30	Fri	1. Rear End	SECTOR B15, BEAT 2507 V2 WAS TRAVELING NORTH ON VAN BUREN ROAD APPROACHING THE INTERSECTION OF DUMFRIES RD. A GREEN TRAFFIC LIGHT WAS INITIATED AND V2 CONTINUED TO THE ENTRANCE OF THE ENTERSECTION WHEN AN OBSTRUCTION WAS IDENTIFIED. V2 MADE AN ABRUBT STOP. V1 WAS TRAVELING NORTH DIRECTLY BEHIND V2. WHEN V2 STOPPED ABRUBTLY V1'S FRONT FENDER IMPACTED THE REAR FENDER OF V2. BOTH VEHICLES CAME TO REST IN THE RIGHT MOST LANE OF THE INTERSECTION.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234S	234	0234 DUMFRIES ROAD	0627 VAN BUREN ROAD	property damage crash	0	0	0	0	2. No
161965069	7/11/2016	16:00	Mon	1. Rear End	B15 2507 V1 AND V2 WERE TRAVELING WEST ON DUNFRIES RD. STOPPED IN TRAFFIC DUE TO THE LIGHT AT VAN BUREN RD. V2 STARTED TO GO AND THEN STOPPED AGAIN. THE DRIVER OF V1 STATED HE THOUGHT V2 WAS STARTING TO GO AND REAR ENDED V2 AT ABOUT 15 MPH. THE DRIVER OF V2 WAS TRANSPORTED DUE TO REAGGRIVATING A PREVIOUS BACK INJURY.	20. Motor Vehicle In Transport	1. On Roadway	Non-Incapacitating Injury (B)	VA-234N	234	0627 VAN BUREN ROAD	0234 DUMFRIES ROAD	injury crash	0	0	0	1	2. No
162005119	7/16/2016	5:20	Sat	2. Angle	SECTOR: B15 / BEAT: 2507 VEHICLE ONE WAS TRAVELLING SOUTHBOUND ON VAN BUREN ROAD AND WAS STOPPED AT THE RED LIGHT IN THE RIGHT TURN LANE AT THE INTERSECTION AT DUMFRIES ROAD. VEHICLE TWO WAS TRAVELLING IN THE RIGHT MOST THROUGH LANE OF NORTHBOUND DUMFRIES ROAD AND PROCEEDED THROUGH THE INTERSECTION AT VAN BUREN ROAD WITH THE RIGHT OF WAY. VEHICLE ONE PROCEEDED TO MAKE THE RIGHT TURN ONTO NORTHBOUND DUMFRIES ROAD WITHOUT THE RIGHT OF WAY AS VEHICLE TWO WAS TRAVELLING THROUGH THE INTERSECTION. VEHICLE ONE THEN IMPACTED VEHICLE TWO WITH ITS LEFT FRONT BUMPER. VEHICLE TWO WAS IMPACTED IN THE AREA OF ITS RIGHT REAR DOOR AND WHEEL WELL.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	SC-627S (Prince William County)	627	0627 VAN BUREN ROAD	0234 DUMFRIES ROAD	property damage crash	0	0	0	0	2. No

ATTACHMENT 8

Document Number	Crash Date	Crash Time	Day Of Week	Collision Type	Crash Description	First Harmful Event	First Harmful Event Location	KABCO Severity Code	Route Name	Route Number	Secondary Location	Route Or Street Name	Crash Severity	Pedestrian Fatality Count	Non Pedestrian Fatality Count	Pedestrian Injury Cnt	Non Pedestrian Injury Count	Work Zone Related
162035137	7/21/2016	14:23	Thu	1. Rear End	SECTOR B15/ BEAT 2507 VEHICLE #1 WAS TRAVELING EASTBOUND ON DUMFRIES ROAD, WHEN THE DRIVER TOOK HER EYES OFF THE ROAD TO LOOK AT HER CHILD. SHE WAS UNAWARE THAT THE VEHICLES IN FRONT OF HER HAD STOPPED FOR A RED LIGHT, AND SHE WAS UNABLE TO STOP IN TIME BEFORE SHE STRUCK VEHICLE #2 IN THE REAR. VEHICLE #1 STRUCK VEHICLE #2 WITH ENOUGH FORCE, THAT IT PUSHED VEHICLE #2 INTO THE END OF VEHICLE #3. VEHICLE #1 SUSTAINED FRONT END DAMAGE, VEHICLE #2 SUSTAINED REAR END DAMGE AND FRONT END DAMAGE, AND VEHICLE #3 SUSTAINED REAR END DAMAGE. VEHICLE #1 AND #2 WERE TOWED FROM THE SCENE. NONE OF THE DRIVERS WERE TRANSPORTED TO THE HOPSITAL.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234S	234	0627 VAN BUREN ROAD	0234 DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
162355113	8/14/2016	0:24	Sun	2. Angle	B15 2506 AT 0224 HOURS, I RESPONDED TO THE AREA OF DUMFRIES ROAD AND OLD STAGE ROAD FOR A TWO VEHICLE CRASH. I LOCATED THE CRASH AT VAN BUREN ROAD AND DUMFRIES ROAD. VEHICLE TWO WAS PARKED WITH IT'S HAZARD LIGHTS ON THE VEHICLE HAD BEEN STRUCK ON THE DRIVER SIDE REAR QUARTER PANNEL. THE AXEL ON THE VEHICLE WAS BROKE. I LOCATED VEHICLE ONE AT VAN BUREN ROAD AND OLD STAGE ROAD. I SPOKE WITH THE DRIVER OF VEHICLE ONE WHO STATED HE WAS MAKING A LEFT OFF OF DUMFRIES ROAD AND DID NOT SEE THE VEHICLE AT THE INTERSECTION. VEHICLE ONE WAS BROKEN DOWN NEAR THE CURB IN THE RIGHT LANE OF DUMFRIES ROAD AND VAN BUREN ROAD. THE DRIVER OF VEHICLE ONE ADMITTED HE DID NOT SEE VEHICLE TWO AND COULD NOT AVIOD A COLLISION.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234N	234	0627 VAN BUREN ROAD	0234 DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
162705076	9/18/2016	0:32	Sun	2. Angle	B12 RD 2506 VEHICLE 1 TURNED OUT OF THE ECONO LODGE PARKING MAKING A RIGHT TURN INTO THE MIDDLE LANE ON NORTHBOUND DUMFRIES ROAD. VEHICLE 1 WENT INTO THE MIDDLE LANE TO THE RIGHT LANE ATTEMPTING TO TURN INTO THE NEXT PARKING LOT NEXT TO THE ECONO LODGE. VEHICLE 2 WAS TRAVELING IN THE MIDDLE LANE NORTHBOUND DUMFRIES ROAD. VEHICLE 1 CUT OFF VEHICLE 2 CAUSING THE OPERATOR OF VEHICLE 2 TO CHANGE LANES INTO THE RIGHT LANE. VEHICLE 1 TURNED IN FRONT OF VEHICLE 2 CAUSING VEHICLE 2'S FRONT DRIVER SIDE BUMPER TO HIT THE PASSENGER REAR FENDER OF VEHICLE 1.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234N	234	x	0234 DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
171156145	2/9/2017	16:30	Thu	1. Rear End	(B15; 2507) VEHICLE 2, NORTHBOUND ON DUMFRIES RD, WAS STOPPED IN TRAVEL LANE DUE TO POLICE OFFICER DIRECTION WHILE REMOVING DISABLED VEHICLE FROM THE ROADWAY. VEHICLE 1, NORTHBOUND ON DUMFRIES RD, FAILED TO STOP AND STRUCK THE REAR OF VEHICLE 2. BOTH VEHICLES CAME TO A STOP AT THE POINT OF IMPACT. DRIVER 1 STATED SHE WAS DISTRACTED BY THE FLASHING POLICE LIGHTS AND UNABLE TO STOP IN TIME.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234N	234	VAN BUREN ROAD (RT 0627)	DUMFRIES ROAD (RT 234)	property damage crash	0	0	0	0	2. No
171156229	3/19/2017	16:30	Sun	1. Rear End	B15 2507 V1 WAS TRAVELLING WEST ON DUMFRIES RD. V1 STRUCK V2 WHICH WAS STOPPED. V2 THEN REAR ENDED V3.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234N	234	0627 VAN BUREN ROAD	234 / DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
171525102	4/18/2017	20:00	Tue	2. Angle	B15 2507 VEHICLE 1 WAS STOPPED ON VAN BUREN ROAD AT THE RED LIGHT TO TURN RIGHT ONTO DUMFRIES ROAD. VEHICLE 2 WAS TRAVELING SOUTH ON DUMFRIES ROAD. V1 TURNED RIGHT ONTO DUMFRIES ROAD WITHOUT ENSURING THE ROADWAY WAS CLEAR. V2 DROVE THROUGH THE INTERSECTION AND WAS STRUCK BY V1 ON THE RIGHT SIDE OF THE VEHICLE.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234S	234	0627 VAN BUREN ROAD	0234 DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
171156262	4/22/2017	7:45	Sat	1. Rear End	B15 / 2507 V2 WAS STOPPED AT A RED LIGHT IN THE RIGHT THRU LANE OF WB DUMFRIES ROAD AT VAN BUREN ROAD. WHEN THE LIGHT TURNED GREEN, V1 WAS APPROACHING V2 FROM THE REAR AND STRUCK V2 IN THE REAR FENDER.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234N	234	x	0234 DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
171465109	5/25/2017	9:30	Thu	1. Rear End	V1 WAS TRAVELING WEST BOUND ON DUMFRIES ROAD DIRECTLY BEHIND V2 IN THE FAR RIGHT THROUGH LANE. V2 SLOWED AND SIGNALED A RIGHT TURN INTO 17001 DUMFRIES ROAD, PRIOR TO MAKING THE TURN V1 STRUCK V2 IN THE REAR END AT SPEED. FRONT BUMPER AND GRILL DAMAGE WITH AIRBAG DEPLOYMENT TO V1 AND TOTAL REAR END DAMGE TO V2.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234N	234	0627 VAN BUREN ROAD	0234 DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
171525137	5/26/2017	15:50	Fri	1. Rear End	BEAT:6204 RD:B15 V1 AND V2 WHERE STOP IN THE RIGHT TURNING LANE FROM DUMFRIES RD TO VAN BUREN. V2 ADVISED HE TOOK HIS EYES OFF THE ROAD AND WHEN HE LOOKED BACK HE THOUGHT TRAFFIC STARTED TO MOVE FOWARD. V2 PROCEEDED FOWARD AND MADE CONTACT WITH V1 REAR BUMBER. V1 HAD FRONT BUMPER DAMAGE, V2 HAD REAR BUMPER DAMAGE	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234N	234	0627/VAN BUREN	0234/ DUMFRIES RD	property damage crash	0	0	0	0	2. No
171635156	6/8/2017	19:08	Thu	2. Angle	B15/5209. VEH 2 WAS TRAVELING IN THE RIGHT STRAIGHT LANE EAST BOUND ON 234. VEH 2 WAS SLOWING DUE TO TRAFFIC STOPPING AT THE VAN BUREN ROAD LIGHT. VEH 1 WAS TRAVELING DIRECTLY BEHIND VEH 2 AND COULD NOT STOP IN TIME. VEH 1 REALIZED SHE WAS NOT GOING TO STOP AND ATTEMPTED TO DRIVE ON THE SHOULDER TO AVOID VEH 2. VEH 1'S DRIVER SIDE REAR STRUCK VEH 2'S PASSENGER SIDE REAR.	20. Motor Vehicle In Transport	1. On Roadway	Non-Incapacitating Injury (B)	VA-234S	234	x	0234 DUMFRIES ROAD	injury crash	0	0	0	2	2. No
171705112	6/13/2017	21:17	Tue	1. Rear End	B15 5209 V2 WAS TRAVELLING EAST ON DUMFRIES RD. V2 APPLIED THE BRAKES AND SLOWED DOWN. V1 WAS TRAVELLING BEHIND V2 AND STRUCK THE REAR OF V2.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234S	234	0627 / VAN BUREN RD.	0234 / DUMFRIES RD.	property damage crash	0	0	0	0	2. No
171725070	6/19/2017	20:35	Mon	3. Head On	V1 WAS TRAVELING WEST ON 234 WHEN THE DRIVER SPILLED A DRINK ON HIS LAP AND TOOK HIS EYES OFF THE ROAD. V2 WAS EAST BOUD ON 234 STOPPED IN THE LEFT TURN LANE AT THE INTERSECTION OF VAN BUREN. V1 WENT INTO ONCOMMING TRAFFIC STRIKING V2 ON THE FRONT PASSENDER SIDE AND WENT OVER MEDIAN GOING BACK ON THE WEST BOUND LANE.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234N	234	0627/ VAN BUREN	0234/ DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
171735080	6/19/2017	21:27	Mon	1. Rear End	B15 5209 V2 WAS STOPPED IN A TRAFFIC LANE HEADING EAST ON DUMFRIES RD. V1 WAS TRAVELLING EAST ON DUMFRIES RD AND STRUCK THE BACK OF V2. DRIVER OF V1 WAS FLOWN TO INOVA FAIRFAX WITH NON-LIFE THREATENING INJURIES.	20. Motor Vehicle In Transport	1. On Roadway	Incapacitating Injury (A)	VA-234S	234	0627 / VAN BUREN ROAD	0234 / DUMFRIES ROAD	injury crash	0	0	0	2	2. No
172485042	6/27/2017	11:30	Tue	4. Sideswipe - Same Direction	B15, RD: 5209 V1 WAS STOPPED IN TRAFFIC LANE BEHIND V3, HEADING NORTHBOUND ON DUMFRIES ROAD AT VAN BUREN ROAD. V1 LIGHTLY STRUCK V2 FROM THE REAR, CAUSING DAMAGES. WHILE V2 WAS IN MOTION, TRAVELING NORTHBOUND ON DUMFRIES ROAD AND IN ADJACENT LANE, V1 ATTEMPTED TO CHANGE LANES TO ITS LEFT AND SIDESWIPED V2, CAUSING DAMAGES.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234N	234	0627 VAN BUREN ROAD	0234 DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
172055199	7/21/2017	20:39	Fri	2. Angle	B15 5209 V2 WAS TRAVELING NORTH ON VAN BUREN RD ON RIGHT TURN LANE. V1 WAS TRAVELING ALONG SIDE OF V2 WHEN IT CHANGED LANE. V1 FAILED TO YIELD TO V2. AS A RESULT, V1 COLLIDED WITH V2.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	SC-627N (Prince William County)	627	0234 DUMFRIES ROAD	0627 VAN BUREN ROAD	property damage crash	0	0	0	0	2. No
172405084	8/26/2017	16:00	Sat	1. Rear End	BEAT: 5209 SECTOR: B15 ALL THREE VEHICLES WERE STOPPED AT THE RED TRAFFIC SIGNAL LOCATED AT THE INTERSECTION OF DUMFRIES ROAD AND VAN BUREN ROAD. WHEN THE TRAFFIC SIGNAL TURNED GREEN, VEHICLE 1 STRUCK THE REAR BUMPER OF VEHICLE 2. THIS CAUSED THE FRONT BUMPER OF VEHICLE 2 TO STRIKE THE REAR BUMPER OF VEHICLE 3. VEHICLE 1 HAD DAMAGE TO THE FRONT BUMPER, GRILL, AND HOOD. ESTIMATED REPAIR COST IS $1500. VEHICLE 2 HAD MINOR DAMAGE TO THE FRONT AND REAR BUMPER. ESTIMATED REPAIR COST IS $200. VEHICLE 3 HAD MINOR DAMAGE TO THE REAR BUMPER. ESTIMATED REPAIR COST IS $100. THE DRIVER OF VEHICLE 1 WAS CHARGED WITH FOLLOWING TOO CLOSELY (46.2-816).	20. Motor Vehicle In Transport	1. On Roadway	Non-Incapacitating Injury (B)	VA-234S	234	0627 VAN BUREN RD	0234 DUMFRIES ROAD	injury crash	0	0	0	1	2. No
172995166	10/15/2017	9:40	Sun	2. Angle	VEHICLE #1 WAS TRAVELING ON NORTHBOUND ROUTE 234. VEHICLE #2 WAS TURNING ONTO SOUTHBOUND ROUTE 234 FROM VAN BUREN ROAD. VEHICLE #1 FAILED TO OBEY THE TRAFFIC SIGNAL AND STRUCK VEHICLE #2 AS IT ENTERED THE INTERSECTION.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234N	234	VAN BUREN ROAD	ROUTE 234	property damage crash	0	0	0	0	2. No

ATTACHMENT 8

Document Number	Crash Date	Crash Time	Day Of Week	Collision Type	Crash Description	First Harmful Event	First Harmful Event Location	KABCO Severity Code	Route Name	Route Number	Secondary Location	Route Or Street Name	Crash Severity	Pedestrian Fatality Count	Non Pedestrian Fatality Count	Pedestrian Injury Cnt	Non Pedestrian Injury Count	Work Zone Related
173035126	10/28/2017	0:02	Sat	1. Rear End	B12 SECTOR 2223 VEHICLE #2 WAS STOPPED, SOUTH, IN THE RIGHT HAND LANE AT A RED LIGHT FOR TRAFFICE, NORTH, TURNING LEFT ONTO I95 SOUTH. DRIVER #1 STATED SHE DID NOT KNOW WHAT HAPPENED. SHE WAS DRIVING AT APPROXIMATELY 25 MPH AND DID NOT SEE THE RED LIGHT OR THE VEHICLE IN HER LANE. VEHICLE #1 REAR ENDED VEHCILE #2.	10. Other	1. On Roadway	Non-Incapacitating Injury (B)	VA-234S	234	0627/VAN BUREN DRIVE	0234/DUMFRIES ROAC	injury crash	0	0	0	1	2. No
173245150	11/15/2017	8:00	Wed	1. Rear End	B15 5209RD VEHICLE #2 WAS STOPPED AT THE TRAFFIC SIGNAL IN THE RIGHT TURN LANE OF EASTBOUND DUMFRIES ROAD. VEHICLE #1 WAS DIRECTLY BEHIND VEHICLE #2. DRIVER #1 WAS WATCHING THE TRAFFIC SIGNAL INSTEAD OF THE VEHICLE IN FRONT, WHICH CAUSED THE FRONT BUMPER OF VEHICLE #1 TO STRIKE THE REAR BUMPER OF VEHICLE #2.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234S	234	0627 VAN BUREN ROAD	0234 DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
180165321	12/13/2017	17:30	Wed	1. Rear End	BEAT: B15 RD: 5209 VEHICLE #2 WAS ON DUMFRIES ROAD IN THE LEFT MOST LANE TRAVELING WEST STOPPED FOR TRAFFIC. VEHICLE #1 WAS BEHIND VEHICLE #2 AND WASN'T PAYING ATTENTION TO VEHICLES IN FRONT OF THEM. VEHICLE #1 FAILED TO STOP IN TIME FOR VEHICLE #2 AND REAR ENDED VEHICLE #2 WHERE BOTH VEHICLES CAME TO REST.	6. Parked Vehicle	1. On Roadway	No Injury (O)	VA-234N	234	0627 VAN BUREN ROAD	0234 DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
180165471	12/26/2017	10:56	Tue	16. Other	SECTOR B15 / BEAT 5209 VEHICLE #1 WAS TRAVELING NORTH BOUND ON DUMFRIES ROAD NEAR THE INTERSECTION VAN BUREN ROAD. WHEN VEHICLE #1 WAS APROACHING THE INTERSECTION OF DUMFRIES ROAD AND VAN BUREN, VEHICLE #1 DISREGARED THE RED TRAFFIC LIGHT AND PROCEEDED THOUGH THE INTERSECTION AND STRUCK VEHICLE #2. VEHICLE #1 SUSTAINED FRONT RIGHT SIDE DAMAGE. VEHICLE #2 SUSTAINED FRONT END DAMAGE. BOTH VEHICLES WERE TOWED FROM THE SCENE. NO ONE INVOLVED IN THE ACCIDENT WAS TRANSPORTED TO THE HOSPITAL.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234N	234	0627 VAN BUREN ROAD	0234 DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
180655179	2/24/2018	8:23	Sat	4. Sideswipe - Same Direction	B15 5209 V3 WAS WESTBOUND ON DUMFRIES ROAD. AT THE INTERSECTION OF DUMFRIES ROAD AND OLD STAGE ROAD V1 STRUCK V3 ON THE LEFT REAR OF V3. V1 THEN CONTINUED WESTBOUND, PASSING IN FRONT OF V3 AND PASSING V2 ON RIGHT. IN PASSING V2 ON THE RIGHT, V1 SIDESWIPED V2. V1 CONTINUED DRIVING AND DID NOT PULL OVER UNTIL APPROXIAMTELY 1 MILE FROM THE CRASH SITE. DRIVER OF V1 COULD NOT PROVIDE AN ACCOUNT OF HOW DAMAGE AND CRASHES OCCURRED.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234N	234	0738/OLD STAGE ROAD	0234 DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
180655123	3/4/2018	13:54	Sun	4. Sideswipe - Same Direction	B15 5209RD VEHICLE #1 WAS TRAVELING NORTHBOUND IN THE CENTER STRAIGHT TRAFFIC LANE OF DUMFRIES ROAD. VEHICLE #2 WAS TRAVELING NORTHBOUND IN THE RIGHT STRAIGHT TRAFFIC LANE OF DUMFRIES ROAD. PRIOR TO THE INTERSECTION, THE DRIVER OF VEHICLE #1 ATTEMPTED TO CHANGE LANES, WHICH CAUSED THE FRONT PASSENGER SIDE WHEEL WELL TO STRIKE THE REAR DRIVER SIDE WHEEL WELL OF VEHICLE #2. THIS CAUSED VEHICLE #2 TO LOSE CONTROL. VEHICLE #2 CONTINUED ACROSS ALL NORTHBOUND LANES OF TRAFFIC, ONTO THE MEDIAN, STRUCK A SPEED LIMIT SIGN, AND ROTATED 180 DEGREE. VEHICLE #2 CAME TO REST FACING SOTHBOUND IN THE SOUTHBOUND LANES OF DUMFRIES ROAD.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234N	234	0627 VAN BUREN ROAD	0234 DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
181345066	5/4/2018	14:00	Fri	1. Rear End	V1 STRUCK V2 WHO THEN STRUCK V3. STOP AND GO TRAFFIC. NO INJURIES.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234N	234	VAN BUREN RD	234/ VAN BUREN	property damage crash	0	0	0	0	2. No
181365198	5/11/2018	13:50	Fri	4. Sideswipe - Same Direction	B15/5209 VEHICLE 1 WAS TRAVELING NORTH ON DUMFRIES ROAD PASSING THE INTERSECTION OF VAN BUREN ROAD IN THE LEFT LANE. THE LEFT LANE WAS BLOCKED BY A DISABLED MOTORIST CAUSING TRAFFIC TO PASS ON THE RIGHT. V1 CHANGED LANES TO THE RIGHT STRIKING V2 WHICH WAS IN ALREADY POSITIONED IN THE MIDDLE LANE. BOTH VEHICLES SUSTAINED MINOR DAMAGE.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234N	234	0627 VAN BUREN ROAD	0234 DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
181455181	5/23/2018	20:00	Wed	1. Rear End	B15 5209 VEHICLE #1 WAS TRAVELING NORTH BOUND ON ROUTE 234 DUMFRIES ROAD. VEHICLE #2 WAS STOPPED AT A RED TRAFFIC LIGHT AT THE INTERSECTION OF DUMFRIES ROAD AND VAN BUREN ROAD. VEHICLE #1 WAS FOLLOWING TO CLOSEING AND HIT VEHICLE #2. VEHICLE #1 WAS CITED FOR FOLLOWING TO CLOSELY. NO ONE WAS INJURED, NO VEHICLES WERE TOWED.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234S	234	0627 VAN BUREN ROAD	0234 DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
181625115	6/7/2018	8:10	Thu	3. Head On	B15 5209 VEHICLE 1 WAS WESTBOUND ON 234 AT VAN BUREN DRIVE. VEHICLE 1 WAS TOWING A DUAL AXLE TRAILER, VIRGINIA PLATE 245149TL. THE LEFT REAR WHEEL OF THE TRAILER SEPARATED FROM THE AXLE WHILE VEHICLE 1 WAS IN MOTION, AND BEGAN TO ROLL ACROSS 234 AT A DIAGONAL ANGLE. THE WHEEL AND TIRE ROLLED INTO EASTBOUND TRAFFIC WHERE VEHICLE 2 WAS UNABLE TO AVOID IT AND STRUCK IT.	37. Equipment Failure (Tire, etc)	1. On Roadway	No Injury (O)	VA-234N	234	0627/VAN BUREN ROAD	0234/DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
182045071	7/14/2018	22:53	Sat	1. Rear End	BEAT: B15 RD: 5209 VEHICLE 2 WAS STOPPED IN THE LEFT THROUGH LANE OF WESTBOUND DUMFRIES RO AT VAN BUREN RD FOR A RED TRAFFIC SIGNAL. VEHICLE 1 WAS TRAVELING WESTBOUND ON DUMFRIES RD IN THE SAME LANE AS VEHICLE 2. IMMEDIATELY FOLLOWING THE TRAFFIC LIGHT TURNING GREEN, VEHICLE 1, WHICH FAILED TO SLOW, STRUCK THE REAR OF VEHICLE 2, PUSHING VEHICLE 2 INTO THE INTERSECTION.	20. Motor Vehicle In Transport	1. On Roadway	Non-Incapacitating Injury (B)	VA-234N	234	0627 VAN BUREN RAOD	0234 DUMFRIES ROAD	injury crash	0	0	0	2	2. No
182475159	9/2/2018	19:48	Sun	4. Sideswipe - Same Direction	B15, RD: 5209 V1 WAS TRAVELLING WESTBOUND ON DUMFRIES ROAD IN THE LEFT CENTER LANE WHEN IT CHANGED LANES ABRUPTLY, ATTEMPTING TO ENTER THE RIGHTMOST TURN AND STRAIGHTAWAY LANE. AT THIS TIME, V2 WAS TRAVELLING IN THE RIGHTMOST TURN AND STRAIGHTAWAY LANE AND COULD NOT AVOID CONTACT WITH V1, CAUSING DAMAGES.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234N	234	0627 VAN BUREN ROAD	0234 DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
183375116	11/29/2018	14:22	Thu	2. Angle	BEAT: B15 RD: 5209 VEHICLE 1 WAS ACTIVELY FLEEING FROM MARKED POLICE VEHICLES WITH THEIR EMERGENCY EQUIPMENT ACTIVATED IN THE CENTER THROUGH LANE OF EASTBOUND DUMFRIES ROAD. VEHICLE 2 WAS TRAVELING IN THE RIGHT TURN LANE, VEHICLE 3 WAS IN THE RIGHT TURN LANE OF EASTBOUND DUMFRIES ROAD, AND VEHICLE 4 WAS IN THE CENTER THROUGH LANE. VEHICLE 1 ATTEMPTED TO MAKE AN ABRUPT RIGHT TURN ONTO SOUTHBOUND VAN BUREN ROAD. VEHICLE 2 ATTEMPTED TO AVOID STRIKING VEHICLE 1 AND STRUCK VEHICLE 3 IN THE LEFT REAR CORNER WITH ITS RIGHT FRONT CORNER. IT WAS REDIRECTED LEFT AND STRUCK VEHICLE 4 IN THE RIGHT FRONT WHEEL AREA.	20. Motor Vehicle In Transport	1. On Roadway	Non-Incapacitating Injury (B)	VA-234S	234	0627 VAN BUREN ROAD	0234 DUMFRIES ROAD	injury crash	0	0	0	4	2. No
183375121	11/29/2018	14:22	Thu	2. Angle	BEAT: B15 RD: 5209 VEHICLE 1 WAS FLEEING FROM POLICE ON EASTBOUND DUMFRIES ROAD AND ATTEMPTING TO TURN RIGHT ONTO SOUTHBOUND VAN BUREN ROAD. VEHICLE 1 TOOK THE TURN FASTER THAN HIS VEHICLE COULD MANAGE AND UNDERSTEERED INTO THE DRIVER'S SIDE OF VEHICLE 2 WHO WAS STOPPED IN THE LEFT MOST TURN LANE OF NORTHBOUND VAN BUREN ROAD. VEHICLE 2 WAS FORCED REARWORD AND STRUCK VEHICLE 3 IN THE LEFT FRONT WHEEL AREA WITH ITS RIGHT REAR WHEEL AREA.	20. Motor Vehicle In Transport	1. On Roadway	Incapacitating Injury (A)	VA-234S	234	0627 VAN BUREN ROAD	0234 DUMFRIES ROAD	injury crash	0	0	0	4	2. No
183445394	12/9/2018	11:58	Sun	1. Rear End	B15 / 5209 VEH 1 WAS STOPPED IN TRAFFIC BEHIND VEH 2. TRAFFIC SIGNAL CHANGED TO GREEN AND TRAFFIC BEGAN MOVING. DRIVER OF VEH 2 TOOK FOOT OFF BRAKE BUT DID NOT BEGIN TO ACCELERATE. DRIVER OF VEH 1 ACCELERATED INTO THE REAR OF VEH 2.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234S	234	VANBUREN ROAD 0627	DUMFRIES ROAD 0234	property damage crash	0	0	0	0	2. No
190445056	2/11/2019	14:50	Mon	1. Rear End	PD190005103 B15 5209 V2 WAS AT THE INTERSECTION OF DUMFRIES ROAD AND VAN BUREN ROAD STOPPED AT A RED LIGHT. THE LIGHT CHANGED TO GREEN, AND V2 STARTED TO MOVE FORWARD AT A LOW SPEED. V1 WAS TRAVELING BEHIND V2. THE DRIVER OF V1 DID NOT NOTICE V2 WAS SLOWED DOWN BECAUSE OF THE RED LIGHT. V1 REAR ENDED V2.	20. Motor Vehicle In Transport	1. On Roadway	Non-Incapacitating Injury (B)	VA-234S	234	0627 VAN BUREN ROAD	0234 DUMFRIES ROAD	injury crash	0	0	0	2	2. No
191515103	5/24/2019	10:03	Fri	1. Rear End	B15 5209. BOTH VEHICLES WERE TRAVELLING NORTHBOUND ON RT 234DUMFRIES RD AND APPROACHED THE TRAFFIC LIGHT AT VAN BUREN ROAD. V2 (PICK-UP PULLING A TRAILER) BRAKED IN RESPONSE TO THE YELLOW/RED LIGHT. V1 IMPACTED THE REAR OF V2.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234N	234	0627 VAN BUREN RD	0234 DUMFRIES RD	property damage crash	0	0	0	0	2. No

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Document Number	Crash Date	Crash Time	Day Of Week	Collision Type	Crash Description	First Harmful Event	First Harmful Event Location	KABCO Severity Code	Route Name	Route Number	Secondary Location	Route Or Street Name	Crash Severity	Pedestrian Fatality Count	Non Pedestrian Fatality Count	Pedestrian Injury Cnt	Non Pedestrian Injury Count	Work Zone Related
191515105	5/30/2019	7:45	Thu	1. Rear End	SECTOR B/15 BEAT 5209 VEHICLE #1 WAS TRAVELING WESTBOUND ON DUMFRIES RD. APPROACHING THE INTERSECTION OF VAN BUREN RD. AT SLOW RATE OF SPEED, APPROX 5 MPH, DUE TO TRAFFIC WHEN DRIVER #1 WAS NOT PAYING ATTENTION TO THE ROAD WHEN HE STRUCK THE REAR END OF VEHICLE #2 THAT WAS STOPPED IN THE ROADWAY. DRIVER #2 COMPLAINT OF NECK PAIN AND RESCUE WAS CALLED AND LATER TRANSPORTED DRIVER #2 TO THE HOSPITAL	20. Motor Vehicle In Transport	1. On Roadway	Non-Incapacitating Injury (B)	VA-234N	234	0627/VAN BUREN ROAD	0234/DUMFRIES ROAD	injury crash	0	0	0	2	2. No
192275072	8/6/2019	7:50	Tue	2. Angle	B15, 5209 V2 WAS SITTING AT A RED SIGNAL ON VAN BUREN ROAD PREPARING TO CROSSING 234. AS THE LIGHT TURNED GREEN SHE BEGAN TO CROSS 234 WHEN V1 DISREGARDED THE RED SIGNAL CAUSING V2 TO STRIKE V1 IN THE REAR PASSENGER SIDE WHEEL. V2 SUSTAINED DAMAGE TO THE FRONT BUMPER, HOOD, AND RIGHT QUARTER PANNEL. V1 SUSTAINED DAMAGE TO THE REAR PASSANGER QUARTER PANNEL AND REAR AXLE.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	SC-627S (Prince William County)	627	0627 VAN BUREN ROAD	0324 DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
192775221	9/30/2019	15:16	Mon	1. Rear End	B15 5209 VEHICLE 1 AND VEHICLE 2 WERE TRAVELING EASTBOUND ON DUMFRIES ROAD IN THE RIGHT THROUGH LANE. VEHICLE 2 WAS STOPPED FOR A RED TRAFFIC SIGNAL AT VAN BUREN ROAD. DRIVER 1 STATED HIS CHEST STARTED TO HURT AND HE HE BEGAN TO SWEAT. HE OBSERVED THE SCHOOL BUS STOPPED AND REMEMBERS BEGINNING TO SLOW DOWN AND THEN PASSED OUT. WHEN DRIVER 1 WOKE UP THE FRONT OF HIS VEHICLE WAS UNDER THE SCHOOL BUS.	20. Motor Vehicle In Transport	1. On Roadway	Non-Incapacitating Injury (B)	VA-234S	234	0627 VAN BUREN ROAD	0234 DUMFRIES ROAD	injury crash	0	0	0	1	2. No
192805071	10/4/2019	8:46	Fri	1. Rear End	SECTOR - B15 BEAT - 5209 V1 WAS STOPPED IN TRAFFIC BEHIND V2 IN THE RIGHT MOST TRAVEL LANE ON SOUTHBOUND DUMFRIES ROAD BETWEEN VAN BUREN ROAD AND I95. TRAFFIC BEGAN TO ROLL FORWARD AT A LOW RATE OF SPEED. V1 ATTEMPTED TO MERGE RIGHT INTO THE CENTER TRAVEL LANE. WHILE DOING SO DRIVER 1 LOST CONTROL OF THE VEHICLE AND REAR ENDED V2 ON THE RIGHT REAR BUMBER, THEN CONTINUED TO ACCELERATE AND CAME TO A STOP WITH A PORTION OF THE HOOD OF V1 UNDER V2'S PASSENGER DOOR.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234S	234	627	0234 DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
192815069	10/7/2019	17:10	Mon	1. Rear End	BEAT=5209 SECTOR=B15 V2 WAS TRAVELING SOUTHBOUND ON DUMFRIES AND SLOWED DOWN DUE TO HEAVY TRAFFIC. V1 WAS ALSO TRAVELING SOUTHBOUND ON DUMFRIES ROAD, WHEN V1 FAILED TO STOP IN TIME AND REAR ENDED V2. D1 WAS CHARGED WITH FOLLOWING TOO CLOSELY. NO INJURIES.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234S	234	0627/VAN BUREN ROAD	0234/DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
192845082	10/10/2019	22:54	Thu	2. Angle	B15 5209 V2 WAS TRAVELLING SOUTHEAST ON 234S. V1 DISREGARDED THE RED LIGHT AT VAN BUREN RD. AND MADE A LEFT TURN ONTO 234S. V1 STRUCK V2 WHILE ATTEMPTING TO MAKE THE TURN IN THE INTERSECTION. THERE WERE NO INJURIES.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234S	234	0627 / VAN BUREN RD.	0234 / DUMFRIES RD.	property damage crash	0	0	0	0	2. No
193465094	12/11/2019	6:58	Wed	1. Rear End	B15 / 5209 VEHICLE 2 WAS MOVING IN SLOW TRAFFIC WESTBOUND ON DUMFRIES ROAD. VEHICLE 1 APPROACHED VEHICLE 2, APPLIED THE BRAKES AND FAILT TO AVOID STRIKING THE REAR OF VEHICLE 2. VEHICLE 1 TOWED FROM SCENE WITH AIRBAG DEPLOYMENT. NO INJURIES.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234N	234	VAN BUREN ROAD 0627	DUMFRIES ROAD 0234	property damage crash	0	0	0	0	2. No
193525086	12/15/2019	20:11	Sun	1. Rear End	BEAT: 5209 SECTOR: B15 VEHICLE 1 WAS TRAVELING WEST ON DUMFRIES ROAD APPROACHING VAN BUREN ROAD. VEHICLE 2, VEHICLE 3, AND VEHICLE 4 WERE ALL STOPPED AT THE RED SIGNAL IN THE LEFT TURN LANE TO TURN ON TO VAN BUREN ROAD. VEHICLE 1 LEFT ITS TRAVEL LANE AND STRUCK THE REAR END OF VEHICLE 2. THIS CAUSED THE FRONT BUMPER OF VEHICLE 2 TO STRIKE THE REAR BUMPER OF VEHICLE 3. THE FRONT BUMPER OF VEHICLE 3 THEN STRUCK THE REAR BUMPER OF VEHICLE 4. VEHICLE 1 THEN ROLLED OVER AND CAME TO REST FACING EAST BOND TRAFFIC. VEHICLE 1 HAD EXTENSIVE DAMAGE TO THE FRONT OF THE VEHICLE. APPROXIMATE REPAIR COST IS $8000. VEHICLE 2 HAD SIGNIFICANT DAMAGE TO THE REAR, PASSENGER SIDE, AND FRONT OF THE VEHICLE. APPROXIMATE REPAIR COST IS $8000. VEHICLE 3 HAD DAMAGE TO THE REAR AND FRONT BUMPER. APPROXIMATE REPAIR COST IS $1500. VEHICLE 4 HAD DAMAGE TO THE REAR BUMPER. APPROXIMATE REPAIR COST IS$500. THE DRIVER OF VEHICLE 1 WAS CHARGED WITH DUID (18.2-266).	20. Motor Vehicle In Transport	1. On Roadway	Non-Incapacitating Injury (B)	VA-234S	234	0627 VAN BUREN ROAD	0234 DUMFRIES ROAD	injury crash	0	0	0	4	2. No
200625046	2/18/2020	17:55	Tue	2. Angle	RDB15 B5209: AS VEHICLE 1 WAS ATTEMPTING TO MERGE INTO THE MIDDLE LANE FROM THE FAR RIGHT, VEHICLE 1 WAS NOT ABLE TO MERGE DUE TO ANOTHER VEHICLE ATTEMPTING TO MERGE INTO THE MIDDLE LANE AT THE SAME TIME. THIS CAUSED VEHICLE 1 TO QUICKLY MERGE BACK INTO THE FAR RIGHT LANE THUS STRIKING VEHICLE 2 ON THE LEFT REAR WHILE STOPPD AT A RED LIGHT.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234S	234	0627 VAN BUREN ROAD	0234 DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
201395100	5/17/2020	15:52	Sun	1. Rear End	BEAT:5209 SECTOR: B15 VEHICLE 2 AND VEHICLE 1 WERE TRAVELLING EAST BOUND ON DUMFRIES ROAD. VEHICLE 1 WAS TRAVELLING IN THE RIGHT TURN LANE. DRIVER OF THE VEHICLE 1 SUDDENLY SWITCHED LANES TO KEEP TRAVELLING EAST BOUND ON DUMFRIES ROAD AND CAME TO AN ABRUPT STOP AT YELLOW LIGHT. DRIVER OF THE VEHICLE 2 WAS UNABLE TO STOP ON TIME AND COLLIDED WITH VEHICLE 1.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234S	234	0627 VAN BUREN ROAD	0234 DUMFRIES ROAD	property damage crash	0	0	0	0	2. No
201605072	6/4/2020	12:20	Thu	4. Sideswipe - Same Direction	B15/ 5209 BOTH VEHICLE 1 AND VEHICLE 2 WERE EASTBOUND ON DUMFRIES ROAD, APPROACHING VAN BUREN DRIVE. VEHICLE 1 WAS IN CENTER THRU LANE OF TRAVEL. VEHICLE 2 WAS EASTBOUND IN LEFT MOST THRU LANE ADJACENT TO VEHICLE 1. VEHICLE 1 MADE A LANE CHANGE TO THE LEFT, STRIKING THE SIDE OF VEHICLE 2. DRIVER OF VEHICLE 1 ADMITTED SHE DID NOT SEE VEHICLE 2 PRIOR TO CHANGING LANES. NO INJURIES. BOTH VEHICLES DRIVEN FROM SCENE.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234N	234	VAN BUREN DRIVE (0627)	DUMFRIES ROAD (0234)	property damage crash	0	0	0	0	2. No
202055041	7/14/2020	21:47	Tue	2. Angle	BEAT: 5209 SECTOR: B15 VEHICLE #1 WAS TRAVELING WEST BOUND IN THE FAR LEFT LANE APPROACHING VAN BUREN RD. AS VEHICLE #1 GOT CLOSER TO VAN BUREN, THEY CHANGE LANES FROM THE FAR LEFT LANE TO THE MIDDLE LANE. VEHICLE #2 WAS SEVERAL CAR LINKS BEHIND VEHICLE #1 AND ALSO TRAVELING WEST BOUND ON DUMFRIES ROAD. DRIVER OF VEHICLE #1 ADVISED THAT THEY WERE GOING TO TURN INTO ON EOF THE RESTARAUNTS OFF OLD STAGE. THE DRIVER ADVISED THAT SHE CHECKED HER MIRROR AND DID NOT SEE ANYONE SO SHE SWITCHED LANES. VEHICLE #1 COLLIDED WITH VEHICLE #2 AT THE INTERSECTION OF DUMFRIES ROAD AND VAN BUREN. DRIVER OF VEHICLE #2 COMPLAINED OF PAIN TO HER RIGHT KNEE BUT REFUSED MEDICAL. VEHICLE #1 HAD DAMAGE TO THE FRONT BUMPER. VEHICLE #2 HAD DAMAGE TO DRIVER SIDE QUARTER PANEL, DOOR, AND REAR QUARTER PANEL.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234N	234	VAN BUREN ROAD / 0627	DUMFRIES ROAD / RT. 234	property damage crash	0	0	0	0	2. No
202095094	7/23/2020	16:21	Thu	2. Angle	BEAT: B15 SECTOR: 5209 D2 STATED THAT HE WAS TRAVELING EASTBOUND ON DUMFRIES ROAD WHEN V1 SUDDENLY BEGAN MERGING INTO HIS LANE AND ULTIMATELY STRIKING HIS VEHICLE. D2 STATED THAT THIS IMPACT CAUSED HIS VEHICLE TO ROTATE ACROSSTWO LANES OF TRAVEL AND STRIKE V3. D3 STATED THAT HE WAS ALSO TRAVELING EASTBOUND ON DUMFRIES ROAD UNTIL V2 CAME ACROSS THE ROAD STRIKING HIS VEHICLE D1 STATED THAT WHILE TRAVELING EASTBOUND ON DUMFRIES ROAD, HE ATTEMPTED TO CHANGE LANES TO HIS RIGHT AND SUDDENLY SAW V2 LOSE CONTROL IN FRONT OF HIS VEHICLE. D1 STATED THAT V2 SLID IN FRONT OF HIS TRUCK BEFORE COMING TO REST NEAR THE MEDIAN. D1 STATED THAT HE DID NOT SEE V2 WHILE ATTEMPTING TO CHANGE LANES.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	VA-234S	234	0627 / VAN BUREN ROAD	0234 / DUMFRIES ROAD	property damage crash	0	0	0	0	2. No

ATTACHMENT 8

ATTACHMENT 8

Document Number	Crash Date	Crash Time	Day Of Week	Collision Type	Crash Description	First Harmful Event	First Harmful Event Location	KABCO Severity Code	Route Name	Route Number	Secondary Location	Route Or Street Name	Crash Severity	Pedestrian Fatality Count	Non Pedestrian Fatality Count	Pedestrian Injury Cnt	Non Pedestrian Injury Count	Work Zone Related
152645292	9/19/2015	9:10	Sat	1. Rear End	B15/RD2463 VEHICLE 1 AND 2 WERE STOPPED AT A RED LIGHT, EAST BOUND, AT THE INTERSECTION OF CARDINAL DRIVE AND BENITA FITZGERALD. THE LIGHT TURNED GREEN AND THE VEHICLES STARTED TO ACCELERATE. VEHICLE 2 STOPPED ABRUBTLY BECAUSE OF A VEHICLE IN FRONT OF THEM THAT HAD A DELAYED REACTION TO THE LIGHT CHANGING GREEN. VEHICLE 1 ATTEMPTED TO STOP BUT WAS UNABLE TO AND SLIGHTLY BUMPED THE REAR OF VEHICLE 2. THERE WAS VERY LITTLE DAMAGE AND BOTH VEHICLES WERE DRIVEABLE.DRIVER OF VEHICLE 2 WAS TRANSPORTED BY MEDIC UNIT FOR COMPLAINT OF NECK/HEAD PAIN.	20. Motor Vehicle In Transport	1. On Roadway	Non-Incapacitating Injury (B)	SC-610S (Prince William County)	610	2480 BENITA FITZGERALD DRIVE	0610 CARDINAL DRIVE	injury crash	0	0	0	1	2. No
153135221	11/1/2015	18:46	Sun	10. Deer	BEAT=B15 RD=2463 VEHICLE 1 WAS TRAVELING SOUTHBOUND ON BENITA FITZGERALD DRIVE IN THE RIGHT TURN LANE APPROACHING CARDINAL DRIVE. WHILE TRAVELING AT APPROXIMTELY 30 MPH, A DEER RAN FROM A WOODED AREA ADJACENT TO THE ROADWAY AND INTO THE PATH OF VEHICLE 1, STRIKING THE FRONT AND PASSENGER SIDE OF VEHICLE 1.	23. Animal	1. On Roadway	No Injury (O)	SC-2480S (Prince William County)	2480	0610 CARDINAL DRIVE	2480 BENITA FITZGERALD DRIVE	property damage crash	0	0	0	0	2. No
160115101	1/10/2016	0:30	Sun	9. Fixed Object - Off Road	B15 / 2463 V1 ATTEMPTED TO MAKE A RIGHT HAND TURN ONTO NORTHBOUND BENITA FITZGERALD DRIVE FROM WESTBOUND CARDINAL DRIVE BUT FAILED TO NEGOTIATE THE TURN CORRECTLY. V1 MADE A VERY WIDE RIGHT HAND TURN ONTO BENITA FITZGERALD DRIVE AND IN DOING SO IT DROVE ONTO THE RAISED MEDIAN AND STRUCK A SCHOOL ZONE SPEED LIMIT SIGN RESULTING IN A CRASH.	8. Sign, Traffic Signal	3. Median	No Injury (O)	SC-2480N (Prince William County)	2480	0610 CARDINAL DRIVE	2480 BENITA FITZGERALD DRIVE	property damage crash	0	0	0	0	2. No
160265119	1/20/2016	18:59	Wed	1. Rear End	BEAT: B15 RD: 2463 V2 WAS DRIVING EASTBOUND ON CARDINAL DRIVE IN THE LEFT LANE APPROXIMATELY ONE TENTH OF A MILE PAST BENITA FITZGERALD DRIVE. V1 WAS DRIVING EASTBOUND IN THE SAME LANE BEHIND V2. V2 BEGAN TO SLOW BEFORE GOING DOWN THE HILL DUE TO SEVERE ICY CONDITIONS. V1 ATTEMPTED TO SLOW BUT SLID ON THE ICE AND STRUCK V2 FROM THE REAR.	20. Motor Vehicle In Transport	1. On Roadway	Non-Incapacitating Injury (B)	SC-610S (Prince William County)	610	2480 BENITA FITZGERALD DRIVE	0610 CARDINAL DRIVE	injury crash	0	0	0	1	2. No
160565072	2/24/2016	12:00	Wed	1. Rear End	SECTOR B15 BEAT 2463 VEHICLE #2 WAS AT THE INTERSECTION OF BENITA FITZGERALD DRIVE AT CARDINAL DRIVE STOPPED IN THE RIGHT TURN LANE DUE TO A RED LIGHT. VEHICLE #1 PROCEEDED THAN STOPPED ABRUPTLY DUE TO TO TRAFFIC COMING WESTBOUND WHEN VEHICLE #1 COLLIDED TO THE REAR OF VEHICLE #2.	20. Motor Vehicle In Transport	1. On Roadway	Non-Incapacitating Injury (B)	SC-2480S (Prince William County)	2480	0610 CARDINAL DRIVE	2480 BENITA FITZGERALD DRIVE	injury crash	0	0	0	1	2. No
161325057	5/10/2016	19:22	Tue	1. Rear End	B15 RD2463 V2 WAS STOPPED IN TRAFFIC AT THE INTERSECTION OF CARDINAL DRIVE AT VAN BUREN ROAD. V1 CAME FROM BEHIND AND WAS UNABLE TO STOP IN TIME MAKING CONTACT WITH THE REAR END OF V2.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	SC-610S (Prince William County)	610	0627 VAN BUREN ROAD	0610 CARDINAL DRIVE	property damage crash	0	0	0	0	2. No
161555089	5/27/2016	11:56	Fri	2. Angle	SECTOR B15 BEAT 2463 VEHICLE #2 PROCEEDED FROM THE INTERSECTION OF VAN BUREN ROAD TO CARDINAL DRIVE AND WAS MAKING A LEFT TURN ONTO CARDINAL DRIVE. VEHICLE # 1 WAS TRAVELING SOUTHBOUND ON BENITA FITZGERALD DRIVE TO VAN BUREN ROAD AND ENTERED THE INTERSECTION STRIKING VEHICLE #2 AS IT WAS TURNING.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	SC-610N (Prince William County)	610	2480 BENITA FITZGERALD DRIVE	0610 CARDINAL DRIVE	property damage crash	0	0	0	0	2. No
163335130	11/18/2016	5:57	Fri	2. Angle	BEAT: B15 RD: 2463 VEHICLE 1 WAS TRAVELING IN THE RIGHT THROUGH LANE OF WESTBOUND CARDINAL DRIVE APPROACHING THE INTERSECTION WITH BENITA FITZGERALD DRIVE. VEHICLE 2 WAS IN THE OUTSIDE LEFT TURN LANE OF EASTBOUND CARDINAL DRIVE APPROACHING THE INTERSECTION WITH BENITA FITZGERALD DRIVE. BOTH DRIVERS ASSERTED THEY RECEIVED A GREEN SIGNAL AND ENTERED THE INTERSECTION. VEHICLES 1 AND 2 COLLIDED IN THE INTERSECTION. VEHICLE 1 ROTATED CLOCKWISE AND STRUCK VEHICLE 3 AS IT WAS STOPPED IN THE OUTSIDE LEFT TURN LANE OF SOUTHBOUND BENITA FITZGERALD DRIVE AT THE INTERSECTION.	20. Motor Vehicle In Transport	1. On Roadway	Non-Incapacitating Injury (B)	SC-610N (Prince William County)	610	2480 BENITA FITZGERALD DRIVE	0610 CARDINAL DRIVE	injury crash	0	0	0	4	2. No
171155235	3/8/2017	20:35	Wed	2. Angle	B15 2500 VEHICLE 1 WAS IN THE LEFT TURN LANE ON CARDINAL DRIVE TO TAKE A LEFT ONTO BONITA FITZGERALD, THEN SUDDENLY SWERVED ACROSS ALL LANES OF TRAFFIC TO TAKE A RIGHT ONTO VAN BUREN ROAD. VEHICLE 2 WAS TRAVELING STRAIGHT ON CARDINAL DRIVE AND WAS IN RIGHT MOST TRAVEL LANE WHEN VEHICLE 1 CROSSED INTO THE PATHWAY OF VECHILE 2 CAUSING A CRASH. DRIVER 1 ADMITTED TO FAULT AND WAS CITED FOR RECKLESS.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	SC-610S (Prince William County)	610	0627 VAN BUREN ROAD	0610 CARDINAL DRIVE	property damage crash	0	0	0	0	2. No
180165313	12/4/2017	17:25	Mon	1. Rear End	B15, 2502 V2 WAS TRAVELING EAST ON CARDINAL DRIVE STOPPED AT THE INTERSECTION OF VAN BUREN ROAD FOR A RED LIGHT. V1 WAS TRAVELING EAST ON CARDINAL DRIVE BEHIND V2. V1 DID NOT STOP IN TIME AND REAR ENDED V2. I COULD NOT DETERMINE WHO WAS AT FAULT AND A SUMMONS WAS NOT ISSUED IN THIS CRASH.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	SC-610S (Prince William County)	610	0627 / VAN BUREN ROAD	0610 / CARDINAL DRIVE	property damage crash	0	0	0	0	2. No
181975095	7/11/2018	15:30	Wed	2. Angle	B15----2502 VEHICLE 1 WAS TRAVELING EASTBOUND ON CARDINAL DRIVE WHEN THE DRIVER VIOLATED THE RED SIGNAL AT THE CARDINAL DRIVE AT VAN BUREN INTERSECTION. VEHICLE 2 WAS TRAVELING SOUTHBOUND ON BENITA FITZGERALD DRIVE AND HAD A GREEN SIGNAL. HE WAS CROSSING THE INTERSECTION IN ORDER TO CONTINUE ONTO VAN BUREN ROAD. VEHICLE 1 COLLIDED DIRECTLY INTO VEHICLE 2 WITHIN THE INTERSECTION DUE TO VIOLATING THE RED SIGNAL	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	SC-610S (Prince William County)	610	0627 VAN BUREN ROAD	0610 CARDINAL DRIVE	property damage crash	0	0	0	0	2. No
182225179	8/3/2018	15:10	Fri	1. Rear End	B15 2502 VEHICLE 2 WAS STOPPED IN THE WESTBOUND RIGHT THROUGH LANE OF CARDINAL ROAD FOR THE RED SIGNAL WITH BENITA FITZGERALD DRIVE. VEHICLE 1 WAS TRAVELING WESTBOUND ON CARDINAL ROAD APPROACHING THE RED SIGNAL TO BENIT FITZGERALD DRIVE. VEHICLE 1 FAILED TO STOP BEFORE CRASHING INTO THE REAR OF VEHICLE 2.	20. Motor Vehicle In Transport	1. On Roadway	Non-Incapacitating Injury (B)	SC-610N (Prince William County)	610	2480 BENITA FITZGERALD DRIVE	0610 CARDINAL ROAD	injury crash	0	0	0	1	2. No
190465060	2/13/2019	7:40	Wed	16. Other	B15 / 2502 ON 02/13/2019 VEHICLE 2 WAS TRAVELLING NORTHBOUND ON VAN BUREN ROAD CROSSING OVER CARDINAL DRIVE TO BENITA FITZGERLAD DRIVE WITH A GREEN LIGHT. VEHICLE 1 WAS TRAVELLING EASTBOUND ON CARDINAL DRIVE AND HAD A RED LIGHT BUT PROCEEDED INTO THE INTERSECTION AT APPROXIMATELY 45 MPH. VEHICLE 1 STRUCK VEHICLE 2 ON THE FRONT DRIVER SIDE AND CONTINUED TO TRAVEL EAST ON CARDINAL DRIVE TOWARD JEFFERSON DAVIS HIGHWAY. VEHICLE 2 SPUN COMPLETELY AROUND AND STOPPED ON THE SIDEWALK AT VAN BUREN ROAD WITH HEAVY FRONT END DAMAGE. DRIVER 2 SUSTAINED MINOR INJURIES AND WAS TREATED ONSCENE. ON 2/18/2019 I LOCATED THE DRIVER AND VEHICLE AND HE ADMITTED HIS ROLE AND FLEEING. INFORMATION UPDATED IN REPORT.	20. Motor Vehicle In Transport	1. On Roadway	Non-Incapacitating Injury (B)	SC-610S (Prince William County)	610	2480 BENITA FITZGERLAD DRIVE	0610 CARDINAL DRIVE	injury crash	0	0	0	1	2. No
192035066	7/12/2019	19:26	Fri	2. Angle	BEAT:2502 SECTOR:B15 V1 WAS TRAVELLING SOUTHBOUND ON BENITA FITZGERALD IN THE LEFT THROUGH LANE WHEN IT ATTEMPTED TO TURN RIGHT GOING WESTBOUND ON CARDINAL DRIVE WHEN IT STRUCK THE MEDIAN/SIGN THEN STRUCK V2 IN THE DRIVERS DOOR THEN STRUCK V3 IN THE FRONT BUMPER WHERE IT CAME TO REST. BOTH V2 AND V3 WERE AT A STOP IN THE LEFT TURN LANE ON CARDINAL DR WHEN THEY WERE STRUCK.	8. Sign, Traffic Signal	1. On Roadway	No Injury (O)	SC-610S (Prince William County)	610	2480 BENITA FITZGERALD DRIVE	0610 CARDINAL DRIVE	property damage crash	0	0	0	0	2. No

ATTACHMENT 8

Document Number	Crash Date	Crash Time	Day Of Week	Collision Type	Crash Description	First Harmful Event	First Harmful Event Location	KABCO Severity Code	Route Name	Route Number	Secondary Location	Route Or Street Name	Crash Severity	Pedestrian Fatality Count	Non Pedestrian Fatality Count	Pedestrian Injury Cnt	Non Pedestrian Injury Count	Work Zone Related
192815222	10/2/2019	11:16	Wed	1. Rear End	SECTOR 11 BEAT 2502 VEHICLE 1 WAS DRIVING NORTH ON BENITA FITZGERALD DRIVE. VEHICLE 2 WAS DRIVING BEHIND V1. DRIVER 1 APPLIED THE BREAKS TO AVOID A THIRD VEHICLE THAT WAS DRIVING OUT OF THE ELENTARY SCHOOL CAUSING V2 TO REAR END V1. DUE TO THIRD DRIVER NOT BEING ON SCENE AND NOT BEING ABLE TO DETERMINE DRIVER AT FAULT, NO CITATIONS ISSUED. DAMAGE TO BOTH VEHICLES IS ESTIMATED AT 3500. NO BODLY INJURY.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	SC-2480S (Prince William County)	2480	BENITA FITZGERALD DRIVE (2480)	BENITA FITZGERALD (2480)	property damage crash	0	0	0	0	2. No
192815301	10/7/2019	14:30	Mon	1. Rear End	BEAT 2502 / SECTOR B15 V2 WAS TRAVELING ON THE LEFT THROUGH LANE ON CARDINAL DR APPROACHING VAN BUREN RD, WESTBOUND. V1 WAS BEHIND V2. V2 WAS SLOWING DOWN FOR A RED LIGHT. V1 WAS UNABLE TO STOP ON TIME A STRUCK V2 FROM THE REAR. V1 SUSTAINED DAMAGES TO ITS FRONT BUMPER AND ENGINE. V2 SUSTAINED DAMAGES TO THE REAR FRAME, BUMPER, AND HITCH.	20. Motor Vehicle In Transport	1. On Roadway	No Injury (O)	SC-610N (Prince William County)	610	0627 VAN BUREN ROAD	0610 CARDINAL ROAD	property damage crash	0	0	0	0	2. No
201955076	7/9/2020	23:28	Thu	9. Fixed Object - Off Road	B15 2502 V1 WAS TRAVELLING NORTH ON CARDINAL DRIVE IN THE RIGHT THROUGH LANE AT 60 MILES PER HOUR, APPROACHING THE INTERSECTION WITH BENITA FITZGERALD DRIVE. JUST PRIOR TO THE INTERSECTION, AN ANIMAL JUMPED OUT IN FRONT OF V1. V1 SWERVED TO THE RIGHT TO AVOID STRIKING THE ANIMAL, CAUSING V1 TO COLLIDE WITH A MEDIAN / ONE-WAY SIGN POLE ON THE MEDIAN AT THE END OF BENITA FITZGERALD DRIVE. THE SIGN POLE, AS WELL AS THE TWO SIGNS, WERE THROWN TO THE SHOULDER OF BENITA FITZGERALD DRIVE. V1 CAME TO A REST ON THE SHOULDER OF BENITA FITZGERALD DRIVE. THE SIGNS WERE NOT DAMAGED, BUT THE SIGN POLE WAS DAMAGED.	8. Sign, Traffic Signal	3. Median	No Injury (O)	SC-610N (Prince William County)	610	2480 BENITA FITZGERAL DRIVE	610 CARDINAL DRIVE	property damage crash	0	0	0	0	2. No
202555067	9/7/2020	15:08	Mon	2. Angle	SECTOR:B15 BEAT:2502 V1 WAS TRAVELING NORTH ON VAN BUREN RD ATTEMPTING TO MAKE A RIGHT ONTO CARDINAL DR. V1 DRIVER WAS TEXTING AND DID NOT STOP AT THE RED SIGNAL STRICKING V2 WHO WAS TRAVELING EAST ON CARDINAL DR. V2 CAME TO REST IN THE MEDIAN OF CARDINAL DR. V1 CONTINUED OVER THE MEDIAN STRICKING V3 WHICH WAS STOPPED AT THE INTERSECTION. V1 THEN STRUCK V4 WHERE V1 CAME TO REST. V4 WAS ALSO STOPPED AT THE INTERSECTION. V1 DRIVER WAS TRANSPORTED TO THE HOSPITAL WITH A POSSIBLE BROKEN ARM. V3 PASSENGER ALSO WENT TO THE HOSPITAL AS PERCAUTION.	20. Motor Vehicle In Transport	1. On Roadway	Non-Incapacitating Injury (B)	SC-610S (Prince William County)	610	0627/ VAN BUREN RD	0610/CARDINAL DR	injury crash	0	0	0	2	2. No

ATTACHMENT 8

Inputs

1. Purpose of A	3-Scenario: Existing, Interim & Design		
1a. Period:	24-hour		
1b. Segment L	1		
2. Is the Analy	Yes		
2a. Does it Rer	Yes		
3. Analysis Fac	Van Buren Road		
3a. Area Type	Suburban		
4. Project Title	Van Buren Road Extension		
4a. Analysis Se	Dumfries Road (Route 234)		
4b. Facility Dir	North-South		
4c. Analysis Se	Cardinal Drive		
4d. Reverse D	No		
5. VDOT Distri	Northern_Virginia		
5a. Jurisdictior	Prince William Co		
5b. Terrain:	Level		
6. Name/ Year	Existing|2020	Interim|2025	Design|2040
7. Analysis Fac	Local	Major Collecto	Major Collector with PS>35 mph
8. Facility Cros	Undivided	Divided	Divided
9. Posted Spee	25	45	45
11. Number of	1|1	2|2	2|2
12. Lane Widtl	12	12	12
13. Shoulder V	0|2.0	0|2.0	0|2.0
14. Access Der	3	3	3
15. Analysis Se	2	2	2
16. Average C\	140	140	140
17. Average G	13	30	30
18. Signal Coo	No Coordinati	No Coordinati	No Coordination
Note	NA		
19. Volume-De	BPR Model (Noise Study)		
20. Truck Inpu	Daily		
20a. Daily (%):	2	2	2
21. Eastbound	3200	10240	11180
21a. Is No-buil	Yes	3300	3300
22. Interim & I	1. Demand Speed & Volume		
22a. Is Current	No		
22b. User Initi	WFJ		
23. Apply Exist	Yes		
23b. Apply Exi	Yes		

25. K & D factors, Truck Data and Existing Speed:

Starting Time	K-factor	D-factor	A bound % Tru	A bound % Tru	B bound % Tru	B bound % Tru	A bound Existi	B bound Existi	Interim year K	Desgin year K-	Interim year D	Desgin year D-	Interim Truck	Design Truck
0:00	0.00501	0.37243	0.00748	0.0405	0.02792	0.06751	42.50033234	46.05677975	0.00501	0.00501	0.37243	0.37243	0.02792	0.06751
1:00	0.00296	0.49045	0.01882	0.09908	0.04611	0.06671	43.08981597	45.93922576	0.00296	0.00296	0.49045	0.49045	0.04611	0.06671
2:00	0.00198	0.45725	0.06539	0.0883	0.05722	0.09588	42.54753795	45.06034328	0.00198	0.00198	0.45725	0.45725	0.05722	0.09588
3:00	0.00236	0.54617	0.05242	0.02116	0.07901	0.04236	44.23624752	45.06901366	0.00236	0.00236	0.54617	0.54617	0.07901	0.04236
4:00	0.0055	0.62041	0.05219	0.00288	0.06033	0.03419	45.10601879	44.33261999	0.0055	0.0055	0.62041	0.62041	0.06033	0.03419
5:00	0.02257	0.76997	0.05537	0.0142	0.04331	0.02263	45.02243042	44.44905492	0.02257	0.02257	0.76997	0.76997	0.04331	0.02263
6:00	0.05524	0.82379	0.03023	0.02293	0.06003	0.02382	40.662329	44.14581115	0.05524	0.05524	0.82379	0.82379	0.06003	0.02382
7:00	0.06855	0.77913	0.02409	0.02728	0.04921	0.02139	38.44252577	43.92053519	0.06855	0.06855	0.77913	0.77913	0.04921	0.02139
8:00	0.07071	0.76567	0.02631	0.02546	0.0418	0.02222	38.37532059	44.10739941	0.07071	0.07071	0.76567	0.76567	0.0418	0.02222
9:00	0.06177	0.7015	0.0348	0.02924	0.04428	0.02498	39.35967618	43.83986856	0.06177	0.06177	0.7015	0.7015	0.04428	0.02498
10:00	0.04553	0.56878	0.03494	0.02778	0.04195	0.02761	39.93951711	44.05846412	0.04553	0.04553	0.56878	0.56878	0.04195	0.02761
11:00	0.04503	0.49601	0.03463	0.02767	0.04088	0.02399	40.79318379	43.71967583	0.04503	0.04503	0.49601	0.49601	0.04088	0.02399
12:00	0.0484	0.47072	0.03304	0.02425	0.04172	0.02476	40.33874685	43.8052175	0.0484	0.0484	0.47072	0.47072	0.04172	0.02476
13:00	0.04994	0.40291	0.03637	0.02213	0.0374	0.02415	40.7451487	43.31894765	0.04994	0.04994	0.40291	0.40291	0.0374	0.02415
14:00	0.05317	0.36011	0.03367	0.02736	0.03192	0.02747	41.14091109	40.52004238	0.05317	0.05317	0.36011	0.36011	0.03192	0.02747
15:00	0.06968	0.29257	0.03698	0.01919	0.0277	0.02837	41.8846445	36.04119057	0.06968	0.06968	0.29257	0.29257	0.0277	0.02837
16:00	0.07564	0.29375	0.02747	0.01646	0.02058	0.02236	41.91819385	30.88208996	0.07564	0.07564	0.29375	0.29375	0.02058	0.02236
17:00	0.07787	0.32949	0.02894	0.01108	0.0169	0.02526	41.82341587	31.195653	0.07787	0.07787	0.32949	0.32949	0.0169	0.02526
18:00	0.07629	0.34077	0.02142	0.01094	0.01539	0.01645	41.7915316	32.16497003	0.07629	0.07629	0.34077	0.34077	0.01539	0.01645
19:00	0.05779	0.39854	0.01995	0.01203	0.01755	0.01086	41.16505151	44.18901931	0.05779	0.05779	0.39854	0.39854	0.01755	0.01086
20:00	0.04364	0.41567	0.02142	0.00953	0.01692	0.01151	42.00853909	44.31156776	0.04364	0.04364	0.41567	0.41567	0.01692	0.01151
21:00	0.02959	0.43332	0.01484	0.00759	0.00866	0.00791	42.81982592	45.44042807	0.02959	0.02959	0.43332	0.43332	0.00866	0.00791
22:00	0.0197	0.43951	0.01009	0.01173	0.01095	0.02812	42.97062999	44.67890526	0.0197	0.0197	0.43951	0.43951	0.01095	0.02812
23:00	0.01108	0.4425	0.0095	0.02387	0.01366	0.02306	42.63698148	45.31084249	0.01108	0.01108	0.4425	0.4425	0.01366	0.02306

Output Variab Output
Analysis Facili Van Buren Road
Analysis Segm Dumfries Road (Route 234)
Analysis Segm Cardinal Drive
Analysis Facili Local
Median Type I Undivided
Analysis Facili Major Collector with PS>35 mph
Median Type I Divided
Analysis Facili Major Collector with PS>35 mph
Median Type I Divided

Starting Time	EX Northboun	EX Southboun	NBLD Northbc	NBLD Southbc	BLD Northbou	BLD Southbou	EX (N/A) TRK 2	EX (N/A) TRK 3	EX(Dir 1: N/A)	EX(Dir 1: N/A)	EX Northboun	EX Southboun
0:00	13	18	13	19	46	64					13	18
1:00	0	0	0	0	0	0					0	0
2:00	0	0	0	0	0	0					0	0
3:00	0	0	0	0	0	0					0	0
4:00	13	18	14	18	48	63					13	18
5:00	27	36	28	37	96	127					27	36
6:00	39	56	40	58	137	197					39	56
7:00	51	76	52	79	178	268					50	75
8:00	62	97	64	100	218	340					61	96
9:00	62	97	64	100	218	340					61	96
10:00	62	97	64	100	218	340					61	96
11:00	64	96	66	99	223	335					63	94
12:00	78	113	81	116	275	395					77	111
13:00	94	129	97	133	328	453					92	127
14:00	96	127	99	131	336	446					94	125
15:00	98	125	101	129	344	438					97	123
16:00	117	138	121	142	411	482					115	135
17:00	120	135	124	139	420	474					118	133
18:00	120	135	124	139	420	474					118	133
19:00	103	120	106	124	359	422					101	119
20:00	72	88	74	90	251	307					71	86
21:00	42	53	43	55	147	187					41	53
22:00	27	36	28	37	96	127					27	36
23:00	13	18	14	18	48	63					13	18

NBLD Northbc	NBLD Southbc	BLD Northbou	BLD Southbou	EX Northboun	EX Southboun	NBLD Northbc	NBLD Southbc	BLD Northbou	BLD Southbou	EX Northboun	EX Southboun	NBLD Northbc
14	19	46	64	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
14	18	47	62	0	0	0	0	0	0	0	0	0
28	37	94	125	0	0	0	0	1	1	0	0	0
40	57	135	194	0	0	0	0	1	1	1	1	1
52	78	175	263	0	1	0	1	1	2	1	1	1
63	99	214	334	0	1	0	1	1	2	1	1	1
63	99	214	334	0	1	0	1	1	2	1	1	1
63	99	214	334	0	1	0	1	1	2	1	1	1
65	97	219	329	0	1	0	1	1	2	1	1	1
80	114	270	388	1	1	1	1	2	3	1	2	1
95	131	322	445	1	1	1	1	2	3	1	2	1
97	129	330	437	1	1	1	1	2	3	1	2	1
100	127	337	429	1	1	1	1	2	3	1	2	1
119	140	403	473	1	1	1	1	3	3	2	2	2
122	137	412	465	1	1	1	1	3	3	2	2	2
122	137	412	465	1	1	1	1	3	3	2	2	2
104	122	353	414	1	1	1	1	2	3	1	2	1
73	89	247	301	0	1	0	1	2	2	1	1	1
43	54	145	184	0	0	0	0	1	1	1	1	1
28	37	94	125	0	0	0	0	1	1	0	0	0
14	18	47	62	0	0	0	0	0	0	0	0	0

NBLD Southbc	BLD Northbou	BLD Southbou	EX Northboun	EX Southboun	NBLD Northbc	NBLD Southbc	BLD Northbou	BLD Southbou	EX 2-way SPEE	NBLD 2-way S	BLD 2-way SPEED
0	1	1	71	46			71				
0	0	0	71	46			71				
0	0	0	71	45			71				
0	0	0	71	45			71				
0	1	1	71	44			71				
1	1	2	71	44			71		31		
1	2	3	71	44			71		39		
1	2	4	71	44			71		48		
1	3	5	71	44			71		50		
1	3	5	71	44			71		43		
1	3	5	71	44			71		64		
1	3	4	71	44			71		63		
2	4	5	71	44			71		34		
2	4	6	71	43			71		34		
2	4	6	71	41			71		34		
2	5	6	71	36			71		40		
2	5	6	71	31			71		37		
2	6	6	71	31			71		38		
2	6	6	71	32			71		39		
2	5	6	71	44			71		40		
1	3	4	71	44			71		61		
1	2	3	71	45			71		42		
1	1	2	71	45			71		28		
0	1	1	71	45			71				