

## TRAFFIC IMPACT ANALYSIS

for

## THE OAKS III

Rezoning

Prince William County, Virginia

prepared for:

Clipper II Associates, L.P.

P.O. Box 833 Lancaster, Virginia 22503 202/288-1389

prepared by:

Vernon E. Torney
President
VETTRA Company
703/590-4932

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#### **EXECUTIVE SUMMARY**

This Traffic Impact Analysis (TIA) examined the expected traffic impact of the proposed 3.2755-acre "The Oaks III" (site) office project upon the future area road network. The "site", located at the northwest quadrant of Old Bridge Rd. (Rt.641) and Tanyard Hill Rd. (Rt.2100) in eastern Prince William County, is under a Rezoning application to O(L) on 3.2755 acres for commercial use (low-rise general office building).

This TIA analyzed "worst-case" future (Year 2013) AM and PM peak hour traffic conditions at three (3) key intersections (one existing plus two future) along Old Bridge Rd. and Tanyard Hill Road. Proposed "worst-case" land uses and associated traffic for The Oaks III "site", as well as for ambient traffic growth, were included within the analyses. Traffic impact was determined by comparing, via standard intersection capacity analyses, the future "background" (without site-generated traffic) and future "total" (with site traffic) intersection conditions. Daily traffic (VPD) volumes were also provided for the roadway sections adjacent to the proposed commercial site. All scope, methodology, and assumption parameters within this TIA are in strict adherence to those originally set by County & VDOT staff in a June 2, 2010 scoping meeting and affirmed in a June 21, 2010 revised final scoping package.

Existing intersection analyses (utilizing the Synchro analysis package) show that the analyzed <u>umsignalized</u> (stop-controlled) intersection of Old Bridge Rd./Tanyard Hill Rd. currently operates at an "excellent" (LOS=A) Level Of Service during the AM peak hour (6:30-7:30am), but at a "poor/failing" (LOS=E) during the PM peak hour (4:30-5:30pm).

Assuming no nearby "other" developments and no improvements to the area roadway network, Yr. 2013 "Background" (without site traffic) intersection capacity analyses indicate the same (as existing) AM peak hour Levels Of Service condition (LOS=A) with increased delays at the <u>unsignalized</u> Old Bridge Rd./Tanyard Hill Rd. intersection. However, the PM peak hour LOS will further worsen (from existing LOS=E) to a "very poor/failing" condition (LOS=F). These changes are due to the increased ambient "background" (grown) traffic.

The Oaks III "site" is proposed to utilize two (2) access points: 1) a "Right In only" entrance along Old Bridge Rd. west of Tanyard Hill Rd., and 2) a "Full access" entrance along Tanyard Hill Rd. north of Old Bridge Rd. and Herndon Drive. Both site entrances will operate as <u>unsignalized 3-leg</u> ("T") intersections. No functional interparcel accesses are proposed. As a "worst-case" scenario, The Oaks III "site" (32,500 gross square foot General Office building) is expected to generate 561 vehicle-trips (382 vehicles visiting the site) per day with 76 AM peak hour and 115 PM peak hour trips. No internal or pass-by trip discounts have been utilized.

Future Year 2013 "Total" (with site traffic) intersection analyses reveal that with the addition of "site" traffic, all three (3) key intersections analyzed as part of this TIA will remain at "background" Levels Of Service or operate at "acceptable" Levels Of Service. With "site" traffic, the unsignalized Old Bridge Rd./Tanyard Hill Rd. intersection will continue to operate at "excellent" LOS=A Level Of Service in the AM peak hour and at "very poor/failing" LOS=F conditions in the PM peak hour. Both of the new unsignalized (stop-controlled) Site Entrances (on Old Bridge Rd. and on Tanyard Hill Rd.) will operate at "excellent" (LOS=A) Levels Of Service during both the AM & PM peak hours.

Incremental impact analysis (comparing "background" vs. "total" Levels Of Service), reveals that the addition of site traffic will <u>not</u> cause any significant traffic impact at the three (3) <u>umsignalized</u> intersections along Old Bridge Rd. (Rt.641) and Tanyard Hill Rd. (Rt.2100). All intersections will remain at "background" levels or operate at "excellent" Levels Of Service. Thus, no traffic impact is indicated and no impact "mitigation measures" (improvements) are warranted or recommended.

Based upon the assumed "scoped" parameters, the analytical evaluations and comparisons within this TIA have shown that the proposed development of "The Oaks III" commercial project will not significantly impact the area network and can be easily accommodated within the future road network.

#### INTRODUCTION

## **Scope Of Study**

This Traffic Impact Analysis (TIA) examined the expected traffic impact of the proposed 3.2755-acre "The Oaks III" (site) office project upon the future area road network. The "site", located at the northwest quadrant of Old Bridge Rd. (Rt.641) and Tanyard Hill Rd. (Rt.2100) in eastern Prince William County, is under a Rezoning application to O(L) on 3.2755 acres for commercial use (low-rise general office building) -- see **Figure 1** for the site location.

This TIA analyzed "worst-case" future (Year 2013) AM and PM peak hour traffic conditions at three (3) key intersections (one existing plus two future) along Old Bridge Rd. and Tanyard Hill Road. Proposed "worst-case" land uses and associated traffic for The Oaks III "site", as well as for ambient traffic growth, were included within the analyses. Traffic impact was determined by comparing, via standard intersection capacity analyses, the future "background" (without sitegenerated traffic) and future "total" (with site traffic) intersection conditions.

Daily traffic (VPD) volumes were also provided for the roadway sections adjacent to the proposed commercial site. All scope, methodology, and assumption parameters within this TIA are in strict adherence to those originally set by County & VDOT staff in a June 2, 2010 scoping meeting and affirmed in a June 21, 2010 revised final scoping package -- see **Appendix A** for the final scoping documents.

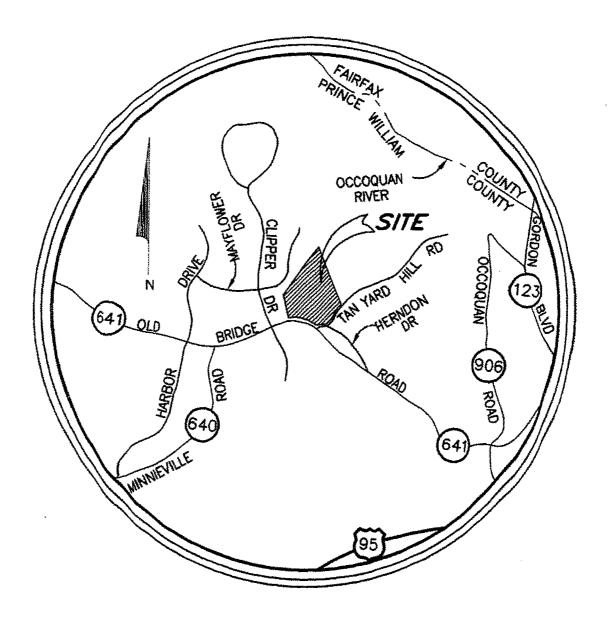
## Methodology

The AM/PM peak hour analyses and evaluations of all signalized and <u>un</u>signalized intersections are in accordance with <u>2000 Highway Capacity Manual (HCM)</u> methodology (acceptable @ LOS "D") utilizing the Synchro (version 6) software package. All weekday trip generation rates are based on the <u>ITE Trip Generation Manual (8th Edition) -- 2008</u>. Future trip distributions are based on expected traffic patterns/distributions provided by the applicant with empirical data from adjacent office buildings.

#### **Assumptions**

The following general assumptions, agreed by County & VDOT staff at and after the scoping meeting, are incorporated within this study (see **Appendix A** for more detail):

- Non-phased development: commercial (32,500 gsf gen. office bldg.) -- Rezoning
- Non-527 TIA
- One (1) site buildout year Yr. 2013
- Assume two (2) future site access points (entrances):
  - -- a full-access (all movements) T intersection on Tanyard Hill Rd. (Rt.2100)
  - -- a "Right-in" movement only entrance on Old Bridge Rd. (Rt.641)
- Two (2) weekday classified commuter AM (6-9am) & PM (4-7pm) peak period movement traffic counts to be collected at following intersection:
  - 1) Old Bridge Rd./Tanyard Hill Rd.
- Two (2) weekday 24-hour traffic counts to be collected at following roads (links):
  - 1) Tanyard Hill Rd. (along site frontage)
  - 2) Herndon Dr. (just east of Tanyard Hill Rd.)
- Existing (2010) & 2013 "Background" AM & PM pk. Hr. Synchro 6 LOS int. analyses at:
  - 1) Old Bridge Rd./Tanyard Hill Rd. -- (unsignalized) -- stop-controlled side street



Source: BC Consultants, June 2010.

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N		FIGURE
lacktriangle	Site Location	1
No Scale		

- Assume following annual "growth" rates (compounded to buildout year "background/total"):
  -- 2% per annum growth rate for all roads
- No (0) "other" area developments to be included in "background/total" traffic conditions
- No public or private transportation improvements assumed in study area
- Utilize traffic distributions for "site" as follows:
  - 65% to/from east via Old Bridge Rd. (60% to "RI only" ent.; 5% to Tanyard Hill ent.)
  - 33% to/from west via Old Bridge Rd. (all into Tanyard Hill Rd. ent. due to no U-turns)
  - 2% (minimum 1 veh.) to/from north via Tanyard Hill Rd. (all into Tanyard Hill ent.)
- Utilize 8<sup>th</sup> Edition ITE Trip Generation rates:
  - -- ITE Land Use Code 710 (fitted curve equation rates)
- One (1) "background" & "total" road network scenario to be tested (same as existing)
- Yr. 2013 "Total" (with site traffic) AM & PM pk. hr. Synchro 6 LOS int. analyses at:
  - 1) Old Bridge Rd./Tanyard Hill Rd. -- (unsignalized) stop-controlled side street
  - 2) Tanyard Hill Rd./Main Site Entrance -- (unsignalized) -- stop-controlled side street
  - 3) Old Bridge Rd./"Right In only" entrance
- No road links to be analyzed (only counted)
- Maintain "minimum acceptable" intersection LOS=D Level Of Service
- Utilize latest Synchro v.6 w/defaults (use field-collected PHF & heavy veh. %)
- Provide Yr.2013 "Total" Synchro 95% BOQ "Queuing Analyses" to determine adequacy of lane lengths at all analyzed intersections/entrances
- Provide Yr.2013 "Total" "Right Turn Lane Warrant" Analysis (VDOT method) for Old Bridge Rd./Right-in only entrance & Tanyard Hill Rd./Full access Site Entrance
- Provide existing intersection distances & turn lane lengths on GDP exhibit in TIA
- Provide three (3) final non-527 TIA's to County (1 of which goes to VDOT) w/CD's

#### **EXISTING 2010 TRAFFIC CONDITIONS**

#### Area Roadway Network

The study area, as outlined by County & VDOT staff at the scoping meeting, includes Old Bridge Rd. (Rt.641) and Tanyard Hill Rd. (Rt.2100). Brief descriptions of the roads with the study area follow:

- Old Bridge Rd. (Rt.641): Within the vicinity, Old Bridge Rd. is currently a six (6) lane, divided principal arterial traversing in a predominant east-west direction between Prince William Parkway several miles to the west and Rt.123 to the east. It currently has 12-foot travel lanes on curb and gutter section with good-to-excellent geometrics. Within the study area, this road has a 45 mph posted speed limit. The latest (2008) VDOT-published ADT count for this road within the study area is 49,000-52,000 vehicles per day.
- Old Bridge Rd. connecting with the Town of Occoquan. Along the section of Tanyard Hill Rd. along the "site" frontage, this paved roadway exhibits fair to good geometrics with 11-foot lanes and 1-2 foot gravel shoulders on an approximate 6-foot ditch section. The road has a posted speed limit of 25 mph. Current 24-hour traffic counts conducted by VETTRA Company show 4,495 vehicles per day see count printouts in **Appendix B**.

## **Existing 2010 Intersection Traffic Volumes**

Existing AM and PM peak period "intersection turn movement" counts were conducted by VETTRA Company personnel on Tuesday, June 8, 2010 (while County schools were still in full session) for the existing Old Bridge Rd./Tanyard Hill Rd. intersection in the study area -- see **Appendix B** for the AM/PM "intersection turn movement" count data. The AM peak hour was measured to occur from 6:30am to 7:30 am and the PM peak hour occurred 4:30-5:30pm. **Figure** 2 presents the Existing 2010 AM/PM Peak Hour Turn Movement Volumes. The latest (2008) published VDOT 24-hour count along the section of Old Bridge Rd. along the proposed site frontage is 52,000 vehicles per day (vpd). Actual 24-hour counts on June 8, 2010 by VETTRA Company for Tanyard Hill Rd. and Herndon Dr. show 4,495 VPD (vehicles per day) and 92 VPD, respectively -- (see printouts in **Appendix B**).

## **Existing 2010 Intersection Capacity Analysis**

LOS/Dly. 95% BOO

inf.

Based on the above intersection volumes, existing intersection geometric conditions and observed operations, the existing <u>un</u>signalized (stop-controlled) Old Bridge Rd./Tanyard Hill Rd. intersection was analyzed via the Synchro v.6 capacity analysis package. **Table 1** and **Figure 3** present the results of the capacity analyses, showing the computed Levels Of Service (LOS) and overall Intersection Delay for the AM and PM peak hours. Synchro 95% BOQ (Back-Of-Queues) lengths are also provided. **Appendix C** provides general LOS information and criteria while **Appendix D** includes the Synchro summary printouts for this <u>un</u>signalized intersection.

**Existing** intersection analyses (utilizing the Synchro analysis package) show that the analyzed <u>unsignalized</u> (stop-controlled) intersection of Old Bridge Rd./Tanyard Hill Rd. currently operates at an "excellent" (LOS=A) Level Of Service during the AM peak hour (6:30-7:30am), but at a "poor/failing" (LOS=E) during the PM peak hour (4:30-5:30pm).

TABLE 1

Existing 2010 Intersection Level Of Service Summary

Intersections	AM <u>Intersec</u> <u>LOS/D</u>	HOUR Lane G Aprch.		PM P Intersecti LOS/Del	<u>ion</u>	HOUR Lane Group Aprch. LOS/Dly.		
<u>Unsignalized</u>	(Avail.Stack.)	(95% BC	DQ)		<u>a</u>	95% BO	Q)	
Old Bridge/Tanyard Hill	(225') A/1.9 (inf.) (inf.) (inf.) (inf.)	(90') (0') (0') (21') (21')	EBL EBT WBTR SBL SBR	B/13.2 A/0.0 A/0.0 D/28.7 D/28.7	E/40.8	(44') (0') (0') (778') (778')	EBL EBT WBTR SBL SBR	F/55.4 A/0.0 A/0.0 F/413.1 F/413.1
	l Of Service See l Of Service & Avg			(seconds) - f	or "Critical Lan	e Grou	p"	

= Level Of Service & Avg. Vehicular Delay (seconds) - for "Critical Movement"

= 95% Back-Of-Queue length (ft.)

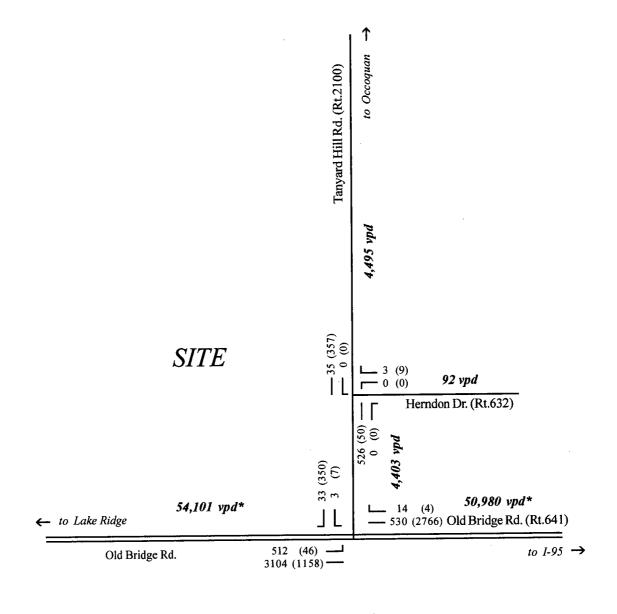
= infinite (length of link)

123 (123) = AM (PM) Pk.Hr. Traffic Volumes

1,234 vpd = Daily Traffic Volume (veh. per day) -- \* 2008 VDOT count factored to 2010



= Traffic Signal



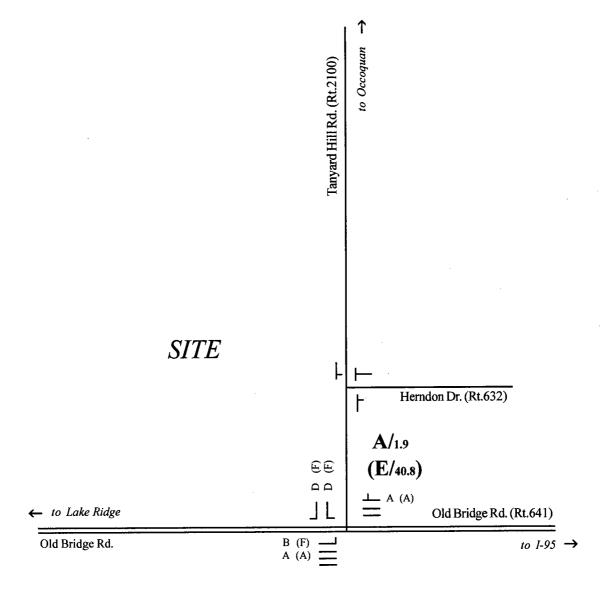


N A No Scale

Existing 2010 Road Network and Daily & AM/PM Peak Hour Traffic Volumes

**FIGURE** 

= Traffic Signal A/1.2 = AM Pk.Hr. LOS/Delay (sec.)(A/1.2) = PM Pk.Hr. LOS/Delay (sec.)



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N A No Scale

Existing 2010 AM/PM Peak Hour Intersection Geometry & Levels Of Service

FIGURE

## **FUTURE "BACKGROUND" TRAFFIC CONDITIONS (YEAR 2013)**

## **Planned Roadway Network**

In accordance with the latest Prince William County Comprehensive Plan, Virginia Department of Transportation (VDOT) Six-Year Primary and Secondary Road Plans, and as directed by County & VDOT staff, the future Year 2013 area roadway network was assumed to be the same as the existing network. No public or private improvements are anticipated or assumed to be built by Yr. 2013.

## Traffic Growth Trends/"Grown" Traffic Volumes

In order to project future traffic volumes, the existing volumes must first be "grown" (or factored) to the future design year. This is performed prior to adding (to the network) the traffic associated with the "other" planned developments. As calculated from VDOT historic counts and concurred with County & VDOT staff, a two (2) percent per annum increase was utilized for all ambient, background traffic.

**Figure 4** presents the Year 2013 "Grown" AM/PM peak hour turn movement volumes derived from the factored Year 2010 "Existing" volumes, based on the above average annual growth rate, compounded to the future year.

#### "Other" Area Planned Developments

No (0) "other" planned/approved development projects within the immediate vicinity were identified by staff. The purpose of identifying and analyzing "other" developments is to add the traffic associated with each of these development projects to the future "grown" traffic volumes. The addition of the "grown" and "other" traffic to the road network comprises the future "background" traffic. However, no "other" development traffic is assumed in this TIA.

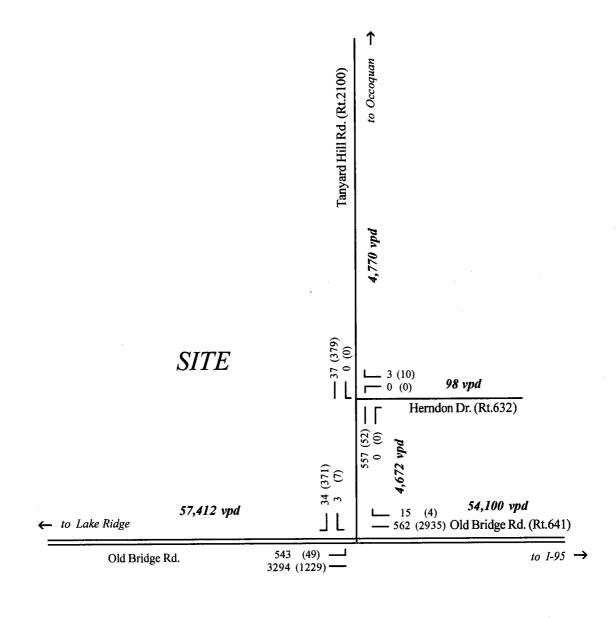
#### Future "Background" Traffic Volumes

Typically the summation of the Yr. 2013 "grown" plus "other" development traffic comprise the future "background" traffic volumes. However, since no "other" development traffic is assumed, the "grown" traffic is the same as the "background" traffic volumes – as shown on **Figure 4**. Two-way, daily traffic projections for the adjacent roadways are also provided.

123 (123) = AM (PM) Pk.Hr. Traffic Volumes 1,234 vpd = Daily Traffic Volume (veh. per day)



= Traffic Signal





V E T T R A C O M P A N Y

N A No Scale

Yr. 2013 "Grown/Background" Daily & AM/PM Peak Hour Traffic Volumes

**FIGURE** 

## Future "Background" Intersection Capacity Analysis

The derived "background" traffic volumes, with assumed geometrics, were subjected to the Synchro <u>unsignalized</u> intersection capacity analyses. **Table 2** and **Figure 5** present the results of the "background" capacity analyses, showing the computed Levels Of Service (LOS) and vehicular delays at the one (1) "background" intersection (Old Bridge Rd./Tanyard Hill Rd.) for AM and PM peak hours, as well as Synchro 95% BOQ (Back-Of-Queue) lengths. **Appendix E** includes the Synchro printouts for both peak hours at the 'background" intersection. All Synchro analyses in this TIA utilize default variables where appropriate.

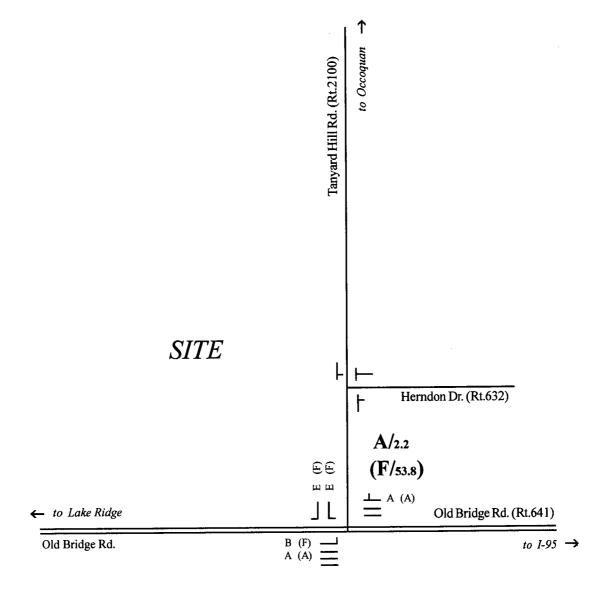
Assuming no nearby "other" developments and no improvements to the area roadway network, Yr. 2013 "Background" (without site traffic) intersection capacity analyses indicate the same (as existing) AM peak hour Levels Of Service condition (LOS=A) with increased delays at the <u>unsignalized</u> Old Bridge Rd./Tanyard Hill Rd. intersection. However, the PM peak hour LOS will further worsen (from existing LOS=E) to a "very poor/failing" condition (LOS=F). These changes are due to the increased ambient "background" (grown) traffic.

TABLE 2
Year 2013 "Background" Intersection Level Of Service Summary

<u>Intersections</u>		AM Intersec LOS/De	<u>tion</u>	HOUR Lane G Aprch.		PM <u>Interse</u> <u>LOS/I</u>		HOUR <u>Lane Group</u> <u>Aprch. LOS/Dl</u>	
Unsignalized	(Avail.Stac	<u>ck.)</u>	<u>(95% BO</u>	Q)			(95% BO	<i>Q)</i>	
Old Bridge/Tanyard Hill	(225')	A/2.2	(109')	EBL	B/14.6	F/53.	8 (59')	EBL	F/75.0
•	(inf.)		(0')	EBT	A/0.0		(0')	EBT	A/0.0
	(inf.)		(0')	WBTR	A/0.0		(0')	WBTR	
	(inf.)		(31')	SBL	E/35.8		(918')		F/545.6
	(inf.)		(31')	SBR	E/35.8		(918')	SBR	F/545.6

Legend:	
LOS	= Level Of Service See Appendix C
LOS/Delay	= Level Of Service & Avg. Vehicular Delay (seconds) - for "Critical Lane Group"
LOS/Dly.	= Level Of Service & Avg. Vehicular Delay (seconds) - for "Critical Movement"
95% BOQ	= 95% Back-Of-Queue length (ft.)
inf.	= infinite (length of link)

= Traffic Signal A/1.2 = AM Pk.Hr. LOS/Delay (sec.) (A/1.2) = PM Pk.Hr. LOS/Delay (sec.)



6/28/10



N A No Scale

Yr. 2013 "Background" AM/PM Peak Hour Intersection Geometry & Levels Of Service

FIGURE 5

#### PROPOSED "THE OAKS III" SITE DEVELOPMENT

#### Site Development Plan/Access

The Oaks III "site" is proposed to utilize two (2) access points: 1) a "Right In only" entrance along Old Bridge Rd. west of Tanyard Hill Rd., and 2) a "Full access" entrance along Tanyard Hill Rd. north of Old Bridge Rd. and Herndon Drive. Both site entrances will operate as <u>unsignalized</u> 3-leg ("T") intersections. No functional interparcel accesses are proposed. **Figure 6** presents the "The Oaks III" General Development Plan.

#### **Development Densities**

"The Oaks III" general office building is expected to be "built out" (occupied) by Year 2013.

#### **Site Trip Generation**

**Table 3** presents the expected Year 2013 Daily and Peak Hour (AM/PM) trip generations for the proposed "The Oaks III" development. These calculations are based on ITE Trip Generation – 8<sup>th</sup> Edition (2008) "adjacent street" trip rates.

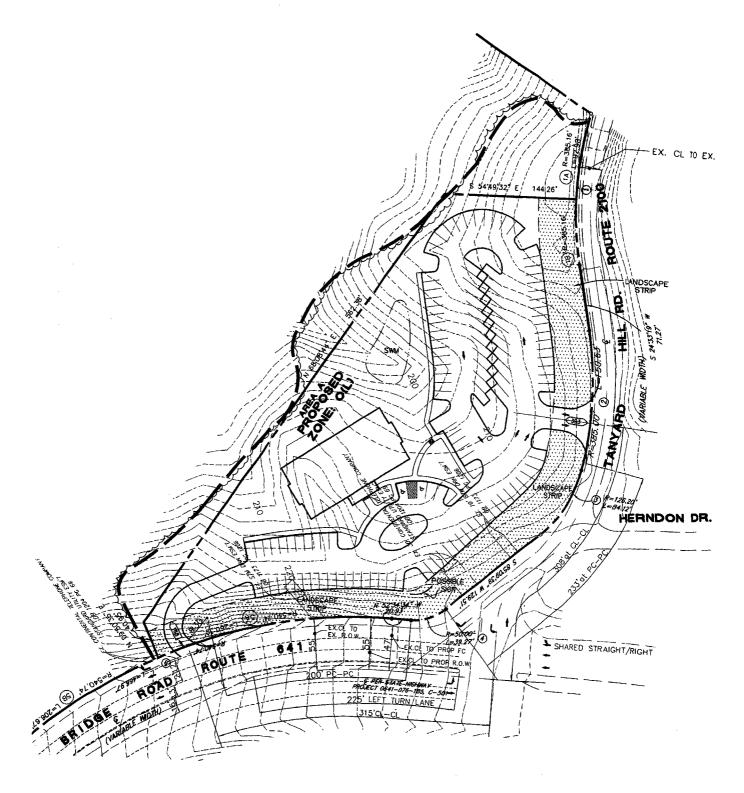
As a "worst-case" scenario, The Oaks III "site" (32,500 gross square foot General Office building) is expected to generate 561 vehicle-trips (382 vehicles visiting the site) per day with 76 AM peak hour and 115 PM peak hour trips. No internal or pass-by trip discounts have been utilized.

#### **Site Trip Distribution**

Year 2013 site-generated trips were assigned to the road network based on pre-approved (by County & VDOT staff) site trip distributions provided by the applicant based on empirical data from adjacent office buildings. Generalized "site" trip distributions for the site uses are shown on **Figure 7.** 

#### **Site Traffic Volumes**

Based on the abovementioned site trip generation and distributions, site traffic volumes are assigned to the roadway network. **Figure 8** shows the Year 2013 site-related AM/PM Peak Hour Intersection Movement Volumes.



Source: BC Consultants, June 2010.





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"The Oaks III" General Development Plan **FIGURE** 

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## **TABLE 3**

\oaks3\sitegen1.wk4

## "SITE" DEVELOPMENT DENSITIES & TRIP GENERATION

#### PROPOSED DENSITIES AND TRIP RATES

			::	=	-	Trip Rates (8th E	•	::
Land Uses & Densities			::	ITE	AM	PM	Weekday	::
	Quantity	Unit	::	(Code)	Pk.Hr.	Pk.Hr.	VPD	::
			::					::
THE OAKS III			::					::
32,500 gsf Gen. Office building use fitted curve equations	32.5	gsf	::	(710)	2.35	3.55	17.28	::
			::					::
			::					::
Notes: gsf = gross square feet								

#### GENERATED TRIPS

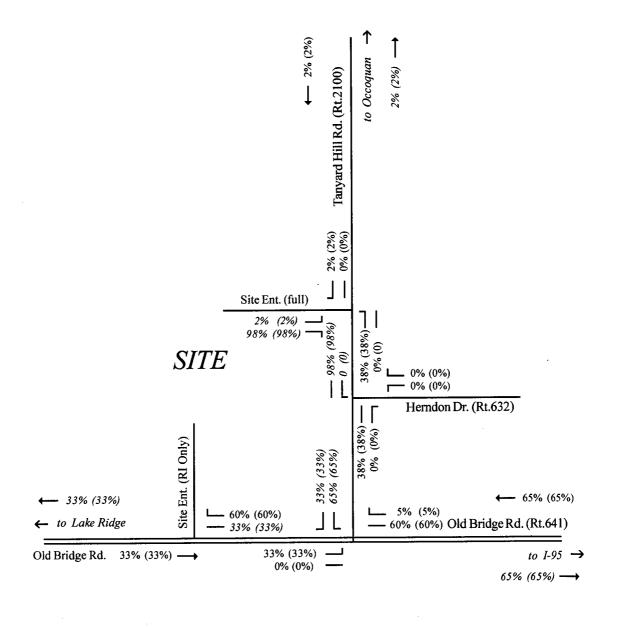
	::		AM Pk.H	r.	:		PM Pk.H	r.	:		::
Land Uses & Densities	::				:				:	Weekday	::
	::	In	Out	Total	:	In	Out	Total	:	VPD	::
THE OAKS III	::				:				:		::
32,500 gsf Gen. Office building use fitted curve equations	::	67	9	76	:	20	96	115	:	561	::
	::				:				:		::
	::				:				:		::

Note: All computations are automatically rounded.

12% (12%) = AM (PM) Pk.Hr. Trip Distributions
-- "outbound" shown in italics --



= Traffic Signal





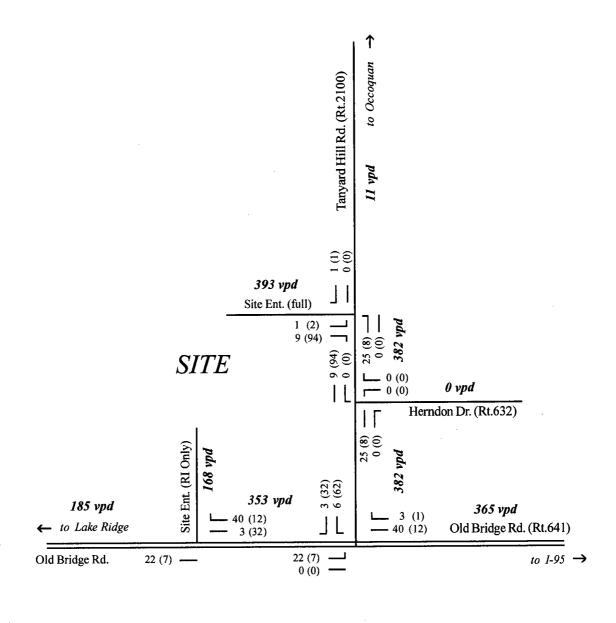
N A No Scale

Yr. 2013 Generalized "Site" Directional Trip Distributions **FIGURE** 

123 (123) = AM (PM) Pk.Hr. Traffic Volumes 1,234 vpd = Daily Traffic Volume (veh. per day)



= Traffic Signal



6/28/10

N ▲
No Scale

Yr. 2013 "Site" Daily & AM/PM Peak Hour Trip Assignments **FIGURE** 

## FUTURE "TOTAL" TRAFFIC CONDITIONS WITH SITE (YEAR 2013)

#### Future "Total" Traffic Volumes

By totaling the future "background" (**Figure 4**) and "site" (**Figure 8**) traffic volumes, future "total" volumes are developed. **Figure 9** shows the Yr. 2013 "Total" AM/PM peak hour volumes, as well as two-way, daily traffic estimates for the adjacent roadways, respectively.

## Future "Total" Intersection Capacity Analysis

These "total" traffic volumes, with assumed geometrics, were again subjected to the Synchro <u>unsignalized</u> (stop-controlled) intersection analysis procedures (as done for "background" conditions). **Table 4** presents the results of the analyses showing the computed Levels Of Service (LOS) and vehicular delays for the AM/PM peak hours at the analyzed intersections, as well as 95% Back-of-Queue (BOQ) lengths. **Figure 10** presents the LOS information in graphic format. **Appendix F** includes the Year 2013 AM/PM Peak Hour Synchro printouts. Intersection spacing and other network information and parameters are provided at the end of **Appendix F**.

Future Year 2013 "Total" (with site traffic) intersection analyses reveal that with the addition of "site" traffic, all three (3) key intersections analyzed as part of this TIA will remain at "background" Levels Of Service or operate at "acceptable" Levels Of Service. With "site" traffic, the unsignalized Old Bridge Rd./Tanyard Hill Rd. intersection will continue to operate at "excellent" LOS=A Level Of Service in the AM peak hour and at "very poor/failing" LOS=F conditions in the PM peak hour. Both of the new unsignalized (stop-controlled) Site Entrances (on Old Bridge Rd. and on Tanyard Hill Rd.) will operate at "excellent" (LOS=A) Levels Of Service during both the AM & PM peak hours.

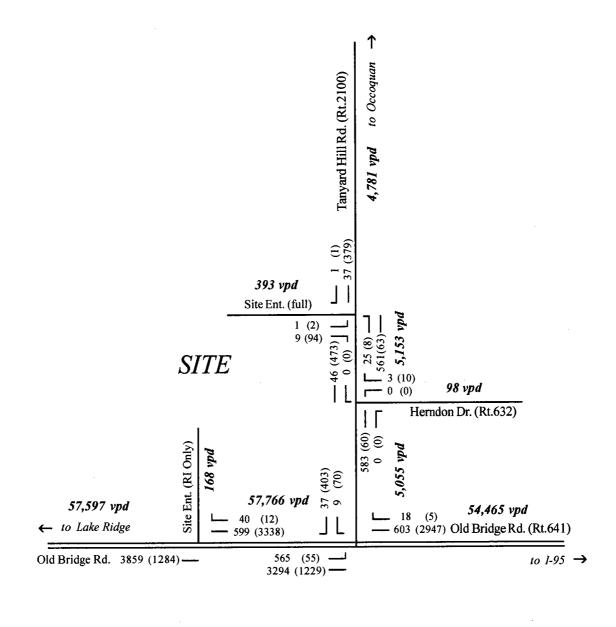
TABLE 4
Year 2013 "Total" Intersection Level Of Service Summary

	AM PEAK HOUR				PM PEAK HOUR				
		Intersec	<u>tion</u>	Lane G	roup	Intersect	ion	Lane Group	
<u>Intersections</u>		LOS/De	elay	Aprch.	LOS/Dly.	LOS/Del	<u>ay</u>	Aprch. LOS/Dly	
<u>Unsignalized</u>	(Avail.Sta	<u>ck.)</u>	(95% BO	Q)		4	95% BO	<u>Q)</u>	
Old Bridge/Tanyard Hill	(225')	A/4.2	(131')	EBL	C/16.4	$F/_{1183.5}$	(71')	EBL	F/84.7
	(inf.)		(0')	<b>EBT</b>	A/0.0		(0')	EBT	A/0.0
	(inf.)		(0')	WBTR	A/0.0		(0')	WBTR	A/0.0
	(inf.)		(142')	SBL	F/148.5		( <b>*</b> ')	SBL	F/*
	(inf.)		(142')	SBR	F/148.5		( <b>*</b> ')	SBR	F/*
Old Bridge/Site Ent. (RI)	(inf.)	A/0.0	(0')	EBT	A/0.0	$A/_{0.0}$	(0')	<b>EBT</b>	A/0.0
	(inf.)		(0')	WBTR	A/0.0		(0')	WBTR	A/0.0
Tanyard Hill/Site Ent.	(70')	A/0.6	(1')	<b>EBLR</b>	A/9.6	A/2.4	(20')	<b>EBLR</b>	B/12.9
	(inf.)		(2')	<b>NBLT</b>	A/0.6		(1')	NBLT	A/1.0
	(inf.)		(0')	SBTR	A/0.0		(0')	SBTR	A/0.0
Legend:	0.00 ;	0	A	. 0					
		ce See			(cocondo)	for "Critical I am	o Grov	n"	
•		_		-		for "Critical Lan for "Critical Mo		-	
•		gful inter		_	(seconds) -	ioi Cittical Mo	VCIIICIII	•	
•		Queue len	•						
•	e (length	•	(·)						

123 (123) = AM (PM) Pk.Hr. Traffic Volumes 1,234 vpd = Daily Traffic Volume (veh. per day)



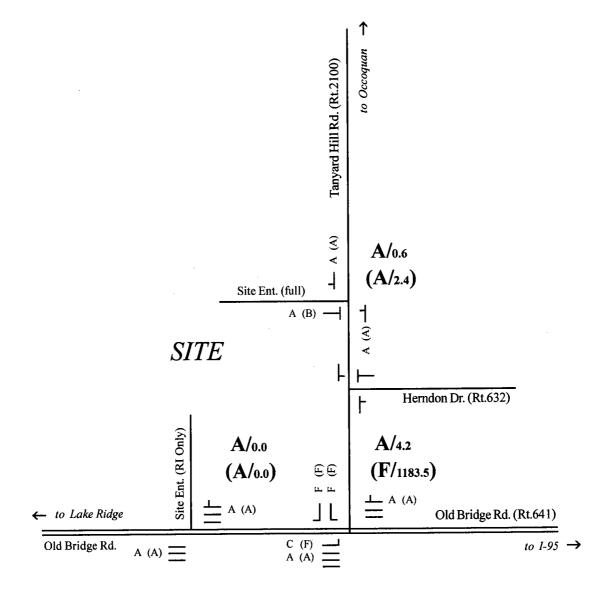
= Traffic Signal





Yr. 2013 "Total" (w/site) Daily & AM/PM Peak Hour Traffic Volumes **FIGURE** 

= Traffic Signal A/1.2 = AM Pk.Hr. LOS/Delay (sec.)(A/1.2) = PM Pk.Hr. LOS/Delay (sec.)





N ▲
No Scale

Yr. 2013 "Total" (w/site) AM/PM Peak Hour Intersection Geometry & LOS **FIGURE** 

#### **INCREMENTAL IMPACT ANALYSIS**

By comparing the "Background" intersection LOS's (**Table 2**) against the "Total" intersection LOS's (**Table 4**), any changes in Levels Of Service at the analyzed intersections can be seen. **Table 5** provides a side-by-side comparison of the Year 2013 Summary of "Background" vs. "Total" LOS's for the analyzed intersections.

Incremental impact analysis (comparing "background" vs. "total" Levels Of Service), reveals that the addition of site traffic will <u>not</u> cause any significant traffic impact at the three (3) <u>unsignalized</u> intersections along Old Bridge Rd. (Rt.641) and Tanyard Hill Rd. (Rt.2100). All intersections will remain at "background" levels or operate at "excellent" Levels Of Service. Thus, no traffic impact is indicated and no impact "mitigation measures" (improvements) are warranted or recommended.

TABLE 5

Comparison of Yr. 2013 "Background" vs. "Total" Intersection LOS's

		AM PEAK HOUR			PM PEAK HOUR			
<u>Intersection</u>	Ln.Grp.	Bkgrd.	<u>Total</u>	LOS Change?	<u>Bkgrd.</u>	<u>Total</u>	LOS Change?	
<u>Unsignalized</u>								
Old Bridge/Tanyard Hill	=	Α	Α	no	F	F	no	
	EBL	В	C	no*	F	$\mathbf{F}$	no	
	EBT	Α	Α	no	Α	Α	no	
	WBTR	Α	Α	no	Α	Α	no	
	SBL	E	F	no*	F	$\mathbf{F}$	no	
	SBR	E	F	no*	F	F	no	
Old Bridge/Site Ent. (RI)	=		Α	no		Α	no	
	EBT		Α	no		Α	no	
	WBTR		A	no		Α	no	
Tanyard Hill/Site Ent.	=		A	no	~~	Α	no	
	EBLR		Α	no		В	no	
	NBLT		Α	no		Α	no	
	SBTR		Α	no		Α	no	

<sup>\* -</sup> not a significant change - still within same (as background) "acceptable" or "failing" categories.

#### RECOMMENDED TRANSPORTATION IMPROVEMENTS

Since no traffic impact is indicated at any of the intersections for either peak hour analyzed, no additional impact "mitigation measures" are warranted or recommended.

#### **QUEUING ANALYSIS**

Synchro 95% Back-of-Queues (BOQ's) for all lane groups at all analyzed intersections are presented within **Tables 1, 2, and 4**. Nearly all 95% BOQ's are minimal and well within available storage lengths, thus indicating no delay or queuing problems. Only the SB approach at the Old Bridge Rd./Tanyard Hill Rd. intersection during the PM peak hour experiences excessive queues, which currently exist.

## RIGHT TURN LANE WARRANT ANALYSES - (VDOT METHOD)

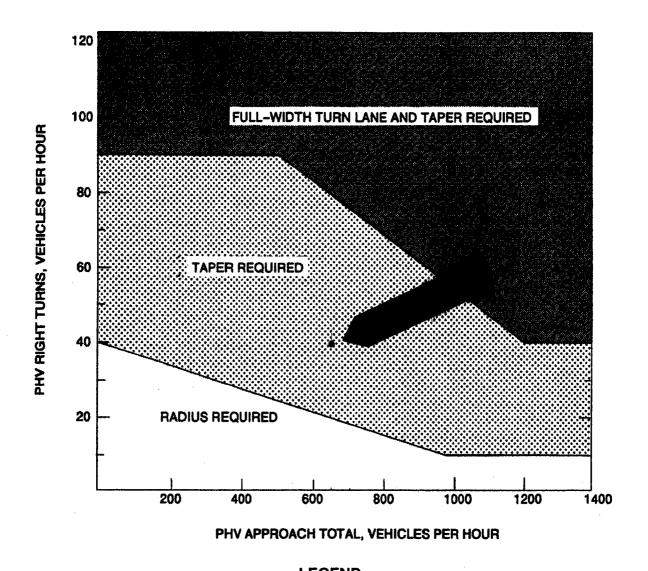
As requested by staff, Right Turn Lane Warrant analysis was conducted at the Old Bridge Rd./Site Entrance (Right-In only) to determine whether a taper is warranted. **Figures 11a & 11b** provide the AM & PM peak hour analyses, respectively, for this entrance showing that <u>a taper is warranted</u>.

Right Turn Lane Warrant analysis was also conducted at the Tanyard Hill Rd./Site Entrance (full access) to determine whether a taper or turn lane is warranted. **Figures 12a & 12b** provide the AM & PM peak hour analyses, respectively, for this entrance showing that <u>neither are warranted</u>.

#### **CONCLUSIONS**

Traffic impact via intersection capacity analysis has been analyzed for existing and future Year 2013 conditions - "Background" (with out site traffic) and "Total" (with site traffic).

Based upon the assumed "scoped" parameters, the analytical evaluations and comparisons within this TIA have shown that the proposed development of "The Oaks III" commercial project will not significantly impact the area network and can be easily accommodated within the future road network.



## <u>LEGEND</u>

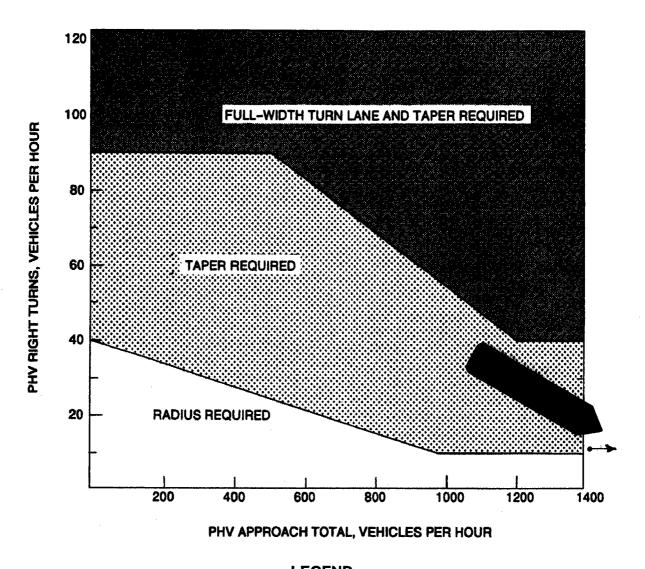
PHV- - Peak Hour Volume (also Design Hourly Volume equivalent)

## **Adjustment for Right Turns**

If PHV is not known use formula: PHV = ADT x K x D K = the percent of AADT occurring in the peak hour D = the percent of traffic in the peak direction of flow Note: An average of 11% for K x D will suffice.

## FIGURE C-1-9 GUIDELINES FOR RIGHT TURN TREATMENT (4-LANE HIGHWAY)

FIGURE 11a



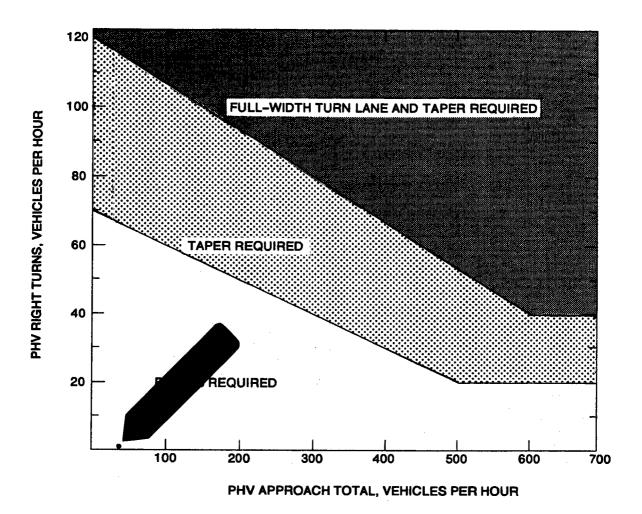
PHV- - Peak Hour Volume (also Design Hourly Volume equivalent)

#### **Adjustment for Right Turns**

If PHV is not known use formula: PHV = ADT x K x D K = the percent of AADT occurring in the peak hour D = the percent of traffic in the peak direction of flow Note: An average of 11% for K x D will suffice.

## FIGURE C-1-9 GUIDELINES FOR RIGHT TURN TREATMENT (4-LANE HIGHWAY)

FIGURE 11b



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

## **Adjustment for Right Turns**

For posted speeds at or under 70 km/h (45 mph), PHV right turns > 40, and PHV total < 300.

Adjusted right turns = PHV Right Turns - 20

If PHV is not known use formula: PHV = ADT x K x D

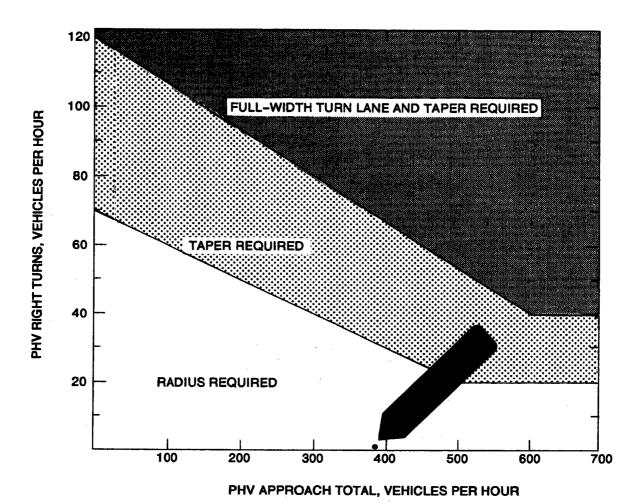
K = the percent of AADT occurring in the peak hour

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

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

## FIGURE C-1-8 GUIDELINES FOR RIGHT TURN TREATMENT (2-LANE HIGHWAY)

FIGURE 12a



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

## **Adjustment for Right Turns**

For posted speeds at or under 70 km/h (45 mph), PHV right turns > 40, and PHV total < 300.

Adjusted right turns = PHV Right Turns - 20

If PHV is not known use formula: PHV = ADT x K x D

K = the percent of AADT occurring in the peak hour

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

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

## FIGURE C-1-8 GUIDELINES FOR RIGHT TURN TREATMENT (2-LANE HIGHWAY)

FIGURE 12b

## **APPENDICES**

## APPENDIX A

**TIA Scoping Correspondence** 

**Contact Information** 

Name:

Tele: E-mail:

Consultant



## PRE-SCOPE OF WORK MEETING FORM

# Information on the Project and the Traffic Impact Analysis Base Assumptions

The applicant is responsible for entering the relevant information and submitting the form to VDOT and the locality no less than three (3) business days prior to the meeting. If a form is not received by this deadline, the scope of work meeting may be postponed.

**VETTRA Company** 

703/590-4932

vettra@aol.com

Developer/Owner Name: Telephone: E-mail:	Clipper II Associates, L.P. 202/288-1389 <a href="mailto:kthompson@kenthompsoninc.com">kthompson@kenthompsoninc.com</a>							
Project Information								र 2006
Project Name:	The Oaks III		Loca	lity/Co	ounty:	Prince W	illiam Count	ty
Project Location: (Attach regional and site specific location map)	West of Tanyard Hill Rd. (Rt.2100) & north of Old Bridge Rd. (Rt.641) – see attached Vicinity Map					_		
Submission Type:	Comp Plan   Rezoning <b>X</b>			Site Plan □		an 🗆	Subd Plat	
Project Description: (Including details on the land use, acreage, phasing, access location, etc. Attach additional sheet if necessary)	Current Zoning: A-1 proposed for O (L) 18.55 acres; Parcel ID: 8393-32-7695 (develop only 3.5 acres) Buildout @ Yr. 2013 Access: 2 site entrances: 1) on Old Bridge Rd. (RI only) 2) on Tanyard Hill Rd. (full) Proposed Uses: see attached GDP Buildout: (Yr.2013) - 32,500 gsf General Office building							
	Residential 🗆	Commercial 2	X	Mixed	d Use C	] c	Other 🗆	
	Residential Use(s)  Number of Units:  ITE LU Code(s):  1 2  Commercial Use(s)  ITE LU Code(s):  1 2							
				Other Uses:				
				TTE LU Code(s):  1 2				
				3 4 Independent Variable(s): 1. 2.				
	Square Feet or Ot							
	1. 32,500 gsf	2	-					

Total Peak Hour Trip Projection	Less than 100 $\square$	□ 100 - 499 <b>X</b>		500	- 999 🛚	1,000 or more □		
Traffic Impact Analysis Assumptions								
Study Period	Existing Year: <b>2010</b> Build			d-out Year: 2013		Design Year:		
Study Area Boundaries	North: Town of Occoquan			South: Old Bridge Rd. (Rt.641)				
(Attach map)	East: <b>Herndon Rd. (Rt.632)</b> W			West: C	West: Clipper Dr. (Rt.2116)			
External Factors That Could Affect Project (Planned road improvements, other nearby developments)	None known							
Consistency With Comprehensive Plan (Land Use, Transportation Plan)	Yes							
Available Traffic Data (Historical, forecasts)	Old Bridge Rd. = 52,000 ADT (VDOT 2007 ADT) Tanyard Hill Rd.= 4,495 ADT (VETTRA June 9, 2010 count)							
Trip Distribution (Attach Sketch) – per shown empirical	I to /trom onct / bill/c to DI only &			Road Name: <u>Tanyard Hill Rd.</u> : 2% to/from north (min. 1 veh.pk.hr.)				
data	Road Name: Road N				lame:	ame:		
Annual Vehicle Trip	2%/yr. Peak Pe		riod for Study X AM X PM SAT [		1 X PM □ SAT □ SUN			
Growth Rate:	compounded	Peak Hour of the Generator			L15 (AM/PM) — <u>see</u> ched "Table 1"			
	1. Old Bridge Rd. @ Tanyard Hill Rd. (full access)				4.			
Study Intersections and/or Road Segments	2. Old Bridge Rd. @ Site Ent. (RI only)				5.			
(Attach additional sheets as necessary)	3. Tanyard Hill Rd. @ Site Ent. (full access)			ss)	6.			
	4.			,				
Trip Adjustment Factors				,	Pass-by allowance: ☐ Yes X No Reduction:% trips			
Software Methodology	X Synchro (v.6)							

Traffic Signal Proposed or Affected Analysis software to be used, progression speed, cycle length	none					
Improvement(s) Assumed or to be Considered	none					
Background Traffic Studies Considered	None known					
Plan Submission	☐ Master Development Plan (MDP) X Generalized Development Plan (GDP) ☐ Preliminary/Sketch Plan ☐ Other Plan type (Final Site, Subd. Plan)					
Additional Issues to be addressed	X Queuing analysis (all 3 int.)       ☐ Actuation/Coordination         ☐ Weaving analysis       ☐ Merge analysis       ☐ Bike/Ped Accommodations         ☐ Intersection(s)       ☐ TDM Measures       ☐ Other					
NOTES on ASSUMPTION	S: <u> non-527 TIA</u> use 8 <sup>th</sup> edition ITE Trip Generation					
	conduct VDOT "Right Turn Lane Warrant Analysis" for Old					
Bridge Rd. RI only to check if taper is needed						
conduct VDOT "Right Turn Lane Warrant Analysis" for						
	Tanyard Hill Rd. entrance					
add length of existing turn lanes and intersection spacing						
	dimensions on GDP graphic in TIA					
SIGNED: <u>Veru</u> Applicant of	or Consultant					
PRINT NAME: Ver Applicant of	rn Torney or Consultant					

## **APPENDIX B**

**Existing (June 2010) Traffic Counts & 2008 VDOT Counts** 

## VETTRA Co. -- Traffic Planning & Engineering

11535 Gunner Ct. -- Woodbridge, VA 22192 (tel) 703.590.4932 (fax) 703.590.1277 (email) vettra@aol.com

. Peak Period(s): Weekday AM & PM . Intersection: Old Bridge/Tanyard Hill

. by/Board #: jham/D1-0989 . Weather: Fair, Warm

File Name : ob10ewth Site Code : 00020091 Start Date : 6/8/2010

Page No : 1

Groups	Printed-	Unshifted
O Oubs	i illiteu-	Onsimieu

		( ) 110				Gro	ups Prin	ted- Unshif							
	lan	yard Hill	Rd. (Rt.	2100)	0	ld Bridge	Rd. (Rt	.641)	Old	d Bridge	Rd. (Rt	.641)			
- OL 17	1 6 1		hbound				tbound			Wes	tbound	,			
Start Time	Left		Heavy	App. Total	Left	Thru		App. Total	Thru	Right	Heavy	App. Total	Exclu. Total	Inclu. Total	Int. Total
06:00 AM	0	1	0	1	106	831	12	937	59	3	9	62	21	1000	1021
06:15 AM	0	2	0	2	98	749	8	847	55	3	8	58	16	907	923
06:30 AM	0	5	0	5	131	838	13	969	122	2	14	124	27	1098	1125
06:45 AM	1	7	0	8	123	812	13	935	122	3	12	125	25	1068	1093
Total	1	15	0	16	458	3230	46	3688	358	11	43	369	89	4073	4162
	_												-		4102
07:00 AM	0	8	0	8	128	742	4	870	140	5	15	145	19	1023	1042
07:15 AM	2	12	0	14	130	712	14	842	. 146	4	5	150	19	1006	1025
07:30 AM	2	6	0	8	127	777	17	904	150	1	2	151	19	1063	1023
07:45 AM	2_	19	0	21	97	800	13	897	158 -	3	7	161	20	1079	1099
Total	6	45	0	51	482	3031	48	3513	594	13	29	607	77	4171	
												007	• • • • • • • • • • • • • • • • • • • •	4171	4248
08:00 AM	3	5	0	8	87	735	16	822	172	3	9	175	25	1005	1030
08:15 AM	0	9	0	9	73	745	16	818	171	3	12	174	28	1003	
08:30 AM	0	14	1	14	61	747	16	808	176	1	11	177	28	999	1029
08:45 AM	0	9	0	9	40	596	9	636	172	2	10	174	19	_	1027
Total	3	37	1	40	261	2823	57	3084	691	9	42	700	100	819	838
•							٥.	0004	001	3	42	700	100	3824	3924
*** BREAK ***															
04:00 PM	1	45	0	46	12	270	11	282	620	6	21	626	32	954	000
04:15 PM	0	80	1	80	16	298	14	314	632	1	16	633	31		986
04:30 PM	0	64	1	64	8	278	2	286	703	ó	11	703	14	1027	1058
04:45 PM	6	109	0	115	12	312	4	324	647	1	11	648	15	1053	1067
Total	7	298	2	305	48	1158	31	1206	2602	- 8	59	2610	92	1087	1102
'			_	300		1100	01	1200	2002	o	39	2010	92	4121	4213
05:00 PM	0	88	0	88	9	267	3	276	735	1	14	736	17	4400	
05:15 PM	1	89	ō	90	17	301	7	318	681	2	12	683		1100	1117
05:30 PM	1	61	Ö	62	11	284	6	295	669	1	5	670	19 11	1091	1110
05:45 PM	1	50	ō	51	10	320	3	330	599	1	5 7	1		1027	1038
Total	3	288	0	291	47	1172	19	1219	2684	<del></del>	38	600	10_	981	991_
,	•		•	201	٦,	1172	13	1219	2004	5	30	2689	57	4199	4256
06:00 PM	0	51	0	51	6	254	6	260	547	1		540 }	4.4		
06:15 PM	2	64	Õ	66	2	264	3	266	668	-	8	548	14	859	873
06:30 PM	1	56	ŏ	57	6	250	3			2	9	670	12	1002	1014
06:45 PM	i	17	ŏ	18	12	250 250	3	256	685	2	8	687	11	1000	1011
Total	4	188	0	192	26			262	655	1	8	656	11	936	947
i otai	7	100	U	192	20	1018	15	1044	2555	6	33	2561	48	3797	3845
Grand Total	24	871	3	895	1322	12432	246	40754	0.404		044				
Apprch %	2.7	97.3	3	693	9.6	90.4	216	13754	9484	52	244	9536	463	24185	24648
Total %	0.1	3.6		3.7	9.6 5.5			50.0	99.5	0.5					
10tai 70	0.1	3.0		3.7	5.5	51.4		56.9	39.2	0.2		39.4	1.9	98.1	

## VETTRA Co. -- Traffic Planning & Engineering 11535 Gunner Ct. -- Woodbridge, VA 22192 (tel) 703.590.4932 (fax) 703.590.1277 (email) vettra@aol.com

. Peak Period(s): Weekday AM & PM

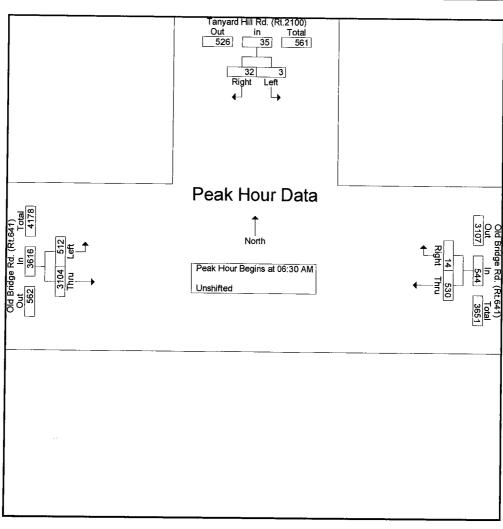
. Intersection: Old Bridge/Tanyard Hill

. by/Board #: jham/D1-0989 . Weather: Fair, Warm

File Name : ob10ewth Site Code : 00020091 Start Date : 6/8/2010

Page No : 2

		Hill Rd. (Rt.2 Southbound			dge Rd. (R Eastbound			dge Rd. (R Vestbound		
Start Time	Left	Right	App. Total	Left	Thru	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From	06:00 AM to	11:45 AM - F	Peak 1 of 1						ripp. Total	III. TOTAL
Peak Hour for Entire Inter	section Beai	ns at 06:30 A	M							
06:30 AM	0	5	5	131	838	969	122	2	124	4000
06:45 AM	1	7	8	123	812	935	122	2	125	1098
07:00 AM	0	8	8	128	742	870	140	E	145	1068
07:15 AM	2	12	14	130	712			9	- 1	1023
Total Volume		32				842	146	4	150	_ 1006
-	3		35	512	3104	3616	530	14	544	4195
% App. Total	8.6	91. <b>4</b>		14.2	85.8		97.4	2.6		
PHF PHF	.375	.667	625	.977	.926	.933	.908	.700	.907	.955



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. Peak Period(s): Weekday AM & PM

. Intersection: Old Bridge/Tanyard Hill

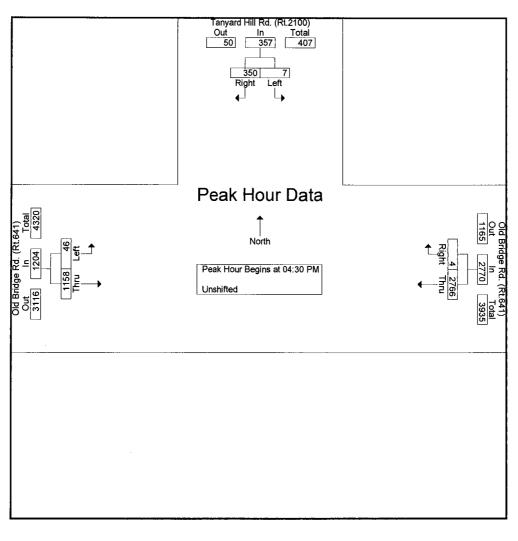
File Name : ob10ewth

Site Code : 00020091 Start Date : 6/8/2010

Page No : 3

by/Board	#: jham/D1-0989	
Weather:	Fair, Warm	

		Hill Rd. (Rt. outhbound	2100)		dge Rd. (R Eastbound			idge Rd. (R Westbound		
Start Time	Left	Right	Ann Total							
			App. Total	Left	Thru	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From	12:00 PM to	06:45 PM -	Peak 1 of 1							
Peak Hour for Entire Inter-	section Begir	ns at 04:30 F	PM							
04:30 PM	0	64	64	8	278	286	703	0	703	1053
04:45 PM	6	109	115	12	312	324	647	1	648	1087
05:00 PM	0	88	88	9	267	276	735	1	736	1100
05:15 PM	1	89	90	17	301	318	681	2	683	1091
Total Volume	7	350	357	46	1158	1204	2766	4	2770	4331
% App. Total	2	98		3.8	96.2		99.9	0.1	ł	
PHF	.292	.803	.776	.676	.928	.929	.941	.500	.941	.984



### Date/Time/Volume/Average Speed/Temperature Report

HI-Star ID: 1275 Street: Tanyard Hill Rd. State: VA

Begin: Jun/08/2010 12:00:00 AM Lane: 2-way Oper: vet

End: Jun/09/2010 12:00:00 AM Hours: 24.00

Period: 15 Raw Count: 4495

City: Woodbridge
County: Prince William

	Posted: 25
AAD1	「Factor:1

County: Prince William AADT Factor: 1		AADT Count 4,495				
Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry		
Tue,Jun/08/2010						
[00:00-00:15]	3	29 MPH	74 F	Dry		
[00:15-00:30]	2	25 MPH	74 F	Dry		
[00:30-00:45]	2	35 MPH	74 F	Dry		
[00:45-01:00]	2	23 MPH	74 F	Dry		
[01:00-01:15]	1	22 MPH	74 F	Dry		
[01:15-01:30]	1	22 MPH	72 F	Dry		
[01:30-01:45]	1	28 MPH	72 F	Dry		
[01:45-02:00]	0	0 MPH	72 F	Dry		
[02:00-02:15]	1	32 MPH	72 F	Dry		
[02:15-02:30]	2	30 MPH	72 F	Dry		
[02:30-02:45]	2	28 MPH	72 F	Dry		
[02:45-03:00]	0	0MPH	72 F	Dry		
[03:00-03:15]	2	28 MPH	72 F	Dry		
[03:15-03:30]	0	0 MPH	70 F	Dry		
[03:30-03:45]	0	0 MPH	70 F	Dry		
[03:45-04:00]	2	33 MPH	70 F	Dry		
[04:00-04:15]	0	0 MPH	70 F	Dry		
[04:15-04:30]	0	0 MPH	70 F	Dry		
[04:30-04:45]	4	30 MPH	70 F	Dry		
[04:45-05:00]	7	23 MPH	70 F	Dry		
[05:00-05:15]	13	29 MPH	70 F	Dry		
[05:15-05:30]	16	28 MPH	70 F	Dry		
[05:30-05:45]	33	27 MPH	68 F	Dry		
[05:45-06:00]	61	28 MPH	68 F	Dry		
[06:00-06:15]	107	28 MPH	68 F	Dry		
[06:15-06:30]	102	28 MPH	68 F	Dry		
[06:30-06:45]	141	28 MPH	68 F	Dry		
[06:45-07:00]	136	28 MPH	68 F	Dry		
[07:00-07:15]	136	29 MPH	68 F	Dry		
[07:15-07:30]	158	29 MPH	68 F	Dry		
[07:30-07:45]	148	28 MPH	68 F	Dry		
[07:45-08:00]	119	28 MPH	68 F	Dry		
[08:00-08:15]	106	28 MPH	68 F	Dry		
[08:15-08:30]	91	28 MPH	70 F	Dry		
[08:30-08:45]	78	29 MPH	70 F	Dry		
[08:45-09:00]	51	27 MPH	70 F	Dry		

#### Date/Time/Volume/Average Speed/Temperature Report

HI-Star ID: 1275 Street: Tanyard Hill Rd. State: VA Begin: Jun/08/2010 12:00:00 AM Lane: 2-way Oper: vet

End: Jun/09/2010 12:00:00 AM Hours: 24.00

Period: 15

City: Woodbridge	Posted: 25		Raw Count: 4495		
County: Prince William	AADT Factor: 1		AADT Count: 4,495		
Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry	
Tue,Jun/08/2010				<del></del>	
[09:00-09:15]	44	29 MPH	72 F	Dny	
[09:15-09:30]	32	28 MPH	72 F	Dry	
[09:30-09:45]	44	28 MPH	72 F	Dry	
[09:45-10:00]	35	29 MPH	74 F	Dry Dry	
[10:00-10:15]	29	27.MDU	70 5	•	
[10:15-10:30]	33	27 MPH	76 F	Dry	
[10:30-10:45]	32	28 MPH	76 F	Dry	
[10:45-11:00]	41	28 MPH 28 MPH	80 F 78 F	Dry	
•	71	20 WIFT	701	Dry	
[11:00-11:15]	42	29 MPH	78 F	Dry	
[11:15-11:30]	33	27 MPH	78 F	Dry	
[11:30-11:45]	50	28 MPH	78 F	Dry	
[11:45-12:00]	47	29 MPH	85 F	Dry	
[12:00-12:15]	46	28 MPH	85 F	Dry	
[12:15-12:30]	27	28 MPH	83 F	Dry	
[12:30-12:45]	34	29 MPH	83 F	Dry	
[12:45-13:00]	47	28 MPH	85 F	Dry	
[13:00-13:15]	45	27 MPH	91 F	Dry	
[13:15-13:30]	52	29 MPH	99 F	Dry	
[13:30-13:45]	44	28 MPH	105 F	Dry	
[13:45-14:00]	35	28 MPH	99 F	Dry	
[14:00-14:15]	35	28 MPH	95 F	Dry	
[14:15-14:30]	56	27 MPH	91 F	Dry	
[14:30-14:45]	39	30 MPH	89 F	Dry	
[14:45-15:00]	59	30 MPH	89 F	Dry	
[15:00-15:15]	53	29 MPH	89 F	Dry	
[15:15-15:30]	55	29 MPH	87 F	Dry	
[15:30-15:45]	55	29 MPH	87 F	Dry	
[15:45-16:00]	79	28 MPH	87 F	Dry	
[16:00-16:15]	80	29 MPH	85 F	D.m.	
[16:15-16:30]	109	26 MPH	85 F	Dry	
[16:30-16:45]	105	24 MPH	85 F	Dry Dry	
[16:45-17:00]	127	22 MPH	87 F	Dry	
[17:00-17:15]	139	24 MPH	01 E		
[17:15-17:30]	131		91 F	Dry	
[17:13-17:30]	102	24 MPH 26 MPH	91 F 89 F	Dry	
[17:45-18:00]	86	26 MPH	89 F	Dry	
[77.40 10.00]	00	ISIVIED	OB I	Dry	

#### Date/Time/Volume/Average Speed/Temperature Report

HI-Star ID:1275 Street:Tanyard Hill Rd.

Begin: Jun/08/2010 12:00:00 AM Lane: 2-way

End: Jun/09/2010 12:00:00 AM

Hours: 24.00

State:VA City:Woodbridge County:Prince William	Oper: vet Posted: 25 AADT Factor: 1		Period: 15 Raw Count: 4495 AADT Count: 4,495	
Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry
Tue,Jun/08/2010				
[18:00-18:15]	134	22 MPH	89 F	Dry
[18:15-18:30]	136	22 MPH	89 F	Dry
[18:30-18:45]	104	23 MPH	89 F	Dry
[18:45-19:00]	69	28 MPH	85 F	Dry
[19:00-19:15]	44	28 MPH	85 F	Dry
[19:15-19:30]	38	27 MPH	83 F	Dry
[19:30-19:45]	29	28 MPH	82 F	Dry
[19:45-20:00]	30	28 MPH	82 F	Dry
[20:00-20:15]	32	28 MPH	80 F	Dry
[20:15-20:30]	28	27 MPH	80 F	Dry
[20:30-20:45]	30	28 MPH	78 F	Dry
[20:45-21:00]	22	27 MPH	78 F	Dry
[21:00-21:15]	23	28 MPH	78 F	Dry
[21:15-21:30]	28	28 MPH	78 F	Dry
[21:30-21:45]	16	27 MPH	76 F	Dry
[21:45-22:00]	20	29 <b>MP</b> H	76 F	Dry
[22:00-22:15]	19	32MPH	76 F	Dry
[22:15-22:30]	13	26 MPH	76 F	Dry
[22:30-22:45]	14	29MPH	76 F	Dry
[22:45-23:00]	10	28 <b>MP</b> H	76 F	Dry
[23:00-23:15]	9	31 MPH	76 F	Dry
[23:15-23:30]	9	27 MPH	76 F	Dry
[23:30-23:45]	4	33 MPH	76 F	Dry
[23:45-00:00]	4	24 MPH	76 F	Dry
Jun/08/2010 12:00:00 AM				
Jun/09/2010 12:00:00 AM	4495	28 MPH	78 F	

========== [ Report #1 DATE/TIME/VOLUME Report ]================================ Begi06/08/2010 00:00 End:06/09/2010 Survey #: 413 00:00 Route: Herndon Rd. 2-way Lane: Hours: 24 hrs

Loc/Sta west of Tanyard Hill Oper: vet AdjF: 0.000 Period: 15 min Lake Ridge, VA Posted: 25 Raw Count: 92 mph AADT Count ( 92) County: Prince William AADT Factor: 1.00

County: Prince William	AADI Factor:	1.00	AADI Count: 92)
Day	Date		Count
Tue	06/08/2010	00:00	0
Tue	06/08/2010	00:15	Ö
Tue	06/08/2010	00:30	0
Tue	06/08/2010	00:45	0
Tue	06/08/2010	01:00	0
Tue	06/08/2010	01:15	0
Tue	06/08/2010	01:30	0
Tue	06/08/2010	01:45	0
Tue	06/08/2010	02:00	0
Tue	06/08/2010	02:15	0
Tue	06/08/2010	02:30	0
Tue	06/08/2010	02:45	0
Tue	06/08/2010	03:00	0
<u>T</u> ue	06/08/2010	03:15	0
Tue	06/08/2010	03:30	0
Tue	06/08/2010	03:45	0
Tue	06/08/2010	04:00	0
Tue	06/08/2010	04:15	0
Tue	06/08/2010	04:30	0
Tue	06/08/2010	04:45	0
Tue Tue	06/08/2010 06/08/2010	05:00	0
Tue	06/08/2010	05:15 05:30	0 0
Tue	06/08/2010	05:45	2
Tue	06/08/2010	06:00	2
Tue	06/08/2010	06:15	1
Tue	06/08/2010	06:30	1
Tue	06/08/2010	06:45	2
Tue	06/08/2010	07:00	0
Tue	06/08/2010	07:15	0
Tue	06/08/2010	07:30	2
Tue	06/08/2010	07:45	2
Tue	06/08/2010	00:80	2
Tue	06/08/2010	08:15	1
Tue	06/08/2010	08:30	0
Tue	06/08/2010	08:45	1
Tue	06/08/2010	09:00	1
Tue	06/08/2010	09:15	0
Tue	06/08/2010	09:30	2
<u>T</u> ue	06/08/2010	09:45	1
Tue	06/08/2010	10:00	0
Tue	06/08/2010	10:15	0
Tue	06/08/2010	10:30	3
Tue	06/08/2010	10:45	1

======== [ Report #1 DATE/TIME/VOLUME Report ]========== Survey #: 413 Route: Herndon Rd. Lane:

2-way

Begi06/08/2010 00:00 End:06/09/2010

Hours: 24 hrs vet AdjF: 0.000 Period: 15 min

Loc/Sta west of Tanyard Hill Oper: City: Lake Ridge, VA Posted: 25
County: Prince William AADT Factor:

mph

Raw Count: 92

County: Prince William	AADT Factor:	1.00	AADT Count: 92
Da <i>y</i>	 Date	 Time	Count
Tue	06/08/2010	11:00	2
Tue	06/08/2010	11:15	1
Tue	06/08/2010	11:30	1
Tue	06/08/2010	11:45	4
Tue	06/08/2010	12:00	i
Tue	06/08/2010	12:15	Ō
Tue	06/08/2010	12:30	1
Tue	06/08/2010	12:45	3
Tue	06/08/2010	13:00	1
Tue	06/08/2010	13:15	3
Tue	06/08/2010	13:30	2
Tue	06/08/2010	13:45	1
Tue	06/08/2010	14:00	4
Tue	06/08/2010	14:15	3
Tue	06/08/2010	14:30	2
Tue	06/08/2010	14:45	2
Tue	06/08/2010	15:00	2
Tue	06/08/2010	15:15	0
Tue	06/08/2010	15:30	0
Tue	06/08/2010	15:45	0
Tue	06/08/2010	16:00	1
Tue	06/08/2010	16:15	0
Tue	06/08/2010	16:30	1
Tue	06/08/2010	16:45	4
Tue	06/08/2010	17:00	2
Tue	06/08/2010	17:15	2 2 2
Tue	06/08/2010	17:30	2
Tue	06/08/2010	17:45	1
Tue	06/08/2010	18:00	3
<u>T</u> ue	06/08/2010	18:15	2
<u>T</u> ue	06/08/2010	18:30	5
<u>T</u> ue	06/08/2010	18:45	5
<u>T</u> ue	06/08/2010	19:00	1
<u>T</u> ue	06/08/2010	19:15	0
<u>T</u> ue	06/08/2010	19:30	0
<u>T</u> ue	06/08/2010	19:45	2
<u>T</u> ue		20:00	1
<u>T</u> ue		20:15	1
Tue	_	20:30	0
Tue		20:45	0
Tue		21:00	0
Tue		21:15	0
		21:30	1
Tue	06/08/2010	21:45	0

NU-METRI	CS CDM FRAME STUD	Y CDM Ver	sion 2.3 0	6/09/2010
======= [ Re	port #1 DATE/TIME	/VOLUME Repo	rt ]========	=======
Survey #: 413	Begi <b>06</b> /08/20	10 00:00	End:06/09/2010	00:00
Route: Herndon Rd.	Lane: 2-wa		Hours : 24 hrs	00.00
Loc/Sta west of Tanyard			Period: 15 min	
City: Lake Ridge, VA	Posted: 25	mnh	Raw Count: 92	
County: Prince William	AADT Factor:	1 00	AADT Count: 92	
======================================		1.00	AADI COUNT: 92	
Day				=======
	Date 	Time	Count	
T		=========		=======
Tue	06/08/2010	22:00	О	
Tue	06/08/2010	22:15	0	
Tue	06/08/2010	22:30	0	
Tue	06/08/2010	22:45	0	
Tue	06/08/2010	23:00	0	
	00/00/2010	7.3.LUU	1,7	
Tue	• •		0 1	
Tue Tue	06/08/2010	23:15	1	
Tue	06/08/2010 06/08/2010	23:15 23:30	1 0	
	06/08/2010	23:15	1	

<sup>\*</sup> Page 3 \*

## Virginia Department of Transportation Traffic Engineering Division 2008 Annual Average Daily Traffic Volume Estimates By Section of Route Prince William Maintenance Area

					Prince	e vvilliam	Mainten	ance A	rea							
Route	Length	AADT	QA	4Tire	Bus		Tru 3+Axle		2Trail	QC	K Factor	QK	Dir Factor	AAWDT	QW	Year
Prince William County	<del> </del>															
		From					lın Farm I						•			-
640 Minnieville Rd	0.26	33000	G	98%	0%	1%	0%	0%	0%	F	0.078	F	0.658	35000	G	2008
(640) Minnieville Rd	2.38	25000	L	98%	1%	76-2000 S	moketown 1%	Rd 0%	0%	F	<del> </del>			28000	G	2008
		To				76-641 O	ld Bridge	Rd			$\neg$					
		From	:			76-3000 I	Pr Wm Pk	arv.								
641) Old Bridge Rd	1.27	35000	G	98%	0%	1%	0%	0%	0%	С	0.088	F	0.515	38000	G	2008
	* .	From				76-2217 (	Cricket La	ne								
(641) Old Bridge Rd	0.31	36000	G	98%	0%	0%	0%	0%	0%	F	0.085	F	0.641	39000	G	2008
641) Old Bridge Rd	0.19	37000	G	98%	0%	76-2220 H 0%	edges Rur 0%	Dr 0%	00/	F	0.007		0.000	40000		2000
641) Old Bridge ( td	0.13	37000		3070	U 70		0 76	070	0%		0.087	Г	0.668	40000	G	2008
Old Bridge Bd	4.50	From:	<u> </u>				Cavalier I				_}_					<del></del>
641) Old Bridge Rd	1.50	45000		98%	0%	0%	0%	0%	0%	С	0.087	F	0.727	49000	G	2008
		From:					Colby Ro				<b>→</b>					
(641) Old Bridge Rd	0.37	46000	G	98%	0%	0%	0%	0%	0%	F	0.087	F	0.733	49000	G	2008
		To-				76-640 M	innieville	Rd			$\neg$ —					
641) Old Bridge Rd	0.33	(52000)	) G	98%	1%	1%	1%	0%	0%	F	0.081	F	0.716	56000	G	2008
<u> </u>		To				76-2100 Ta	anyard Hill	Rd								
641) Old Bridge Rd	0.73 (	49000	G	98%	1%	1%	1%	0%	0%	F	0.079	F	0.699	53000	G	2008
												•	0.000	00000	Ŭ	2000
641) Old Bridge Rd	0.33	44000	Ğ	98%	1%	06 Occoquar 1%	1%	SR 253>	0%	С	0.077	F	0.744	40000	$\overline{}$	2000
641) Old Bridge Rd	0.00	To:	<u> </u>	30 /6	1 /0		Fordon Bly		U%	<u> </u>	0.077	г	0.744	48000	G	2008
		P														
Hoodly Dd	4.05	From:	<u> </u>	070/	201		Dumfries F				<b>_</b>	_			_	
642) Hoadly Rd	1.35	12000	G	97%	0%	1%	1%	0%	0%	F	0.089	F	0.533	13000	G	2008
		. To:				76-631	Kahns Rd				$\exists$ —					
642) Hoadly Rd	1.24	14000	G	97%	0%	1%	1%	0%	0%	F	0.088	F	0.561	15000	G	2008
<u> </u>		To:					3; 76-784									
Hondly Pd	2.42		G	070/	00/		Dale Blvd		004			_		0.4000	_	
642) Hoadly Rd	2.13	23000 To:		97%	0%	1%	1%	0%	0%	С	0.099	F	0.695	24000	G	2008
						-3000 Pr W										
643) Purcell Rd	2.00	From:	<u> </u>	000/	00/	SR 234 D						_				
643) Purcell Rd	3.26	4500	G	99%	0%	1%	0%	0%	0%	С	0.089	F	0.511	4900	G	2008
		From:				76-642 W	Hoadly Ro									
643) Spriggs Rd	4.67	8800	G	97%	0%	1%	1%	0%	0%	С	<b></b> 0.086	F	0.608	9500	G	2008
<del></del>		Toul								<u> </u>	<b>-</b> 0.000	•	0.000	0000	J	2000
643) Spriggs Rd	0.27	NA From:		·		SR 234 S,	Dumfries	Rd			٦			N/A		· ·
643) Spriggs Ra	0.27	Ta:				76 2121 1					¬NA			NA		
·						76-3121 F										
Eroo St	0.46	From:				76-772 M	larsteller [	)r			ᆜ					
644) Free St	0.16	100 To:	R			76 710	N. 1 . 6.				NA NA			NA		10/20/200
······································						76-718	Nokes St									
		From:				76-607 Can	riage Ford	Rd								
645) Hazelwood Dr	2.20	340	R								_NA			NA		10/19/200
		Io: From:				76-611 S, F										
645) Deepwood Lane	1.20	170	R			76-611 N, I	leetwood	Dr			⊢ NA			NΙΔ		10/10/200
645) Deepwood Lane	1.20	то:Г	- 11			Doo	d End							NA		10/19/200
· ·		From:						1			<del></del>	*				
646) Aden Rd	0.47	į.		0.40/	10/	SR 28 No			00/			_	0.540	0500	_	0000
Aden Rd	0.47	2300	G	94%	1%	3%	1%	1%	0%	F	0.092	F	0.549	2500	G	2008
		To: From:				76-772 M										<del></del>
Aden Rd	0.47	2000	G	94%	1%	3%	1%	1%	0%	F	0.094	F	0.532	2200	G	2008
$\overline{}$		To:				76-671 C	olvin Land	;			¬—					
646) Aden Rd	1.13	5400	G	94%	1%	3%	1%	1%	0%	С	0.079	F	0.512	5800	G	2008

## **APPENDIX C**

Level Of Service (LOS) Information and Criteria

Exhibit 16-2. Level-of-Service Criteria for Signalized Intersections

Level Of Service (LOS)	Stopped Delay per Vehicle (sec.)
A	< 10.0
В	$\stackrel{-}{>}$ 10.0 and $\stackrel{<}{\leq}$ 20.0
$\mathbf{C}$	> 20.0  and  < 35.0
D	> 35.0  and  < 55.0
E	> 55.0  and  < 80.0
F	> 80.0

Exhibit 17-2. Level-of-Service Criteria for TWSC (Unsignalized) Intersections

Level Of Service (LOS)	Average Total Delay (sec./veh.)
A	< 10.0
В	$\frac{-}{>}$ 10.0 and $<$ 15.0
$\mathbf{C}$	> 15.0  and  < 25.0
D	> 25.0  and  < 35.0
${f E}$	> 35.0  and  < 50.0
F	> 50.0

Source: 2000 Highway Capacity Manual

#### Level of Service for Signalized Intersections

Level of service for signalized intersections is defined in terms of *delay*. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. Specifically, Level-Of-Service criteria are stated in terms of the average stopped delay per vehicle for a 15-minute analysis period. The criteria are given in Table 9-1.

- <u>Level-Of-Service A (LOS=A)</u> describes operations with very low delay, i.e., less than 10.0 seconds per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
- <u>Level-Of-Service B (LOS=B)</u> describes operations with delay in the range of 10.1 to 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS=A, causing higher levels of average delay.
- <u>Level-Of-Service C (LOS=C)</u> describes operations with delay in the range of 20.1 to 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
- <u>Level-Of-Service D (LOS=D)</u> describes operations with delay in the range of 35.1 to 55.0 seconds per vehicle. At LOS=D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
- <u>Level-Of-Service E (LOS=E)</u> describes operations with delay in the range of 55.1 to 80.0 seconds per vehicle. This is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.
- Level-Of-Service F (LOS=F) describes operations with delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Source: 2000 Highway Capacity Manual

3-10 FREEWAYS

General descriptions of operating conditions for each of the levels of service are as follows:

- 1. Level-of-service A—Level A describes primarily free flow operations. Average travel speeds near 60 mph generally prevail on 70-mph freeway elements. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream. The average spacing between vehicles is about 440 ft, or 22 carlengths, with a maximum density of 12 pc/mi/ln. This affords the motorist a high level of physical and psychological comfort. The effects of minor incidents or breakdowns are easily absorbed at this level. Although they may cause a deterioration in LOS in the vicinity of the incident, standing queues will not form, and traffic quickly returns to LOS A on passing the disruption.
- 2. Level-of-service B—Level B also represents reasonably free-flow conditions, and speeds of over 57 mph are maintained on 70-mph freeway elements. The average spacing between vehicles is about 260 ft, or 13 car-lengths, with a maximum density of 20 pc/mi/ln. The ability to maneuver within the traffic stream is only slightly restricted, and the general level of physical and psychological comfort provided to drivers is still high. The effects of minor incidents and breakdowns are still easily absorbed, though local deterioration in service would be more severe than for LOS A.
- 3. Level-of-service C—Level C provides for stable operations, but flows approach the range in which small increases in flow will cause substantial deterioration in service. Average travel speeds are still over 54 mph. Freedom to maneuver within the traffic stream is noticeably restricted at LOS C, and lane changes require additional care and vigilance by the driver. Average spacings are in the range of 175 ft, or 9 car-lengths, with a maximum density of 30 pc/mi/ln. Minor incidents may still be absorbed, but the local deterioration in service will be substantial. Queues may be expected to form behind any significant blockage. The driver now experiences a noticeable increase in tension due to the additional vigilance required for safe operation.
- 4. Level-of-service D—Level D borders on unstable flow. In this range, small increases in flow cause substantial deterioration in service. Average travel speeds of 46 mph or more can still be maintained on 70-mph freeway elements. Freedom to maneuver within the traffic stream is severely limited, and the driver experiences drastically reduced physical and psychological comfort levels. Even minor incidents can be expected to create substantial queuing, because the traffic stream has little space to absorb disruptions. Average spacings are about 125 ft, or 6 car-lengths, with a maximum density of 42 pc/mi/ln.
- 5. Level-of-service E—The boundary between LOS D and LOS E describes operation at capacity. Operations in this level are extremely unstable, because there are virtually no usable gaps in the traffic stream. Vehicles are spaced at approximately 80 ft, or 4 car-lengths, at relatively uniform headways. This, however, represents the minimum spacing at which stable flow can be accommodated. Any disruption to the traffic stream, such as a vehicle entering from a ramp, or a vehicle changing lanes, causes following vehicles to give way to admit the vehicle. This condition establishes a disruption wave which propagates through the upstream traffic flow. At capacity, the traffic stream has no ability to dissipate even the most minor disruptions. Any incident can be expected to produce a serious breakdown with extensive queuing. The range of flows encompassed by LOS E is relatively small compared to other levels, but reflects a sub-

stantial deterioration in service. Maneuverability within the traffic stream is extremely limited, and the level of physical and psychological comfort afforded to the driver is extremely poor. Average travel speeds at capacity are approximately 30 mph.

- 6. Level-of-service F—Level F describes forced or breakdown flow. Such conditions generally exist within queues forming behind breakdown points. Such breakdowns occur for a number of reasons:
- a. Traffic incidents cause a temporary reduction in the capacity of a short segment, such that the number of vehicles arriving at the point is greater than the number of vehicles that can traverse it.
- b. Recurring points of congestion exist, such as merge or weaving areas and lane drops, where the number of vehicles arriving is greater than the number of vehicles traversing the point.
- c. In forecasting situations, any location presents a problem when the projected peak hour (or other) flow rate exceeds the estimated capacity of the location.

It is noted that in all cases, breakdown occurs when the ratio of actual arrival flow rate to actual capacity or the forecasted flow rate to estimated capacity exceeds 1.00. Operations at such a point will generally be at or near capacity, and downstream operations may be better as vehicles pass the bottleneck (assuming that there are no additional downstream problems). The LOS F operations observed within a queue are the result of a breakdown or bottleneck at a downstream point. The designation "LOS F" is used, therefore, to identify the point of the breakdown or bottleneck, as well as the operations within the queue which forms behind it.

The extent of queuing, and the delays caused by queuing, are of great interest in the analysis of congested freeway segments. Chapter 6 contains a methodology for estimating the queue length and delays behind a bottleneck with known arrival and discharge rates. The procedure allows a rough quantification of the extent of congestion created by a LOS F situation.

#### **BASIC RELATIONSHIPS**

#### Maximum Service Flow Rate Per Lane

Table 3-1 presents criteria for maximum service flow rate, MSF, under ideal conditions, for 70-mph, 60-mph, and 50-mph design speed elements. These values are computed from the volume-to-capacity ratios, v/c, as follows, then rounded to the nearest 50 pcphpl.

$$MSF_i = c_j \times (v/c)_i \tag{3-1}$$

where:

 $MSF_i$  = maximum service flow rate per lane for LOS *i* under ideal conditions, in pephpl;

 $(v/c)_i = \text{maximum volume-to-capacity ratio associated with LOS } i$ :

 $c_j$  = capacity under ideal conditions for freeway element of design speed j; 2,000 pcphpl for 60-mph and 70-mph freeway elements, 1,900 pcphpl for 50-mph freeway elements; the value of  $c_j$  is synonymous with the maximum service flow rate for LOS E in Table 3-1.

Note that all values of MSF given in Table 3-1 have been rounded to the nearest 50 pephpl.



Illustration 3-5. Level-of-service A.



Illustration 3-8. Level-of-service D.



Illustration 3-6. Level-of-service B.

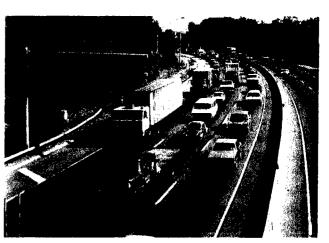


Illustration 3-9. Level-of-service E.



Illustration 3-7. Level-of-service C.



Illustration 3-10. Level-of-service F.

### **APPENDIX D**

# Existing 2010 AM/PM Peak Hour Intersection Synchro Analysis Printouts

	•	-	♣—	•	-	4						
Movement	EBL	EBT	WBT	WBR	SBL	SBR						
Lane Configurations	J.	ተተተ	<b>ተ</b> ተጉ		ሻ	7						
Sign Control Grade		Free	Free		Stop	the service		511				
Volume (veh/h)	512	0% 3104	0% <b>530</b>	14	0% 3	32	in the property of		e de le Colonia		naga nga	1 E V
Peak Hour Factor	0.93	0.93	0.91	0.91	0.65	0.65		and, fi				
Hourly flow rate (vph)	551	3338	582	15	5.	49	A Jacks			Jak		
Pedestrians	enenten ikulioa	You have and the	ome o saver		***							vister um us
Lane Width (ft) Walking Speed (ft/s)												
Percent Blockage				ance tal		yawa ayo	as sa s	arak p			Che887 278	HISKRV
Right turn flare (veh)		841. 2 19	W5 W 400	CI IVE	0".   E1-1445?	4	hid - A. Alwi			i ia w.	4400 14	
Median type					Raised							
Median storage veh)	El-Esaykani	- 3528600 - 50	880188155 - 188		0	.a. 20 80000 12	Bundaner * avis	FOLKKING SIG	EC 569 '6' 1116.	Printer and the second second	28 11627 - 23 - 886 - 9	To come and a
Upstream signal (ft) pX, platoon unblocked									Tia A			
vC, conflicting volume	598				2804	202						
vC1, stage 1 conf vol	2001 - 4 30F38.7V.	2 N. 18009980	(+1803).Bear	V 1886 (1986)	590		D) 1 3.338	West e.				
vC2, stage 2 conf vol					2214							
vCu, unblocked vol tC, single (s)	598 4.1	8088847 A		: - North (1971)	2804	202	er er erkkommen i	7 - William (1986)			STYTT, A SHEET	1864-3802514 (1836-88)
tC, 2 stage (s)	4,1				<b>6.8</b> 5.8	6.9						
tF (s)	2.2				3.5	3.3			P48 - 6 - 8 - 8 - 8 - 8 - 8 - 8 - 8 - 8 -			
p0 queue free %	44	29: · · · · · · · · · · · · · · · · · · ·		WARRENCE SERV.	77	94	22 22 ( 1884 ( 70 ; 0) )	E	VIX.7 2022 Sa 3	P. See Juni 1986 holded	XXX 456 1 500 XX	RKE CANTAKS
cM capacity (veh/h)	982				20	808						
Diebug Jaret	EB 1	<b>FB</b> 2		EB4	WE 1	Thus R	Maria.	89 1		70		
Volume Total	- 551	1113	1113	1113	293	298	#32	54				
Volume Left Volume Right	551 0	0	0	0	0	0	0	5	1988-1998		S 282186	De se escus
cSH	982	1700	1700	1700	1700	1700	15 1700	49 235				
Volume to Capacity	0.56	0.65	0.65	0.65	0.14	0.14	0.08					
Queue Length 95th (ft)	90	0	0	0	0	0	0	21			dragger as acco	3.3.55 (2.38)
Control Delay (s) Lane LOS	13.2 B	0.0	0.0	0.0	0.0	0.0	0.0	28.7				
Approach Delay (s)					0.0			D <b>28</b> .7				\$240 N.A
Approach LOS	97: -5 879660.	C" 60: 200 (XX)	VC36 192 1579488				AGUS #7:57 1	D				
Intersection Summary												
Average Delay			(1.9)	A								
Intersection Capacity Util	ization		70.0%	Į(	CU Leve	l of Ser	vice		С			
Analysis Period (min)			15		hidaijae 8805	2.638888 S. 354	SE 8 J. S. NOMBERS	g 8 87 .88	8888895V.	. 13K888 3.14	zi . 2002 -556	Section sine as
		Jany a					Marie II	k testiá				

	•		<b>←</b>	•	<b>\</b>	4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR					
Lane Configurations	ሻ	ተተተ	ተተሱ		ሻ	7					
Sign Control Grade		Free 0%	Free 0%	4 7	Stop 0%	Sayrener T					
Volume (veh/h)	46	1158	2766	4	7	350		Way shirt		26. <sup>475</sup> (8. 1)	
Peak Hour Factor	0.93	0.93	0.94	0.94	0.78	0.78	i akan		en enginae ing	National Confidence	Ota Willer 1 Mills
Hourly flow rate (vph) Pedestrians	49	1245	2943	4	9	449		yal ar			
Lane Width (ft)						a dage.		건물(B)			\$16. Jan 187 -
Walking Speed (ft/s)	STAN BA	ria. Tam	361 6 714	kr i sasti i	K 34 K	1864 - 1885 P.	allejar I i i i i	######################################	The complete of the control of the c		
Percent Blockage						a Hib	y Ed				
Right turn flare (veh) Median type			. ACOCC 51		المعقامة	4	E 18238820	Bur delama			2000-US MESSON
Median storage veh)				Ţ	Raised 0						
Upstream signal (ft)											
pX, platoon unblocked		ST STELSUNGSPREST	· -3 /800/85°2 *		: - Sig. Protestration	- 2012-04-04-04-04-04-04-04-04-04-04-04-04-04-	2	AND 801 W.C			700 to 500 to 500 23
vC, conflicting volume vC1, stage 1 conf vol	2947				<b>3459</b> 2945	983					
vG2, stage 2 conf vol					514			4.75.544			25832 A.F.
vCu, unblocked vol	2947	LANGE COMPANY	(373" % 7578	**************************************	3459	983		PTMC/22F S	1.1.00000000000000000000000000000000000		
tC, single (s)	4.1				6.8	6.9					
tC, 2 stage (s) tF (s)	2.2				5.8 3. <b>5</b>	3.3					
p0 queue free %	58		(58 W (******)		47	0.0	Bericke all	28623823			
cM capacity (veh/h)	119				17	248					
Drection Lanex						INE 2	WE 3				
Volume Total	40	415	415			1177	523	450			
Volume Left Volume Right	49 0	0	0 <b>0</b>	0	0	0	0 4	9 <b>449</b>	ára - Maria Araba	\$	
cSH	119	1700	1700	1700	1700	1700	1700	253			
Volume to Capacity	0.42	0.24	0.24	0.24	0.69	0.69	0.35	1.81			
Queue Length 95th (ft) Control Delay (s)	44 55.4	0	0	0	0	0	0	778		(\$4000000000000000000000000000000000000	20. 4 20. 4 200 . 1444 . 1.
Lane LOS	- 35.4 F	0.0	0.0	0.0	0.0	0.0	0.0	413.1			
Approach Delay (s)	2.1				0.0			413.1			
Approach LOS								F			
Intersection Summary			<u> </u>	<del></del>							
Average Delay Intersection Capacity Uti	lization		40.8 31.9%	$^{\prime}\mathcal{E}$	111 AV	l of Co-	doo		D.	a constants	
Analysis Period (min)	iiratioi I		15		A FEAR	l of Serv	VICE:		שיים		

### **APPENDIX E**

Yr. 2013 "Background" AM/PM Peak Hour Intersection

Synchro Analysis Printouts

	•	-	<b>←</b>	•	-	1							
Movement	EBL	EBT	WBT	WBR	SBL	SBR							
Lane Configurations	ħ	ተተተ	<del>ተ</del> ቀሱ	and the second	ሻ	7	4.						
Sign Control Grade		Free	Free		Stop			1	-				
Volume (veh/h)	543	0% <b>3294</b>	0% <b>562</b>	ं ंश्वास	0%		- 1 a a a a	13 6 3		a sagari sa	1 pres ()	es en en en en	
Peak Hour Factor	0.93	0.93	0.91	15 0.91	3 0.65	34 0.65				都等14%			
Hourly flow rate (vph)	584	3542	618	16	5	52	ara Piggila	(4) <b>有</b> 例	riya w	5387813		1 362, Julie	
Pedestrians	** . \$74 <b>7</b> 9 * *	Clima descri	ి కువామందా	is start (Tr	· · · · · · · · · · · · · · · · · · ·	1965 - <b>Y.M</b> .	Sec. Separate	ti i saiti			1.51.872.3		KI H
Lane Width (ft)		J. Prist					FALL IN			1840 E.			45 Q
Walking Speed (ft/s)	0.00. 0.00	YABIR LIBIT. A						as a Mahada a	22 F 317 F		Perri Boers et 1999	enn inn 4	380 1900
Percent Blockage							iv L						
Right turn flare (veh) Median type	Sawa	Same Total	r e suere	· Keralayaya	rs 200 2	<b>4</b> .0897 7884	800''' TESTLINO	S-1121 - 2598SD	CORN'S PO	Bryspre tro-	85. ×075.86000	40 21 2888 1 Hu + 1 3	Secularity of the
Median storage veh)				<i>10</i> 47:110	Raised		4.487.		KAM				
Upstream signal (ft)		ARYTH ARE			0			. Karang	7 115,000		,587853-3		#13K
pX, platoon unblocked		D-tumbore 3		757 R. 45775			1007 - 2.13	25.34				0.3449,355	.öğlüğ
vC, conflicting volume	634				2974	214							87.36
vC1, stage 1 conf vol		*AA. "II.ME" (\$15	· wons cs	PILMANUS A E PRESS	626	: a abescius	80 m ) 26 m	-3 <b>4</b> 0035	C3889758E -	: #31.48.60°E	(1986-119 <b>0</b> 8)		\$136.4
vC2, stage 2 conf vol					2348								
vCu, unblocked vol	634		98 - Cappage	87. 787088895, 790	2974	214	S. Commonweak, 20				***************************************		VM92: 381
tC, single (s) tC, 2 stage (s)	4.1				6.8	6.9							
tF (s)	2.2			G SL DAVIS	5.8 <b>3.5</b>	3,3		PET STATE	9477838388		D 755788695		. 3888; 17 <b>8</b>
p0 queue free %	39		E.A.807		ა.ა 69	93							
cM capacity (veh/h)	952			31	15	794							aw.v
Direction, Lane #	ER 1	<b></b>	leg s			IAND A		II be					78:3 
VO Umexitotela Prof. Rosa	784		7:81		27. <sub>7</sub>	24.7	445.3 140	(- 1 					
Volume Left	584	Ü	0	0	0	0	0		<b></b>				
Volume Right	0	0	0	Ö	Ö	Ö	16	52		-19			
csh	952	1700	1700	1700	1700	1700	1700	185	K\$CC\$35-36 1588	<b>4</b> 4100000000000000000000000000000000000			\$4000 A
Volume to Capacity	0.61	0.69	0.69	0.69	0.15	0,15	0.08	0.31					
Queue Length 95th (ft)	109	0	0	0	0	_ 0	0	31		Olio Albitto e e e a la l	ves : "+955,164 NAO	evil	
Control Delay (s) Lane LOS	14.6 B	0,0	0.0	0,0	0.0	0.0	0.0	35.8	41.554 #1.00490				
Approach Delay (s)	21		S 1877 . 178		0.0			E ne c	- Siassussissis (M.)	SEE THE	3 Ave	F - 578 7972 5 4440	A 7:
Approach LOS	<del></del>				0.0			35.8 E					
ntersection Summary								L	-			2777.00000	SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
Average Delay			(2.2)	) 4									
ntersection Capacity Utili	zation	-	73.6%	) A 	2111-00-	d of Oo.	rvice		9000	n			ST 1 754
Analysis Period (min)			15	, IV	on FRAE	71 UI 361	VICE		Wat i	ט			
,													
			10						100				

Movement	EBL	EBT	WBT	WBR	SBL	SBR					
Lane Configurations Sign Control	<b> </b>	<b>↑↑↑</b> Free	<b>11</b>		<u>ነ</u>	"آ				·	
Grade		0%	Free 0%		Stop 0%				n jagina		
Volume (veh/h)	49	1229	2935	4.	7	371			Per Pro	Askirsin	i gari
Peak Hour Factor Hourly flow rate (vph)	0.93 <b>53</b>	0.93 <b>1322</b>	0.94 <b>3122</b>	0.94	0.78 9	0.78 476	oriin illaan	7.84 LW			nanas.
Pedestrians					E WARRY.		il Assession			( 예약 : 사람보기 있 )	
Lane Width (ft) Walking Speed (ft/s)											
Percent Blockage			y 5 % San San	2007 SE	2008 - ES						
Right turn flare (veh)	SALARTY S T AGG			Access, 888, 77 - 5-28	Sidenia ( ) - id	4		75 GEF 135P		Mara Elskyr)	
Median type Median storage veh)					Raised 0						
Upstream signal (ft)											
pX, platoon unblocked vC, conflicting volume	3127				3670	1040	. a. 2020				
vC1, stage 1 conf vol	9121				3124	1043			***		
vC2, stage 2 conf vol	2407				546						
vCu, unblocked vol tC, single (s)	3127 4.1				3670 <b>6</b> .8	1043 6,9					
tC, 2 stage (s)	10000000				5.8				De 75		
tF (s) p0 queue free %	2.2 48				3.5 32	3.3 0					
cM capacity (veh/h)	100				13		Marine Common	SOCIONES NO PROCESSOR	C20 000 (1) (1%) #1000 (0000 ) vocasor		7-18-3-3-3
	**************************************				10	226					- NACHARA - 1804
Direction, Lane #	EB.1		EB 3	-EB 4	WB 1	226 WB 2	WB 3	- SB 1			
Vojumestojal 🖅 jy k 🗽	EB 1		E9 0 - 341	.EB4 - 441	WB 1 1249	WB 2 1249	WB 3 629	333			
Volume Total  Volume Left	53	Ō	Ō	Ö	WB 1 1249 0	WB 2 1249 0	0	485 <del>-</del> 9			
Volume Total Volume Left Volume Right cSH	53 0 100	0 0 1700	0 1700	0 0 1700	1249 0 0 1700	WB 2 1249 0 0 0 1700	0 <b>4</b> 1700	485 9 476 230			
Volume Total Volume Left Volume Right cSH Volume to Capacity	53 0 100 0.52	0 0 1700 0, <b>2</b> 6	0 0 1700 0. <b>26</b>	0 0 1700 0, <b>2</b> 6	WB 1 1249 0 0 1700 0,73	WB 2 1249 0 0 1700 0.73	0 4 1700 0.37	485 9 476 230 2.10			
Volume Total Volume Left Volume Right cSH Volume to Capacity Queue Length 95th (ft) Control Delay (s)	53 0 100	0 0 1700	0 1700	0 0 1700	1249 0 0 1700	WB 2 1249 0 0 0 1700	0 4 1700 0.37 0	485 9 476 230			
Volume Total Volume Left Volume Right cSH Volume to Capacity Queue Length 95th (ft) Control Delay (s) Lane LOS	53 0 100 0.52 59 75.0 F	0 0 1700 0, <b>26</b> 0	0 0 1700 0. <b>26</b> 0	0 0 1700 0, <b>26</b> 0	0 0 0 1700 0,73 0	WB 2 1249 0 0 1700 0.73 0	0 4 1700 0.37 0	485 9 476 230 2.10 918 545.6 F			
Volume Total Volume Left Volume Right cSH Volume to Capacity Queue Length 95th (ft) Control Delay (s) Lane LOS	53 0 100 0.52 59	0 0 1700 0, <b>26</b> 0	0 0 1700 0. <b>26</b> 0	0 0 1700 0, <b>26</b> 0	WB 1 1249 0 0 1700 0.73 0	WB 2 1249 0 0 1700 0.73 0	0 4 1700 0.37 0	485 9 476 230 2.10 918 545.6			
Volume Total Volume Left Volume Right cSH Volume to Capacity Queue Length 95th (ft) Control Delay (s) Lane LOS Approach Delay (s)	53 0 100 0.52 59 75.0 F	0 0 1700 0, <b>26</b> 0	0 0 1700 0. <b>26</b> 0	0 0 1700 0, <b>26</b> 0	0 0 0 1700 0,73 0	WB 2 1249 0 0 1700 0.73 0	0 4 1700 0.37 0	485 9 476 230 2.10 918 545.6 F			
Volume Total Volume Left Volume Right cSH Volume to Capacity Queue Length 95th (ft) Control Delay (s) Lane LOS Approach Delay (s) Approach LOS Intersection Summary Average Delay	53 0 100 0 52 59 75,0 F 2,9	0 0 1700 0.26 0 0.00	0 1700 0.26 0 0.0	0 0 1700 0,26 0 0.0	WB 1 1249 0 0 1700 0.73 0 0.0	VVB 2 1249 0 0 1700 0.73 0 0.0	0 4 1700 0.37 0 0.0	485 9 476 230 2.10 918 545.6 F			
Volume Total Volume Left Volume Right cSH Volume to Capacity Queue Length 95th (ft) Control Delay (s) Lane LOS Approach Delay (s) Approach LOS Intersection Summary Average Delay Intersection Capacity Ut	53 0 100 0 52 59 75,0 F 2,9	0 0 1700 0.26 0 0.00	0 1700 0.26 0 0.0	0 0 1700 0,26 0 0.0	0 0 0 1700 0,73 0	VVB 2 1249 0 0 1700 0.73 0 0.0	0 4 1700 0.37 0 0.0	485 9 476 230 2.10 918 545.6 F	E		
Volume Total Volume Left Volume Right cSH Volume to Capacity Queue Length 95th (ft) Control Delay (s) Lane LOS Approach Delay (s) Approach LOS Intersection Summary Average Delay	53 0 100 0 52 59 75,0 F 2,9	0 0 1700 0.26 0 0.00	0 1700 0.26 0 0.0	0 0 1700 0,26 0 0.0	WB 1 1249 0 0 1700 0.73 0 0.0	VVB 2 1249 0 0 1700 0.73 0 0.0	0 4 1700 0.37 0 0.0	485 9 476 230 2.10 918 545.6 F	E		

### **APPENDIX F**

Yr. 2013 "Total" AM/PM Peak Hour Intersection
Synchro Analysis Printouts

	٠	-	<b>←</b>	•	<b>\</b>	1						
Movement	EBL	EBT	WBT	WBR	SBL	SBR						
Lane Configurations	ኻ	ተተተ	<b>ተ</b> ተጉ		ሻ	7						
Sign Control		Free	Free		Stop	1.5					1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Grade Volume (veh/h)	565	0% <b>329</b> 4	0%	10	0%	27				una di Lagri		
Peak Hour Factor	0.93	0.93	6 <b>03</b> 0.91	18 0.91	9 0.65	37 0.65	tij to signi		1-0441	基取って、		
Hourly flow rate (vph)	608	3542	663	20	14				a karatai			
Pedestrians		11 197.4 List/921Nr - 14	. 7.11580114	tis a zentsta.	- 10 1050877		47 det 51	e i izvruži.	1111000000	uff. 879	か (数444 - 1) 15-15-	ti i Nuder etti sahi
Lane Width (ft) Walking Speed (ft/s)											Tiki	
Percent Blockage		S. A.										Jacob Jacob
Right turn flare (veh)			FED IT 4. (See 8)	Birna Shuk i mask	decessor e	4	SON COME LANGUAGE	134 800 00 952 611			23	
Median type Median storage veh)					Raised							
Upstream signal (ft)				i dan ka	0	Milia daka	8579E. LUSSØC		3.250000		. Rođenist	
pX, platoon unblocked	. XXVIVAE. 3,	3500 34.33	(#WW 18.5b)									2.4351 (b
vC, conflicting volume	682				3068	231						
vC1, stage 1 conf vol	C a lasasassa c	23a-1778070-173 T	C S COLUMN STREET STREET	INDIVIDUAL PRANCIS	673	*****************	Arrest, Arrestati	NAAAAA TI TITISA.			ioni marazerri ilea-	660° 77, 331-324°° 76
vC2, stage 2 conf vol vCu, unblocked vol	600				2396							
tC, single (s)	682 4.1				3068 6.8	231 6.9	3.000000			6.430.864.88		E X <b>383</b> 0-55
tC, 2 stage (s)	न,।				5.8	0.5						
tF (s)	2.2				3.5	3.3						
p0 queue free %	33	MANAGE CO 2 / 10.2			0	93	C-800 Tax 1 -200	Decay report of a 2 or	8:::::: (87.194.)		59 S480-P4850-A M/427 -	,5480 250%
cM capacity (veh/h)	913				12	775						
		FE 2					WB 1	- 58 t				
Volume Total	608	1151	1181	1181	265	266	152	71				
Volume Left Volume Right	608 <b>0</b>	0	0	0 0	0	0	0	14				BC*25 E322**6481.4
cSH	913	1700	1700	1700	0 1700	0 1700	<b>20</b> 1700	<b>5</b> 7	r 11 10 - 11 10 10 10 10 10 10 10 10 10 10 10 10			
Volume to Capacity	0.67	0.69	0.69	0.69	0.16	0.16	0.09	1.13				
Queue Length 95th (ft)	131	0	0	0	0	0	0	142	XX.5375744.08.000000		e pa la simblese	UMB(4: RE. "\$W
Control Delay (s)	16.4	0.0	0.0	0.0	0.0	0,0	0.0	148.5				
Lane LOS	C		COLLEGE LEVE	oografi se				F		8888 8 8 8 8 8 7 E 3 9	E 500-1285-8886	POST Jaharaanis oo d
Approach Delay (s) Approach LOS	2.4				0,0			148.5 F				
Intersection Summary												
Average Delay	ere vierie immerie	(V1.03880) July 6397-4	(4.2)	A								
Intersection Capacity Util	zation		73.6%	l(	CU Leve	el of Ser	vice		D			
Analysis Period (min)			15		hanan	8 <b>3</b> 9020 <b>3</b> 846 - A		\$2 (88%+ )	colonates	MARINE CO.	a Bereka 1982 e	
PERCETE STILLING STAVIOR	5 M - 1 75M	s : <b>II</b> I (2)	asa ali 1									

	•	<b>→</b>	←	•	-	4				
Movement	EBL	EBT	WBT	WBR	SBL	SBR				
Lane Configurations	آر	ተተተ	<b>ተ</b> ተጉ		ሻ	77			_	
Sign Control Grade		Free	Free	1.624	Stop					
Volume (veh/h)	55	0% 1229	0% <b>2947</b>	5	0% <b>70</b>	403	si ng sab	ely trials.		ALAM MARKE
Peak Hour Factor	0.93	0.93	0.94	0.94	0.78	0.78	if perfectly all	e jeg vijskaferiid	시킨 스 제휴생	
Hourly flow rate (vph)	59	1322	3135	5	90	517				图设置图片对
Pedestrians Lane Width (ft)	-6002e9557 . 536			SECTIVATES S		\$154.00 ps/ \$25.00	erina e inidan	er (a. a. mwa. er ce ja	c Callery Seeks	- 5 (*494.3% - 300 - 80% - 80% - 90% - 90% - 90% - 90% - 90% - 90% - 90% - 90% - 90% - 90% - 90% - 90% - 90% -
Walking Speed (ft/s)					Ewit i					
Percent Blockage										
Right turn flare (veh)	7000mm.1	-8 = WWYF5 40 A	sear animative.	E 1408-40	- 255 (5 (52 <b>33</b> )en	4	158 S.F. 1984G	01999 A SEESTI.	"DAMPERSONS" &	
Median type				ı	Raised					
Median storage veh) Upstream signal (ft)					0	vota i gleba				
pX, platoon unblocked							C. IZ. Sátříš			
vC, conflicting volume	3140				3697	1048				
vC1, stage 1 conf vol	E24000000000000000000000000000000000000	######################################	(SANSANIA 1. 7-111)	8084865V 3: . vi	3138	.:: SNYXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	-SHESSYSCELAU SYLLI'S III - 3	8621/789/9974096	0.650 1	SELECT S S TREES STREET AS A DOCUMENT
vC2, stage 2 conf vol vCu, unblocked vol	3140				<b>559</b> 3697	1048				
tC, single (s)	4.1				6.8	6.9				
tC, 2 stage (s)	TT 8. 1771.000001977	***************************************	C 273X.18388736	987: 180-96187	5.8					* 15
tF (s)	2.2				3.5	3.3				
p0 queue free % cM capacity (veh/h)	40 <b>99</b>				0 13	0 <b>224</b>				
**************************************	mn a	ma.	lea a		10			•		
Direction, Lane # Volume Total				441 - 441	493) 2422			8.1 306		11. 84 27
Volume Left	59	Ö	0	0	0		0 0	90		
Volume Right	0	0	0	0	0	0		517		
cSH		1700	1700	1700	1700		1700	66	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	DE 2000E FAR DV
Volume to Capacity  Queue Length 95th (ft)	0.60 71	0.26 0	0. <b>2</b> 6	0. <b>2</b> 6	0.74 0	0.74 0	0. <b>3</b> 7 9	). <b>2</b> 0 Err		
Control Delay (s)	84.7	0.0	0.0	0.0	0.0	0.0	0.0	Err		
Lane LOS	F				201 202 - 3.4400030		A6.81.54.1.9. SCA0999999	F		Mare e S. 2007 - 1185, 5 K
Approach Delay (s)	3.6				0.0			Err		
Approach LOS			No. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10					F		
Intersection Summary		<u></u>	400.5	_						
Average Delay Intersection Capacity Util	zation		183.5 8.7%	5 - 200 - 10 - 10 - 10 - 10 - 10 - 10 - 1	مريم ا ا ا	of Servi	ര			
Analysis Period (min)	ZUGUJI	######################################	15	:	AN FRAC	יו יום טייניונייני	ve			

	<i>→</i> →		4	· 4			
Movement	EBL EB	T WBT	WBR SBI	. SBR			
Lane Configurations	<b>^</b>				<u> </u>		
Sign Control Grade	Free		Stor 0%				
Volume (veh/h)	0 3859		40 (				
Peak Hour Factor	0.93 0.93		0.80 0.80		1	. : 1 : 1 : 1 : 1 : 1 : 1 : 1 : 1 : 1 :	
Hourly flow rate (vph) Pedestrians	0 4149	658	50 (	) 0			
Lane Width (ft)			YILERYY!				
Walking Speed (ft/s)	es par en marcher manne en u. Region particular i esta il 1860	ESTERNET C. TAR. C. A		6 (Albert 19 Uni - 64)	omining in the control of the		
Percent Blockage Right turn flare (veh)			PVIJET.				
Median type			None	v e	n en		
Median storage veh)		AMAR BULKERIA	/ ASIPABA (1971/49		SANGER TELEVISIONE		
Upstream signal (ft) pX, platoon unblocked							
vC, conflicting volume	708		2066	244			Ewista as a
vC1, stage 1 conf vol							
vC2, stage 2 conf vol vCu, unblocked vol	700						
tC, single (s)	708 4.1		2066 6.8				
tC, 2 stage (s)			· · · · · · · · · · · · · · · · · · ·	<b></b>	45 B : 140/2013 E 142		
tF (s) p0 queue free %	2.2		3.5	- 80.9 SASSAMENTEEST - DOWN			
cM capacity (veh/h)	100 <b>8</b> 93		100 47	***************************************			
Direction, Lane #	EB41 EB1		va 1 Was				
Volume Total	1383 - 1320	1000	263. : 1256				
Volume Left	0 0	0	Ö Ö	0			
Volume Right cSH	0 ( 1700 1700	No. 11 (1971) 11	0 0	\$266 (**)\$444 (* 1885, \$200 <b>4</b> 88 (*) 15			
Volume to Capacity	0.81 0.81	Andrea - a communication and a communication a	1700 1700 0.15 0.15				
Queue Length 95th (ft)	0 0	0	0 0	0			
Control Delay (s) Lane LOS	0.0 0.0	0.0	0.0 0.0	0.0			
Approach Delay (s)	0.0		0.0				
Approach LOS	28 # TABIME						
Intersection Summary		_			ne en e		
Average Delay	00/344300032/3007-0-0-000-	(0.0)	4	. to 300 4 27 New Westman			
Intersection Capacity Utiliz Analysis Period (min)	zation	77.9% 15	ICU Lev	el of Servic	<b>e</b>	D	
r maryolo i citou (miii)		10					

	•	→ ←	•	-	4				
Movement	EBL	EBT WBT	WBR	SBL	SBR				
Lane Configurations		<u></u>							
Sign Control		ree Free	g karanta	Stop					
Grade Volume (veh/h)	sitti kale <b>ka</b> ki a <b>a</b>	0% 0%		0%		e e e e e e e e e e e e e e e e e e e	eran eran er		
Peak Hour Factor	*** *** * * * * ****	<b>284 3338</b> 0.93 0.94		0 0.80	0.80				
Hourly flow rate (vph)	the state of the second state of	381 3551	15	0.80	0.80	a. Markin			Simulatera est
Pedestrians	YR 1. 894 . 1	NI 76 PARA BANGARA		enteru na 1851 augus	wisserver	ing nagayagi. M	्राणाः । जिल्लाकाः कृतिकार्यः । जन्म		
Lane Width (ft)			S. major Alteria				TEXT CONTRACT		
Walking Speed (ft/s)	LICENS MISSON	Rockers Lights	FROMBSTAT. 44	oon4888 ka - Kiisaa	42 (21 % Tall 10 0 0 0 0 0 0 0	: 3-41. J. W. W. W. 15	TO THE STATE OF STREET	.37773457-4-1-34,4887	of National Control Control
Percent Blockage Right turn flare (veh)									
Median type			5.77 (E. B.20)	None		Switch to			Sac de lació
Median storage veh)		**************************************	eret stater		1.004 1.5.7	ere ja 1-tua			
Upstream signal (ft)									
pX, platoon unblocked	9500	92 3 300 PAG - ESCANOS	Dasid Sassacti	1.38528282 ED. 2	9202012 S. 1 & COMMO	On' Teggin //www.ews.v		MERCO PER . Television :	1887 Section Comme on 1 to 1
vC, conflicting volume vC1, stage 1 conf vol	3566			4019	1191				
vO2, stage 2 conf vol			(*)			Maria di Parana			
vCu, unblocked vol	3566	\$2000 (S2000) (S2000 (S2000)	8 - 58 16 50 000 100 100 100 100 100 100 100 100	4019	1191	F 10897191			* * * * * * * * * * * * * * * * * * * *
tC, single (s)	4.1			6.9	7.0				
tC, 2 stage (s)		98847 3867 mark (5.1.)	5 (\$15.9980%), 46A, 157%	404001 <u>22</u> (24 <u>25</u> 0 2388	EV. Salarovica s.	Se et ingenerio	74 h.1.000 t. **P0001.J97468000	WYSTLON NESSAMILED A	
tF (s) p0 queue free %	2. <b>2</b> 100			3.5 100	3.3				
cM capacity (veh/h)	66			2	100 177				
Direction Lane#		ma ema							
Voline Jokar *		194 - E.S. 180 - 7480		(4/3)2 (. (4/2)6 (.)					
Volume Left	0	0 0	::::# <b>#</b> ¥₩ O	0	<b>725</b> 0				
Volume Right	0	0 0	Ö	Ö	15				
cSH		700 1700	1700	1700	1700				
Volume to Capacity		0.27	0.84	2.5632.173000000115290· 3	0.43				
Queue Length 95th (ft) Control Delay (s)	0.0	0 0 0.0 0.0	0 0,0	0	0	STANKAGAN DI MARA	ens A <i>ddinesia</i> (2005)	335.75.238888.238	M. Christian An
Lane LOS	U.U	0.0	0.0	0.0	0.0				
Approach Delay (s)	0.0		0.0						
Approach LOS		7000.5.7 Y Y . NOPECCC	- 12-07 (30-15, -00000000)	CORPORC - No. 1998 (1997)	7778 J.	PETA (86) 8 62568659.	HEEKSKA TENNI	7 T. 7 (580) 1111 (1866) - 2 (186	
Intersection Summary									
Average Delay		(0.0)	A						
Intersection Capacity Uti	lization	68.1%		U Level	of Service	<b>)</b>	С		
Analysis Period (min)		15	1 9 <b>1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1</b>	X28803 1 (2016)		RMSETS IN A	* *****		Maria aras dast s

		7 1	<b>↑</b> ↓	4			
Movement	EBL	EBR NBL	NBT SE	BT SBR			
Lane Configurations	¥		4	<b>}</b>			
Sign Control	Stop	a platfie but	Free Fre				g niligen
Grade	0%			%		A Mark and the Control of the Contro	
Volume (veh/h)	1	9 25		37 1			
Peak Hour Factor	0.80	0.80 0.80	0.65 0.6				
Hourly flow rate (vph)	.:0774 <b>1</b>	11 31	863 6	57 1			
Pedestrians Lane Width (ft)	881 - 1 - 5 <i>a</i> 460	S 70 (14 60 887) - 18 65 (6)	SANTEE ELEVENIE	i wasan a wasan	STANDAR LESS TO CLUSTER	BEET MUD. SECTION CONSIDER ON THE	C - 5 - 12018
Walking Speed (ft/s)			李心思对于"黄"。				
Percent Blockage	Mir 1806)S		### 1 3 \$ 5 mag			areciyati lerkindeya by leligy.	-10s-r1.08
Right turn flare (veh)	Constant Constant						5.38
Median type	None					Reciji(1877) (3.5 (1878) 5.69	
Median storage veh)							×. 4944
Upstream signal (ft)							1-890
pX, platoon unblocked				24,000,000,000,000	Londo London I. Billion School Beller sinde & Sa	- Commission of the Control of Co	8- 465/CA
vC, conflicting volume	983	58 58					
vC1, stage 1 conf vol	97940-000-00-31-34			1406680144 /1145-488 LKassesynta			No. company
vC2, stage 2 conf vol vCu, unblocked vol	002	50 50					
tC, single (s)	983 6.4	58 58 6. <b>2 4</b> .1				3:30:30:23:30:30:00:00:00:00:00:00:00:00:00:00:00	ASSESSE AS
tC, 2 stage (s)	Ų. <del>4</del>	0.2 4.1			Service of the second		
tF (s)	3.5	3,3 2.2					*
p0 queue free %	100	99 98					V27-969
cM capacity (veh/h)	270	1009 1546					<b>1</b>
Direction, Lane #		ND4 CD4				er de de la referenciada de la composición del composición de la composición de la composición de la composición del composición de la com	
Volume Total		894 53			je Kan		
Volume Left	1	31 O					
Volume Right	11	0 1					
cSH	792	1546 1700	- 1000, 10000 T. Set 20,000,000 to 100,000.		9919997 WY 1988	######################################	686577.2342
Volume to Capacity	0.02	0.02 0.03					
Queue Length 95th (ft)	1	2 0	23024350700.00.70.00.00.22.00	£046706,122	77.4 12. 14.4.000 Me 10.00 11. 12. 12.	\$ "02-00 and 00000" - 21 455 no 042 ship (	
Control Delay (s) Lane LOS	9.6 ^	0.6 0.0					
Approach Delay (s)	A QA	A NE NO					
Approach LOS	э.о А	0.6 0.0	Best Edit (1998)				
Intersection Summary			1				
Average Delay Intersection Capacity Uti	مملاموا	(0.6)		oval at C*			511989 E.E
Analysis Period (min)	uzatiOH	<b>47.6%</b> 15	ICU L	evel of Service		A	
Allarysis i eriod (illin)		10					- Kalair
varate e la catemica (a 1) i 493.	i itala					rokur kilinder (dagi karangalan)	

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Movement EBL EBR NBL NBT SBR	
Lane Configurations Y 4 1	
Sign Control Stop Free Free Grade 0% 0% 0%	
Grade 0% 0% 0% Volume (veh/h) 2 94 8 63 379 1	Mada Sasar in Rain.
Peak Hour Factor 0.80 0.80 0.80 0.78 0.78 0.80	
Hourly flow rate (vph) 2 118 10 81 486 1	
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s) Percent Blockage	estata de la composición della
Right turn flare (veh)	
Median type None	
Median storage veh)	POWARJININAN A COMP
Upstream signal (ft) pX, platoon unblocked	
vC, conflicting volume 587 487 487	
vC1, stage 1 conf vol	
vG2, stage 2 conf vol	
vCu, unblocked vol 587 487 487	GREEN TO THE TRANSPORT OF A
tC, single (s) 6.4 6.2 4.1 tC, 2 stage (s)	
tF(s) 3.5 3.3 2.2	
p0 queue free % 99 80 99	
cM capacity (veh/h) 464 577 1066	
Direction, Lane # EB1 NB1 SB1	
Volume Total 120 91 487	
Volume Left 2 10 0	
Volume Right 118 0 1	
Volume to Capacity 0.21 0.01, 0.29	
Queue Length 95th (ft) 20 1 0	
Control Delay (s) 12.9 1.0 0.0	
Lane LOS B A Approach Delay (s) 12.9 1.0 0.0	FRANCIS SI
Approach LOS B	
Intersection Summary	
Average Delay (2.4) A	
Intersection Capacity Utilization 32.6% ICU Level of Service A	
Analysis Period (min) 15	CONTRACTOR OF THE SEC.