

George W. Nickelson, P.E.

Traffic Engineering • Transportation Planning

July 8, 2008

Mr. Kris Pigman
The Pigman Companies
2481 Sunrise Blvd., Suite 200
Gold River, CA 95670

Subject: *Traffic Analysis for the Proposed Greenwood Business Park Project in the Napa Airport Industrial Area (NAIA) of Napa County*

Dear Mr. Pigman:

I am pleased to provide this traffic analysis for the proposed Greenwood Business Park project in the NAIA. The analysis reflects input received from County staff and is consistent with prior traffic studies in the area.

The proposed development would involve a primarily warehouse type facility (with some ancillary office space) on the south side of Airport Boulevard west of Devlin Road (see Figure 1). Our study has focused on the project's effects on three nearby intersections and the project's share of the future volumes at those intersections. We have also assessed the project's access and internal circulation.

The existing traffic conditions have been based on available count data at State Route 29 (SR 29)/Airport Boulevard-SR 12 and new PM peak commute period traffic counts at Airport Boulevard/Gateway Drive and Airport Boulevard/Devlin Road.⁽¹⁾⁽²⁾ Cumulative intersection traffic volumes have been derived from an areawide study conducted for the entire NAIA.⁽³⁾

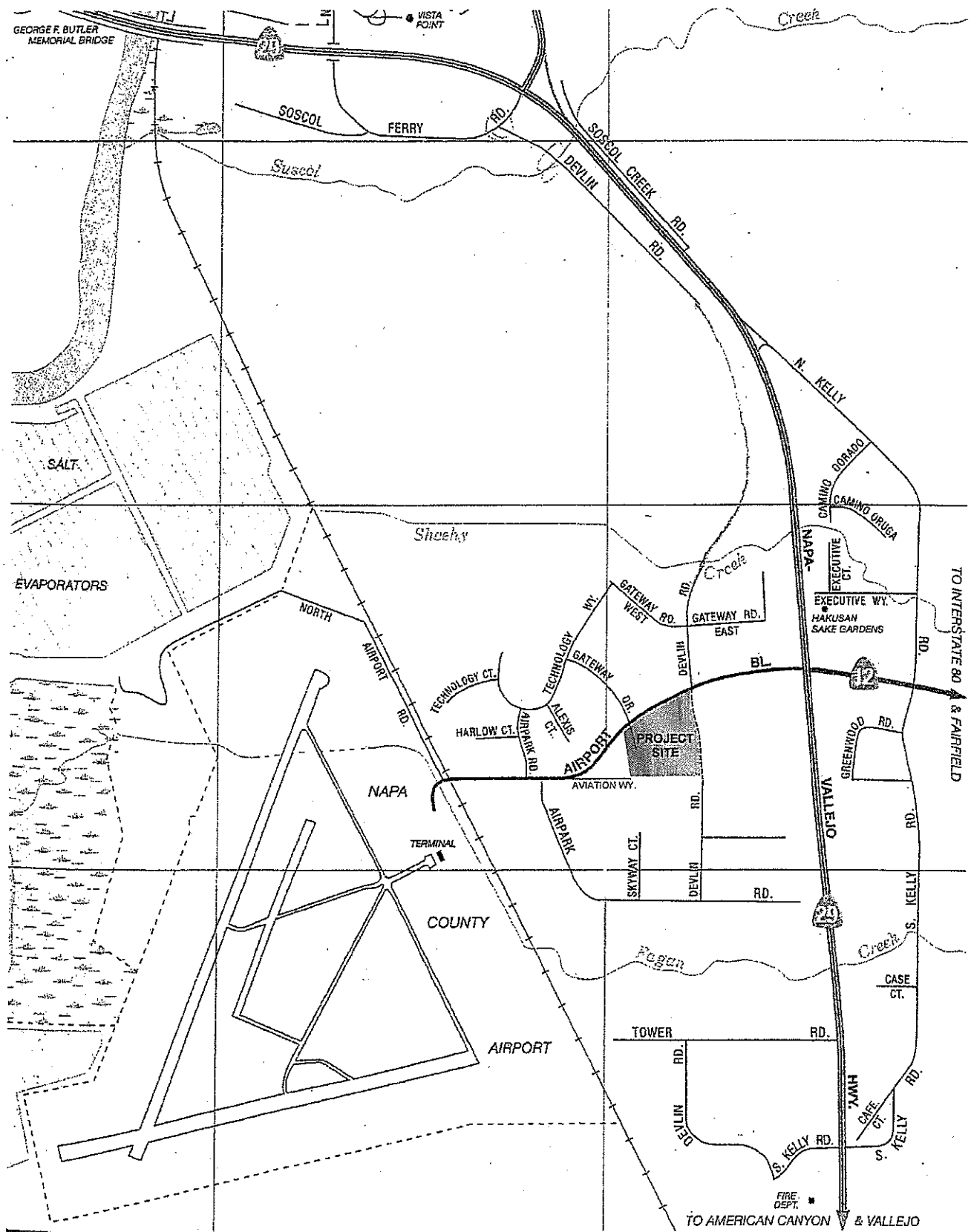
1. ROADWAY NETWORK AND EXISTING TRAFFIC FLOW CONDITIONS

The project site is located on the south side of Airport Boulevard west of Devlin Road, about 1/4 mile west of State Route 29 (SR 29). Airport Boulevard is a four-lane roadway providing the primary east-west access for the NAIA development. Devlin Road is a four-lane north-south roadway that will eventually extend throughout the NAIA. With the proposed Greenwood Business Park development, Devlin would be built from Airport Boulevard south along the project's easterly frontage to the road's current terminus, completing an important part of the Devlin Road corridor.

The study intersections are as follows:

- SR 29/Airport Boulevard-SR 12 (traffic signal)
- Airport Boulevard/Devlin Road (traffic signal)
- Airport Boulevard/Gateway Drive (Gateway Drive controlled by a stop sign)

The existing PM peak hour intersection volumes are shown in Figure 2.

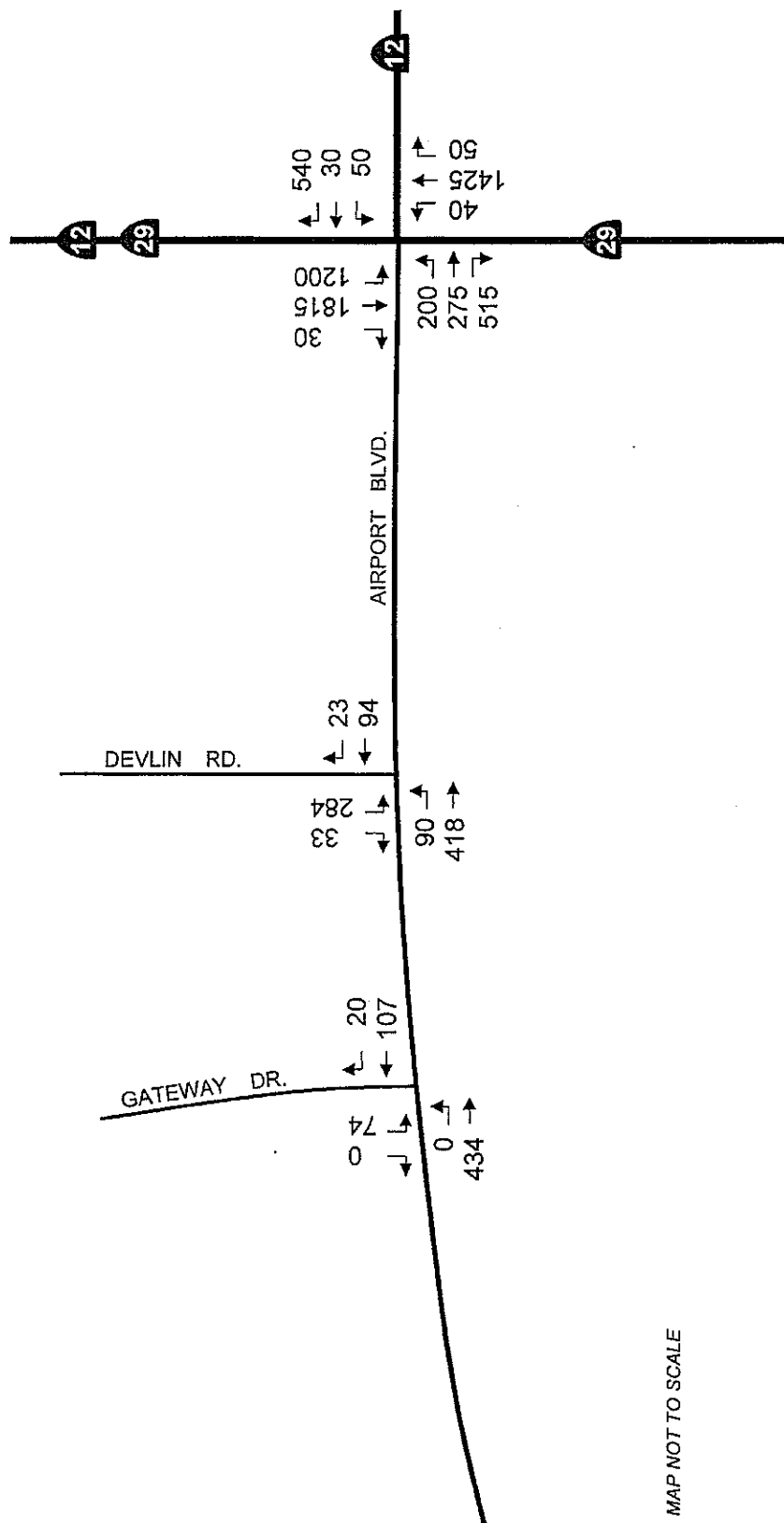


Project Site Location Map

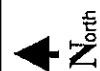


George W. Nickelson, P.E.

figure 1



MAP NOT TO SCALE



Existing P.M. Peak Hour Volumes

George W. Nickelson, P.E.

figure 2

As shown in Table 1, the existing intersection operations are a very stable LOS "C" or better (LOS definitions and calculations are attached as appendices). The intersection of Airport/Gateway has also been evaluated regarding the potential need for a traffic signal. Based on Caltrans standards, the PM peak hour volumes do not meet the minimum thresholds at which a traffic signal could be warranted (signal warrant graph attached as an appendix).⁽⁴⁾

2. PROJECT TRIP GENERATION/TRAFFIC EFFECTS

a. Project Trip Generation and Distribution

The project site is currently a vacant parcel within the NAIA. The site has no current trip generation. Three buildings would be constructed on the site with a total building area of 378,891 sq.ft. (the site plan is attached as an appendix). About 92% of the buildings' area (348,070 sq.ft.) would be devoted to low intensity warehouse/distribution uses and about 8% (30,821 sq.ft.) would be used as office/administrative space. Although the expected uses are primarily low intensity warehouse, Napa County has requested that a conservative "worst case" traffic analysis assume "Industrial Park" land uses.

Based on "Industrial Park" trip rates compiled by the Institute of Transportation Engineers (ITE), the project would generate the following PM peak commute hour trips⁽⁵⁾:

- 378,891 sq.ft. @ 0.86/1,000 = 326 PM peak trips; 68 in/258 out.

The project trips have been distributed onto the roadway network consistent with traffic flow patterns at the study intersections. The specific assignment of project trips has also considered the parking and driveway locations identified on the site plan.

b. Project Effects on Existing Traffic Conditions

The development would include a connection of Devlin Road from Airport Boulevard south to its current terminus at Aviation Way. With this connection, existing development located south of Airport Boulevard and west of Devlin Road would have another link with Airport Boulevard (traffic now uses Aviation Way and Airpark Road to access Airport Boulevard). This connection is part of the planned NAIA improvements, and will benefit traffic circulation in the entire area.

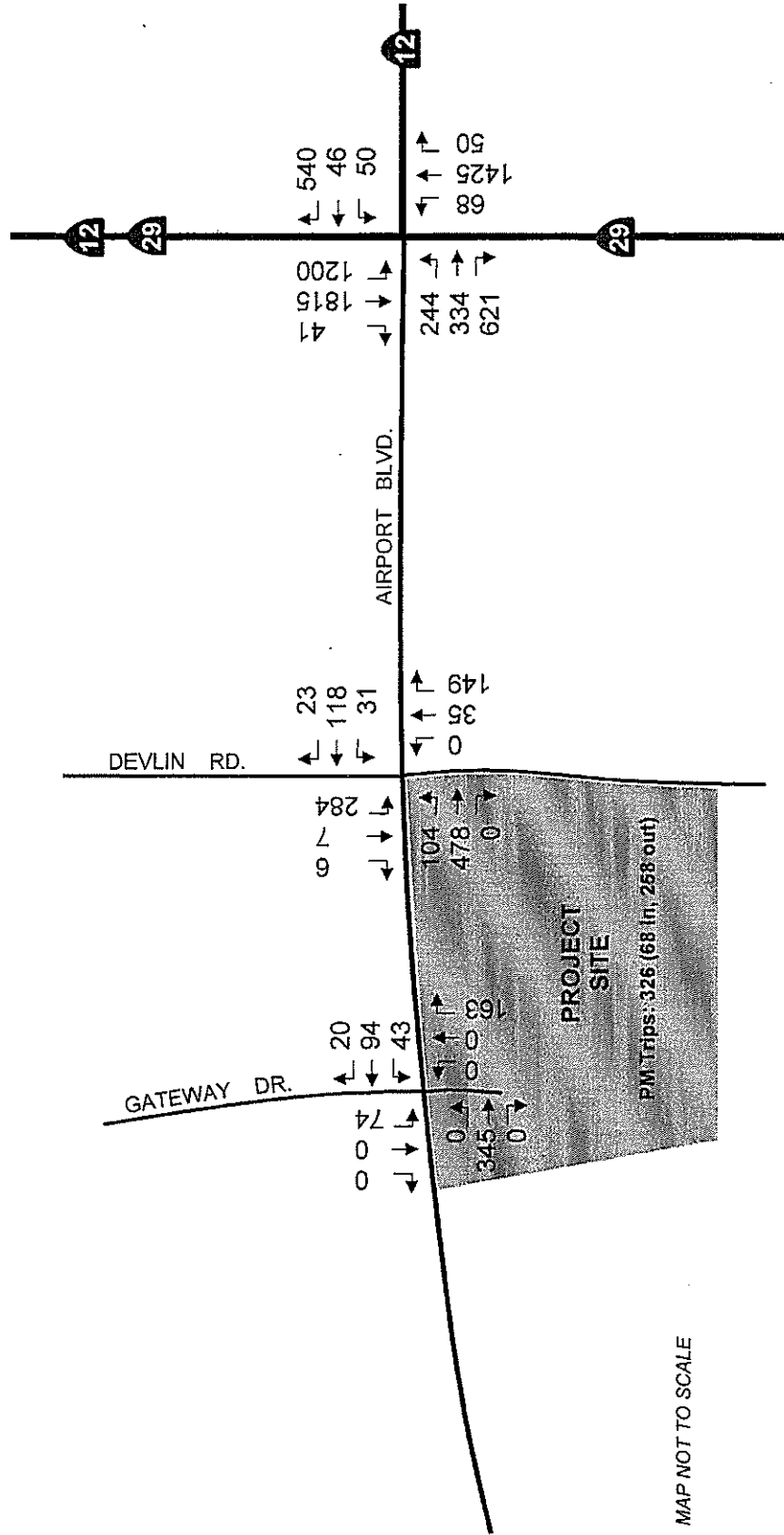
We have counted the PM peak hour traffic at the Airport Boulevard intersections with Aviation Way and Airpark Road and estimated a proportion of that traffic that would divert to the new Devlin Road connection. This traffic diversion and the addition of project trips are reflected in Figure 3.

As outlined in Table 1, the diversion of existing traffic to Airport/Devlin and the addition of project

TABLE 1
EXISTING AND PROJECTED PM PEAK HOUR
INTERSECTION OPERATIONS

Intersection	PM Level of Service (LOS)/ Seconds of Delay	
	Existing	Existing + Project
Airport Boulevard/ Gateway Drive ⁽¹⁾	LOS "B"/ 13.9 sec.	LOS "C"/ 22.9 sec.
Airport Boulevard/ Devlin Road	LOS "B"/ 10.9 sec.	LOS "B"/ 17.7 sec.
SR 29/Airport Boulevard-SR 12	LOS "C"/ 32.2 sec.	LOS "D"/ 40.2 sec.

- (1) The LOS conditions refer to delays experienced by Gateway Drive traffic turning onto Airport Boulevard.



Existing + Project P.M. Peak Hour Volumes

George W. Nickelson, P.E.

figure 3

trips would result in some degradation of the study intersections' existing operation. However, all of the intersections' LOS would be acceptable.

The PM peak hour volumes at Airport/Gateway would not meet the minimum thresholds at which a traffic signal would be warranted (signal warrant graph attached as an appendix).

Projected volumes at Airport/Gateway have been used to determine appropriate left turn lengths on the Airport Boulevard approaches. Although this analysis has focused on PM peak commute hour conditions, the highest inbound left turn volume would occur during the AM peak commute hour. Based on ITE trip rates (and assuming an Industrial Park use), the project would generate the following AM peak commute hour trips⁽⁶⁾:

- 378,891 sq.ft. @ 0.84/1,000 = 318 AM peak trips; 261 in/57 out.

This analysis has estimated that about 63% of the project trips (or 164 inbound left turns) would use the driveway opposite Gateway Drive. Based on Caltrans design guidelines, left turn lanes at an unsignalized location should have sufficient storage for two minutes of volume or 5-6 vehicles.⁽⁷⁾ Assuming a 6 vehicle inbound left turn queue with a "worst case" assumption that half of the vehicles are trucks, about 225 feet of left turn storage would be required (3 x 25 feet and 3 x 50 feet). The project site plan shows a left turn lane about 250 feet in length, exceeding the calculated queue. The existing eastbound left turn lane is about 130 feet in length. The eastbound left turn volumes are extremely low (no eastbound left turns were counted during the PM peak commute hour), and this existing lane design is satisfactory.

3. PROJECT EFFECTS ON CUMULATIVE TRAFFIC CONDITIONS

a. Cumulative Traffic Projections

The cumulative traffic flows at the study intersections have been derived from PM peak hour projections prepared for an areawide study of the Napa Airport Industrial Area (NAIA).⁽⁸⁾ Those projections were derived from the Napa County travel demand model. Because the projections represent buildout of the entire area, a certain level of development on the project site would be reflected in the cumulative volumes.

The NAIA study's cumulative projections were based on an assumed continuation of the low intensity warehouse type development that has been completed in the area. Based on the existing NAIA trip characteristics, the proposed Greenwood Business Park project would generate 76 PM peak hour trips (378,891 sq.ft. @ 0.20/1,000). The very conservative assumption of an Industrial Park use would generate 326 PM peak hour trips, and the "project" would therefore result in 250 additional PM peak hour trips.

b. Cumulative Traffic Conditions

The NAIA cumulative traffic projections also reflect completion of various roadway improvements. The primary improvement within the NAIA would be the completion of Devlin Road as a 3-4 lane arterial from Soscol Ferry Road south throughout the entire NAIA. Traffic signals would also be installed at Airport/Airpark (west of the project) and at Devlin/Soscol Ferry. The primary external improvement would be construction of an interchange at SR 29/Airport Boulevard-SR 12.

As indicated in Table 2, all the study intersections would operate at acceptable levels (LOS "D" or better) with cumulative traffic growth. As noted in Table 2, with the planned interchange at SR 29/Airport Boulevard-SR 12, a specific intersection LOS calculation would not be applicable.

The addition of project trips (beyond the NAIA assumed low intensity warehouse use) would result in some degradation of intersection operations. However, the intersections' LOS would remain at acceptable levels.

With both the cumulative and cumulative + project scenarios, the PM peak hour volumes at Airport/Gateway would be below the minimum thresholds at which a signal could be warranted (signal warrant graphs are attached as appendices).

As a part of the NAIA, the project is subject to the "Airport Industrial Area Traffic Impact Fee", currently \$3,551 per PM peak hour trip. By paying this fee (calculated on the basis of trip generation of the actual planned development land uses), the project would be contributing a "fair share" toward the areawide roadway improvements. However, the project would be building a portion of Devlin Road, a key improvement identified within the NAIA, and it would be appropriate for the project to receive a fee credit as a result of this roadway construction.

4. SITE ACCESS/INTERNAL CIRCULATION

The proposed project would have two driveways, one on Airport Boulevard opposite Gateway Drive and one on Devlin Road about 550 feet south of Airport Boulevard. These driveways would provide ample access opportunities for the traffic generation of the project. As noted above, the westbound Airport Boulevard approach at Gateway Drive would be modified to include a left turn lane to accommodate access into the project site.

The site plan has been designed to accommodate inbound and outbound truck traffic at both the Gateway Drive and Devlin Road driveways. The internal drive aisles have been designed to accommodate Caltrans standard tractor/trailer truck turn paths.

TABLE 2
CUMULATIVE PROJECTIONS OF PM PEAK HOUR
INTERSECTION OPERATIONS

Intersection	Cumulative⁽¹⁾	Cumulative + Project⁽²⁾
Airport Boulevard/ Gateway Drive ⁽³⁾	LOS "C"/ 16.5 sec.	LOS "D"/ 26.0 sec.
Airport Boulevard/ Devlin Road	LOS "C"/ 29.3 sec.	LOS "C"/ 32.7 sec.
SR 29/Airport Boulevard-SR 12	N.A. ⁽⁴⁾	N.A. ⁽⁴⁾

- (1) The cumulative traffic projections include trips generated by buildout of vacant parcels. The cumulative projections would therefore already include trip generation from the proposed project site assuming lower intensity warehouse type development.
- (2) The "project" conditions reflect the added trips generated by an assumed Industrial Park development vs. the NAIA study's assumed lower intensity warehouse type development.
- (3) The LOS condition refers to delays experienced by Gateway Drive traffic turning onto Airport Boulevard.
- (4) The year 2030 buildout conditions would reflect an interchange at this location – an intersection LOS calculation would not be applicable.

July 8, 2008
Mr. Kris Pigman
Page 10 of 12

5. CONCLUSIONS

As a part of the NAIA, the project is subject to the "Airport Industrial Area Traffic Impact Fee", currently \$3,551 per PM peak hour trip. However, the project would be building a portion of Devlin Road, a key improvement identified within the NAIA, and it would be appropriate for the project to receive a fee credit as a result of this roadway construction.

With the diversion of traffic to this new connection and the addition of project trips, the study intersections' operation would remain acceptable (LOS "D" or better). With the addition of project trips (beyond the NAIA assumed low intensity warehouse use) to cumulative volumes, the intersections' LOS would remain at acceptable levels.

In all of the analysis scenarios, the PM peak hour volumes at Airport/Gateway would be below the minimum threshold at which a traffic signal could be warranted. A new westbound left turn lane would be constructed on Airport Boulevard at the proposed Gateway Drive access. This proposed left turn lane (and the existing eastbound left turn lane) would have adequate storage for the anticipated peak hour volumes.

The site plan has been designed to accommodate inbound and outbound truck traffic at both the Gateway Drive and Devlin Road driveways. The internal drive aisles have been designed to accommodate Caltrans standard tractor/trailer truck turn paths.

I trust that this report responds to the needs of Napa County. Please call me with any questions or comments.

Sincerely,

A handwritten signature in black ink that reads "George Nickelson". The signature is written in a cursive, flowing style.

George W. Nickelson, P.E.

References:

- (1) Mark D. Crane, P.E., *Traffic Report Panattoni Napa Corporate Center Phase 2*, April 15, 2008.
- (2) George W. Nickelson, P.E., traffic counts conducted on June 11, 2008.
- (3) Omni-Means, Ltd., *Roadway Improvement Fee (RIF) Study, County of Napa, Napa Airport Industrial Area*, (Administrative Draft Report), October 2005.
- (4) Caltrans, *California Manual on Uniform Traffic Control Devices for Streets and Highways*, September 26, 2006.
- (5) ITE, *Trip Generation – 7th Edition*, 2003.
- (6) ITE, *ibid.*
- (7) Caltrans, *Guidelines for Reconstruction of Intersections*, August, 1985.
- (8) Omni-Means, Ltd. *Ibid.*...

APPENDICES

- LOS Definitions
- LOS Calculations
- Signal Warrant Graphs for Airport/Gateway
 - Site Development Plan

LEVEL OF SERVICE DEFINITIONS

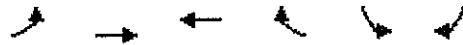
LEVEL OF SERVICE	SIGNALIZED INTERSECTIONS	UNSIGNALIZED INTERSECTIONS*
"A"	Uncongested operations, all queues clear in a single-signal cycle. (Average stopped delay less than 10 seconds per vehicle; V/C less than or = 0.60).	Little or no delay. (Average delay of ≤ 10 seconds)
"B"	Uncongested operations, all queues clear in a single cycle. (Average delay of 10-20 seconds; V/C=0.61-0.70).	Short traffic delays. (Average delay of >10 and ≤ 15 secs.)
"C"	Light congestion, occasional backups on critical approaches. (Average delay of 20-35 seconds; V/C=0.71-0.80).	Average traffic delay. (Average delay of >15 and ≤ 25 secs.)
"D"	Significant congestion of critical approaches but intersection functional. Cars required to wait through more than one cycle during short peaks. No long queues formed. (Average delay of 35-55 seconds; V/C=0.81-0.90).	Long traffic delays for some approaches. (Average delay of >25 and ≤ 35 secs.)
"E"	Severe congestion with some long standing queues on critical approaches. Blockage of intersection may occur if traffic signal does not provide for protected turning movements. Traffic queue may block nearby intersection(s) upstream of critical approach(es). (Average delay of 55-80 seconds; V/C=0.91-1.00).	Very long traffic delays for some approaches. (Average delay of >35 and ≤ 50 secs.)
"F"	Total breakdown, stop-and-go operation. (Average delay in excess of 80 seconds; V/C of 1.01 or greater).	Extreme traffic delays for some approaches (intersection may be blocked by external causes--delays >50 seconds).

* Level of Service refers to delays encountered by certain stop sign controlled approaches. Other approaches may operate with little delay.

Source: Transportation Research Board, Highway Capacity Manual, 2000.

HCM Unsignalized Intersection Capacity Analysis
1: Airport Blvd. & Gateway Dr.

Greenwood Business Park Project
PM Existing Conditions



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations	↰	↱↱	↱↰		↰	↱	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Volume (veh/h)	0	434	107	20	74	0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	472	116	22	80	0	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type					Raised		
Median storage veh					0		
Upstream signal (ft)			852				
pX, platoon unblocked							
vC, conflicting volume	138				363	69	
vC1, stage 1 conf vol					127		
vC2, stage 2 conf vol					236		
vCu, unblocked vol	138				363	69	
tC, single (s)	4.1				6.8	6.9	
tC, 2 stage (s)					5.8		
tF (s)	2.2				3.5	3.3	
p0 queue free %	100				83	100	
cM capacity (veh/h)	1443				486	980	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	0	236	236	78	61	80	0
Volume Left	0	0	0	0	0	80	0
Volume Right	0	0	0	0	22	0	0
cSH	1700	1700	1700	1700	1700	486	1700
Volume to Capacity	0.00	0.14	0.14	0.05	0.04	0.17	0.00
Queue Length 95th (ft)	0	0	0	0	0	15	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	13.9	0.0
Lane LOS						B	A
Approach Delay (s)	0.0			0.0		13.9	
Approach LOS						B	
Intersection Summary							
Average Delay			1.6				
Intersection Capacity Utilization			22.8%			ICU Level of Service	A
Analysis Period (min)			15				

HCM Signalized Intersection Capacity Analysis
2: Airport Blvd. & Devlin Rd.

Greenwood Business Park Project
PM Existing Conditions



























Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	←	↑↑	↑↑		←	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		0.97	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3435		3433	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3435		3433	1583
Volume (vph)	90	418	94	23	284	33
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	454	102	25	309	36
RTOR Reduction (vph)	0	0	20	0	0	21
Lane Group Flow (vph)	98	454	107	0	309	15
Turn Type	Prot			Perm		
Protected Phases	7	4	8	6		
Permitted Phases					6	
Actuated Green, G (s)	3.3	14.9	7.6		16.8	16.8
Effective Green, g (s)	3.3	14.9	7.6		16.8	16.8
Actuated g/C Ratio	0.08	0.38	0.19		0.42	0.42
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	147	1328	658		1453	670
v/s Ratio Prot	0.06	0.13	0.03		0.09	
v/s Ratio Perm						0.01
v/c Ratio	0.67	0.34	0.16		0.21	0.02
Uniform Delay, d1	17.7	8.9	13.4		7.3	6.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	10.9	0.2	0.1		0.3	0.1
Delay (s)	28.5	9.0	13.5		7.6	6.7
Level of Service	C	A	B		A	A
Approach Delay (s)		12.5	13.5		7.5	
Approach LOS		B	B		A	

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	39.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	26.4%	ICU Level of Service	A
Analysis Period (min)	15		
Critical Lane Group			




















HCM Signalized Intersection Capacity Analysis 3: Airport Blvd. & Hwy. 29

Greenwood Business Park Project
PM Existing Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.91	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	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3365	1583	1770	1863	1583	1770	5085	1583	3433	3539	1583
Flt Permitted	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3365	1583	1770	1863	1583	1770	5085	1583	3433	3539	1583
Volume (vph)	200	275	515	50	30	540	40	1425	50	1200	1815	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	211	289	542	53	32	568	42	1500	53	1263	1911	32
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	31	0	0	0
Lane Group Flow (vph)	161	339	542	53	32	568	42	1500	22	1263	1911	32
Turn Type	Split		Free	Split		Free	Prot		Perm	Prot		Free
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			Free			Free			2			Free
Actuated Green, G (s)	11.0	11.0	99.8	3.0	3.0	99.8	2.4	30.9	30.9	38.9	67.4	99.8
Effective Green, g (s)	11.0	11.0	99.8	3.0	3.0	99.8	2.4	30.9	30.9	38.9	67.4	99.8
Actuated g/C Ratio	0.11	0.11	1.00	0.03	0.03	1.00	0.02	0.31	0.31	0.39	0.68	1.00
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	177	371	1583	53	56	1583	43	1574	490	1338	2390	1583
v/s Ratio Prot	0.10	c0.10		c0.03	0.02		0.02	c0.29		c0.37	0.54	
v/s Ratio Perm			0.34			0.36			0.01			0.02
v/c Ratio	0.91	0.91	0.34	1.00	0.57	0.36	0.98	0.95	0.04	0.94	0.80	0.02
Uniform Delay, d1	43.9	43.9	0.0	48.4	47.8	0.0	48.7	33.7	24.1	29.4	11.4	0.0
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	42.2	26.2	0.6	123.6	13.3	0.6	127.2	14.0	0.2	13.4	2.9	0.0
Delay (s)	86.1	70.2	0.6	172.0	61.1	0.6	175.9	47.7	24.3	42.8	14.3	0.0
Level of Service	F	E	A	F	E	A	F	D	C	D	B	A
Approach Delay (s)		36.4			17.5			50.3			25.4	
Approach LOS		D			B			D			C	
Intersection Summary												
HCM Average Control Delay			32.5			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			99.8			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			87.4%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												





















HCM Unsignalized Intersection Capacity Analysis
1: Airport Blvd. & Gateway Dr.

Greenwood Business Park Project
PM Existing+Project Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	345	0	43	94	20	0	0	163	74	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	375	0	47	102	22	0	0	177	80	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			Raised	
Median storage veh											0	
Upstream signal (ft)					852							
pX, platoon unblocked												
vC, conflicting volume	124			375			520	592	188	571	582	62
vC1, stage 1 conf vol										207	207	
vC2, stage 2 conf vol										365	375	
vCu, unblocked vol	124			375			520	592	188	571	582	62
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)										6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			96			100	100	78	71	100	100
cM capacity (veh/h)	1461			1180			426	401	823	280	348	990
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2			
Volume Total	0	250	125	47	68	56	177	80	0			
Volume Left	0	0	0	47	0	0	0	80	0			
Volume Right	0	0	0	0	0	22	177	0	0			
cSH	1700	1700	1700	1180	1700	1700	823	280	1700			
Volume to Capacity	0.00	0.15	0.07	0.04	0.04	0.03	0.22	0.29	0.00			
Queue Length 95th (ft)	0	0	0	3	0	0	20	29	0			
Control Delay (s)	0.0	0.0	0.0	8.2	0.0	0.0	10.6	22.9	0.0			
Lane LOS				A			B	C	A			
Approach Delay (s)	0.0			2.2			10.6	22.9				
Approach LOS							B	C				
Intersection Summary												
Average Delay	5.1											
Intersection Capacity Utilization	40.4%											
ICU Level of Service	A											
Analysis Period (min)	15											

























HCM Signalized Intersection Capacity Analysis 2: Airport Blvd. & Devlin Rd.

Greenwood Business Park Project
PM Existing+Project Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95		0.97	0.95	
Frt	1.00	1.00		1.00	0.98			0.88		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539		1770	3452			3109		3433	3291	
Flt Permitted	0.95	1.00		0.47	1.00			1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539		877	3452			3109		3433	3291	
Volume (vph)	104	478	0	31	118	23	0	35	149	284	7	6
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)	113	520	0	34	128	25	0	38	162	309	8	7
RTOR Reduction (vph)	0	0	0	0	21	0	0	141	0	0	5	0
Lane Group Flow (vph)	113	520	0	34	132	0	0	59	0	309	10	0
Turn Type	Prot			Perm			Perm			Split		
Protected Phases	7	4			8			2		6	6	
Permitted Phases				8			2					
Actuated Green, G (s)	4.6	17.1		8.5	8.5			6.6		16.2	16.2	
Effective Green, g (s)	4.6	17.1		8.5	8.5			6.6		16.2	16.2	
Actuated g/C Ratio	0.09	0.33		0.16	0.16			0.13		0.31	0.31	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	157	1166		144	565			395		1072	1027	
v/s Ratio Prot	c0.06	c0.15			0.04			c0.02		c0.09	0.00	
v/s Ratio Perm				0.04								
v/c Ratio	0.72	0.45		0.24	0.23			0.15		0.29	0.01	
Uniform Delay, d1	23.0	13.7		18.9	18.9			20.1		13.5	12.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	14.6	0.3		0.8	0.2			0.2		0.7	0.0	
Delay (s)	37.6	13.9		19.7	19.1			20.3		14.2	12.3	
Level of Service	D	B		B	B			C		B	B	
Approach Delay (s)		18.2			19.2			20.3			14.1	
Approach LOS		B			B			C			B	
Intersection Summary												
HCM Average Control Delay	17.7			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.35											
Actuated Cycle Length (s)	51.9			Sum of lost time (s)			12.0					
Intersection Capacity Utilization	43.8%			ICU Level of Service			A					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 3: Airport Blvd. & Hwy. 29

Greenwood Business Park Project
PM Existing+Project Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.91	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	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3365	1583	1770	1863	1583	1770	5085	1583	3433	3539	1583
Flt Permitted	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3365	1583	1770	1863	1583	1770	5085	1583	3433	3539	1583
Volume (vph)	244	334	621	50	46	540	68	1425	50	1200	1815	41
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	257	352	654	53	48	568	72	1500	53	1263	1911	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	31	0	0	0
Lane Group Flow (vph)	196	413	654	53	48	568	72	1500	22	1263	1911	43
Turn Type	Split		Free	Split		Free	Prot		Perm	Prot		Free
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			Free			Free			2			Free
Actuated Green, G (s)	11.0	11.0	99.8	3.0	3.0	99.8	3.0	30.8	30.8	39.0	66.8	99.8
Effective Green, g (s)	11.0	11.0	99.8	3.0	3.0	99.8	3.0	30.8	30.8	39.0	66.8	99.8
Actuated g/C Ratio	0.11	0.11	1.00	0.03	0.03	1.00	0.03	0.31	0.31	0.39	0.67	1.00
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	177	371	1583	53	56	1583	53	1569	489	1342	2369	1583
v/s Ratio Prot	0.12	0.12		0.03	0.03		0.04	0.29		0.37	0.54	
v/s Ratio Perm			0.41			0.36			0.01			0.03
v/c Ratio	1.11	1.11	0.41	1.00	0.86	0.36	1.36	0.96	0.04	0.94	0.81	0.03
Uniform Delay, d1	44.4	44.4	0.0	48.4	48.2	0.0	48.4	33.8	24.2	29.3	11.9	0.0
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	99.3	81.0	0.8	123.6	70.1	0.6	245.8	14.4	0.2	13.0	3.1	0.0
Delay (s)	143.7	125.4	0.8	172.0	118.3	0.6	294.2	48.3	24.4	42.3	14.9	0.0
Level of Service	F	F	A	F	F	A	F	D	C	D	B	A
Approach Delay (s)		63.7			22.7			58.4			25.5	
Approach LOS		E			C			E			C	

Intersection Summary												
HCM Average Control Delay		40.2		HCM Level of Service				D				
HCM Volume to Capacity ratio		0.97										
Actuated Cycle Length (s)		99.8		Sum of lost time (s)				16.0				
Intersection Capacity Utilization		89.3%		ICU Level of Service				E				
Analysis Period (min)		15										
c Critical Lane Group												

Queuing and Blocking Report
PM Existing+Project Conditions

6/25/2008

Intersection: 1: Airport Blvd. & Gateway Dr.

Movement	WB	NB	SB
Directions Served	L	LR	L
Maximum Queue (ft)	44	82	75
Average Queue (ft)	11	46	33
95th Queue (ft)	35	73	61
Link Distance (ft)	961		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	150	150	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Airport Blvd. & Devlin Rd.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	T	TR	L	L	T	TR
Maximum Queue (ft)	139	110	131	73	80	68	66	116	99	132	21	32
Average Queue (ft)	60	63	69	20	40	24	21	47	41	66	1	4
95th Queue (ft)	108	103	110	55	75	54	52	87	82	108	10	21
Link Distance (ft)	766		766	1210		1210	1074	1074			754	754
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	300			125					200	200		
Storage Blk Time (%)												
Queuing Penalty (veh)												

Queuing and Blocking Report
PM Existing+Project Conditions

6/25/2008

Intersection: 3: Airport Blvd. & Hwy. 29

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB
Directions Served	L	LT	T	R	L	T	R	L	T	T	T	R
Maximum Queue (ft)	338	908	1042	645	140	150	212	275	616	568	514	224
Average Queue (ft)	272	545	564	363	45	45	117	98	368	343	291	58
95th Queue (ft)	394	957	1046	733	114	121	241	246	593	557	516	185
Link Distance (ft)		1210	1210			1398			1754	1754	1754	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	300			600	175		200	350				200
Storage Blk Time (%)	18	56	19	0	2		1		13		26	0
Queuing Penalty (veh)	51	69	121	0	10		1		9		13	0

Intersection: 3: Airport Blvd. & Hwy. 29




















Movement	SB	SB	SB	SB
Directions Served	L	L	T	T
Maximum Queue (ft)	258	268	308	332
Average Queue (ft)	180	197	161	166
95th Queue (ft)	238	253	271	275
Link Distance (ft)			2269	2269
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	1000	1000		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network-wide Queuing Penalty: 274





















HCM Unsignalized Intersection Capacity Analysis
1: Airport Blvd. & Gateway Dr.

Greenwood Business Park Project
PM Cumulative Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	345	0	10	157	27	0	0	38	90	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	375	0	11	171	29	0	0	41	98	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			Raised	
Median storage veh											0	
Upstream signal (ft)					852							
pX, platoon unblocked												
vC, conflicting volume	200			375			482	597	188	436	582	100
vC1, stage 1 conf vol										207	207	
vC2, stage 2 conf vol										229	375	
vCu, unblocked vol	200			375			482	597	188	436	582	100
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)										6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	95	76	100	100
cM capacity (veh/h)	1370			1180			464	411	823	411	363	936
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2			
Volume Total	0	250	125	11	114	86	41	98	0			
Volume Left	0	0	0	11	0	0	0	98	0			
Volume Right	0	0	0	0	0	29	41	0	0			
cSH	1700	1700	1700	1180	1700	1700	823	411	1700			
Volume to Capacity	0.00	0.15	0.07	0.01	0.07	0.05	0.05	0.24	0.00			
Queue Length 95th (ft)	0	0	0	1	0	0	4	23	0			
Control Delay (s)	0.0	0.0	0.0	8.1	0.0	0.0	9.6	16.5	0.0			
Lane LOS				A			A	C	A			
Approach Delay (s)	0.0			0.4			9.6	16.5				
Approach LOS							A	C				
Intersection Summary												
Average Delay	2.9											
Intersection Capacity Utilization	27.9%											
ICU Level of Service	A											
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis 2: Airport Blvd. & Devlin Rd.

Greenwood Business Park Project
PM Cumulative Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vohpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		0.97	0.95	
Frt	1.00	1.00		1.00	0.93		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3525		1770	3309		1770	3461		3433	3456	
Flt Permitted	0.95	1.00		0.51	1.00		0.17	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3525		951	3309		308	3461		3433	3456	
Volume (vph)	94	369	10	54	134	103	10	806	140	218	268	50
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)	102	401	11	59	146	112	11	876	152	237	291	54
RTOR Reduction (vph)	0	3	0	0	95	0	0	17	0	0	19	0
Lane Group Flow (vph)	102	409	0	59	163	0	11	1011	0	237	326	0
Turn Type	Prot			Perm			Perm			Split		
Protected Phases	7	4			8			2		6	6	
Permitted Phases				8			2					
Actuated Green, G (s)	4.5	19.1		10.6	10.6		24.2	24.2		16.3	16.3	
Effective Green, g (s)	4.5	19.1		10.6	10.6		24.2	24.2		16.3	16.3	
Actuated g/C Ratio	0.06	0.27		0.15	0.15		0.34	0.34		0.23	0.23	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	111	940		141	490		104	1170		782	787	
v/s Ratio Prot	c0.06	c0.12			0.05			c0.29		0.07	c0.09	
v/s Ratio Perm				0.06			0.04					
v/c Ratio	0.92	0.44		0.42	0.33		0.11	0.86		0.30	0.41	
Uniform Delay, d1	33.4	21.8		27.7	27.3		16.3	22.2		22.9	23.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	59.7	0.3		2.0	0.4		0.4	6.8		1.0	1.6	
Delay (s)	93.1	22.1		29.7	27.7		16.7	29.0		23.9	25.2	
Level of Service	F	C		C	C		B	C		C	C	
Approach Delay (s)		36.2			28.1			28.9			24.7	
Approach LOS		D			C			C			C	
Intersection Summary												
HCM Average Control Delay	29.3			HCM Level of Service			C					
HCM Volume to Capacity ratio	0.63											
Actuated Cycle Length (s)	71.6			Sum of lost time (s)			12.0					
Intersection Capacity Utilization	60.1%			ICU Level of Service			B					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 1: Airport Blvd. & Gateway Dr.





















Greenwood Business Park Project
PM Cumulative+Project Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱		↰	↰↱			↕		↰	↰↱	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	345	0	43	157	27	0	0	163	90	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	375	0	47	171	29	0	0	177	98	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			Raised	
Median storage veh											0	
Upstream signal (ft)					852							
pX, platoon unblocked												
vC, conflicting volume	200			375			554	668	188	643	654	100
vC1, stage 1 conf vol										279	279	
vC2, stage 2 conf vol										365	375	
vCu, unblocked vol	200			375			554	668	188	643	654	100
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)										6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			96			100	100	78	63	100	100
cM capacity (veh/h)	1370			1180			403	362	823	268	331	936
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2			
Volume Total	0	250	125	47	114	86	177	98	0			
Volume Left	0	0	0	47	0	0	0	98	0			
Volume Right	0	0	0	0	0	29	177	0	0			
cSH	1700	1700	1700	1180	1700	1700	823	268	1700			
Volume to Capacity	0.00	0.15	0.07	0.04	0.07	0.05	0.22	0.37	0.00			
Queue Length 95th (ft)	0	0	0	3	0	0	20	40	0			
Control Delay (s)	0.0	0.0	0.0	8.2	0.0	0.0	10.6	26.0	0.0			
Lane LOS				A			B	D	A			
Approach Delay (s)	0.0			1.5			10.6	26.0				
Approach LOS							B	D				

Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis 2: Airport Blvd. & Devlin Rd.

Greenwood Business Park Project
PM Cumulative+Project Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		0.97	0.95	
Frt	1.00	1.00		1.00	0.94		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3528		1770	3332		1770	3436		3433	3449	
Flt Permitted	0.95	1.00		0.46	1.00		0.16	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3528		854	3332		290	3436		3433	3449	
Volume (vph)	118	470	10	69	161	103	10	820	198	218	272	56
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)	128	511	11	75	175	112	11	891	215	237	296	61
RTOR Reduction (vph)	0	2	0	0	95	0	0	26	0	0	21	0
Lane Group Flow (vph)	128	520	0	75	192	0	11	1080	0	237	336	0
Turn Type	Prot			Perm			Perm			Split		
Protected Phases	7	4			8			2		6	6	
Permitted Phases				8			2					
Actuated Green, G (s)	6.0	21.4		11.4	11.4		25.7	25.7		16.1	16.1	
Effective Green, g (s)	6.0	21.4		11.4	11.4		25.7	25.7		16.1	16.1	
Actuated g/C Ratio	0.08	0.28		0.15	0.15		0.34	0.34		0.21	0.21	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	141	1004		129	505		99	1174		735	738	
v/s Ratio Prot	c0.07	c0.15			0.06			c0.31		0.07	c0.10	
v/s Ratio Perm				0.09			0.04					
v/c Ratio	0.91	0.52		0.58	0.38		0.11	0.92		0.32	0.45	
Uniform Delay, d1	34.3	22.6		29.7	28.7		16.9	23.8		24.9	25.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	48.6	0.5		6.5	0.5		0.5	11.6		1.2	2.0	
Delay (s)	82.9	23.0		36.2	29.2		17.4	35.4		26.1	27.7	
Level of Service	F	C		D	C		B	D		C	C	
Approach Delay (s)		34.8			30.6			35.2			27.1	
Approach LOS		C			C			D			C	
Intersection Summary												
HCM Average Control Delay	32.7			HCM Level of Service			C					
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	75.2			Sum of lost time (s)			12.0					
Intersection Capacity Utilization	65.7%			ICU Level of Service			C					
Analysis Period (min)	15											
c Critical Lane Group												

Queuing and Blocking Report
PM Cumulative Conditions

6/25/2008

Intersection: 1: Airport Blvd. & Gateway Dr.

Movement	WB	NB	SB
Directions Served	L	LR	L
Maximum Queue (ft)	27	48	68
Average Queue (ft)	2	23	36
95th Queue (ft)	14	47	61
Link Distance (ft)	961		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	150	150	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Airport Blvd. & Devlin Rd.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	L	T
Maximum Queue (ft)	133	137	120	96	81	131	32	308	290	81	115	130
Average Queue (ft)	67	79	66	37	47	50	5	193	186	42	61	70
95th Queue (ft)	128	117	108	77	80	96	24	278	280	73	96	113
Link Distance (ft)	766		766					1074	1074	754		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	300			125			150			200	200	
Storage Blk Time (%)							13					
Queuing Penalty (veh)							1					

Intersection: 2: Airport Blvd. & Devlin Rd.

Movement	SB
Directions Served	TR
Maximum Queue (ft)	138
Average Queue (ft)	71
95th Queue (ft)	115
Link Distance (ft)	754
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report
PM Cumulative+Project Conditions

6/25/2008

Intersection: 1: Airport Blvd. & Gateway Dr.

Movement	WB	NB	SB
Directions Served	L	LR	L
Maximum Queue (ft)	44	75	95
Average Queue (ft)	10	46	37
95th Queue (ft)	34	72	67
Link Distance (ft)	961		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	150		150
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Airport Blvd. & Devlin Rd.

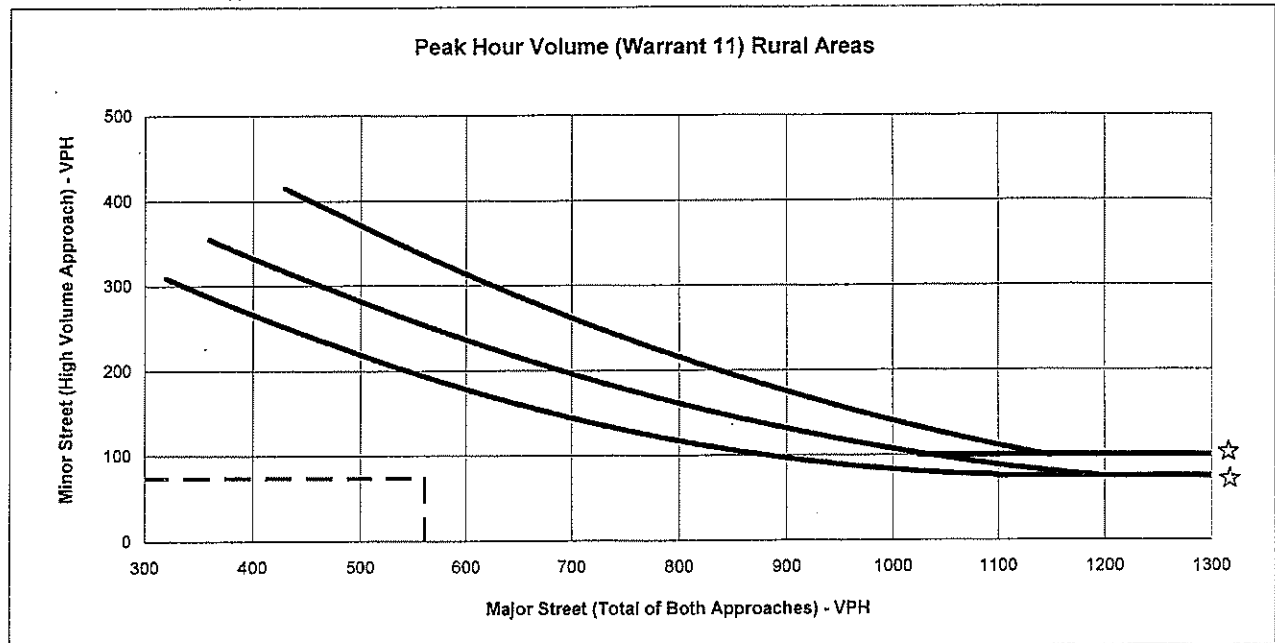
Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	L	T
Maximum Queue (ft)	240	146	159	99	110	152	127	437	421	103	124	132
Average Queue (ft)	113	93	87	48	59	53	10	242	240	51	67	69
95th Queue (ft)	206	139	136	90	98	100	63	369	372	92	105	109
Link Distance (ft)	766		766							1074	1074	754
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	300			125			150			200	200	
Storage Blk Time (%)				0	0			24				
Queuing Penalty (veh)				0	0			2				

Intersection: 2: Airport Blvd. & Devlin Rd.

Movement	SB
Directions Served	TR
Maximum Queue (ft)	137
Average Queue (ft)	76
95th Queue (ft)	125
Link Distance (ft)	754
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
370	280				
400	270	460	297	430	410
500	215	500	290	500	380
600	185	600	230	600	310
700	140	700	198	700	265
800	115	800	170	800	210
900	99	900	125	900	180
1000	85	1000	105	1000	140
1100	75	1100	90	1100	110
1200	75	1200	75	1150	100
1300	75	1300	75	1300	100

* Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation

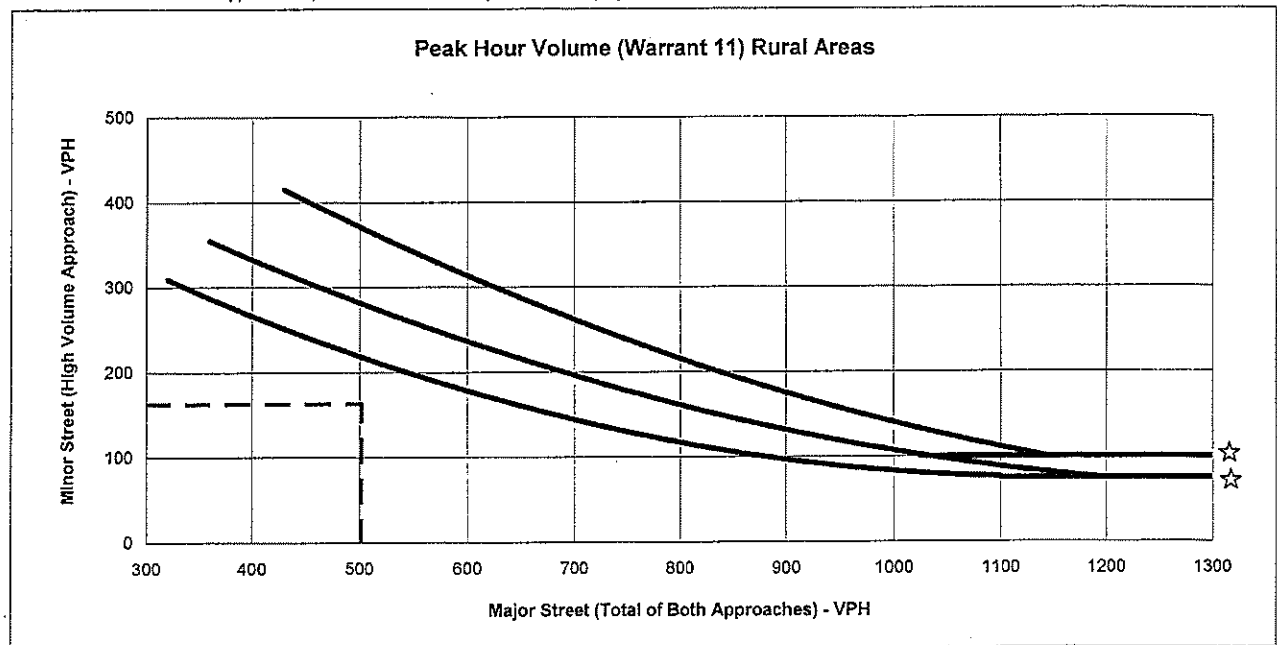


NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET
APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER
THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Intersection: Airport Blvd. / Gateway Drive
Scenario: Existing PM Peak Hour Conditions
Minor St. Volume: 74
Major St. Volume: 561
Warrant Met?: No

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
370	280				
400	270	460	297	430	410
500	215	500	290	500	380
600	185	600	230	600	310
700	140	700	198	700	265
800	115	800	170	800	210
900	99	900	125	900	180
1000	85	1000	105	1000	140
1100	75	1100	90	1100	110
1200	75	1200	75	1150	100
1300	75	1300	75	1300	100

* Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation

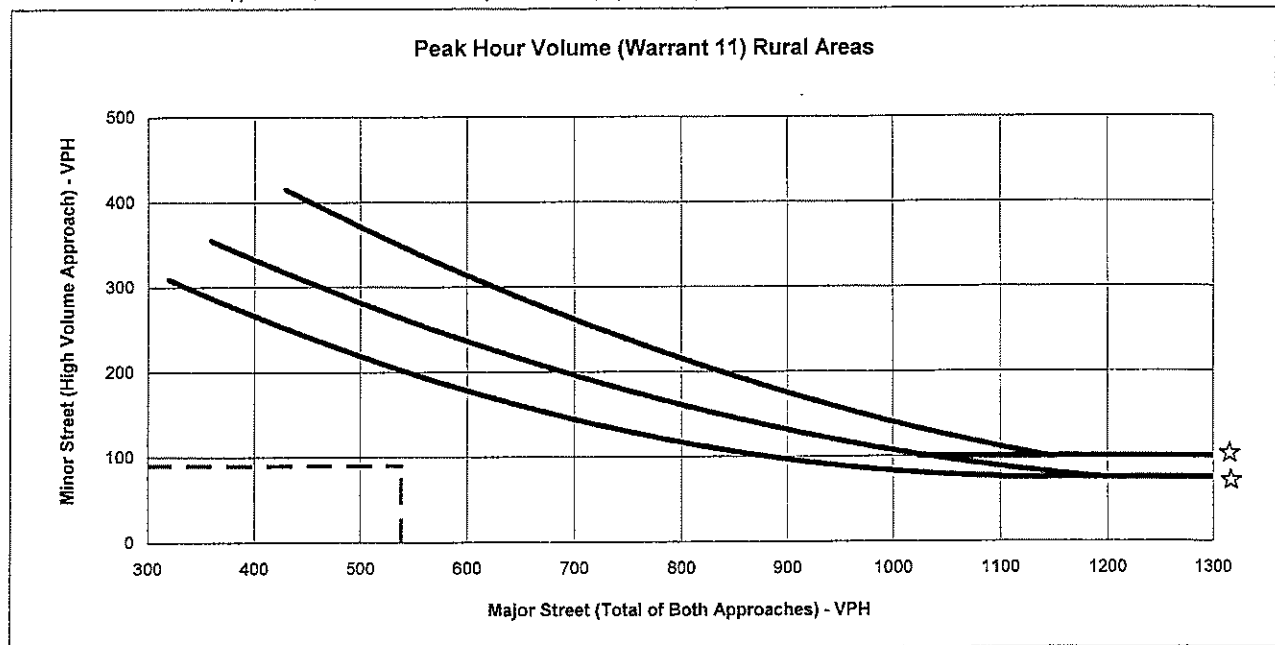


☆ NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Intersection: Airport Blvd. / Gateway Drive
Scenario: Existing+Project PM Peak Hour Conditions
Minor St. Volume: 163
Major St. Volume: 502
Warrant Met?: No

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
370	280				
400	270	460	297	430	410
500	215	500	290	500	380
600	185	600	230	600	310
700	140	700	198	700	265
800	115	800	170	800	210
900	99	900	125	900	180
1000	85	1000	105	1000	140
1100	75	1100	90	1100	110
1200	75	1200	75	1150	100
1300	75	1300	75	1300	100

* Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation

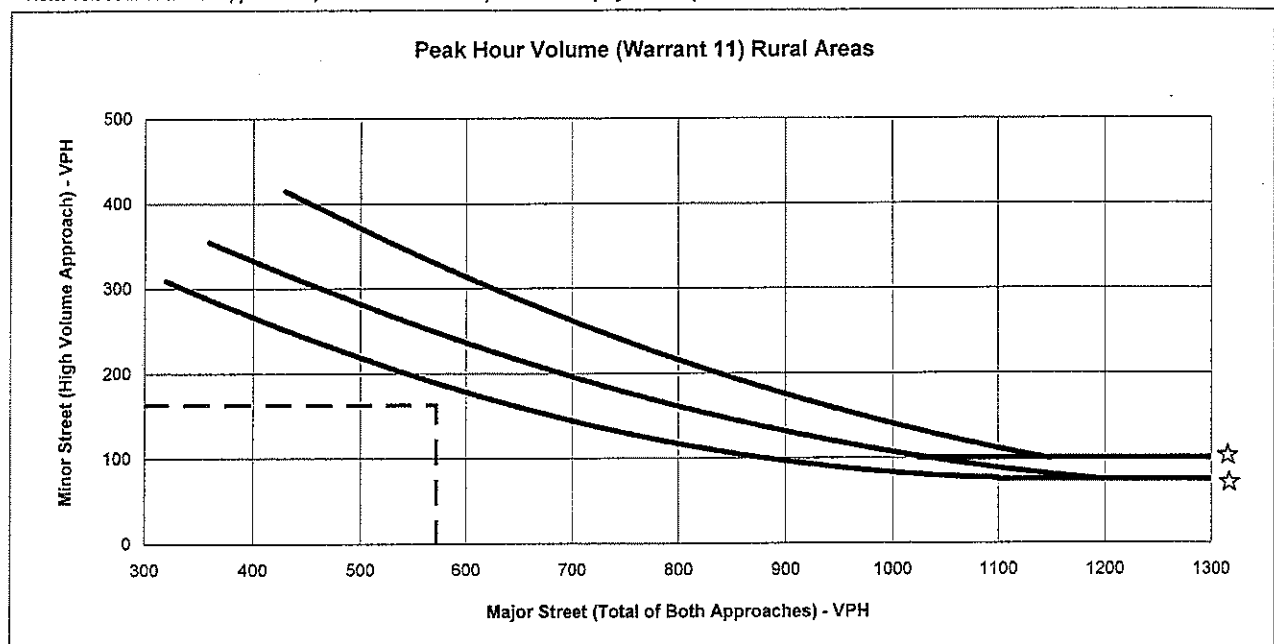


☆ NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET
APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER
THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Intersection: Airport Blvd. / Gateway Drive
Scenario: Cumulative PM Peak Hour Conditions
Minor St. Volume: 90
Major St. Volume: 539
Warrant Met?: No

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
370	280				
400	270	460	297	430	410
500	215	500	290	500	380
600	185	600	230	600	310
700	140	700	198	700	265
800	115	800	170	800	210
900	99	900	125	900	180
1000	85	1000	105	1000	140
1100	75	1100	90	1100	110
1200	75	1200	75	1150	100
1300	75	1300	75	1300	100

* Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation



☆ NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Intersection: Airport Blvd. / Gateway Drive
 Scenario: Cumulative+Project PM Peak Hour Conditions
 Minor St. Volume: 163
 Major St. Volume: 572
 Warrant Met?: No



- [illegible]

[illegible]

A01.1

