FINAL REPORT

Traffic Engineering Study

Broadway Boulevard, Euclid Avenue to Country Club Road

Prepared For:
HDR Engineering, Inc.
5210 East Williams Circle, Suite 530
Tucson, AZ 85711

Prepared By:
Kittelson & Associates, Inc.
33 N. Stone Ave., Suite 800
Tucson, AZ 85701

Registered Professional Engineer (Civil)
CERTIFICATE NO. 25991
JAMES M. SCHOEN
Date Signed 3/14/2012
ARIZONA U.S.A.
Expires 3/31/2013

March 2012

Regional Transportation Authority

CITY OF TUCSON

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING/PLANNING

Table of Contents

EXECUTIVE SUMMARY 1
1. Background and Scope 3
2. Existing Conditions 5
   2.1 Roadway 5
   2.2 Land Use 5
   2.3 Speed Limit 5
   2.4 Traffic Operations 6
   2.5 Crash History 10
   2.6 Transit Service 11
3. Future Conditions 13
   3.1 Planned Improvements 13
   3.1 Traffic Projections 14
   3.3 Median Openings 15
   3.4 Capacity and Level of Service Analysis 18
4. Conclusions 28
   4.1 Roadway Cross Section 28
   4.2 Intersection Lane Configuration 29
   4.3 Signals 29
   4.4 Multi-Modal Facilities 29
   4.5 Access 30
References 31

List of Exhibits

Exhibit 1 Location and Vicinity Map 4
Exhibit 2 Existing Access Points 5
Exhibit 3 Traffic Factors 6
Exhibit 4 Summary of Vehicle Classification Data 7
Exhibit 5 Peak Hour Pedestrian Volumes 7
Exhibit 6 Travel Time Summary 8
Exhibit 7 Existing Traffic Conditions 9
Exhibit 8 Crash Data Summary (January 1, 2008 to December 31, 2010) 11
Exhibit 9 Sample Route 8 Daily Ridership Data 12
Exhibit 10 Traffic Projections 15
Exhibit 11 Conceptual Median Opening Locations 16
Exhibit 12 Summary of 2040 Capacity Analysis Results 19
Exhibit 13 2040 Intersection Lane Requirements 20
Exhibit 14 Estimated Queue Storage Length Requirements 21
Exhibit 15 Arterial Analysis Results 21
Exhibit 16 Typical Cross Sections 24
Exhibit 17 Simulation Performance Measures 25
Exhibit 18 Travel Time Comparison 26
Exhibit 19 Summary MMLOS Analysis Results 27

List of Appendices

A. Traffic Count Data

B. Capacity Analysis Worksheets - Existing

C. Signal Warrants

D. 2040 Turning Volume Worksheets

E. Capacity Analysis Worksheets - 2040

F. Turn Lane Storage Calculations

G. Multi-Modal LOS Worksheets

EXECUTIVE SUMMARY

The Regional Transportation Authority (RTA) plan approved by Pima County voters in 2006 includes widening Broadway Boulevard from Euclid Avenue to Country Club Road to a 6-lane divided arterial with two dedicated transit lanes. As part of the planning and preliminary engineering phase of the project, a traffic study was conducted to determine the capacity requirements of the roadway and intersections, traffic control and access control requirements, and facilities to address multi-modal needs.

A preliminary traffic assessment prepared in 2009 evaluated corridor capacity requirements based on projected 2030 traffic demands. This report updates the initial capacity recommendations to reflect the 2040 planning horizon and provides a detailed assessment of arterial operations and multi-modal needs.

Analysis of roadway and intersection capacity was conducted utilizing the analytical procedures provided in the Highway Capacity Manual. Detailed evaluation of corridor operations, particularly the impact of dedicated transit, or multi-use lanes, was conducted using a microscopic simulation model that was developed for a one mile section of the corridor, Cherry Avenue to Tucson Boulevard. The findings of this traffic study are summarized below.

- Current (2010) daily traffic volumes on Broadway Boulevard range from 34,000 to 41,000 vehicles per day (vpd). 2040 traffic demands are projected to range from 40,000 to 56,000 vpd. The capacity analysis indicates that a 6-lane roadway with appropriate turn-lane capacity and storage at signalized intersections will be required to serve future demand at a satisfactory level of service.
- At Euclid Avenue, dual left-turn lanes will be required on the eastbound and westbound approaches to serve projected 2040 peak-hour traffic volumes. At Campbell Avenue, dual left-turn lanes and exclusive right-turn lanes will be required on all approaches. Even with the recommended capacity improvements, some movements at Campbell Avenue will likely operate at or near capacity during the evening peak period. At Country Club Road, dual left-turn lanes and right-turn lanes are required to serve projected future turning demand, however due to constrained right-of-way, it is likely that only single left-turn lanes can be provided. As such, it is expected that this intersection will become congested during the evening peak traffic period based on 7-10 years of projected traffic growth. Recommended intersection lane requirements are provided in Exhibit 13.
- A review of historical crash data covering the most recent 3-year period indicated that over 400 crashes occurred on Broadway Boulevard from Euclid Avenue to Country Club Road. Rear-end crashes accounted for approximately 40% of all crashes. Widening the roadway and reducing intersection congestion will reduce rear-end crash potential.
- Providing a high level of access control will optimize roadway capacity and reduce crash potential. Based on a potential shift of the Broadway Boulevard alignment to the north, a conceptual plan for the location of median openings was prepared in this study. An access

management plan should be developed for the corridor based on the final roadway alignment and anticipated redevelopment of adjacent properties. This plan should strive to minimize the number of driveways that provide direct access onto Broadway Boulevard.

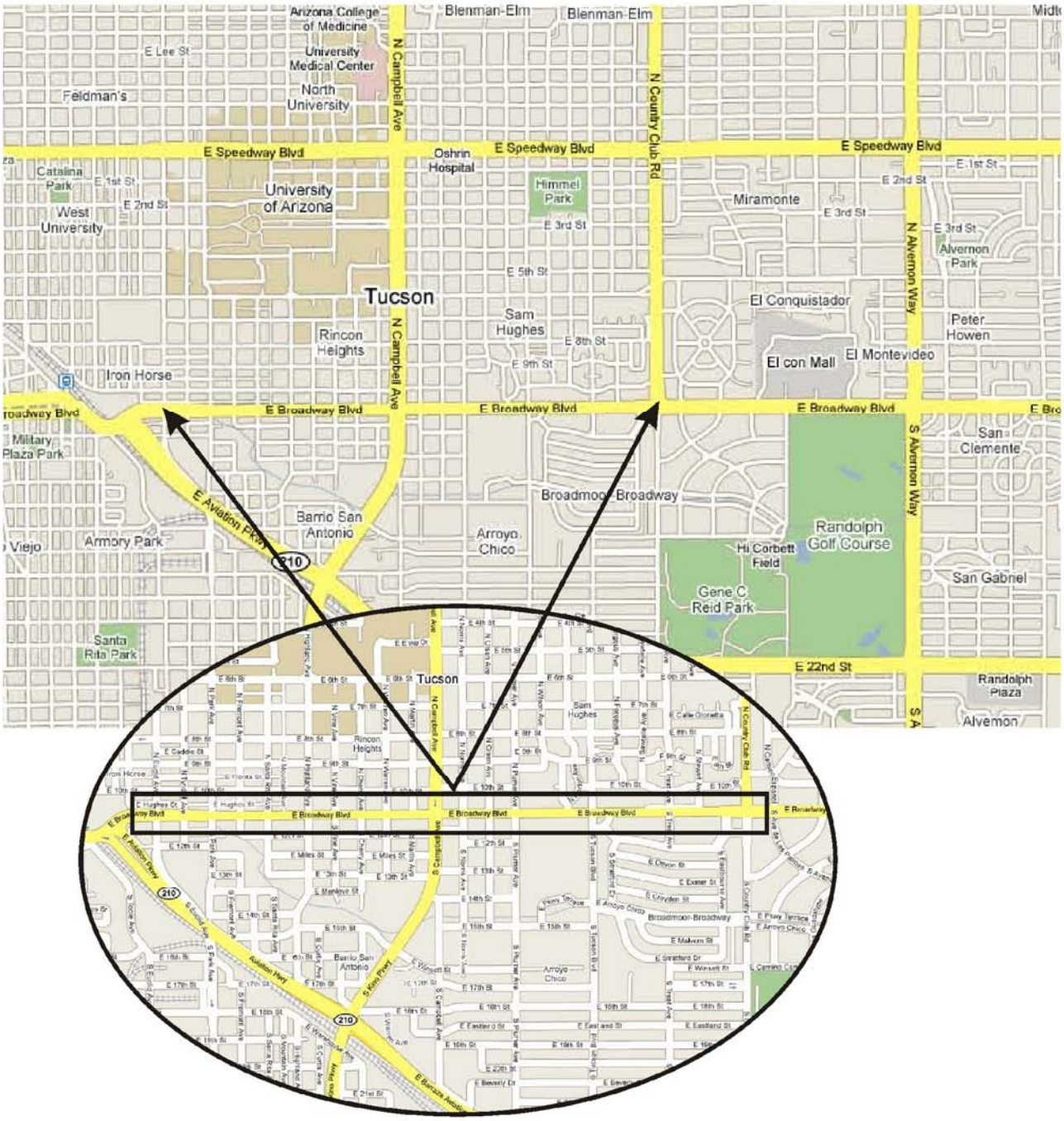
- The current pedestrian activity at the Treat Avenue marked crossing does not justify installation of a pedestrian signal; however, it is anticipated that a signal will be required in the future to accommodate the City's plan to convert Treat Avenue into a bike boulevard.
- To optimize Broadway Boulevard operations, it is critical that all pedestrian signals, either HAWK or Pelican, be integrated into the corridor's coordinated signal operations. This will require that the HAWK signals be designed and operated as 2-stage crossings.
- Based on current side street and driveway traffic volumes, no additional traffic signals will be required. It is recommended that all traffic signals be equipped with transit signal priority technology to enhance transit performance and support ridership within the corridor.
- Microscopic simulation models were developed for the 6-lane and 6-lane with multi-use lanes scenarios. The multi-use lanes are expected to serve three functions – dedicated bus lanes, right-turn deceleration lanes, and bike lanes, as they currently do on much of Broadway Boulevard to the east of Columbus Road. The simulation results indicate that the multi-use lanes will improve transit performance. Average delay of buses will be approximately 12% less, number of stops will be 15% less, and the average speed of buses will be 6% higher. The benefit to vehicles in the general traffic lanes is marginal. Considering current local bus service and the potential future implementation of Bus Rapid Transit (BRT) service on Broadway Boulevard, provision of a dedicated lane is not essential, however it will benefit transit operations. What is essential if multi-use lanes are not included are pull thrus/outs at signalized intersections and other major transit stops, although not at minor stops. Reducing driveway density along the corridor will also benefit transit and bicycle operations if multi-use lanes are not provided.

1. BACKGROUND AND SCOPE

The City of Tucson Department of Transportation is moving ahead with plans to widen Broadway Boulevard from Euclid Avenue to Country Club Road as part of the Regional Transportation Authority (RTA) transportation improvement program. Kittelson & Associates, Inc. (KAI) was retained by HDR Engineering to evaluate existing and future traffic conditions along Broadway Boulevard. This report documents the evaluation results, including existing conditions, projected traffic growth within the corridor, and roadway capacity and control requirements to serve traffic demand. Specific recommendations were developed for the design of improvements on Broadway Boulevard, including the lane configuration at signalized intersections, turn lane storage requirements, and needed traffic control. The study limits are defined in Exhibit 1.

The traffic assessment conducted included five signalized intersections - Euclid Avenue, Highland Avenue, Campbell Avenue, Tucson Boulevard and Country Club Road; four intersections with HAWK pedestrian signals - Park Avenue, Cherry Avenue, Norris Avenue and Plumer Avenue; and a two-way stop-controlled intersection with pedestrian crossing at Treat Avenue. Existing intersection peak period turning movement counts, 24-hour segment counts with vehicle classification data, and 24-hour counts on eleven side streets were collected during February 16, 2009 and February 19, 2009 and were used to establish the existing conditions. Socioeconomic data, driveway activity data, pedestrian counts, lane utilization information, and crash data were also collected.

(NO SCALE)



LOCATION & VICINITY MAP

EXHIBIT 1

H:\profile\8795 - Broadway\dwgs\figs\8795 Figs.dwg Dec 14, 2011 - 3:26pm - tradderman Layout Tab: Fig01 New

2. EXISTING CONDITIONS

2.1 ROADWAY

Broadway Boulevard currently has a 6-lane cross section with a raised between Euclid Avenue and Tyndall Avenue, transitioning to a 5-lane cross section with a center two-way left-turn lane (TWLTL) between Tyndall Avenue and Park Avenue, and a 5-lane cross section between Park Avenue and just west of Country Club Road. The TWLTL accommodates access to adjacent commercial and residential properties. The current cross sections include 11-foot travel lanes with 5-foot bike lanes. A short frontage road located on the north side of Broadway Boulevard, extending from 400 feet west of Treat Avenue to Stewart Avenue provides access to twelve residences. No on-street parking exists within the study corridor. Sidewalk or paved areas on both sides of the roadway are available for pedestrians along the entire roadway section. Current access (driveways and side streets) along Broadway Boulevard is summarized in Exhibit 2.

Exhibit 2 Existing Access Points

Broadway Section	North Side	South Side
Euclid Ave. - Highland Ave.	19	27
Highland Ave. - Campbell Ave.	23	16
Campbell Ave. - Tucson Blvd.	37	34
Tucson Blvd. - Country Club Rd.	19	25
Total	98	102

2.2 LAND USE

The study section of Broadway Boulevard is fully developed. Residential and small retail commercial are the principal land uses between Euclid Avenue and Campbell Avenue. Retail commercial, including several strip commercial buildings, is the principal land use between Campbell Avenue and Country Club Road. Nearly all of these developments currently have full access onto Broadway Boulevard.

2.3 SPEED LIMIT

The existing posted speed limits within the study limits are as follows:

- Broadway Boulevard - 30 mph from Euclid Avenue to Campbell Avenue, 35 mph from Campbell Avenue to Country Club Road.
- Euclid Avenue - 30 mph north of Broadway Boulevard, 35 mph south of Broadway Boulevard.
- Highland Avenue - 25 mph.

- Campbell Avenue - 35 mph north of Broadway Boulevard, 40 mph south of Broadway Boulevard.
- Tucson Boulevard - 30 mph north of Broadway Boulevard, 35 mph south of Broadway Boulevard.
- Country Club Road - 35 mph.
- All other side streets - 25 mph.

2.4 TRAFFIC OPERATIONS

Traffic counts collected between February 16, 2009 and February 19, 2009 include peak-period turning movement counts at the study intersections. Daily (24-hour) directional traffic counts were collected on Broadway Boulevard between Campbell Avenue and Tucson Boulevard and on eleven side streets. Recent daily traffic counts were also obtained from the Pima Association of Governments (PAG). The hourly and daily traffic volume data are summarized in Exhibit 7 and the detailed counts (including pedestrian counts) are included in Appendix A.

2.4.1 Traffic Factors

The traffic factors listed in Exhibit 3 were calculated from the 24-hour roadway counts. The K-factor represents the percentage of daily traffic that occurs during the peak hour and the D-factor represents the percentage of traffic in the heaviest direction of travel. The hourly segment count data indicates that existing demand remains heavy throughout the day with the two-way volume exceeding 2,000 vehicles per hour from 7 AM until 7 PM.

Exhibit 3 Traffic Factors

Broadway Boulevard	K		D	
	AM	PM	AM	PM
Campbell Ave. to Tucson Blvd.	7%	8%	56% WB	53% EB

Four hour vehicle classification counts were taken on September 1, 2011 on Broadway Boulevard near Norris Avenue. The observed heavy vehicle percentage during the peak periods (7-9 AM and 4-6 PM) is about 2%. The Federal Highway Administration (FHWA) defines 13 vehicle categories. Heavy vehicles as those in Categories 5 thru 13. The vehicle classification data is summarized in Exhibit 4.

Based on the 24-hour segment and peak period intersection turning movement count data, the morning peak hour occurs from 7:30 to 8:30 AM and evening peak hour from 4:30 to 5:30 PM. Traffic operations were evaluated for these two peak hours.

Exhibit 4 Summary of Vehicle Classification Data

	1	2	3	4	5	6	7	8	9	10	11	12	13
Peak Period	Motor-cycles/ Bikes	Pass. Cars	Trucks, Vans, etc	Bus	Single Unit Trucks			Truck with Trailer			Truck with Multi Trailers		
					2Axle, 6 Tire	3 Axle	4 Axle	<5 Axle	5 Axle	>6 Axle	< 6 Axle	6 Axle	>6 Axle
AM	0.5%	48.4%	47.1%	1.3%	1.7%	0.0%	0.0%	0.6%	0.3%	0.0%	0.0%	0.0%	0.0%
PM	0.6%	50.0%	47.9%	0.7%	0.5%	0.0%	0.0%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%

2.4.2 Pedestrian and Bicycle Volumes

Pedestrian counts taken at each of the four existing HAWK signals and at the unsignalized pedestrian crossing during the vehicular peak hour (7:30-8:30 AM and 4:30-5:30 PM) on Broadway Boulevard are summarized in Exhibit 5. These data were collected in February 2009 and again in September 2011. The 2011 counts also include the number of times that HAWK signals were activated during each peak hour. A detailed evaluation of the impact of these HAWK signals on traffic flow on Broadway Boulevard was conducted using a microscopic traffic simulation model (VISSIM) and the results are discussed in Section 3.2.4.

Exhibit 5 Peak Hour Pedestrian Volumes

Intersection	2009 Ped. Vol. During Pk Hrs on Broadway		2011 Ped. Vol. (Signal Activations)		
			During Pk Hrs on Broadway		Peak Ped. Crossing Activity
	AM	PM	AM	PM	
Park Ave./Broadway Blvd. (HAWK)	0	19	22 (18)	11 (9)	41 (15); 9:15-10:15 AM
Cherry Ave./Broadway Blvd. (HAWK)	31	40	19 (11)	14 (12)	21 (9); 7:45-8:45
Norris Ave./Broadway Blvd. (HAWK)	1	15	3 (3)	6 (5)	15 (9); 3:15-4:15 PM
Plumer Ave./Broadway Blvd. (HAWK)	16	16	17 (12)	14 (13)	27 (12); 3:15-4:15 PM
Treat Ave./Broadway Blvd. (marked crosswalk)	3	35	1 (NA)	1 (NA)	6 (NA); 9:45-10:45

The peak-hour of pedestrian activity at each crossing is also provided in Exhibit 5 for the 2011 counts. At Plumer Avenue and Norris Avenue, the number of pedestrians peaked from 3:15 to 4:25 PM; at Park Ave, the peak pedestrian activity occurred between 9:15 – 10:15 AM with 41 pedestrians in 15 signal activations; at Cherry Ave the highest pedestrian volume observed was 21 pedestrians between 7:45 – 8:45 AM; the pedestrian activity at the Treat Ave crossing was low with a maximum of 6 pedestrians observed between 9:45 and 10:45 AM.

Bicycle counts were collected at the Norris Avenue intersection on September 1, 2011 between 4:30 and 5:30 PM. Six bicyclists were observed travelling in the eastbound direction and one in the westbound direction along Broadway Blvd.

2.4.3 Arterial Traffic Flow

Travel time data was collected on February 19, 2009 between 7 and 9 AM and between 4 and 6 PM using the floating car method. The average travel times on the 1.92 mile section of Broadway Boulevardfrom Euclid Avenue to Country Club Road are provided in Exhibit 6. The Synchro models developed for capacity analysis were calibrated to better reflect the observed travel times. The travel time and speed outputs given by the calibrated Synchro models are also provided in Exhibit 6 for comparison. The results show the Synchro model outputs match the field data reasonably well with the exception of the westbound traffic flow during the evening peak period. This may be due to the impacts of the HAWK signals, which are included in the field data, however are not cannot be modeled by Synchro.

Assuming a free-flow speed of 30/35 mph (the same as the posted speed limits) the average delay traveling on Broadway Boulevard between Euclid Avenue and Country Club Road is 27 seconds during the morning peak period and 57 seconds during the evening peak period in the eastbound direction and 56 seconds during morning peak period and 80 seconds during evening peak period in the westbound direction.

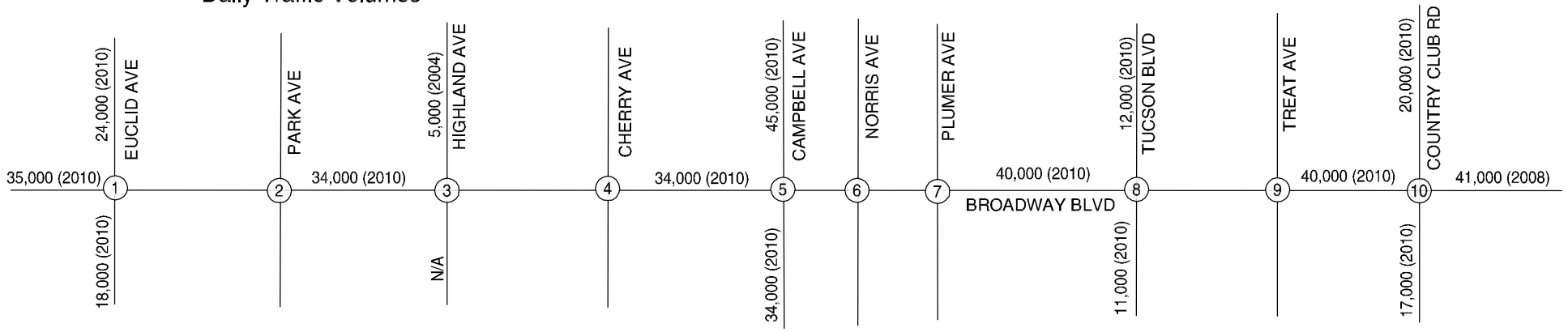
Exhibit 6 Travel Time Summary

Broadway Boulevard	Field Data								Synchro Outputs			
	# of Runs		Avg. Travel Time (sec)		Travel Time Standard Deviation (sec)		Avg. Travel Speed (mph)		Avg. Travel Time (sec)		Avg. Travel Speed (mph)	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Eastbound	10	8	240	270	19.4	39.6	28.8	25.6	231	270	30	25.7
Westbound	10	8	269	293	41.5	38.7	25.6	23.5	262	247	26.4	28.2

2.4.4 Intersection Capacity

Intersection capacity analysis was performed using the Synchro 7 traffic analysis software which utilizes the current Highway Capacity Manual procedures. The analysis results of existing traffic conditions at the signalized intersections are summarized in Exhibit 7. The detailed capacity analysis worksheets are included in Appendix B. The results show that overall traffic operations at the Euclid Avenue, Highland Avenue, Campbell Avenue, Tucson Boulevard and Country Club Road intersections are at LOS D or better during the morning and evening peak periods. Several movements at some intersections operate at LOS E or F during at least one of the peak periods. The eastbound and southbound left-turn movements at the Euclid Avenue intersection operate at LOS F with a volume-to-capacity (v/c) ratio greater than 1.00 during the morning peak period. A v/c ratio exceeding 1.00 indicates significant congestion. During the evening peak period, the eastbound and

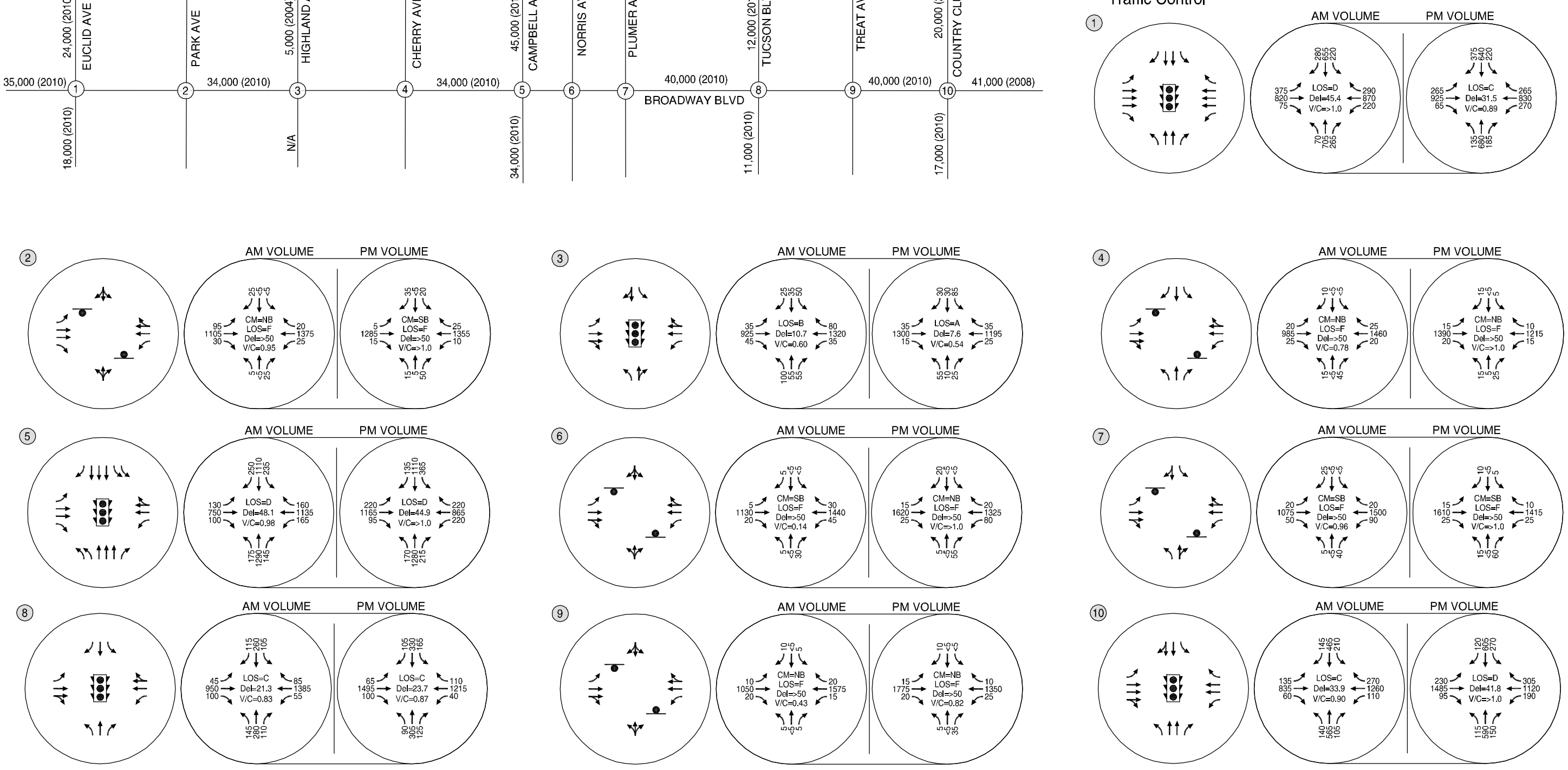
Daily Traffic Volumes



Intersection Lane Configuration and Traffic Control

Intersection Peak-Hour Volumes and Traffic Operations

(NO SCALE)



LEGEND

CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

EXISTING TRAFFIC CONDITIONS

EXHIBIT 7

H:\projfile\8795 - Broadway\dwgs\figs\8795 Figs.dwg Mar 01, 2012 - 11:24am - traddeman Layout Tab: Exhibit 7

westbound left-turn movements at the Campbell Avenue intersection operate at LOS F with a v/c ratio greater than 1.00. The southbound left-turn, through and right-turn movements at the Country Club Road intersection also operate at LOS F with a v/c ratio greater than 1.00 during the evening peak period.

2.4.5 Signal Warrants

Based on peak-hour counts taken at the unsignalized intersections, the highest volume on a side street was 79 veh/hr. To warrant a signal based on vehicular volume, the 8th highest hour side street volume would need to exceed 75 veh/hr for Warrant 1 (Eight-Hour Vehicular Volume) and the 4th highest hour side street volume would need to exceed 80 veh/hr for Warrant 2 (Four-Hour Vehicular Volume). As such, no additional signals are currently warranted based on existing volumes.

2.4.6 Pedestrian Signal Warrants

A marked crosswalk is currently located at Treat Avenue. A pedestrian signal warrant analysis was conducted for this crossing for current conditions following the City of Tucson HAWK signal warrant criteria. Based on the analysis results, the intersection received 16 points which does not meet the minimum score of 25 points for consideration of a HAWK signal installation. The warrant evaluation for the Treat Avenue pedestrian crossing is included in Appendix C. Although a pedestrian signal is not currently warranted, future City of Tucson plans to convert Treat Avenue into a bike boulevard will increase demand at the Broadway Boulevard crossing, likely requiring the installation of a pedestrian signal.

2.5 CRASH HISTORY

The City of Tucson provided historical crash data for the 3-year period from January 1, 2008 to December 31, 2010. The data includes the number of crashes and crash type, but not injury level or severity. During the 3-year period no fatalities occurred along Broadway Boulevard within the study limits. The segment and intersection crash data are summarized in Exhibit 8.

The intersection accident rates ranged from 0.30 to 1.21 accidents per million vehicles entering the intersection. The highest number of accidents occurred at the Campbell Avenue intersection. Of the 101 accidents, 41 were rear end crashes, with 20 occurring on Broadway Boulevard, 12 on Campbell Avenue, and 9 on Kino Parkway. As a comparison, the average 3-year (2007-2009) accident rate at signalized intersections on the Pima County roadway system was 0.81 accidents per million vehicles with a standard deviation of 0.52. Therefore, the range of observed signalized intersection accident rates on the Pima County system was 0.29 to 1.33 accidents per million vehicles, which is consistent with the rates observed on Broadway Boulevard. Average accident rate information within the City of Tucson is not available for comparison.

The 3-year segment accident rates along Broadway Boulevard range from 0.77 to 2.69 accidents per million vehicle miles travelled on a segment. The segment from Campbell Avenue to Tucson Boulevard experienced the highest number of crashes (59) with rear-end crashes being the most

predominant (33). Rear-end crashes are typically the most common on roadways that experience heavy congestion and which have frequent driveways and side streets. The average 3-year (2007-2009) accident rate on high volume roadway segments (daily traffic > 10,000) within Pima County system is 1.26 accidents per million vehicle miles with a standard deviation of 1.08. Therefore, the range of observed segment accident rates on the Pima County system is 0.18 to 2.34 accidents per million vehicle miles.

Exhibit 8 Crash Data Summary (January 1, 2008 to December 31, 2010)

Signalized Intersections										
	Euclid Avenue		Highland Avenue		Campbell Avenue		Tucson Blvd		Country Club Road	
Total Accidents	67		12		101		51		70	
Angle	5	7%	1	8%	12	12%	2	4%	5	7%
Rear-End	16	24%	3	25%	41	41%	17	33%	24	34%
Turning	13	19%	3	25%	20	20%	10	20%	11	16%
Other	33	49%	5	42%	28	28%	22	43%	30	43%
Daily ADT:	55,500		36,500		76,500		51,500		63,500	
Accident Rate[1]	1.10		0.30		1.21		0.90		1.01	

Roadway Segments								
	Euclid Ave to Highland Ave (0.5 mile)		Highland Ave to Campbell Ave (0.4 mile)		Campbell Ave to Tucson Blvd (0.5 mile)		Tucson Blvd to Country Club Rd (0.5 mile)	
Total Accidents	27		26		59		21	
Angle	1	4%	1	4%	3	5%	0	0%
Rear-End	8	30%	9	35%	33	56%	15	71%
Turning	4	15%	9	35%	11	19%		0%
Other	14	52%	7	27%	12	20%	6	29%
Daily ADT:	34,000		40,000		40,000		36,740	
Accident Rate[1]	1.45		1.48		2.69		0.77	

1. Intersection accident rates refer to the number of accidents per million vehicles entering the intersection. Rate = (number of 3-year accidents x 10^6)/(3 years x weekday entering volume x 365 days).
2. Segment accident rates refer to the number of accidents per million vehicles-miles of travel. Rate = (number of 3-year accidents x 10^6)/(3 years x weekday segment volume x 365 days x segment length).

2.6 TRANSIT SERVICE

Current Sun Tran service along Broadway Boulevard includes one fixed route and one express route - Route 8 (Broadway/6th Ave) and Route 108X (Broadway-Downtown Express). Route 8 runs from the Roy Laos Transit Center on South 6th Avenue to the Ronstadt Transit Center downtown, then to Houghton Road. Route 8 is has the highest Sun Tran ridership. Bus headways range from 10 minutes

during the peak commute periods to 30 minutes during other periods. Sample daily ridership data for Route 8 is provided in Exhibit 9.

Route 108X, the Broadway-Downtown Express, is served by buses stationed at the Ronstadt Transit Center with three morning runs and three evening runs. The route is the same as that of Route 8 but has no stop within the study limits. Route 108X service is planned for expansion to six morning runs and six evening runs by 2012.

There are three bus pull-outs within the project area, two of which are located near the Campbell Avenue intersection. The third one is located on the north side of Broadway Boulevard, between Olsen Avenue and Plumer Avenue. There are 16 bus stops within the study limits.

Exhibit 9 Sample Route 8 Daily Ridership Data

	2009 EB		2009 WB		2011 EB		2011 WB	
	Board	Alight	Board	Alight	Board	Alight	Board	Alight
Euclid Ave	168	85	N/A	N/A	155	69	34	105
Park Ave	N/A	N/A	62	71	N/A	N/A	23	45
Freemont Ave	45	69	62	31	40	49	33	21
Highland Ave	29	46	41	21	23	35	20	26
Cherry Ave	45	39	51	29	33	41	42	26
Campbell Ave	118	153	143	126	125	148	128	116
Plumer Ave	67	56	63	66	49	61	76	46
Tucson Blvd	56	76	71	46	52	65	59	68
Treat Ave	15	38	31	16	7	21	12	21
Total	543	562	524	406	484	489	427	474

3. FUTURE CONDITIONS

3.1 PLANNED IMPROVEMENTS

The Regional Transportation Authority (RTA) 20-year improvement plan includes the widening of Broadway Boulevard, Euclid Avenue to Country Club Road to a 6-lane divided arterial with two dedicated bus lanes, bike lanes, and sidewalks. The High Capacity Transit (HCT) plan for the PAG region has established Broadway Boulevard as a priority corridor, identifying Bus Rapid Transit (BRT) as the most viable HCT option. Beyond the possible addition of a BRT system, no other planned roadway improvements within this section of the Broadway Boulevard corridor, including the cross streets, are part of the PAG 2040 Regional Transportation Plan.

3.1.1 High Capacity Transit

As a primary transit corridor within the region, Broadway Boulevard has long been considered a potential candidate for the implementation of a HCT system. Assessment and planning for HCT on Broadway Boulevard began in 1989 with the Broadway Corridor Study. This study concluded that the best long range HCT option was to install dedicated bus lanes between the downtown and Pantano Road. An 8-lane divided cross section that accommodates this option is essentially in place between Columbus Boulevard and Pantano Road. However, the outside "multi-use" lanes that are in place do not operate solely as dedicated bus lanes, but serve several other functions including right-turn deceleration lanes and bike lanes.

The PAG High Capacity Transit Study, completed in 2009, recommended that BRT is the best HCT option on Broadway Boulevard. While the optimal application is to run BRT in dedicated travel ways similar to Light Rail Transit (LRT), applications of BRT in general travel lanes on arterials and parkways are gaining increasing popularity across the country due to the prohibitive cost associated with implementing dedicated transit travel ways. Both the original Broadway Corridor Study and the High Capacity Transit Study concluded that LRT is not a viable long term option on Broadway Boulevard due to insufficient ridership and very high cost. The High Capacity Transit Study did suggest that extending the Tucson Modern Streetcar from downtown to El Con Mall could be considered depending upon several factors, including the success and cost of the initial streetcar line between downtown and the University of Arizona and redevelopment along Broadway Boulevard at the mall. The mall redevelopment is nearly complete and includes no residential uses which are integral to supporting a street car option.

BRT operation on Broadway Boulevard can be achieved in both a 6-lane and 6-lane plus multi-use lane cross section. An analysis of the operational characteristics of each cross section was conducted as part of this traffic study. The findings are discussed in Section 3.3.4.

3.1 TRAFFIC PROJECTIONS

Future traffic demands for this study were developed based on the 2040 projections produced by the PAG regional traffic forecasting model. The 2040 PAG traffic projections are provided in Exhibit 10. The projections indicate that traffic demand on Broadway Boulevard is expected to see moderate annual growth, essentially ranging from 0.5% to 1.3%. Considering that Broadway Boulevard is located within a heavily urbanized and developed area, annual traffic growth ranging from 1% to 1.5% is reasonable.

On the major cross streets, Euclid Avenue, Campbell, Avenue, Tucson Blvd, and Country Club Road, low to moderate annual traffic growth is projected. On Highland Avenue, a major collector roadway, very high annual growth (6.7%) is projected. Given the nature and limitations of the regional traffic forecasting model, projected 2040 volumes, which is assumed to be the design year for the Broadway Boulevard improvements, were adjusted for several roadway segments included in this traffic study. These adjustments are discussed below.

- Euclid Avenue – The roadway capacity, land use, and characteristics of Euclid Avenue north and south of Broadway Boulevard are not conducive to a doubling of traffic volumes over the next 30 years. To the north, Euclid Avenue has a 5-lane cross section, however the impact of pedestrian crossing facilities at Tucson High and the University of Arizona diminish roadway capacity. To the south, the 5-lane section narrows to 3 lanes at 22nd Street. As the 2040 regional plan does not include a project to increase the capacity on Euclid Avenue and since the surrounding areas are well developed, more moderate growth rates (1.7% and 2.0%) were assumed for this study.

- Highland Avenue – Highland Avenue is a two-lane residential collector road that has historically carried 5,000 to 7,000 vpd. North of Broadway Boulevard, there exist speed bumps that discourage high speed and volume. South of Broadway Boulevard, Highland Avenue terminates at Barraza Aviation Parkway. As such, it is very unlikely that future traffic growth on Highland Avenue can reach 17,000 vpd without substantial capacity improvements. A more reasonable 9,000 to 10,000 vpd was assumed.

- Campbell Avenue/Kino Parkway – PAG's 2040 projection for the south Kino Parkway leg is 70,000 vpd. Since Campbell Avenue is not planned to be widened beyond its current 6-lane cross section, volumes on Campbell Avenue won't be able to reach this level. Historically, the daily traffic volumes on the north and south legs have been comparable. As such, annual growth rates of 0.7% and 2.2% were assumed for the north and south legs, respectively, resulting in a more realistic future volume.

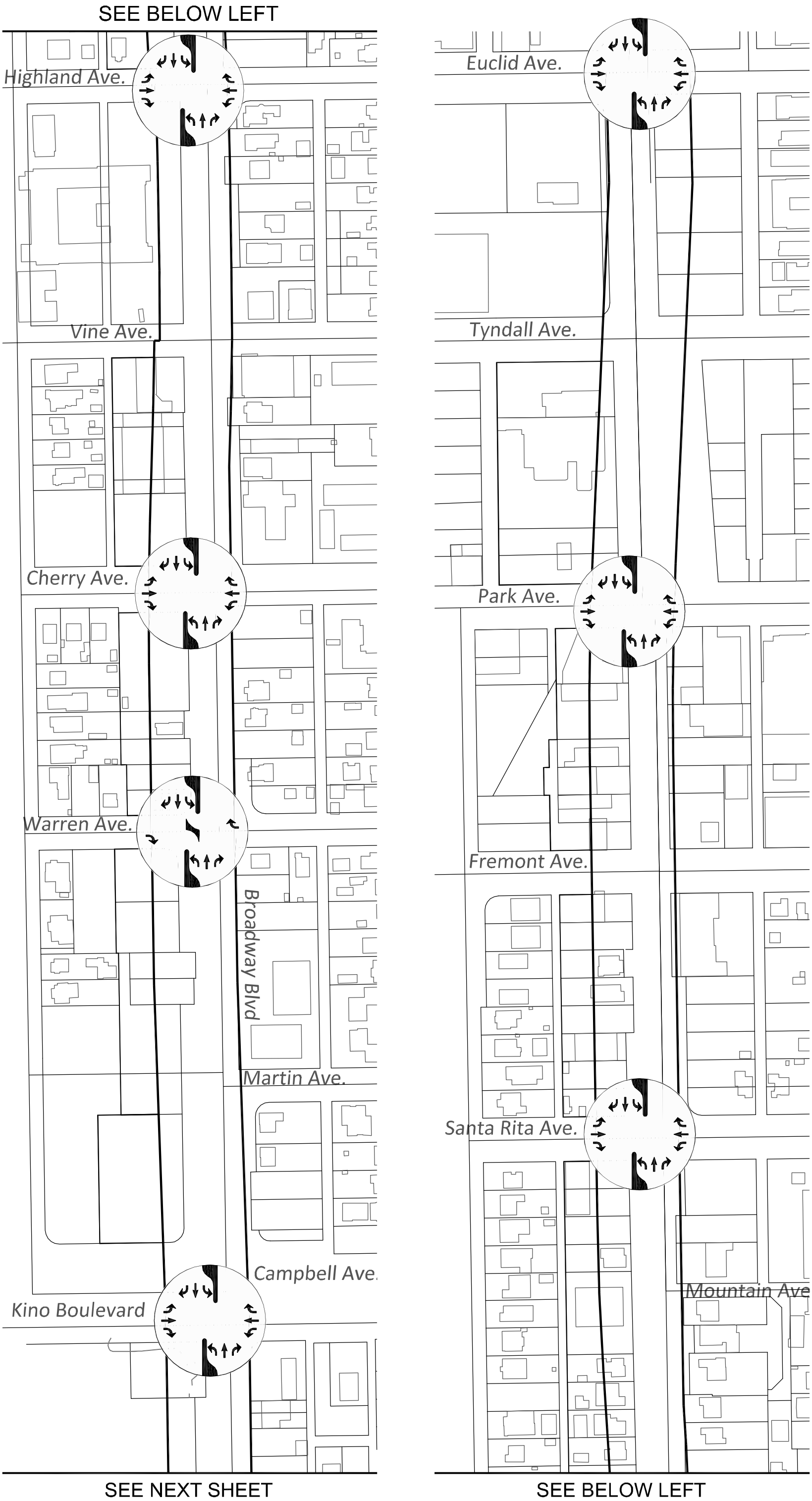
Using the existing traffic factors, turning movement counts, and design year ADTs, 2040 peak period turning volumes were developed for use in the analysis of future intersection and roadway capacity requirements. Worksheets used to develop the future turning movement volumes are provided in Appendix D.

Exhibit 10 Traffic Projections

Roadway	Segment	Current Daily Volume (Year)	PAG Daily Volume Projection		Daily Volume Assumed For This Study	
			2040	Annual Growth Rate	Design Year (2040)	Annual Growth Rate
Euclid Ave	North	24,000 (10)	46,000	3.0%	36,000	1.7%
	South	18,000 (10)	44,000	4.8%	29,000	2.0%
Highland Ave	North	5,000 (04)	17,000	6.7%	9,000	2.2%
	South	7,000[1] (09)	NA	NA	10,000	1.4%
Campbell Ave Kino Pkwy	North	45,000 (10)	55,000	0.7%	54,000	0.7%
	South	34,000 (10)	70,000	3.5%	56,000	2.2%
Tucson Blvd	North	12,000 (10)	12,000	0.0%	15,000	0.7%
	South	11,000 (10)	12,000	0.3%	14,000	0.7%
Country Club Rd	North	20,000 (10)	26,000	1.0%	31,000	1.8%
	South	17,000 (10)	22,000	1.0%	25,000	1.6%
Broadway Blvd	West of Euclid Ave	35,000 (10)	33,000	-0.2%	39,000	0.4%
	Euclid Ave to Highland Ave	34,000 (10)	41,000	0.7%	41,000	1.1%
	Highland Ave to Campbell Ave	34,000 (10)	46,000	1.2%	46,000	1.2%
	Campbell Ave to Tucson Blvd	40,000 (10)	56,000	1.3%	56,000	1.3%
	Tucson Blvd to Country Club Rd	40,000 (10)	46,000	0.5%	47,000	0.6%
	East of Country Club Rd	41,000 (08)	53,000	1.0%	53,000	0.9%

3.3 MEDIAN OPENINGS

As specified in the City's Major Streets and Routes Plan for high volume arterials, the widening of Broadway Boulevard will include a raised median. The City's Transportation Access Management Guidelines specifies 660 feet as the minimum spacing between full access median openings on an arterial. Based on this guideline and examination of existing cross street traffic demand, network connectivity, and potential future development, a conceptual median opening plan for Broadway Boulevard, Euclid Avenue to Country Club Road is presented in Exhibit 11.



CONCEPTUAL MEDIAN OPENING LOCATIONS

EXHIBIT 11

CONCEPTUAL MEDIAN OPENING LOCATIONS (CONT.)

FIGURE 11

H:\profile\8795 - Broadway\dwgs\figs\8795 Access.dwg Dec 14, 2011 - 3:16pm - traddeman Layout Tab: Fig11_CONT

3.4 CAPACITY AND LEVEL OF SERVICE ANALYSIS

3.4.1 Methodology

Future intersection and roadway lane requirements were determined based on the results of capacity and level of service analysis of the 2040 traffic forecasts. The following criteria were assumed for the analysis:

- Percentages of heavy vehicles are the same as existing conditions if they are greater than 2%, otherwise they are 2%.
- For Broadway Boulevard and major cross streets, peak-hour factors are the same as existing if greater than 0.92, otherwise they are 0.92. A minimum peak-hour factor of 0.92 was used for future conditions because variation in traffic demand tends to decrease during peak periods as traffic demand increases. On the minor cross streets, peak-hour factors are the same as existing.
- 4-phase signal operation with permitted/protected left-turn phasing.
- Cycle lengths are 90 seconds with optimized timing to minimize intersection delay.
- Right-turns on red are permitted.
- Platoon arrival Type 4, representing coordinated signal operations.

.3.4.2 Intersection Capacity

The intersection capacity analysis results indicate that with the provision of sufficient turn lane capacity, a 6-lane cross section will provide overall operations of LOS D or better at each intersection. Intersection capacity and level of service analysis worksheets are provided in Appendix E. The intersection level of service analysis results are summarized in Exhibit 152. Intersection lane requirements are presented in Exhibit 12.

At Campbell Avenue, the eastbound and southbound left-turns may operate at LOS F even with dual left-turn lanes provided and several through movements are predicted to operate at LOS E. Several potential solutions to increase intersection capacity include utilizing left-turn overlap phasing at the Campbell Avenue intersection or potentially implementing a traffic adaptive signal control system on Broadway Boulevard. Adding overlap phasing for the eastbound and westbound left-turn movements was evaluated to assess the potential benefit to intersection operations. The results are included in Appendix E. Overall intersection operations will improve slightly with the greatest benefit realized by the eastbound left-turn.

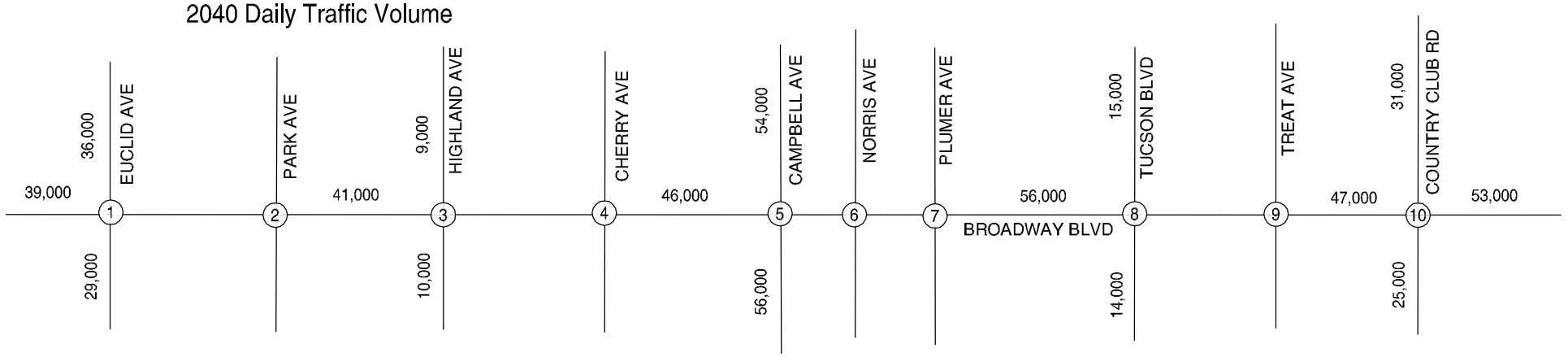
At the Euclid Avenue intersection, dual eastbound and westbound left-turn lanes are required.

At Country Club Road, substantial right-of-way constraints, particularly on the southeast and southwest corners will make it difficult to achieve the required left-turn lane capacity on the southbound approach. Implementing single left-turn lanes on each approach and right-turn lanes on all but the eastbound approach will provide satisfactory operation during the morning peak period,

Exhibit 12 Summary of 2040 Capacity Analysis Results

Intersection		Movement/ Approach	LOS and Average Delay (s/veh)				Movement/ Approach	LOS and Average Delay (s/veh)	
			AM	PM				AM	PM
Euclid Ave./ Broadway Blvd.	EB	LT	D(38)	D(40)	Tucson Blvd./ Broadway Blvd.	EB	LT	C(33)	C(34)
		TH	C(34)	C(28)			TH	B(17)	C(23)
		RT	C(23)	B(20)			RT	B(13)	B(15)
		Approach	C(34)	C(30)			Approach	B(17)	C(23)
	WB	LT	C(30)	D(46)		WB	LT	B(14)	B(12)
		TH	C(35)	C(27)			TH	A(8)	A(8)
		RT	D(37)	C(27)			RT	A(1)	A(1)
		Approach	C(34)	C(31)			Approach	A(8)	A(7)
	NB	LT	C(32)	C(33)		NB	LT	D(41)	D(52)
		TH	D(41)	D(36)			TH	D(47)	D(38)
		RT	C(24)	C(23)			RT	C(27)	C(26)
		Approach	D(36)	C(34)			Approach	D(42)	D(39)
	SB	LT	D(46)	D(43)		SB	LT	D(36)	D(42)
		TH	C(32)	C(31)			TH	D(37)	D(48)
		RT	C(22)	C(35)			RT	C(30)	C(27)
		Approach	C(33)	C(34)			Approach	C(34)	D(42)
	Intersection		C(34)	C(32)		Intersection		B(18)	C(22)
Highland Ave./ Broadway Blvd.	EB	LT	C(30)	B(11)	Country Club Rd/ Broadway Blvd.	EB	LT	B(17)	D(37)
		TH+RT	A(7)	A(6)			TH	A(9)	B(15)
		Approach	A(8)	A(6)			RT	A(1)	A(4)
	WB	LT	A(9)	B(11)			Approach	A(10)	B(18)
		TH+RT	A(8)	A(6)		WB	LT	C(22)	D(42)
		Approach	A(9)	A(6)			TH	C(23)	C(24)
	NB	LT	D(43)	C(34)			RT	B(18)	C(22)
		TH+RT	C(34)	C(31)			Approach	C(22)	C(26)
		Approach	D(37)	C(33)		NB	LT	C(32)	D(36)
	SB	LT	D(48)	D(38)			TH	D(36)	D(42)
		TH+RT	C(28)	C(32)			RT	C(26)	C(26)
		Approach	D(37)	D(36)			Approach	C(34)	D(39)
	Intersection		B(13)	A(9)		SB	LT	C(38)	**E(70)**
Campbell Ave./ Broadway Blvd.	EB	LT	D(44)	**F(97)**			TH	C(32)	D(43)
		TH	C(28)	**E(59)**			RT	C(27)	C(26)
		RT	C(20)	B(19)			Approach	C(33)	D(49)
		Approach	C(30)	**E(62)**		Intersection		C(23)	C(30)
	WB	LT	**E(60)**	**E(62)**	Country Club Rd/ Broadway Blvd. – Alternative A: single LT Lanes, no exclusive EB RT Lane	EB	LT	D(46)	D(52)
		TH	**E(61)**	C(27)			TH+RT	D(43)	**E(71)**
		RT	C(25)	C(22)			Approach	D(43)	**E(69)**
		Approach	**E(56)**	C(32)		WB	LT	C(29)	**F(221)**
	NB	LT	D(37)	D(36)			TH	D(53)	**E(78)**
		TH	**E(55)**	**E(78)**			RT	C(24)	C(31)
		RT	C(20)	C(27)			Approach	D(46)	**F(86)**
		Approach	D(50)	**E(66)**		NB	LT	C(33)	D(38)
	SB	LT	**F(115)**	**F(104)**			TH	D(42)	**E(60)**
		TH	C(29)	D(44)			RT	C(27)	C(28)
		RT	C(23)	C(26)			Approach	D(39)	D(52)
		Approach	D(44)	**E(55)**		SB	LT	D(40)	**F(198)**
	Intersection		D(46)	D(54)			TH	C(34)	D(39)
							RT	C(27)	C(25)
							Approach	C(34)	**F(81)**
						Intersection		D(42)	**E(74)**

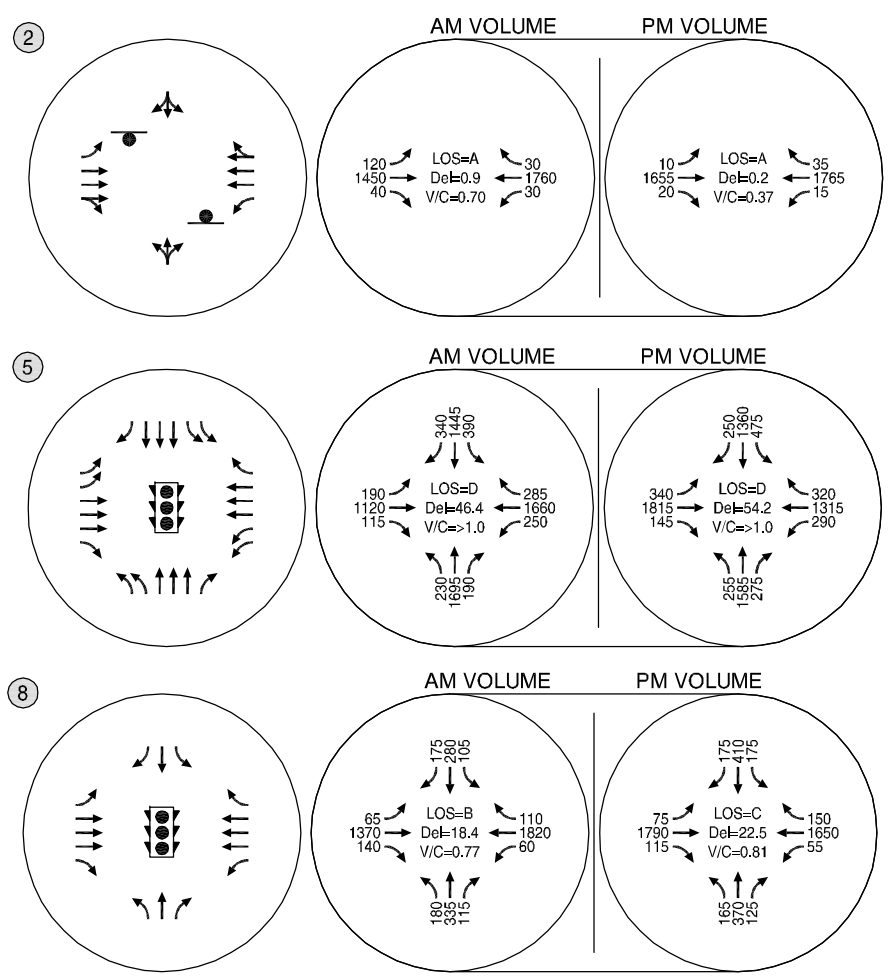
2040 Daily Traffic Volume

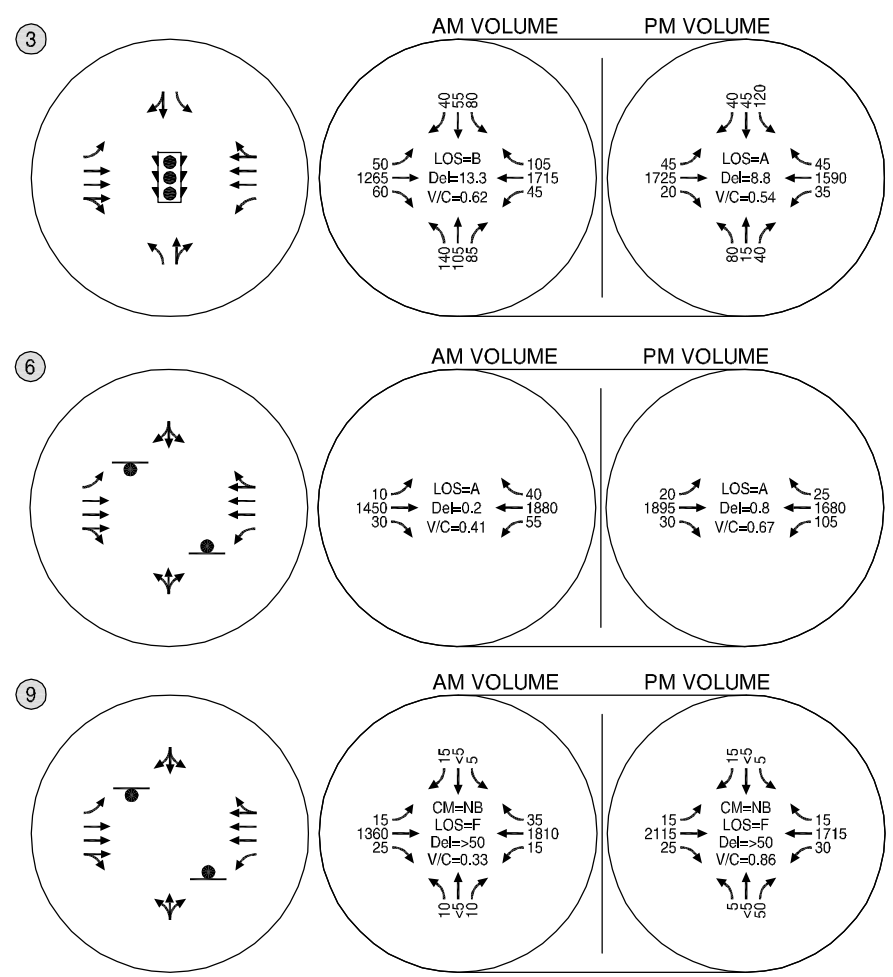


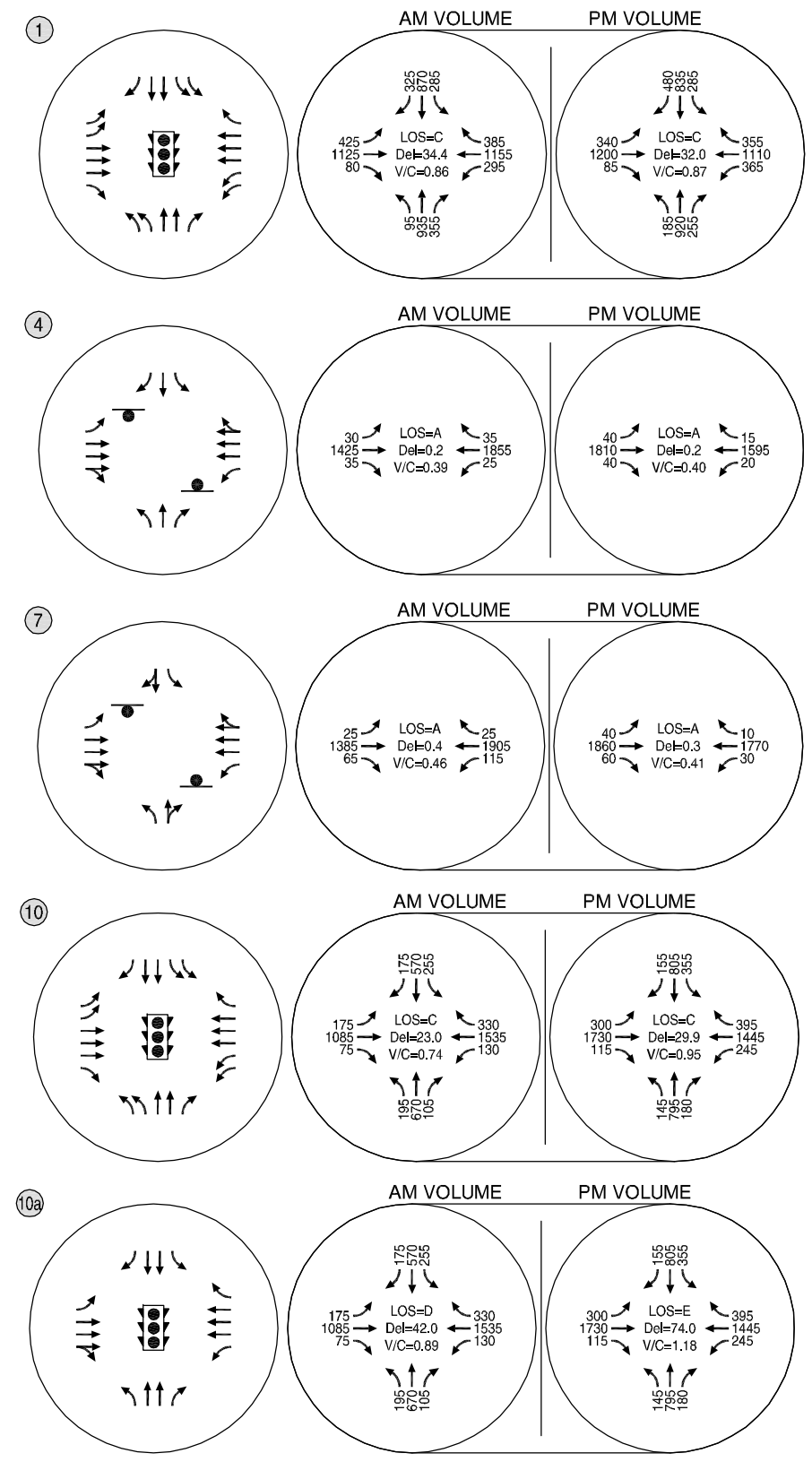
Intersection Lane Configuration and Traffic Control

Intersection Peak-Hour Volumes and Traffic Operations

(NO SCALE)







LEGEND

CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

2040 TRAFFIC CONDITIONS AND LANE REQUIREMENTS

EXHIBIT 13

H:\profile\8795 - Broadway\dwgs\figs\8795 Figs.dwg Mar 01, 2012 - 1:27pm - tradderman Layout Tab: Exhibit 13

but will be insufficient for the westbound and southbound left-turn demands in the evening peak. Considering the critical intersection movements – southbound left-turn, eastbound through, northbound through, and westbound left-turn, this alternative intersection configuration will provide sufficient capacity to accommodate 7-10 years of projected traffic growth before movements begin to fail. Potential solutions to optimize capacity include utilizing overlap phasing for the southbound and westbound left-turn movements and implementing traffic adaptive signal control.

The recommended storage lengths for turn lanes at the signalized intersections are summarized in Exhibit 14. They are based on the estimated 95% percentile queue lengths calculated by the Synchro, software and the minimum storage requirements specified in the PCDOT/TDOT Pavement Marking Design Manual, 2nd Edition. Storage length calculations are included in Appendix F.

Exhibit 14 Estimated Queue Storage Length Requirements

Intersection Broadway Blvd at	Eastbound		Westbound		Northbound		Southbound	
	Left	Right	Left	Right	Left	Right	Left	Right
Euclid Ave.	170 x 2	110	150 x 2	290	110 x 2	210	140	350
Highland Ave	110	110	110	110	140	-	120	-
Campbell Ave	160 x2	110	130 x 2	200	130 x 2	200	220 x 2	200
Tucson Blvd	110	110	110	110	170	110	170	130
Country Club Rd	140 x 2	110	130 x2	220	110 x2	150	160 x 2	130
Country Club Rd (Alt. A)	300	-	300	150	200	110	400	110

1. Minimum storage length of 110 ft per PCDOT/TDOT Pavement Marking Design Manual.
2. Storage lengths do not include tapers.

3.4.3 Roadway Segment Capacity

Detailed roadway segment capacity analysis for 6 through lanes was performed using the Synchro 7 traffic analysis software. Synchro is not able to evaluate the impacts of continuous multi-use lanes used for transit, bicyles, and right-turns. The analysis results summarized in Exhibit 15 show that a 6-lane arterial operates at an overall LOS C in both the eastbound direction during the evening peak period and the westbound direction during the morning peak period.

Exhibit 15 Arterial Analysis Results

Broadway Blvd	Ave. Travel Time (sec)		Ave. Travel Speed (mph)		Arterial LOS	
	AM	PM	AM	PM	AM	PM
Eastbound	362	398	20.8	18.9	C	C
Westbound	428	382	20.5	23.0	C	C

3.4.4 VISSIM Modeling

In addition to the intersection and arterial capacity analyses, microscopic simulation modeling of corridor operations was conducted to more precisely evaluate impacts of the HAWK signals, transit signal priority, dedicated transit lanes, bus pull-outs/pull-thrus, and Bus Rapid Transit (BRT). The VISSIM software was used to develop the models. Since the primary purpose of the VISSIM modeling was to evaluate the operational impacts of specific corridor elements and not to determine intersection capacity, only a portion of the corridor and only the evening peak hour were modeled. The section of Broadway Boulevard modeled extends from west of the Cherry Avenue intersection to east of the Tucson Boulevard intersection. The model was calibrated so that the simulated turning movement volumes essentially matched the estimated 2040 turning movement volumes. Models were developed for the following two scenarios:

- Six general purpose lanes with bus pull thrus/outs at signalized intersections, and
- Six general purpose lanes with outside multi-use lanes for use by transit vehicles, right-turning vehicles, and cyclists.

The following outlines the modeling techniques and assumptions used in the evaluation of the two scenarios.

GENERAL MODEL

The following features and assumptions were included as part of the model:

- Intersection lane configurations matched the recommendations (Exhibit 13) developed from the capacity analysis.
- The basic signal timing (cycle length, phasing, phase splits, clearance intervals) were consistent with those used for the intersection capacity analysis.
- The 2040 evening peak-hour was modeled, including a 15 minute warm-up period and 30 minute cool-down period.
- Median openings for side street and driveway access were as shown in Exhibit 11.
- Turning volumes at each minor side street were estimated based on existing traffic counts. Due to the complexity of modeling the many closely spaced residential driveways and commercial driveways at the strip centers, a single driveway, representing multiple closely spaced driveways was modeled at each location. Peak-hour volumes for driveways and minor side streets were as follows:
    - Safeway right-in/right-out driveway – volumes estimated from data collected; 160 in, 70 out
    - Sonic Drive-In entry/exit –40 right-in, 40 right-out
    - All other driveways – 20 right-in, 20 right-out
- 2% truck volumes assumed

- 0.5% bike volumes assumed
- Pedestrian volumes increased 25% for 2040

6-LANE MODEL

A typical section of the 6-lane arterial is illustrated in Exhibit 16. Bus pull-thru/out lanes are provided at each signalized intersection.

6-LANE W/MULTI-USE LANES MODEL

A typical section of the 6- arterial with multi-use lanes is illustrated in Exhibit 16. The multi-use lane is dedicated to buses/BRT and bikes, and also can be used by right-turners for deceleration. If rail is implemented in the future, dedicated transit and bike lanes will be required and right-turning vehicles would be prohibited from using either lane.

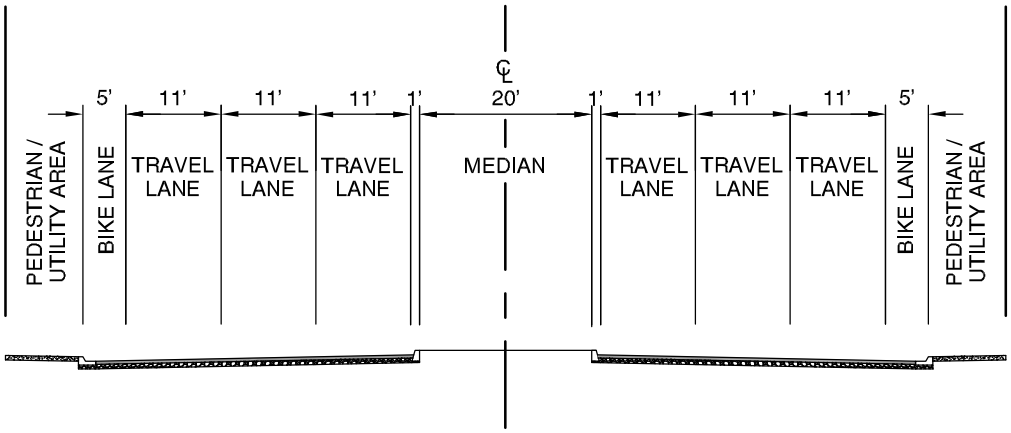
HAWK SIGNAL OPERATIONS

The HAWK signals at Cherry Avenue and Plumer Avenue were modeled as two-stage actuated crossings, unlike the current one-stage crossing, allowing them to be included in the coordinated system on Broadway Boulevard. HAWK signal operations were modeled as follows:

- 3 second flashing yellow for vehicles
- 3 second solid yellow for vehicles to come to stop
- Vehicles are then shown red for 5 seconds while the pedestrian is given the Walk signal
- The flashing red is then displayed to vehicles while the Flash Don't Walk is displayed to pedestrians for the appropriate amount of time (12/15/18 seconds depending on number of lanes the pedestrian is required to cross)
- Due to VISSIM's limitations, it was assumed that cars remain stopped while the flashing red is displayed.

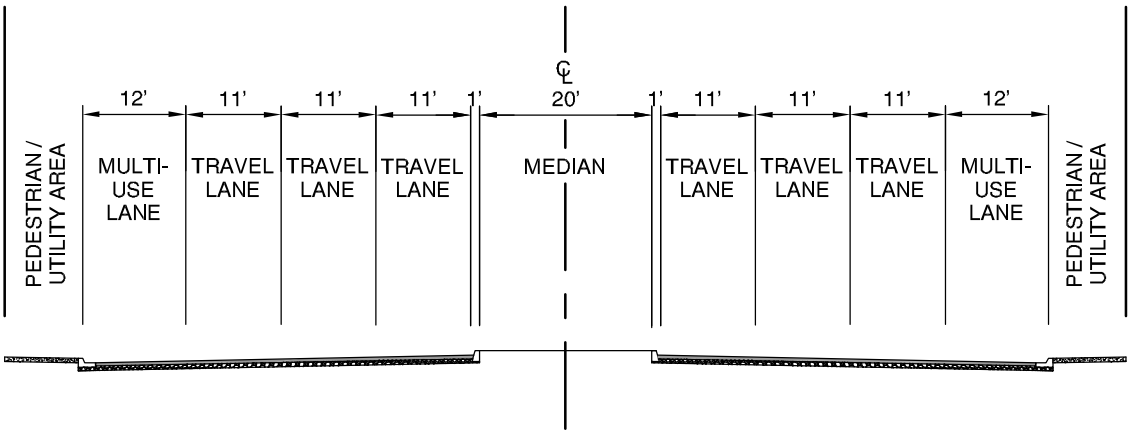
TRAFFIC SIGNAL OPERATIONS

The traffic signals at Campbell Avenue and Tucson Boulevard were included in the model. Signal phasing and timing was based on the optimized settings developed with the Synchro model, with minor adjustments made to accommodate demand. Each signal was controlled using a Ring Barrier Controller, which includes the transit priority feature that can call a phase early or extend a phase (up to 3 seconds) to allow a bus or BRT vehicle to continue through the intersection without stopping. The signals were coordinated based on start of green for eastbound and westbound Broadway traffic (phases 2 & 6). Protected/permitted left-turns were coded as overlap phases.



6-LANE CROSS SECTION

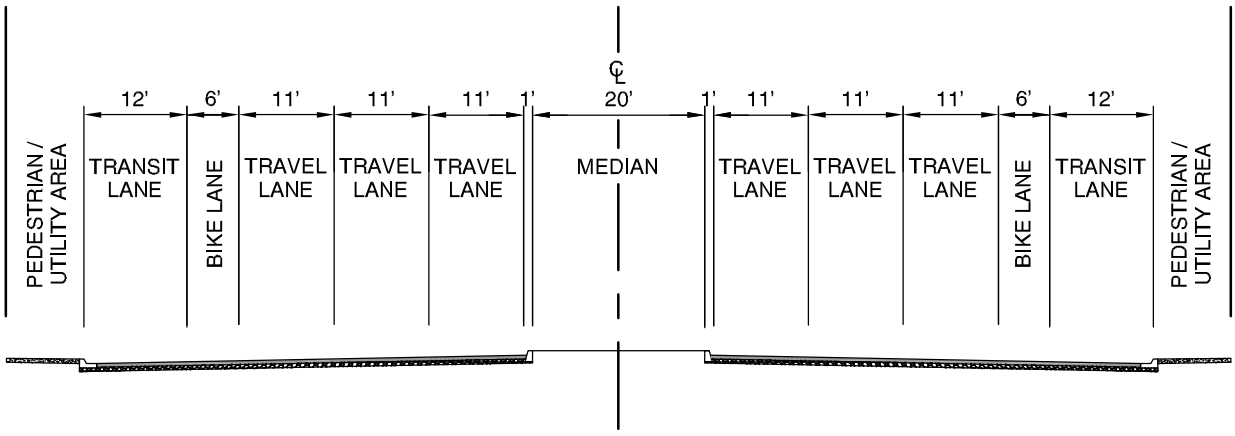
(NOT TO SCALE)



8-LANE CROSS SECTION - MULTI USE LANE*

(NOT TO SCALE)

*BUSES, BICYCLES, RIGHT-TURNING VEHICLES



8-LANE CROSS SECTION - TRANSIT LANES

(NOT TO SCALE)

TYPICAL CROSS SECTION ALTERNATIVES

EXHIBIT **16**

H:\profile\8795 - Broadway\dwgs\figs\8795 TypSec.dwg Mar 12, 2012 - 6:53am - traddeman Layout Tab: Fig16

TRANSIT OPERATIONS

Local buses were modeled at 10-minute headways (i.e., six buses during the peak hour). In the 6-lane model, the buses either stop in the outside lane at mid-block or unsignalized intersection stops or pull into the bus bay at signalized intersections to drop off and collect passengers. These buses stop at all bus stops on the route. BRT vehicles were modeled at 15-minute headways (i.e., 4 buses during the peak hour). BRT vehicles stop only at the Broadway Boulevard/Campbell Avenue intersection, pulling into the bus bay. BRT vehicles are typically articulated buses, 60 feet in length.

At major transit stops where route transfers occur, such as at Campbell Avenue, bus and BRT vehicles dwell for 30 seconds. At minor bus stops, including Cherry Avenue, Plumer Avenue, and Tucson Boulevard, the dwell time is 15 seconds.

MODELING RESULTS

Four network performance measures (average delay per vehicle, average number of stops per vehicle, average speed, and average travel time) were collected by vehicle type (cars/trucks and transit vehicles) from the VISSIM simulation runs for the evening peak-hour, 4:30 to 5:30 PM. Ten model runs were made for each scenario and the performance measures produced by each run were averaged. The network performance results are summarized in Exhibit 17.

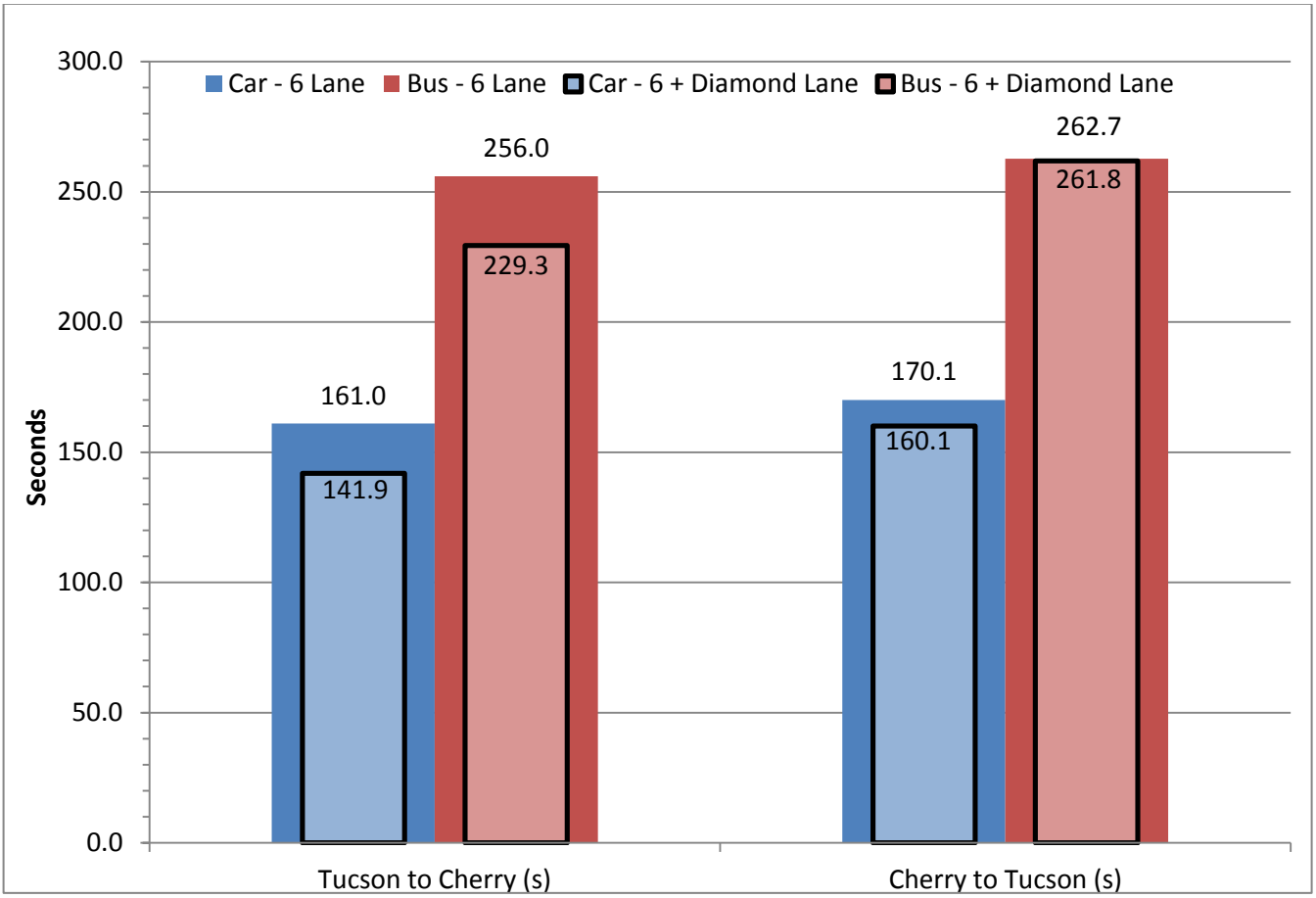
The results show that multi-use lanes will provide marginal improvement, less than 2%, in delay, number of stops, and travel speed for general traffic (cars/trucks). Transit vehicles, bus or BRT, would realize benefits from multi-use lanes, with 12% lower delay, 15% fewer stops, and 6% higher travel speed.

Average vehicle travel time by direction (seconds per vehicle) are also graphically depicted in Exhibit 18. In the eastbound, or heaviest direction of travel during the evening peak period, a multi-use lane reduces car/truck travel time by approximately 6%, however has no impact on bus travel time. Travel times in the westbound direction are 13% and 11% lower for cars/trucks and buses, respectively, with a multi-use lane.

Exhibit 17 Simulation Performance Measures

Performance Measures	6-Lanes w/Multi-use Lanes		6-Lanes		Percent Change	
	General Traffic	Buses	General Traffic	Buses	General Traffic	Buses
Average Delay per Vehicle., secs	78.8	92.6	79.3	103.3	+0.6%	+11.6%
Average Number of Stops per Vehicle.	2.12	1.37	2.16	1.58	+1.9%	+15.3%
Average Speed, mph	17.3	16.3	17.1	15.3	-1.2%	-6.1%
Average Eastbound Travel Time; sec	160	260	170	260	+6.3%	0.0%
Average Westbound Travel Time; sec	142	230	161	255	+13.4%	+10.9%

Exhibit 18 Travel Time Comparison



3.4.5 Multi-Modal Operations Analysis

Evaluation of pedestrian, bicycle, and transit level of service within a widened (6-lane) Broadway Boulevard with projected 2040 traffic demand was conducted utilizing the multi-modal urban streets methodology (MMLOS) provided in the 2010 Highway Capacity Manual. The MMLOS analysis method assigns LOS for each mode of travel based on a range of parameters that affect the user perception of the facility. The parameters considered for bicycle, pedestrian, and transit travel on an urban street are listed on the following page. Bicyclists, for instance, consider the availability of a dedicated bike lane or wide outside travel lane, the volume of traffic in the outside travel lane, the amount of truck traffic, the quality of the pavement, traffic speed, density of driveways and sides streets and driveways, and width of cross streets at signalized intersections. These parameters generally describe the level of comfort that a bicyclist feels when traveling along an urban street. Similar parameters are defined for transit riders and pedestrians.

Bicycle

- Vehicle volume in outside (right) lane
- Heavy vehicle percentage
- Vehicle speeds
- Travel lane and bicycle lane widths
- Pavement quality
- Signalized intersection cross street width
- Unsignalized intersections/driveways

Pedestrian

- Vehicle volume in outside (right) lane
- Vehicle speeds
- Presence and width of sidewalk and buffer
- Lateral separation between vehicles and pedestrians
- Right-turns on red and permitted left-turns during "Walk" phase
- Crossing delay (signalized and uncontrolled)

Transit

- Service Frequency
- Perceived wait time and travel time
- Actual speed
- Provisions for waiting passengers

Based on the 2040 evening peak hour volumes in the eastbound direction and a divided 6-lane roadway with bicycle lanes or multi-use lanes, transit stops with shelters, and sidewalks, multi-modal operations were evaluated. Three bike lane options were evaluated – 5-ft bike lane, 6-ft bike lane, and 12-ft multi-use lane. A 6-ft wide sidewalk immediately behind curb was assumed. The MMLOS worksheets are included in Appendix G.

The results, provided in Exhibit 19, indicate that a 6-lane roadway with 5-ft or 6-ft bike lanes will provide good level of service for transit users and pedestrians, however bicyclists will experience poor level of service (LOS E). The primary factors affecting bicycle level of service are high traffic volumes and high density of driveways and side streets. Wider multi-use lanes may improve bicycle level of service simply based on a more lateral clearance between a cyclist and adjacent traffic, however the effects of conflicting transit vehicles and right-turn traffic using the same lane could very well make it a worse condition for cyclists. The HCM MMLOS methodology does not address these effects.

Exhibit 19 Summary MMLOS Analysis Results

Broadway Cross Section		Transit	Bike	Ped
6 lane divided w/5 ft bike lanes & 6 ft sidewalk	MMLOS Score	1.27	4.37	3.19
	LOS	A	E	C
6 lane divided w/6 ft bike lanes & 6 ft sidewalk	MMLOS Score	1.27	4.27	3.18
	LOS	A	E	C
6 lane divided w/12 ft multi-use lanes & 6 ft sidewalk	MMLOS Score	0.25	3.59	3.11
	LOS	A	D	C

4. CONCLUSIONS

Proposed roadway improvements are based on the analysis results of the existing and future traffic operations, analysis of crash data, and the City's Transportation Access Management Guidelines. The following proposed roadway improvements are intended to increase the capacity on Broadway Boulevard in order to serve future traffic demand which is expected to increase 30-50% over the next 30 years.

4.1 ROADWAY CROSS SECTION

The results of an evaluation of the intersection and roadway capacity requirements utilizing the analytical procedures provided in the Highway Capacity Manual and an analysis of traffic operations using a microscopic simulation modeling effort both indicate that six through lanes with the provision of appropriate turn-lane capacity at signalized intersections and pull thrus/outs at transit stops will provide sufficient capacity to serve projected future traffic demands and transit operations at acceptable levels of service. Increased roadway capacity will not only reduce congestion, but will also reduce crash potential, particularly rear-end type crashes.

The simulation modeling indicates that adding multi-use lanes for use by transit vehicles, right-turning vehicles, and bicycles, will provide marginal capacity and operational benefits to general traffic. Transit vehicles, including local buses and future BRT vehicles would benefit using the multi-use lanes, potentially realizing a 12% reduction in vehicle delay, reduced number of stops, and increased travel speed. While having a dedicated lane for local buses and BRT is optimal, the modeling results suggest that the benefits offered by the multi-use lanes for transit operations may be diminished due to their multi-functionality. The results indicate that buses and BRT can operate effectively within the general purpose lanes on Broadway Boulevard. Providing multi-use lanes on Broadway Boulevard is not essential, as long as pull thrus/outs that can accommodate buses and larger BRT vehicles (60 feet in length) are provided at signalized intersections and other major transit stops. Pull thrus/outs would not be required at minor stops. Implementing transit signal priority along Broadway Boulevard will benefit transit operations. Finally, reducing the density of driveways on Broadway Boulevard will benefit general traffic operations.

While BRT can operate in a general purpose lane on an arterial, introducing rail (i.e. a street car) into a general purpose arterial lane will adversely impact operations of both general traffic and the street car. Although street car operation was not modeled, the need for frequent stops and the typically lower operating speed relative to general traffic requires that a street car be placed within a dedicated running way on a higher speed arterial. Although not desirable a street car could share a multi-use lane with right-turning vehicles. However, a separate bicycle lane would be required due to the presence of rail. The viability of extending street car from Downtown to El Con Mall, as suggested in the PAG High Capacity Transit Study, is unclear at this time and will heavily depend upon the success of the initial street car route and the redevelopment of Broadway Boulevard to support street car usage.

4.2 INTERSECTION LANE CONFIGURATION

Based on the capacity analysis results, the intersection lane configurations provided in Exhibit 13 are recommended. At Country Club Road, since provision of dual left-turn lanes may not be possible given right-of-way constraints, the lane configuration provided in Alternative A should be constructed. Recommended storage lengths for exclusive left and right-turn lanes are provided in Exhibit 14.

4.3 SIGNALS

Unless redevelopment within the corridor produces high access demand onto Broadway Boulevard from a side street, no additional traffic signals are expected on Broadway Boulevard between Euclid Avenue and Country Club Road. Several modifications to signal system operations should be considered as part of the corridor improvements, including adding transit signal priority and potentially implementing adaptive signal control.

Pedestrian signals will need to be re-installed at Park Avenue, Cherry Avenue, Norris Avenue, and Plumer Avenue. To optimize traffic flow on Broadway Boulevard, the City of Tucson prefers the application of a HAWK signal design that allow for a 2-stage crossing so that these signals can be included in the coordinated signal operations on Broadway Boulevard. A Pelican pedestrian signal design could be considered instead of the HAWK. The marked pedestrian crossing at Treat Avenue should also be reinstalled and infrastructure for a future pedestrian signal installation included with the roadway improvements. A pedestrian signal warrant analysis of the Treat Avenue crossing should be conducted as the roadway construction plans are being finalized.

4.4 MULTI-MODAL FACILITIES

Bus pull thrus/pull outs will be required on Broadway Boulevard on the departure side of each signalized intersection. At Campbell Avenue, the bus bays should be of sufficient length to accommodate an articulated transit vehicle. This may require rearranging the location of the right-in/right-out driveway at the Safeway shopping center on the southeast corner. Bus pull thrus/outs will also be required on the north and south legs of the Euclid Avenue, Campbell Avenue, and Country Club Road intersections. Due to right-of-way constraints, it may not be possible to install a bus pull thru on southbound Country Club Road. Shelters should be provided at all transit stops.

Continuous sidewalk will be required on both sides of Broadway Boulevard. Bike lanes will be required with a 6-lane section or can be incorporated into the multi-use lane if one is provided and provision for future rail is disregarded.

4.5 ACCESS

A raised median, a minimum of 20-ft wide, will be required to provide appropriate access control for a 6-lane arterial. Conceptual median opening locations are presented in Exhibit 11, however additional assessment will be required as more information on potential redevelopment within the corridor becomes available. It is recommended that an access management plan be prepared. The plan should include locations of full and partial (left-in only) median openings, driveways, and right-turn deceleration lanes, if needed. Reducing driveway density will be important if multi-use lanes are not provided. The City of Tucson typically does not include right-turn deceleration lanes at unsignalized side streets or driveways on 6-lane arterials, however including a deceleration lane on eastbound Broadway Boulevard at the Safeway center should be considered given the relatively high volume of right-in/right-out traffic. As the existing driveway is located some 120 feet from the Campbell Avenue intersection and there is a bus bay present, implementing a deceleration lane may require relocating the driveway and bus bay.

4.6 SPEED LIMIT

A speed limit of 35 mph is recommended for this section of Broadway Boulevard and is consistent with the speed limit to the east.

4.7 LIGHTING

Street lighting is currently in place and will need to be included in the roadway widening. The street lighting provides improved visibility of driveways, pedestrians, and bicycles, thereby reducing the potential of nighttime crashes. Street lighting also provides improved security for pedestrians.

REFERENCES

1. Broadway Corridor Transportation Study, City of Tucson Department of Transportation, 1987.
2. Transportation Access Management Guidelines for the City of Tucson, July 2010.
3. Major Streets & Routes Plan, City of Tucson, January 2000.
4. 2040 Regional Transportation Plan Projected Traffic Volumes Map, Pima Association of Governments, updated in August 2010.
5. PAG High Capacity Transit Study; Pima Association of Governments, 2009.

A. Traffic Count Data

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

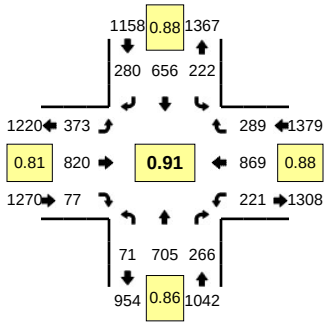
LOCATION: Euclid Ave -- E Broadway Blvd

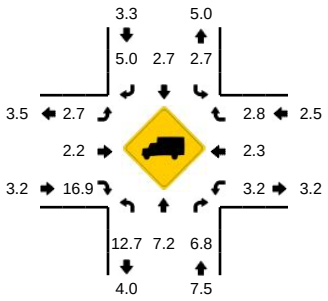
CITY/STATE: Tucson, AZ

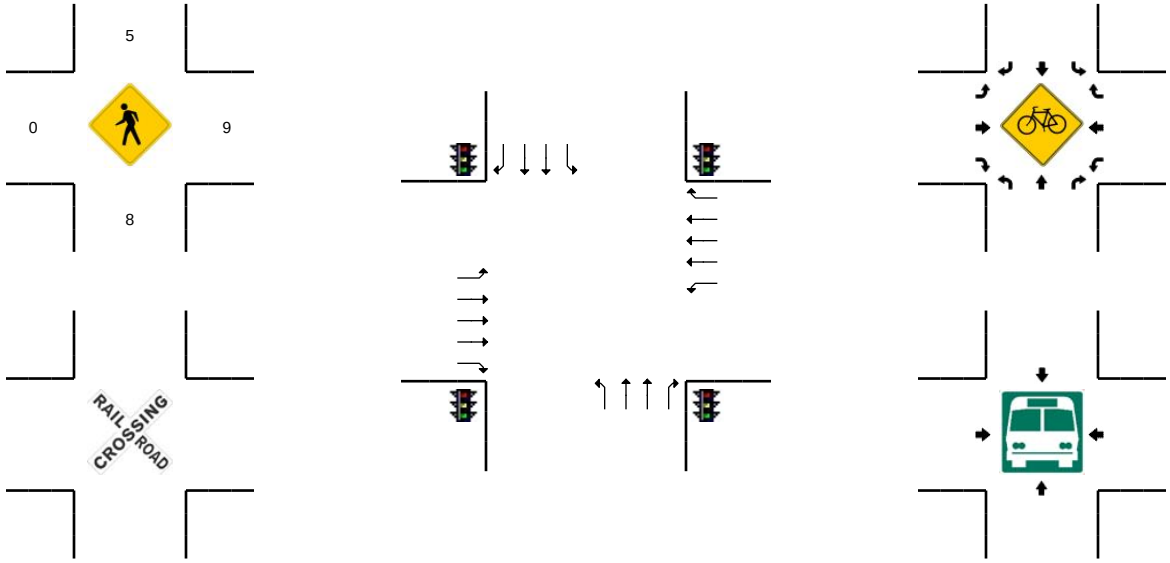
QC JOB #: 10411201

DATE: 2/19/2009

Peak-Hour: 7:25 AM -- 8:25 AM
Peak 15-Min: 7:35 AM -- 7:50 AM







5-Min Count Period Beginning At	Euclid Ave (Northbound)			Euclid Ave (Southbound)			E Broadway Blvd (Eastbound)			E Broadway Blvd (Westbound)			Total	Hourly Totals
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
7:00 AM	6	39	6	12	40	10	16	26	6	8	33	4	206	
7:05 AM	5	27	6	6	67	18	18	17	7	7	31	10	219	
7:10 AM	1	42	8	4	44	12	18	27	5	8	27	12	208	
7:15 AM	5	45	18	12	29	13	29	30	9	14	42	19	265	
7:20 AM	6	53	8	12	51	13	22	58	3	15	49	21	311	
7:25 AM	3	70	23	9	47	18	37	40	7	15	61	21	351	
7:30 AM	6	51	21	18	42	20	33	62	4	14	49	13	333	
7:35 AM	8	58	28	16	54	17	31	78	7	17	63	28	405	
7:40 AM	4	75	26	11	58	28	37	76	1	19	50	28	413	
7:45 AM	3	74	28	28	51	30	39	116	6	19	85	41	520	
7:50 AM	3	43	20	24	49	19	17	74	5	21	67	37	379	
7:55 AM	12	75	16	16	60	24	39	66	10	17	65	28	428	4038
8:00 AM	7	65	24	26	69	19	28	86	9	35	110	24	502	4334
8:05 AM	8	59	16	18	56	30	33	62	4	21	75	11	393	4508
8:10 AM	5	59	23	22	66	24	29	41	5	18	69	17	378	4678
8:15 AM	5	35	21	19	50	30	25	55	5	8	81	18	352	4765
8:20 AM	7	41	20	15	54	21	25	64	14	17	94	23	395	4849
8:25 AM	7	40	13	18	42	17	30	45	6	17	63	18	316	4814
8:30 AM	8	56	17	16	42	13	25	53	11	10	73	25	349	4830
8:35 AM	6	51	12	14	43	13	30	45	12	11	88	22	347	4772
8:40 AM	14	67	14	17	42	18	20	43	6	18	57	22	338	4697
8:45 AM	12	46	10	13	44	15	18	66	8	18	62	15	327	4504
8:50 AM	10	37	18	20	39	21	30	47	7	14	55	12	310	4435
8:55 AM	5	34	16	14	34	6	23	40	4	16	46	13	251	4258

Peak 15-Min Flowrates	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
All Vehicles	60	828	328	220	652	300	428	1080	56	220	792	388	5352
Heavy Trucks	4	64	28	8	20	24	8	32	12	4	20	12	236
Pedestrians		4			0			0			0		4
Bicycles													
Railroad													
Stopped Buses													

Comments:

Report generated on 3/11/2009 9:40 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

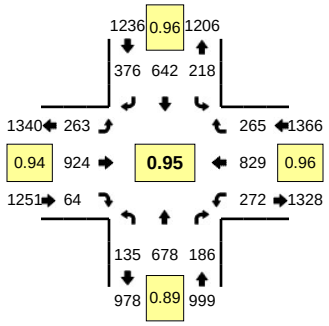
LOCATION: Euclid Ave -- E Broadway Blvd

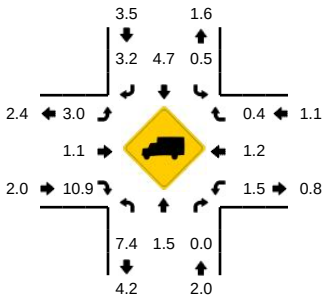
CITY/STATE: Tucson, AZ

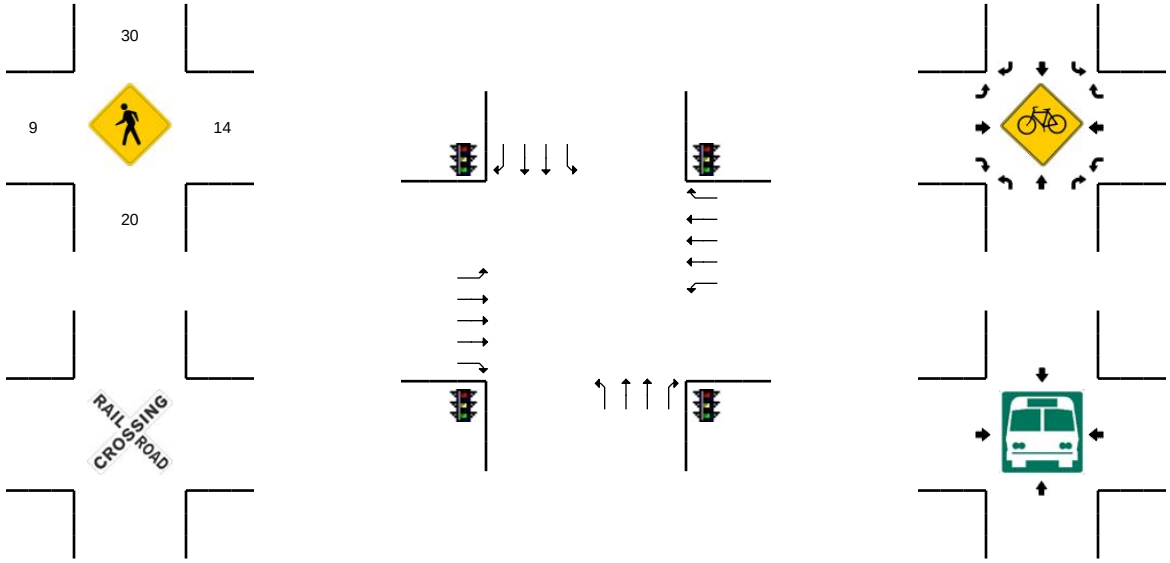
QC JOB #: 10411202

DATE: 2/19/2009

Peak-Hour: 4:40 PM -- 5:40 PM
Peak 15-Min: 5:10 PM -- 5:25 PM







5-Min Count Period Beginning At	Euclid Ave (Northbound)			Euclid Ave (Southbound)			E Broadway Blvd (Eastbound)			E Broadway Blvd (Westbound)			Total	Hourly Totals
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
4:00 PM	8	58	18	26	50	17	24	76	5	21	81	15	399	
4:05 PM	9	63	20	20	48	30	33	64	10	22	48	18	385	
4:10 PM	15	45	23	17	65	19	19	58	3	20	41	15	340	
4:15 PM	10	50	11	23	45	16	25	67	7	19	55	22	350	
4:20 PM	7	43	17	11	45	20	34	60	2	20	41	12	312	
4:25 PM	14	64	16	20	72	17	22	59	4	10	65	18	381	
4:30 PM	7	44	17	16	53	37	11	63	7	22	59	20	356	
4:35 PM	9	48	14	22	57	28	22	57	3	17	58	19	354	
4:40 PM	10	67	17	23	58	31	20	80	11	21	51	18	407	
4:45 PM	17	51	10	21	52	18	18	81	4	28	93	20	413	
4:50 PM	7	43	14	22	53	35	19	85	3	27	62	21	391	
4:55 PM	11	59	10	30	60	25	16	58	0	20	62	11	362	4450
5:00 PM	13	44	24	12	50	22	17	92	11	25	79	19	408	4459
5:05 PM	10	59	18	10	47	38	28	78	5	22	63	28	406	4480
5:10 PM	15	70	19	21	56	41	22	74	4	14	70	22	428	4568
5:15 PM	14	58	17	19	46	30	26	87	7	24	76	31	435	4653
5:20 PM	7	60	20	10	56	33	32	76	4	24	69	18	409	4750
5:25 PM	12	71	11	14	72	35	22	72	8	18	72	21	428	4797
5:30 PM	7	49	7	13	46	38	23	84	3	22	84	29	405	4846
5:35 PM	12	47	19	23	46	30	20	57	4	27	48	27	360	4852
5:40 PM	11	64	15	14	64	29	17	81	3	18	47	16	379	4824
5:45 PM	4	41	11	23	52	24	10	83	9	19	59	20	355	4766
5:50 PM	9	41	11	17	50	29	27	57	5	16	51	21	334	4709
5:55 PM	11	49	10	19	38	23	16	50	3	12	47	28	306	4653

Peak 15-Min Flowrates	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
All Vehicles	144	752	224	200	632	416	320	948	60	248	860	284	5088
Heavy Trucks	4	8	0	0	16	12	12	12	4	8	12	0	88
Pedestrians		28			44			8			8		88
Bicycles													
Railroad													
Stopped Buses													

Comments:

Report generated on 3/11/2009 9:40 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

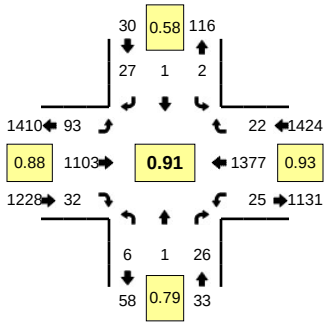
LOCATION: N Park Ave -- E Broadway Blvd

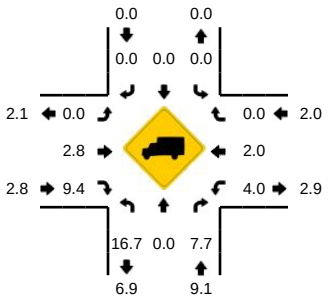
QC JOB #: 10411203

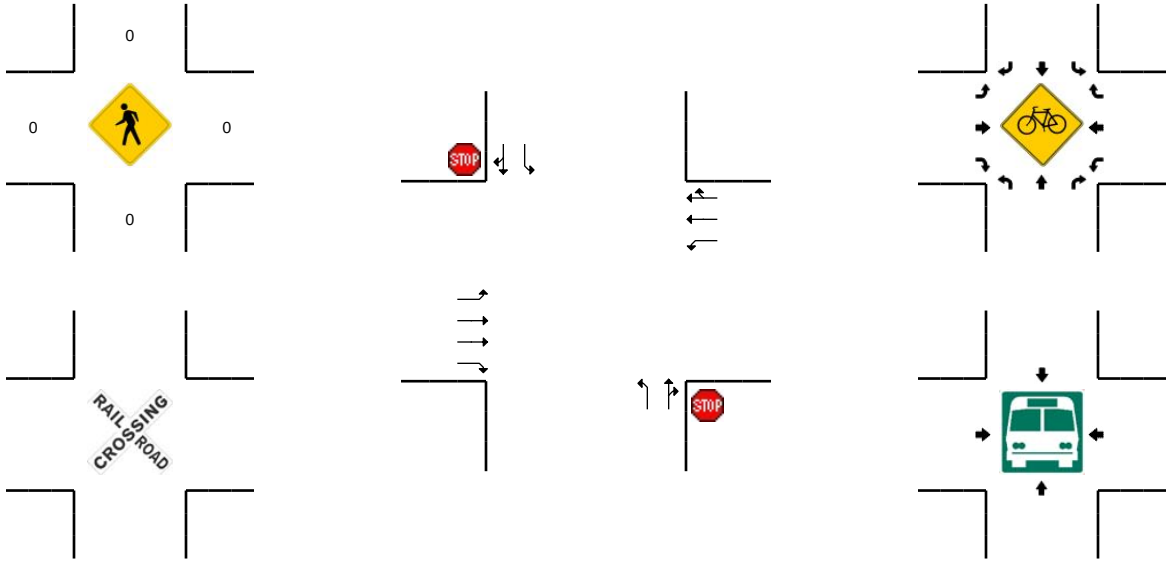
CITY/STATE: Tucson, AZ

DATE: 2/19/2009

Peak-Hour: 7:35 AM -- 8:35 AM
Peak 15-Min: 7:50 AM -- 8:05 AM







5-Min Count Period Beginning At	N Park Ave (Northbound)			N Park Ave (Southbound)			E Broadway Blvd (Eastbound)			E Broadway Blvd (Westbound)			Total	Hourly Totals
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
7:00 AM	0	0	0	0	0	0	1	35	2	0	48	0	86	
7:05 AM	0	0	1	0	0	0	4	28	1	0	57	2	93	
7:10 AM	0	0	0	0	0	1	2	41	0	1	62	0	107	
7:15 AM	1	1	1	0	0	0	3	55	1	0	79	1	142	
7:20 AM	0	0	0	0	0	4	5	61	1	0	74	0	145	
7:25 AM	1	0	1	0	0	0	10	63	3	2	97	1	178	
7:30 AM	0	0	1	0	0	1	9	85	1	2	79	2	180	
7:35 AM	0	0	0	0	0	3	9	106	1	1	109	3	232	
7:40 AM	1	1	3	1	0	5	13	97	0	1	101	3	226	
7:45 AM	0	0	2	0	0	3	19	98	1	3	117	4	247	
7:50 AM	0	0	3	0	0	3	14	111	3	5	119	2	260	
7:55 AM	1	0	2	0	0	1	8	81	0	0	118	2	213	2109
8:00 AM	1	0	4	1	1	9	16	101	5	0	130	1	269	2292
8:05 AM	0	0	2	0	0	2	4	92	10	2	131	0	243	2442
8:10 AM	1	0	1	0	0	0	4	86	1	3	101	2	199	2534
8:15 AM	0	0	2	0	0	1	2	79	2	2	111	3	202	2594
8:20 AM	2	0	3	0	0	0	3	89	7	1	122	0	227	2676
8:25 AM	0	0	3	0	0	0	0	88	2	3	98	1	195	2693
8:30 AM	0	0	1	0	0	0	1	75	0	4	120	1	202	2715
8:35 AM	0	0	2	0	0	1	1	77	3	1	116	3	204	2687
8:40 AM	0	0	0	0	0	0	3	57	3	4	95	0	162	2623
8:45 AM	0	0	10	0	1	0	1	76	3	2	91	2	186	2562
8:50 AM	1	0	1	1	0	1	2	83	3	0	90	0	182	2484
8:55 AM	0	1	2	0	0	2	2	85	0	12	67	1	172	2443

Peak 15-Min Flowrates	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
All Vehicles	8	0	36	4	4	52	152	1172	32	20	1468	20	2968
Heavy Trucks	4	0	4	0	0	0	0	28	4	0	40	0	80
Pedestrians		0			0			0			0		0
Bicycles													
Railroad													
Stopped Buses													

Comments:

Report generated on 3/11/2009 9:40 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

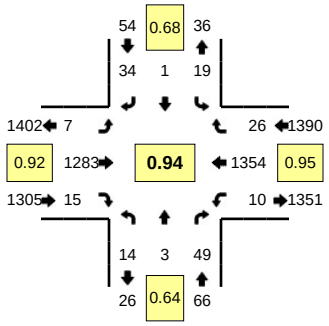
LOCATION: N Park Ave -- E Broadway Blvd

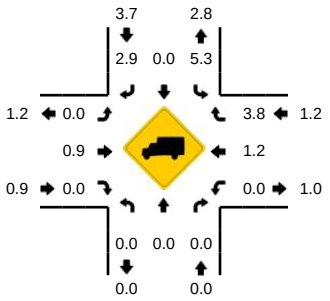
QC JOB #: 10411204

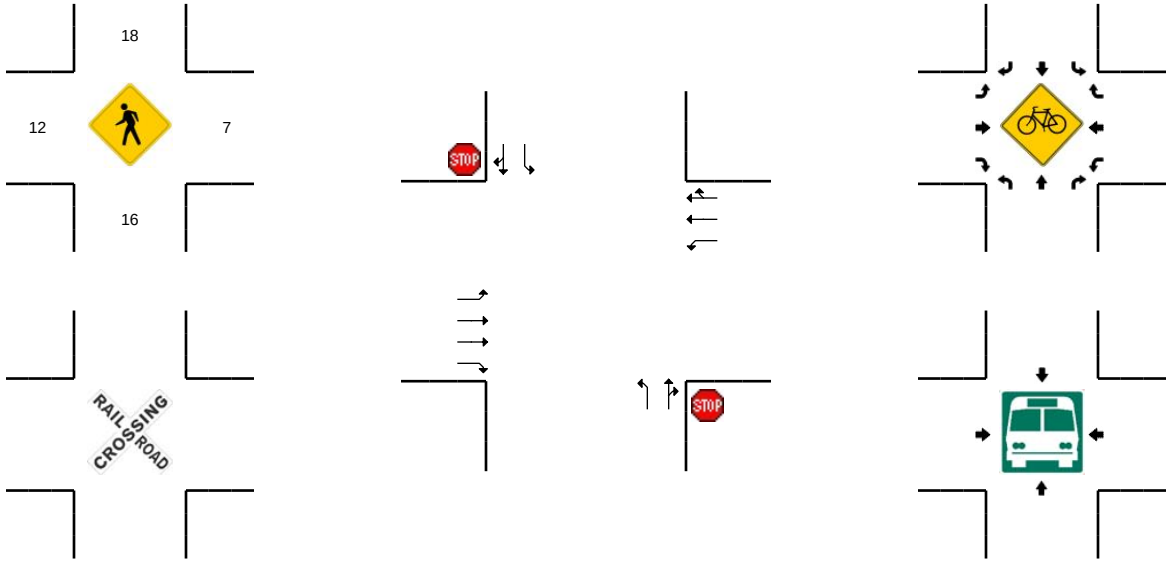
CITY/STATE: Tucson, AZ

DATE: 2/19/2009

Peak-Hour: 4:40 PM -- 5:40 PM
Peak 15-Min: 5:10 PM -- 5:25 PM







5-Min Count Period Beginning At	N Park Ave (Northbound)			N Park Ave (Southbound)			E Broadway Blvd (Eastbound)			E Broadway Blvd (Westbound)			Total	Hourly Totals
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
4:00 PM	1	0	3	0	0	3	3	112	3	1	98	2	226	
4:05 PM	0	0	4	0	1	4	0	81	0	0	106	5	201	
4:10 PM	0	0	3	1	1	2	1	88	1	0	117	3	217	
4:15 PM	0	0	3	1	1	4	0	80	6	1	88	0	184	
4:20 PM	1	1	4	0	0	2	1	76	0	1	98	1	185	
4:25 PM	0	0	0	1	0	0	0	83	2	2	92	2	182	
4:30 PM	0	0	8	1	0	0	1	111	4	0	82	3	210	
4:35 PM	1	0	4	1	1	1	1	92	3	0	91	3	198	
4:40 PM	0	0	2	1	0	1	0	85	0	0	132	2	223	
4:45 PM	0	1	9	3	1	3	0	130	1	0	100	5	253	
4:50 PM	1	0	11	1	0	1	1	96	1	3	119	4	238	
4:55 PM	2	0	4	0	0	3	1	98	2	1	102	2	215	2532
5:00 PM	2	0	5	1	0	1	0	123	2	1	110	3	248	2554
5:05 PM	1	0	4	1	0	4	0	97	1	0	113	0	221	2574
5:10 PM	2	1	2	1	0	1	0	117	2	1	115	1	243	2600
5:15 PM	2	0	3	4	0	6	1	120	1	2	130	0	269	2685
5:20 PM	2	0	3	2	0	5	3	114	3	0	101	2	235	2735
5:25 PM	0	0	2	1	0	2	0	99	1	1	108	2	216	2769
5:30 PM	1	1	2	1	0	5	0	88	1	0	119	2	220	2779
5:35 PM	1	0	2	3	0	2	1	116	0	1	105	3	234	2815
5:40 PM	0	0	4	0	0	1	0	112	1	0	84	0	202	2794
5:45 PM	1	0	1	0	0	3	0	106	4	0	81	1	197	2738
5:50 PM	0	1	2	2	0	1	1	97	0	3	94	1	202	2702
5:55 PM	0	1	1	0	0	2	1	78	0	1	78	2	164	2651

Peak 15-Min Flowrates	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
All Vehicles	24	4	32	28	0	48	16	1404	24	12	1384	12	2988
Heavy Trucks	0	0	0	4	0	4	0	8	0	0	16	0	32
Pedestrians		20			32			8			20		80
Bicycles													
Railroad													
Stopped Buses													

Comments:

Report generated on 3/11/2009 9:40 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

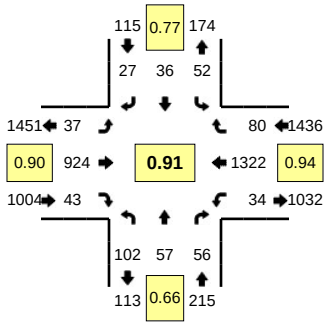
LOCATION: S Highland Ave -- E Broadway Blvd

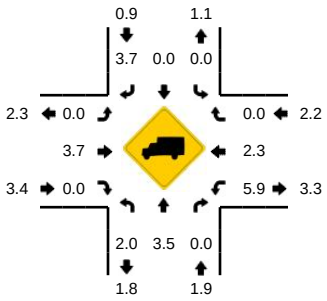
QC JOB #: 10411205

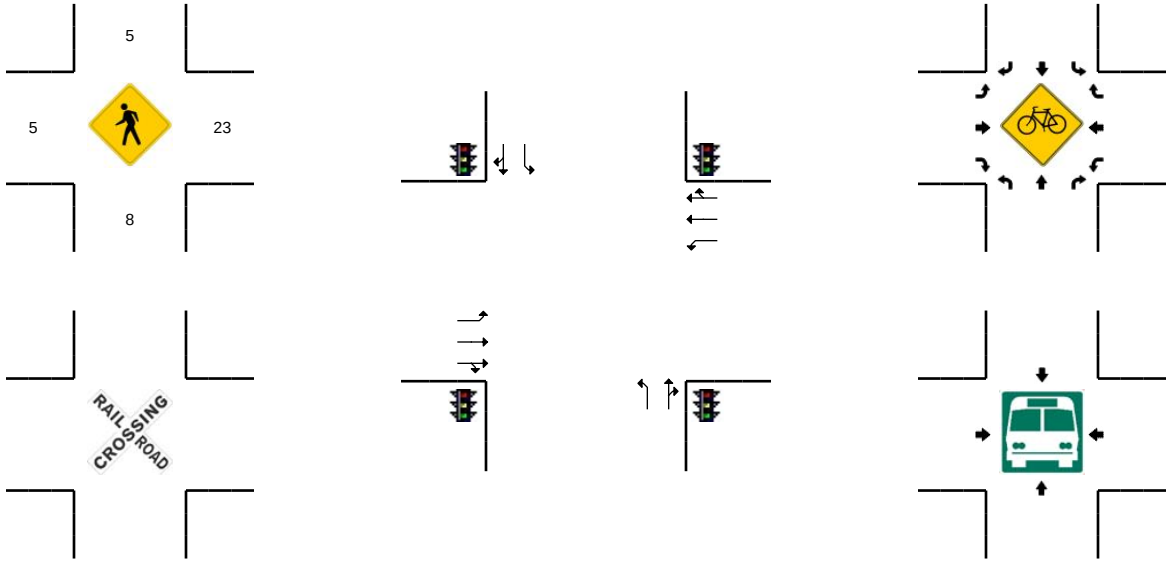
CITY/STATE: Tucson, AZ

DATE: 2/19/2009

Peak-Hour: 7:35 AM -- 8:35 AM
Peak 15-Min: 7:40 AM -- 7:55 AM







5-Min Count Period Beginning At	S Highland Ave (Northbound)			S Highland Ave (Southbound)			E Broadway Blvd (Eastbound)			E Broadway Blvd (Westbound)			Total	Hourly Totals
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
7:00 AM	1	1	1	2	0	1	2	33	2	0	53	3	99	
7:05 AM	0	1	0	1	1	0	2	23	1	2	59	1	91	
7:10 AM	3	2	1	2	0	1	2	42	2	1	65	5	126	
7:15 AM	3	2	1	4	0	2	2	42	0	2	71	5	134	
7:20 AM	0	2	1	7	1	5	3	57	1	0	73	3	153	
7:25 AM	1	2	0	2	4	3	3	51	2	1	107	4	180	
7:30 AM	9	7	4	3	2	0	3	72	6	1	94	7	208	
7:35 AM	9	4	6	7	5	6	1	67	8	4	87	10	214	
7:40 AM	9	14	4	2	5	1	2	91	4	3	101	14	250	
7:45 AM	15	10	8	3	6	5	6	87	2	2	128	7	279	
7:50 AM	12	8	2	9	0	2	4	82	2	1	94	13	229	
7:55 AM	2	2	3	6	3	2	8	70	2	1	113	9	221	2184
8:00 AM	6	5	1	9	2	4	4	89	3	1	136	5	265	2350
8:05 AM	6	2	6	1	4	2	5	65	0	4	108	5	208	2467
8:10 AM	6	1	0	4	1	1	0	94	2	0	116	2	227	2568
8:15 AM	5	2	4	3	1	2	4	70	4	5	101	1	202	2636
8:20 AM	15	2	5	5	4	1	0	58	8	8	105	4	215	2698
8:25 AM	5	3	8	1	4	1	2	78	3	4	119	6	234	2752
8:30 AM	12	4	9	2	1	0	1	73	5	1	114	4	226	2770
8:35 AM	5	0	3	0	0	1	1	59	2	0	99	1	171	2727
8:40 AM	5	0	5	0	0	2	0	66	1	3	98	5	185	2662
8:45 AM	4	2	5	3	0	1	0	81	1	0	88	9	194	2577
8:50 AM	1	0	1	4	0	0	4	65	3	1	85	7	171	2519
8:55 AM	2	1	1	2	1	2	1	77	0	1	71	3	162	2460

Peak 15-Min Flowrates	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
All Vehicles	144	128	56	56	44	32	48	1040	32	24	1292	136	3032
Heavy Trucks	4	4	0	0	0	0	0	28	0	4	32	0	72
Pedestrians		12			4			8			20		44
Bicycles													
Railroad													
Stopped Buses													

Comments:

Report generated on 3/11/2009 9:40 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

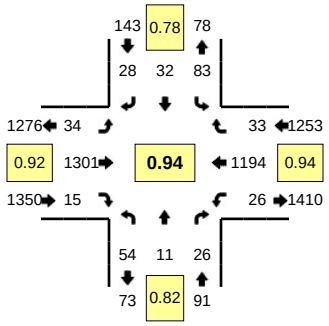
LOCATION: S Highland Ave -- E Broadway Blvd

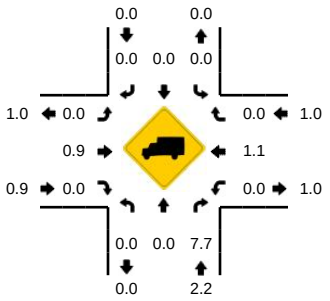
QC JOB #: 10411206

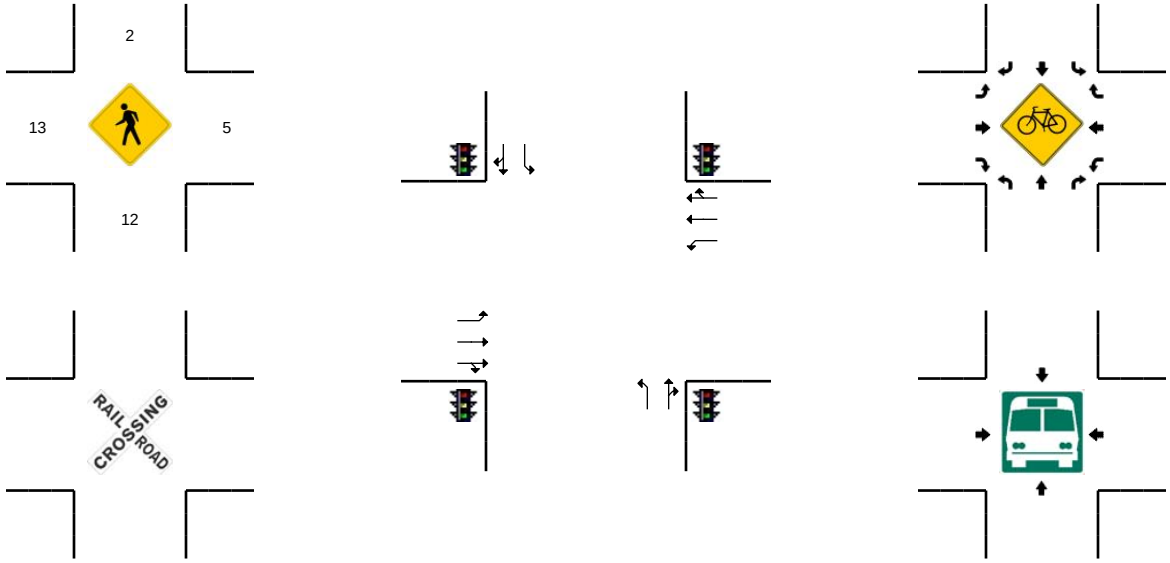
CITY/STATE: Tucson, AZ

DATE: 2/19/2009

Peak-Hour: 4:40 PM -- 5:40 PM
Peak 15-Min: 5:15 PM -- 5:30 PM







5-Min Count Period Beginning At	S Highland Ave (Northbound)			S Highland Ave (Southbound)			E Broadway Blvd (Eastbound)			E Broadway Blvd (Westbound)			Total	Hourly Totals
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
4:00 PM	7	1	1	4	3	2	5	94	1	2	102	4	226	
4:05 PM	7	1	2	9	3	2	1	113	1	1	77	2	219	
4:10 PM	2	1	5	3	3	3	1	80	4	2	88	4	196	
4:15 PM	7	1	2	9	1	3	2	91	2	3	69	5	195	
4:20 PM	4	1	2	4	0	1	2	105	0	2	75	0	196	
4:25 PM	3	0	5	4	0	2	0	84	1	5	86	3	193	
4:30 PM	8	2	7	8	3	3	1	88	1	1	100	3	225	
4:35 PM	5	3	1	6	4	4	1	90	3	0	76	4	197	
4:40 PM	3	1	2	7	1	5	3	122	2	2	88	2	238	
4:45 PM	4	2	5	1	2	2	4	100	2	4	108	1	235	
4:50 PM	5	0	5	6	3	0	4	112	0	2	86	5	228	
4:55 PM	4	0	2	9	1	4	1	100	1	1	91	3	217	2565
5:00 PM	5	2	2	11	0	4	2	116	0	1	111	4	258	2597
5:05 PM	3	1	0	5	2	2	3	104	0	3	86	2	211	2589
5:10 PM	3	0	1	13	3	1	2	107	2	3	112	1	248	2641
5:15 PM	6	3	5	8	3	4	7	139	2	1	108	1	287	2733
5:20 PM	5	1	0	4	9	3	1	97	2	0	91	3	216	2753
5:25 PM	8	0	2	5	4	0	3	103	0	1	123	4	253	2813
5:30 PM	5	0	1	8	4	2	2	105	1	3	98	4	233	2821
5:35 PM	3	1	1	6	0	1	2	96	3	5	92	3	213	2837
5:40 PM	4	1	3	4	2	1	1	118	0	1	89	5	229	2828
5:45 PM	2	2	1	5	1	1	6	104	4	1	71	4	202	2795
5:50 PM	4	4	6	5	1	1	0	79	4	3	89	8	204	2771
5:55 PM	2	2	0	3	1	0	2	94	0	2	90	3	199	2753

Peak 15-Min Flowrates	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
All Vehicles	76	16	28	68	64	28	44	1356	16	8	1288	32	3024
Heavy Trucks	0	0	0	0	0	0	0	12	0	0	16	0	28
Pedestrians		24			4			12			0		40
Bicycles													
Railroad													
Stopped Buses													

Comments:

Report generated on 3/11/2009 9:40 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

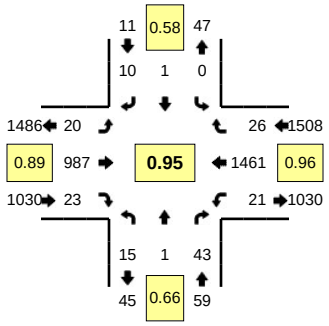
LOCATION: N Cherry Ave -- E Broadway Blvd

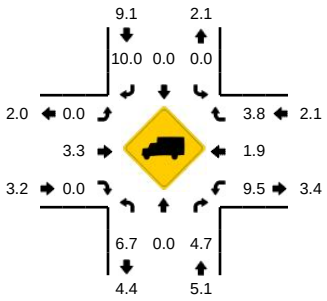
QC JOB #: 10411207

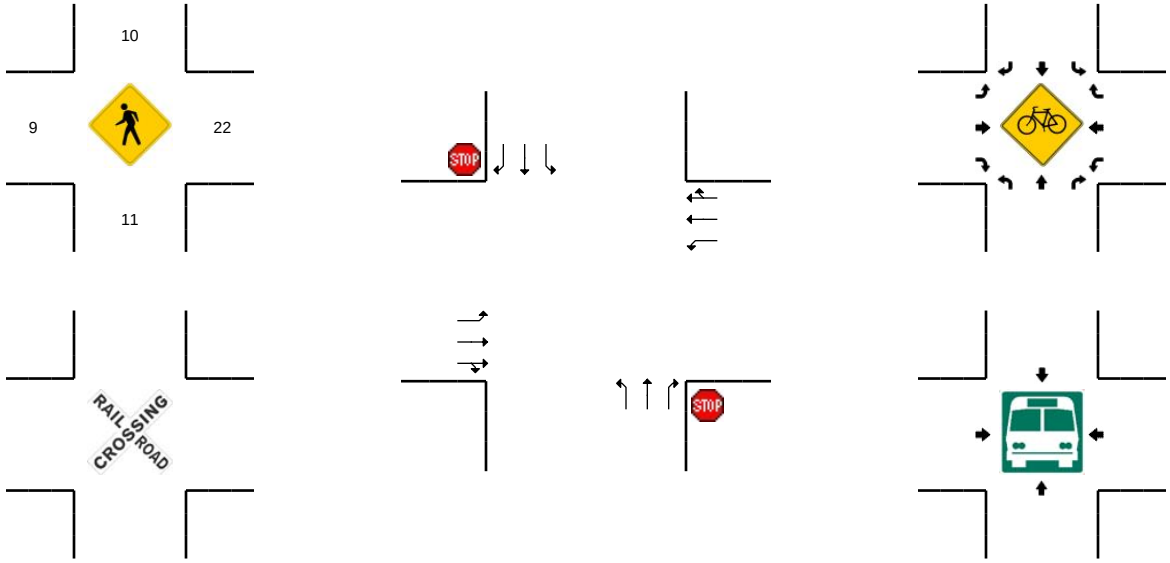
CITY/STATE: Tucson, AZ

DATE: 2/19/2009

Peak-Hour: 7:35 AM -- 8:35 AM
Peak 15-Min: 8:00 AM -- 8:15 AM







5-Min Count Period Beginning At	N Cherry Ave (Northbound)			N Cherry Ave (Southbound)			E Broadway Blvd (Eastbound)			E Broadway Blvd (Westbound)			Total	Hourly Totals
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
7:00 AM	1	0	0	2	0	1	1	41	1	2	51	1	101	
7:05 AM	2	0	0	0	0	1	0	15	1	0	59	3	81	
7:10 AM	0	0	2	0	0	0	0	36	1	0	72	5	116	
7:15 AM	1	0	2	0	0	0	2	56	0	1	76	2	140	
7:20 AM	0	0	1	0	1	1	1	61	1	1	91	3	161	
7:25 AM	0	0	3	0	0	0	2	44	1	5	107	4	166	
7:30 AM	0	0	1	0	0	1	2	80	0	4	97	0	185	
7:35 AM	0	0	3	0	0	0	1	79	2	2	107	1	195	
7:40 AM	1	0	4	0	0	0	1	86	2	2	135	1	232	
7:45 AM	3	1	3	0	0	1	2	90	1	3	117	3	224	
7:50 AM	2	0	2	0	0	1	6	97	3	4	110	1	226	
7:55 AM	1	0	2	0	0	1	3	62	3	1	132	2	207	2034
8:00 AM	0	0	3	0	0	1	2	97	2	1	136	4	246	2179
8:05 AM	1	0	2	0	1	2	0	89	1	2	112	1	211	2309
8:10 AM	1	0	5	0	0	1	1	83	0	1	134	2	228	2421
8:15 AM	1	0	1	0	0	2	1	85	2	0	112	1	205	2486
8:20 AM	1	0	7	0	0	1	1	60	2	3	116	2	193	2518
8:25 AM	2	0	3	0	0	0	1	79	2	0	132	3	222	2574
8:30 AM	2	0	8	0	0	0	1	80	3	2	118	5	219	2608
8:35 AM	3	0	2	1	0	1	0	55	4	1	103	4	174	2587
8:40 AM	1	0	3	0	0	1	1	63	2	3	110	3	187	2542
8:45 AM	0	0	3	0	0	0	1	76	1	2	87	0	170	2488
8:50 AM	0	0	2	1	0	1	2	85	3	1	88	1	184	2446
8:55 AM	1	0	0	0	0	1	2	64	2	0	84	3	157	2396

Peak 15-Min Flowrates	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
All Vehicles	8	0	40	0	4	16	12	1076	12	16	1528	28	2740
Heavy Trucks	0	0	0	0	0	0	0	48	0	0	16	4	68
Pedestrians		0			8			8			8		24
Bicycles													
Railroad													
Stopped Buses													

Comments:

Report generated on 3/11/2009 9:40 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

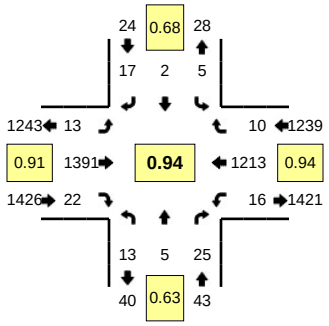
LOCATION: N Cherry Ave -- E Broadway Blvd

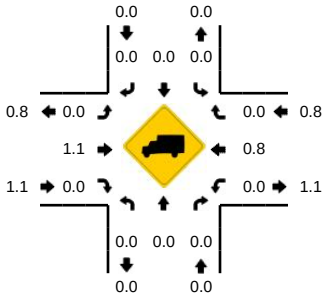
QC JOB #: 10411208

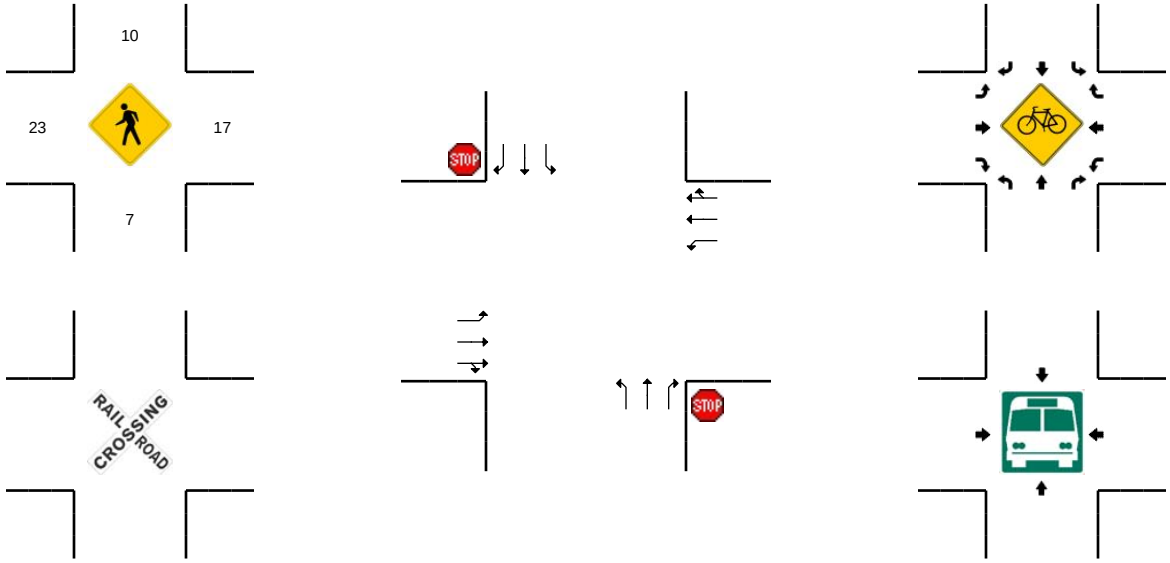
CITY/STATE: Tucson, AZ

DATE: 2/19/2009

Peak-Hour: 4:40 PM -- 5:40 PM
Peak 15-Min: 5:05 PM -- 5:20 PM







5-Min Count Period Beginning At	N Cherry Ave (Northbound)			N Cherry Ave (Southbound)			E Broadway Blvd (Eastbound)			E Broadway Blvd (Westbound)			Total	Hourly Totals
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
4:00 PM	1	0	1	1	0	0	2	98	2	1	85	4	195	
4:05 PM	1	0	6	1	0	1	0	107	3	4	88	1	212	
4:10 PM	2	0	3	1	0	1	0	107	6	2	87	1	210	
4:15 PM	0	0	6	1	1	1	1	95	1	0	73	3	182	
4:20 PM	0	0	1	0	0	0	0	93	2	3	86	1	186	
4:25 PM	1	0	2	0	0	1	0	107	1	0	90	4	206	
4:30 PM	2	0	1	1	0	0	1	104	4	2	108	2	225	
4:35 PM	1	0	3	2	0	0	0	87	2	2	76	2	175	
4:40 PM	1	0	2	0	0	1	0	131	1	2	91	0	229	
4:45 PM	0	1	3	0	0	0	0	106	1	1	106	1	219	
4:50 PM	1	0	4	1	0	0	0	116	4	1	101	1	229	
4:55 PM	0	0	0	0	0	0	3	104	0	0	88	1	196	2464
5:00 PM	1	0	3	1	0	0	1	134	3	1	111	1	256	2525
5:05 PM	1	1	1	2	0	1	0	116	0	0	99	2	223	2536
5:10 PM	1	1	4	0	0	3	3	116	3	2	114	0	247	2573
5:15 PM	0	1	3	0	0	4	1	152	0	3	94	1	259	2650
5:20 PM	1	0	0	0	0	1	1	99	3	2	94	1	202	2666
5:25 PM	2	0	2	0	0	3	1	105	2	1	121	1	238	2698
5:30 PM	2	1	1	0	1	2	1	100	1	2	94	1	206	2679
5:35 PM	3	0	2	1	1	2	2	112	4	1	100	0	228	2732
5:40 PM	1	0	2	0	0	0	1	112	1	0	87	1	205	2708
5:45 PM	1	0	2	0	0	2	2	115	2	3	69	0	196	2685
5:50 PM	2	0	3	1	0	0	3	77	4	0	115	0	205	2661
5:55 PM	0	0	2	0	0	2	1	89	5	7	80	0	186	2651

Peak 15-Min Flowrates	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
All Vehicles	8	12	32	8	0	32	16	1536	12	20	1228	12	2916
Heavy Trucks	0	0	0	0	0	0	0	8	0	0	4	0	12
Pedestrians		8			20			32			24		84
Bicycles													
Railroad													
Stopped Buses													

Comments:

Report generated on 3/11/2009 9:40 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

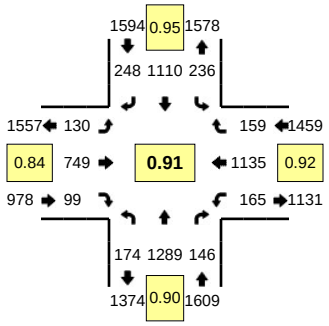
LOCATION: S Campbell Ave -- E Broadway Blvd

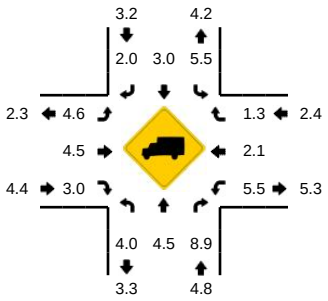
QC JOB #: 10411209

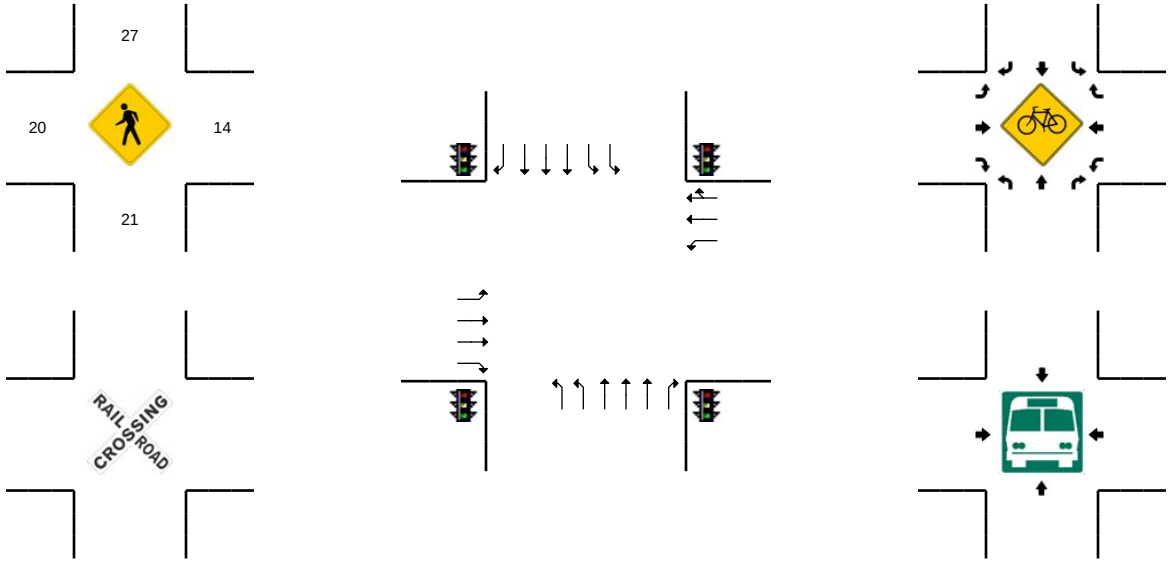
CITY/STATE: Tucson, AZ

DATE: 2/18/2009

Peak-Hour: 7:25 AM -- 8:25 AM
Peak 15-Min: 7:40 AM -- 7:55 AM







5-Min Count Period Beginning At	S Campbell Ave (Northbound)			S Campbell Ave (Southbound)			E Broadway Blvd (Eastbound)			E Broadway Blvd (Westbound)			Total	Hourly Totals
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
7:00 AM	9	94	10	7	91	12	3	21	8	11	42	8	316	
7:05 AM	12	65	10	11	84	11	5	37	3	9	58	10	315	
7:10 AM	14	79	10	13	81	9	3	31	3	13	48	15	319	
7:15 AM	23	110	9	24	98	16	4	38	3	8	41	14	388	
7:20 AM	15	101	7	15	58	12	5	61	5	9	83	20	391	
7:25 AM	18	97	12	11	96	22	11	56	5	14	77	18	437	
7:30 AM	13	134	12	21	106	15	9	47	2	14	80	14	467	
7:35 AM	9	112	13	16	96	23	12	64	6	10	89	11	461	
7:40 AM	14	109	15	20	89	21	18	76	5	20	89	18	494	
7:45 AM	21	136	3	22	115	18	9	73	15	15	96	11	534	
7:50 AM	9	111	15	18	93	15	11	84	14	21	115	10	516	
7:55 AM	15	111	18	20	86	26	14	55	7	18	104	8	482	5120
8:00 AM	26	121	11	27	105	27	7	47	12	13	83	10	489	5293
8:05 AM	10	72	9	13	95	20	7	79	6	7	105	12	435	5413
8:10 AM	14	83	13	25	80	19	17	55	9	14	103	11	443	5537
8:15 AM	13	112	12	26	92	21	8	49	11	8	96	13	461	5610
8:20 AM	12	91	13	17	57	21	7	64	7	11	98	23	421	5640
8:25 AM	13	97	22	14	65	18	17	57	5	18	56	19	401	5604
8:30 AM	28	107	22	19	71	21	13	69	5	9	78	16	458	5595
8:35 AM	18	110	20	14	57	17	6	76	10	5	87	21	441	5575
8:40 AM	17	99	19	14	48	14	20	65	8	17	76	16	413	5494
8:45 AM	25	128	19	18	64	15	9	48	10	9	60	18	423	5383
8:50 AM	19	94	18	11	47	14	11	66	13	10	65	15	383	5250
8:55 AM	11	90	14	22	58	20	7	72	3	7	58	23	385	5153

Peak 15-Min Flowrates	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
All Vehicles	176	1424	132	240	1188	216	152	932	136	224	1200	156	6176
Heavy Trucks	8	52	16	16	40	4	8	36	4	24	16	0	224
Pedestrians		28			24			12			24		88
Bicycles													
Railroad													
Stopped Buses													

Comments:

Report generated on 3/11/2009 9:40 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

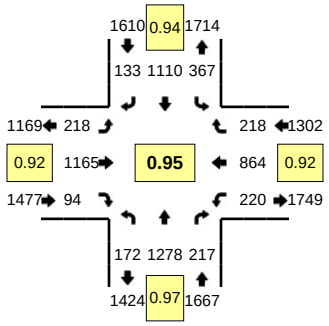
LOCATION: S Campbell Ave -- E Broadway Blvd

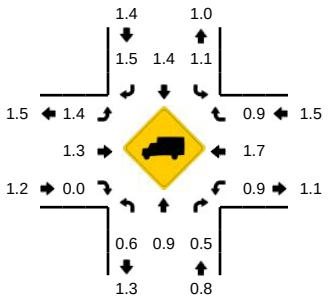
QC JOB #: 10411210

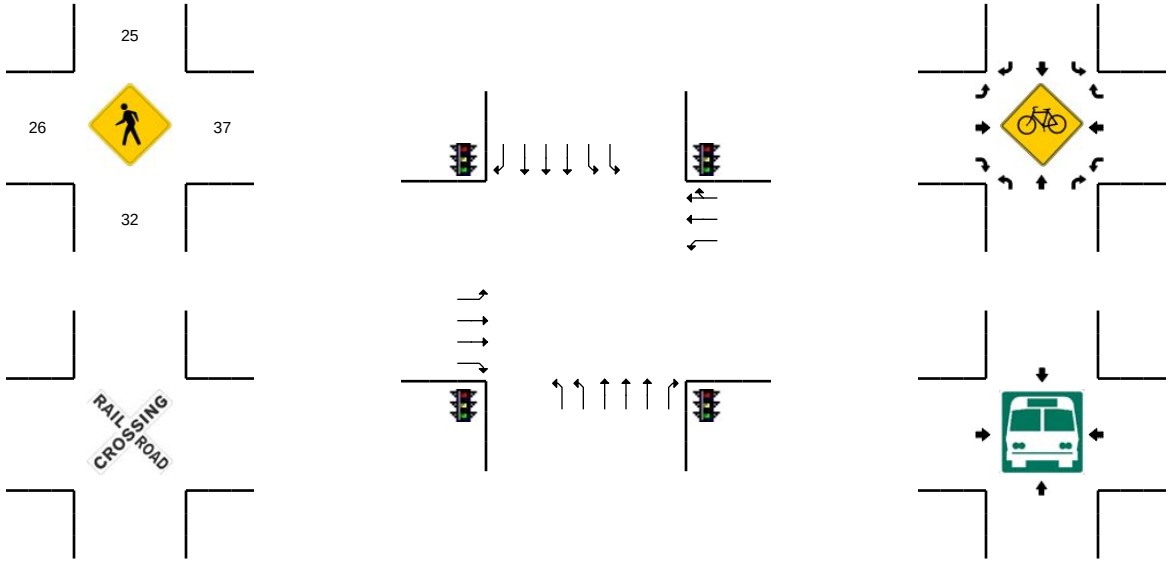
CITY/STATE: Tucson, AZ

DATE: 2/18/2009

Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:10 PM -- 5:25 PM







5-Min Count Period Beginning At	S Campbell Ave (Northbound)			S Campbell Ave (Southbound)			E Broadway Blvd (Eastbound)			E Broadway Blvd (Westbound)			Total	Hourly Totals
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
4:00 PM	24	78	18	41	93	16	6	74	11	22	69	22	474	
4:05 PM	16	96	15	28	92	19	13	99	7	17	59	20	481	
4:10 PM	11	90	27	26	111	14	16	74	1	14	65	21	470	
4:15 PM	12	83	15	45	79	13	17	93	6	11	63	19	456	
4:20 PM	8	97	18	28	81	16	23	75	1	18	72	20	457	
4:25 PM	11	99	15	32	108	19	21	89	4	22	61	13	494	
4:30 PM	17	102	25	37	90	12	11	93	7	15	58	17	484	
4:35 PM	17	87	11	33	94	11	18	92	3	16	66	31	479	
4:40 PM	6	110	18	29	117	10	15	67	4	14	60	16	466	
4:45 PM	9	102	26	28	82	9	15	85	10	14	65	19	464	
4:50 PM	19	102	19	21	80	14	20	100	3	24	80	25	507	
4:55 PM	8	112	24	27	92	12	15	86	5	17	64	16	478	5710
5:00 PM	12	113	22	41	75	13	16	96	19	17	63	17	504	5740
5:05 PM	17	102	14	29	81	8	20	112	8	19	88	17	515	5774
5:10 PM	11	121	20	28	115	16	24	87	11	23	67	21	544	5848
5:15 PM	26	104	12	36	100	15	20	107	3	19	89	11	542	5934
5:20 PM	17	90	17	29	94	11	25	116	9	19	71	18	516	5993
5:25 PM	19	121	16	32	111	7	12	94	9	15	79	12	527	6026
5:30 PM	16	99	10	37	78	9	19	98	7	17	72	18	480	6022
5:35 PM	8	92	9	31	91	9	15	105	5	19	72	29	485	6028
5:40 PM	10	120	28	28	111	10	17	79	5	17	54	15	494	6056
5:45 PM	14	82	10	42	87	13	11	84	5	15	69	18	450	6042
5:50 PM	13	78	19	34	68	19	17	63	4	22	56	11	404	5939
5:55 PM	15	81	16	37	91	7	12	62	3	16	36	19	395	5856

Peak 15-Min Flowrates	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
All Vehicles	216	1260	196	372	1236	168	276	1240	92	244	908	200	6408
Heavy Trucks	0	8	4	8	12	0	0	16	0	0	12	0	60
Pedestrians		28			40			44			44		156
Bicycles													
Railroad													
Stopped Buses													

Comments:

Report generated on 3/11/2009 9:40 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

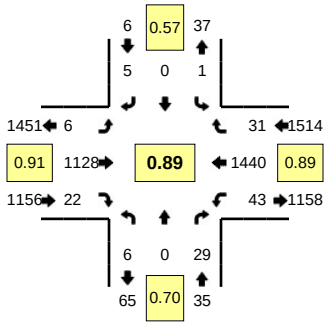
LOCATION: S Norris Ave -- E Broadway Blvd

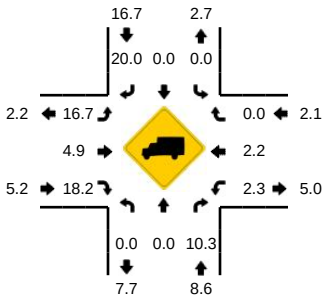
QC JOB #: 10411211

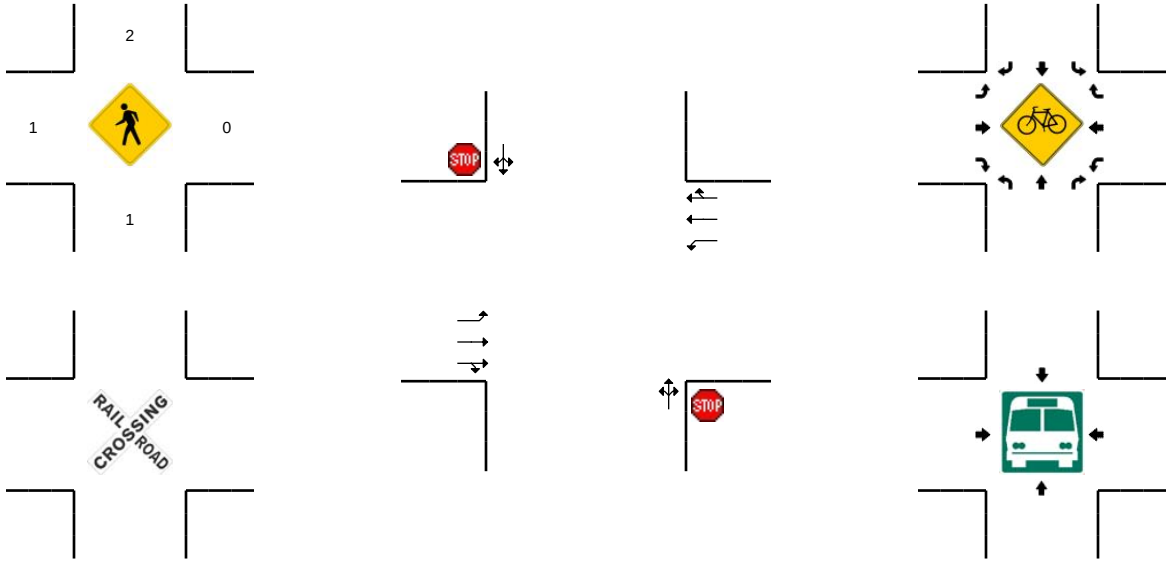
CITY/STATE: Tucson, AZ

DATE: 2/18/2009

Peak-Hour: 7:40 AM -- 8:40 AM
Peak 15-Min: 7:40 AM -- 7:55 AM







5-Min Count Period Beginning At	S Norris Ave (Northbound)			S Norris Ave (Southbound)			E Broadway Blvd (Eastbound)			E Broadway Blvd (Westbound)			Total	Hourly Totals
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
7:00 AM	0	0	2	0	1	2	0	33	2	3	70	1	114	
7:05 AM	0	0	1	0	0	3	0	53	3	2	66	1	129	
7:10 AM	0	1	4	0	0	1	0	53	0	1	73	1	134	
7:15 AM	2	0	3	0	0	2	0	63	3	3	66	0	142	
7:20 AM	1	0	3	0	0	0	0	75	4	7	104	3	197	
7:25 AM	0	0	3	1	0	0	2	74	1	4	112	3	200	
7:30 AM	0	0	4	0	0	1	1	67	1	3	102	2	181	
7:35 AM	0	0	4	1	0	1	1	88	1	4	119	1	220	
7:40 AM	0	0	0	0	0	0	0	110	0	4	138	7	259	
7:45 AM	0	0	1	0	0	1	0	97	2	5	139	2	247	
7:50 AM	1	0	9	0	0	1	1	105	1	3	130	4	255	
7:55 AM	0	0	4	0	0	1	1	99	2	6	119	3	235	2313
8:00 AM	0	0	2	0	0	1	0	74	1	7	120	3	208	2407
8:05 AM	0	0	3	0	0	0	0	99	0	2	118	1	223	2501
8:10 AM	0	0	3	0	0	0	1	96	2	3	125	2	232	2599
8:15 AM	0	0	1	0	0	0	0	79	3	2	128	1	214	2671
8:20 AM	1	0	1	0	0	0	2	83	2	1	115	3	208	2682
8:25 AM	2	0	1	1	0	1	1	89	5	4	86	2	192	2674
8:30 AM	2	0	2	0	0	0	0	93	3	2	110	1	213	2706
8:35 AM	0	0	2	0	0	0	0	104	1	4	112	2	225	2711
8:40 AM	1	0	2	0	0	1	2	101	2	1	112	2	224	2676
8:45 AM	2	0	4	0	0	1	0	77	2	4	91	1	182	2611
8:50 AM	0	0	3	0	0	0	0	83	1	3	73	2	165	2521
8:55 AM	0	0	3	1	1	2	2	104	4	4	97	3	221	2507

Peak 15-Min Flowrates	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
All Vehicles	4	0	40	0	0	8	4	1248	12	48	1628	52	3044
Heavy Trucks	0	0	4	0	0	4	0	60	0	0	28	0	96
Pedestrians		0			4			0			0		4
Bicycles													
Railroad													
Stopped Buses													

Comments:

Report generated on 3/11/2009 9:40 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

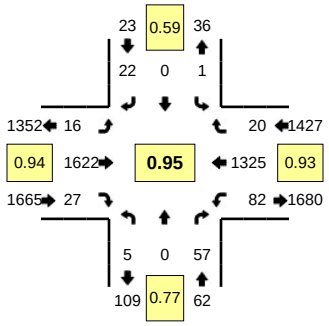
LOCATION: S Norris Ave -- E Broadway Blvd

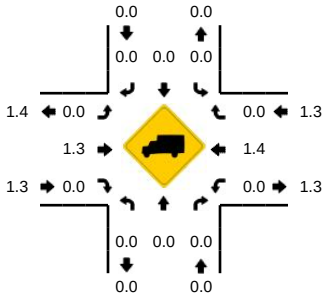
QC JOB #: 10411212

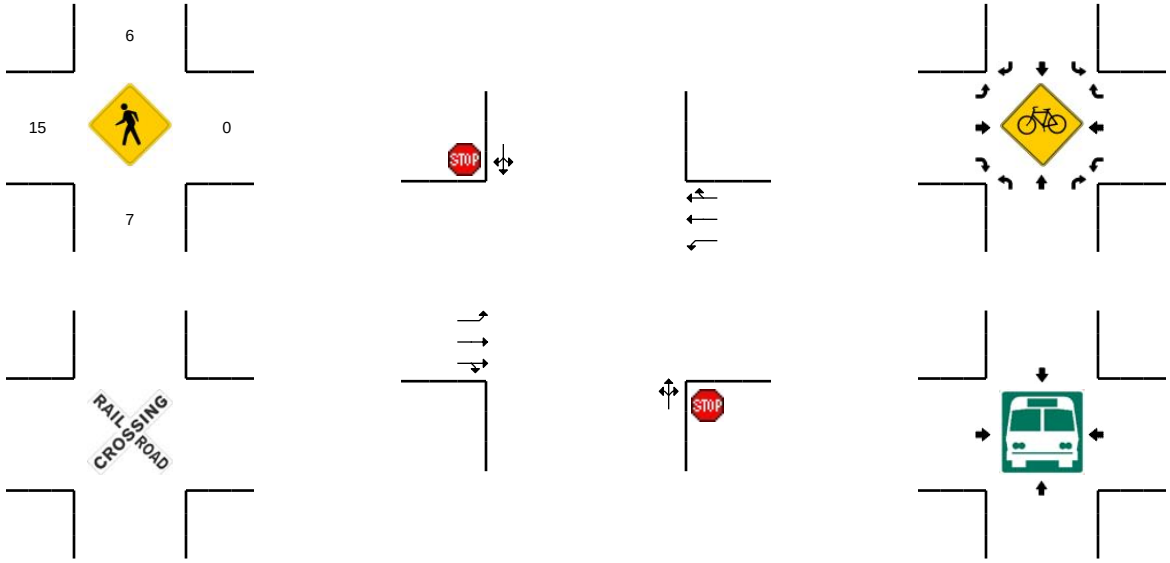
CITY/STATE: Tucson, AZ

DATE: 2/18/2009

Peak-Hour: 4:40 PM -- 5:40 PM
Peak 15-Min: 5:05 PM -- 5:20 PM







5-Min Count Period Beginning At	S Norris Ave (Northbound)			S Norris Ave (Southbound)			E Broadway Blvd (Eastbound)			E Broadway Blvd (Westbound)			Total	Hourly Totals
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
4:00 PM	2	0	5	0	0	0	0	115	2	11	93	1	229	
4:05 PM	3	0	6	0	0	1	1	120	3	3	100	3	240	
4:10 PM	1	0	2	0	0	0	0	140	1	13	103	2	262	
4:15 PM	1	0	2	1	0	1	1	131	1	12	101	0	251	
4:20 PM	0	0	2	0	0	1	1	121	1	2	103	2	233	
4:25 PM	2	0	6	1	0	1	1	126	2	7	100	0	246	
4:30 PM	0	0	4	0	0	2	2	130	1	6	88	0	233	
4:35 PM	1	0	3	0	1	1	0	129	1	7	104	1	248	
4:40 PM	0	0	5	0	0	1	1	120	1	9	107	1	245	
4:45 PM	0	0	5	0	0	2	1	121	3	8	110	1	251	
4:50 PM	1	0	3	0	0	1	3	136	3	0	107	2	256	
4:55 PM	1	0	8	0	0	5	3	128	0	5	103	3	256	2950
5:00 PM	0	0	5	0	0	3	2	147	1	6	105	1	270	2991
5:05 PM	0	0	7	0	0	3	1	134	3	7	118	2	275	3026
5:10 PM	0	0	5	1	0	1	0	141	0	6	123	1	278	3042
5:15 PM	1	0	5	0	0	1	2	145	3	12	112	2	283	3074
5:20 PM	0	0	3	0	0	0	0	140	1	7	91	2	244	3085
5:25 PM	1	0	3	0	0	1	2	149	3	6	124	0	289	3128
5:30 PM	1	0	5	0	0	2	0	121	5	9	107	2	252	3147
5:35 PM	0	0	3	0	0	2	1	140	4	7	118	3	278	3177
5:40 PM	1	0	6	0	0	0	3	135	1	10	84	2	242	3174
5:45 PM	1	0	5	0	0	2	1	115	2	8	90	5	229	3152
5:50 PM	0	0	4	0	0	0	2	114	0	4	93	2	219	3115
5:55 PM	0	0	6	0	0	2	1	111	4	6	77	1	208	3067

Peak 15-Min Flowrates	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
All Vehicles	4	0	68	4	0	20	12	1680	24	100	1412	20	3344
Heavy Trucks	0	0	0	0	0	0	0	24	0	0	12	0	36
Pedestrians		8			8			8			0		24
Bicycles													
Railroad													
Stopped Buses													

Comments:

Report generated on 3/11/2009 9:40 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

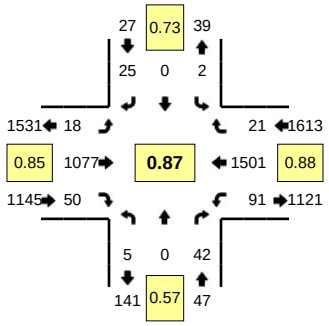
LOCATION: N Plummer Ave -- E Broadway Blvd

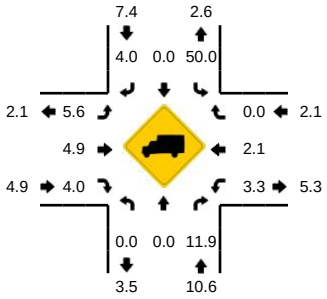
QC JOB #: 10411213

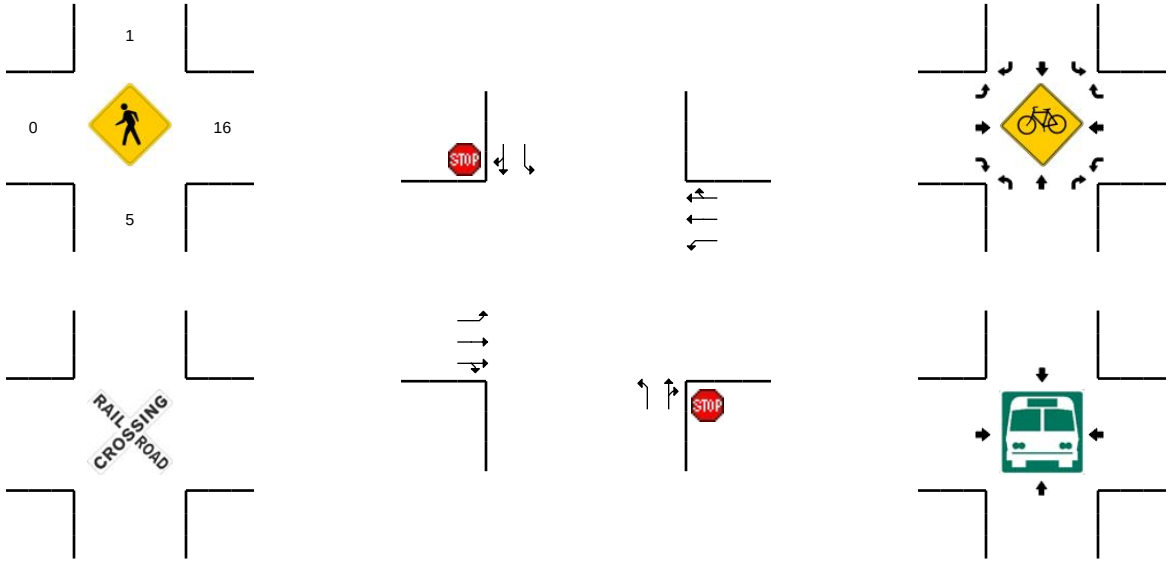
CITY/STATE: Tucson, AZ

DATE: 2/18/2009

Peak-Hour: 7:40 AM -- 8:40 AM
Peak 15-Min: 7:40 AM -- 7:55 AM







5-Min Count Period Beginning At	N Plummer Ave (Northbound)			N Plummer Ave (Southbound)			E Broadway Blvd (Eastbound)			E Broadway Blvd (Westbound)			Total	Hourly Totals
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
7:00 AM	0	0	2	0	0	0	1	37	0	5	85	0	130	
7:05 AM	0	0	2	0	1	2	1	45	2	4	69	1	127	
7:10 AM	0	0	0	0	0	0	1	55	7	3	71	0	137	
7:15 AM	0	0	2	1	0	1	0	66	0	5	75	1	151	
7:20 AM	3	0	6	0	0	1	1	68	2	7	122	1	211	
7:25 AM	0	0	2	0	0	2	2	72	4	10	103	2	197	
7:30 AM	0	0	3	0	0	0	0	77	2	6	106	0	194	
7:35 AM	0	0	5	1	0	3	0	77	2	8	124	2	222	
7:40 AM	0	0	4	0	0	3	1	115	6	5	152	0	286	
7:45 AM	0	0	2	0	0	2	1	92	9	8	151	2	267	
7:50 AM	0	0	2	1	0	2	2	104	5	7	139	3	265	
7:55 AM	1	0	1	0	0	1	2	92	3	8	111	2	221	2408
8:00 AM	0	0	7	0	0	3	3	78	4	11	139	3	248	2526
8:05 AM	1	0	4	0	0	1	1	82	3	11	131	1	235	2634
8:10 AM	0	0	3	0	0	4	1	101	2	10	112	2	235	2732
8:15 AM	0	0	2	0	0	0	1	73	4	6	139	0	225	2806
8:20 AM	0	0	2	1	0	1	1	69	4	6	111	3	198	2793
8:25 AM	0	0	4	0	0	3	1	93	1	7	90	4	203	2799
8:30 AM	1	0	3	0	0	2	1	92	4	2	115	0	220	2825
8:35 AM	2	0	8	0	0	3	3	86	5	10	111	1	229	2832
8:40 AM	0	0	6	1	0	4	3	97	3	9	106	0	229	2775
8:45 AM	1	0	7	0	0	2	2	70	4	8	101	0	195	2703
8:50 AM	0	0	0	0	0	1	3	66	2	6	84	2	164	2602
8:55 AM	0	0	3	0	0	1	1	96	2	3	107	1	214	2595

Peak 15-Min Flowrates	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
All Vehicles	0	0	32	4	0	28	16	1244	80	80	1768	20	3272
Heavy Trucks	0	0	8	0	0	4	0	64	0	0	28	0	104
Pedestrians		4			4			0			0		8
Bicycles													
Railroad													
Stopped Buses													

Comments:

Report generated on 3/11/2009 9:40 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

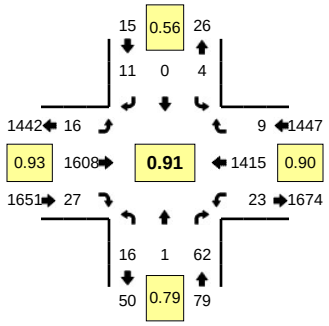
LOCATION: N Plumer Ave -- E Broadway Blvd

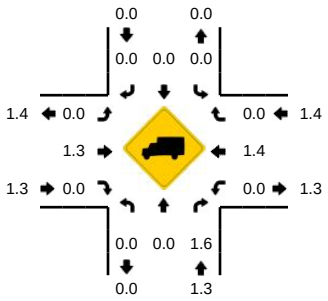
QC JOB #: 10411214

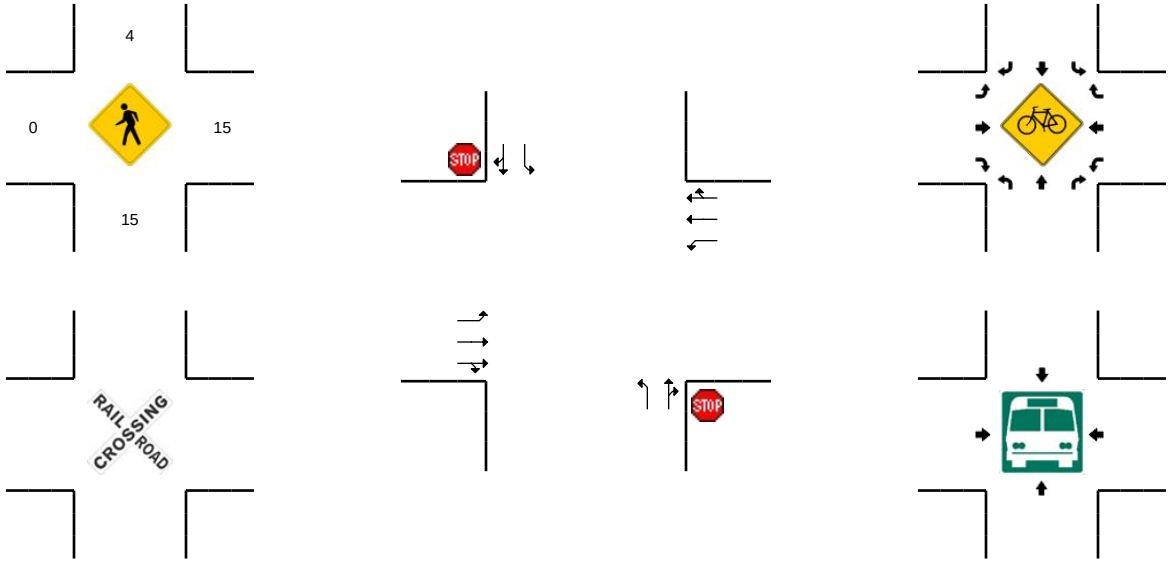
CITY/STATE: Tucson, AZ

DATE: 2/18/2009

Peak-Hour: 4:40 PM -- 5:40 PM
Peak 15-Min: 5:05 PM -- 5:20 PM







5-Min Count Period Beginning At	N Plumer Ave (Northbound)			N Plumer Ave (Southbound)			E Broadway Blvd (Eastbound)			E Broadway Blvd (Westbound)			Total	Hourly Totals
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
4:00 PM	1	0	11	0	0	5	2	111	2	10	96	0	238	
4:05 PM	2	0	5	0	0	1	3	123	0	1	115	1	251	
4:10 PM	1	0	7	0	0	2	1	140	3	2	99	0	255	
4:15 PM	2	0	6	0	0	0	3	126	2	2	111	2	254	
4:20 PM	0	0	6	0	0	3	1	99	4	1	91	1	206	
4:25 PM	0	3	3	0	0	2	2	140	3	2	99	1	255	
4:30 PM	1	0	5	0	0	0	1	129	1	2	103	1	243	
4:35 PM	0	0	4	0	0	2	1	129	4	6	119	1	266	
4:40 PM	1	0	7	1	0	0	1	117	2	2	108	0	239	
4:45 PM	1	0	3	0	0	0	1	121	2	5	121	2	256	
4:50 PM	3	0	4	0	0	2	2	127	1	3	108	1	251	
4:55 PM	1	0	8	0	0	0	1	134	1	1	104	1	251	2965
5:00 PM	0	0	3	0	0	1	2	139	2	1	116	0	264	2991
5:05 PM	3	0	7	1	0	3	0	131	7	1	137	2	292	3032
5:10 PM	3	0	4	0	0	0	0	144	3	0	123	0	277	3054
5:15 PM	0	0	8	0	0	2	2	158	0	3	136	2	311	3111
5:20 PM	0	0	6	0	0	0	1	135	5	4	111	0	262	3167
5:25 PM	2	1	4	0	0	1	1	136	1	1	123	0	270	3182
5:30 PM	2	0	6	0	0	0	2	131	1	0	109	0	251	3190
5:35 PM	0	0	2	2	0	2	3	135	2	2	119	1	268	3192
5:40 PM	1	0	0	1	0	0	0	135	1	3	94	1	236	3189
5:45 PM	0	1	9	0	0	2	0	114	3	2	114	0	245	3178
5:50 PM	0	0	2	0	0	0	2	106	1	2	96	0	209	3136
5:55 PM	0	0	2	0	0	1	0	131	2	2	74	0	212	3097

Peak 15-Min Flowrates	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
All Vehicles	24	0	76	4	0	20	8	1732	40	16	1584	16	3520
Heavy Trucks	0	0	0	0	0	0	0	28	0	0	12	0	40
Pedestrians		8			4			0			8		20
Bicycles													
Railroad													
Stopped Buses													

Comments:

Report generated on 3/11/2009 9:40 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

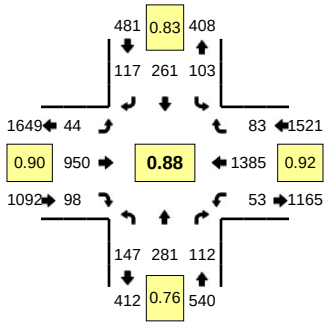
LOCATION: S Tucson Blvd -- E Broadway Blvd

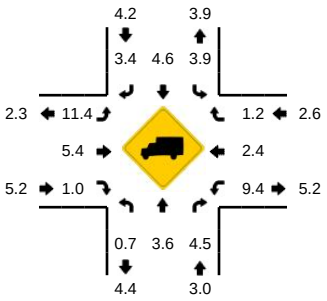
QC JOB #: 10411215

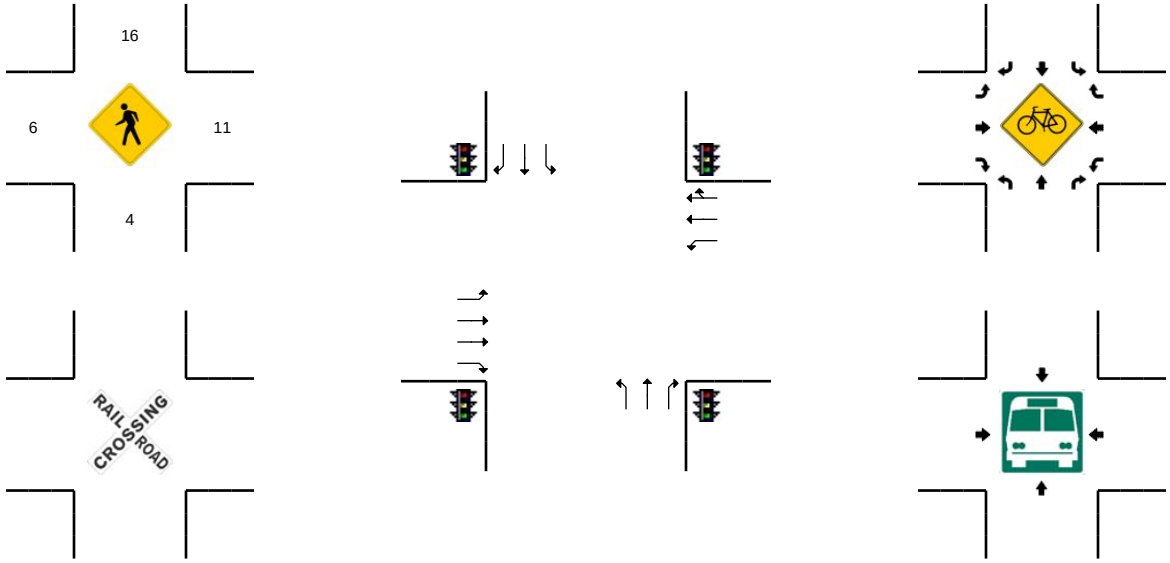
CITY/STATE: Tucson, AZ

DATE: 2/18/2009

Peak-Hour: 7:35 AM -- 8:35 AM
Peak 15-Min: 7:40 AM -- 7:55 AM







5-Min Count Period Beginning At	S Tucson Blvd (Northbound)			S Tucson Blvd (Southbound)			E Broadway Blvd (Eastbound)			E Broadway Blvd (Westbound)			Total	Hourly Totals
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
7:00 AM	2	8	2	3	12	1	1	41	4	1	90	0	165	
7:05 AM	3	15	4	3	18	2	2	42	4	5	61	5	164	
7:10 AM	7	9	7	3	9	3	1	50	0	4	72	3	168	
7:15 AM	8	15	4	3	15	2	2	60	3	3	88	3	206	
7:20 AM	13	19	6	4	19	9	2	64	5	1	100	5	247	
7:25 AM	12	13	5	2	21	7	3	62	6	6	84	8	229	
7:30 AM	5	18	10	6	15	2	6	74	4	7	128	11	286	
7:35 AM	13	35	7	5	20	8	2	64	12	5	95	9	275	
7:40 AM	16	30	8	9	14	10	2	89	13	4	142	8	345	
7:45 AM	16	29	8	7	29	13	2	91	9	5	130	10	349	
7:50 AM	19	42	11	8	34	10	4	79	14	5	110	7	343	
7:55 AM	17	25	13	10	26	11	5	77	13	3	110	11	321	3098
8:00 AM	9	15	11	7	26	7	3	84	8	3	141	9	323	3256
8:05 AM	15	28	10	8	20	14	6	64	6	7	108	3	289	3381
8:10 AM	7	15	8	7	23	8	2	90	7	3	121	5	296	3509
8:15 AM	9	16	6	10	17	7	3	71	8	4	138	3	292	3595
8:20 AM	7	26	12	11	22	6	6	64	1	5	97	5	262	3610
8:25 AM	7	7	7	6	16	12	6	90	2	2	90	7	252	3633
8:30 AM	12	13	11	15	14	11	3	87	5	7	103	6	287	3634
8:35 AM	7	25	6	12	21	9	6	68	2	6	93	3	258	3617
8:40 AM	6	18	8	8	21	7	6	80	6	4	99	13	276	3548
8:45 AM	4	21	3	10	19	8	6	92	5	8	111	14	301	3500
8:50 AM	10	26	4	2	20	8	4	71	4	7	76	4	236	3393
8:55 AM	8	17	6	8	17	10	2	73	6	3	87	4	241	3313

Peak 15-Min Flowrates	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
All Vehicles	204	404	108	96	308	132	32	1036	144	56	1528	100	4148
Heavy Trucks	0	16	4	0	4	0	8	48	4	4	36	0	124
Pedestrians		4			28			4			4		40
Bicycles													
Railroad													
Stopped Buses													

Comments:

Report generated on 3/11/2009 9:40 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

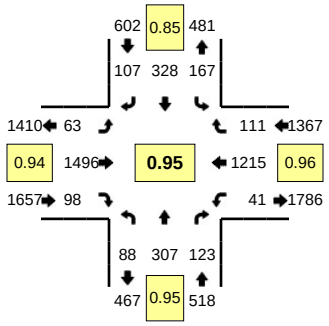
LOCATION: S Tucson Blvd -- E Broadway Blvd

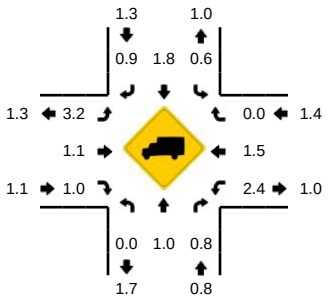
QC JOB #: 10411216

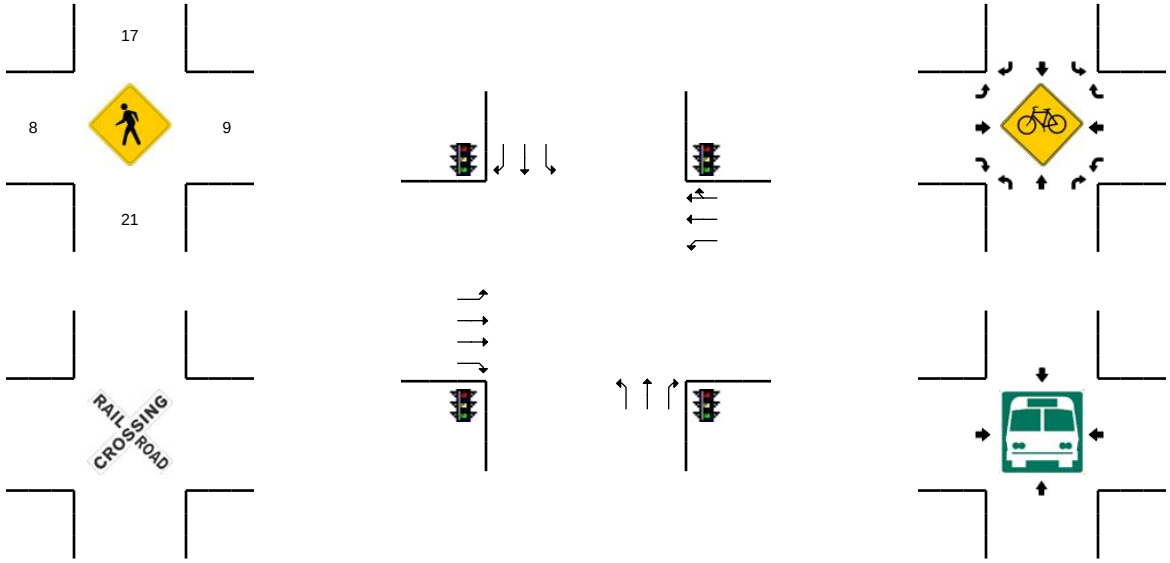
CITY/STATE: Tucson, AZ

DATE: 2/18/2009

Peak-Hour: 4:35 PM -- 5:35 PM
Peak 15-Min: 5:20 PM -- 5:35 PM







5-Min Count Period Beginning At	S Tucson Blvd (Northbound)			S Tucson Blvd (Southbound)			E Broadway Blvd (Eastbound)			E Broadway Blvd (Westbound)			Total	Hourly Totals
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
4:00 PM	5	17	10	9	22	13	4	124	7	8	85	10	314	
4:05 PM	7	27	6	19	37	6	8	109	9	4	84	5	321	
4:10 PM	11	22	8	12	19	7	5	134	3	1	88	8	318	
4:15 PM	8	10	7	11	18	5	7	121	5	3	96	12	303	
4:20 PM	7	27	8	10	33	7	5	93	8	6	85	9	298	
4:25 PM	7	22	10	17	25	11	5	110	5	1	88	7	308	
4:30 PM	7	21	5	13	19	5	4	143	10	2	100	8	337	
4:35 PM	5	21	21	18	31	5	4	112	8	3	98	9	335	
4:40 PM	13	24	4	5	26	13	7	114	3	1	94	12	316	
4:45 PM	5	23	16	12	21	8	3	110	10	7	120	13	348	
4:50 PM	5	34	10	11	32	7	6	108	10	4	85	7	319	
4:55 PM	7	23	10	15	24	5	3	117	10	5	103	8	330	3847
5:00 PM	6	23	9	9	14	12	6	141	11	5	96	6	338	3871
5:05 PM	13	29	13	17	27	9	6	110	9	1	93	12	339	3889
5:10 PM	4	21	6	15	26	8	4	144	7	3	110	10	358	3929
5:15 PM	6	24	6	20	26	8	8	142	4	4	110	8	366	3992
5:20 PM	6	35	9	13	42	11	6	125	7	4	88	9	355	4049
5:25 PM	10	22	9	20	30	9	6	129	15	2	106	7	365	4106
5:30 PM	8	28	10	12	29	12	4	144	4	2	112	10	375	4144
5:35 PM	7	37	6	21	35	8	6	111	4	3	71	8	317	4126
5:40 PM	7	16	7	13	19	6	6	125	7	4	93	13	316	4126
5:45 PM	3	17	4	6	21	4	7	120	5	3	102	13	305	4083
5:50 PM	3	17	9	16	26	8	8	83	4	4	77	5	260	4024
5:55 PM	3	19	6	12	19	10	7	121	8	3	77	5	290	3984

Peak 15-Min Flowrates	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
All Vehicles	96	340	112	180	404	128	64	1592	104	32	1224	104	4380
Heavy Trucks	0	0	4	0	12	0	0	16	0	0	16	0	48
Pedestrians		28			12			0			0		40
Bicycles													
Railroad													
Stopped Buses													

Comments:

Report generated on 3/11/2009 9:40 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

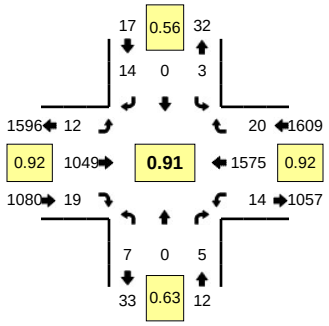
LOCATION: S Treat Ave -- E Broadway Blvd

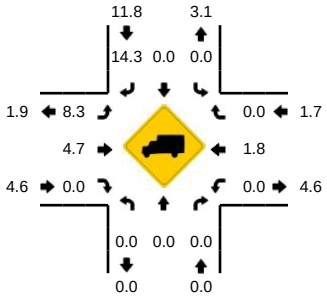
QC JOB #: 10411217

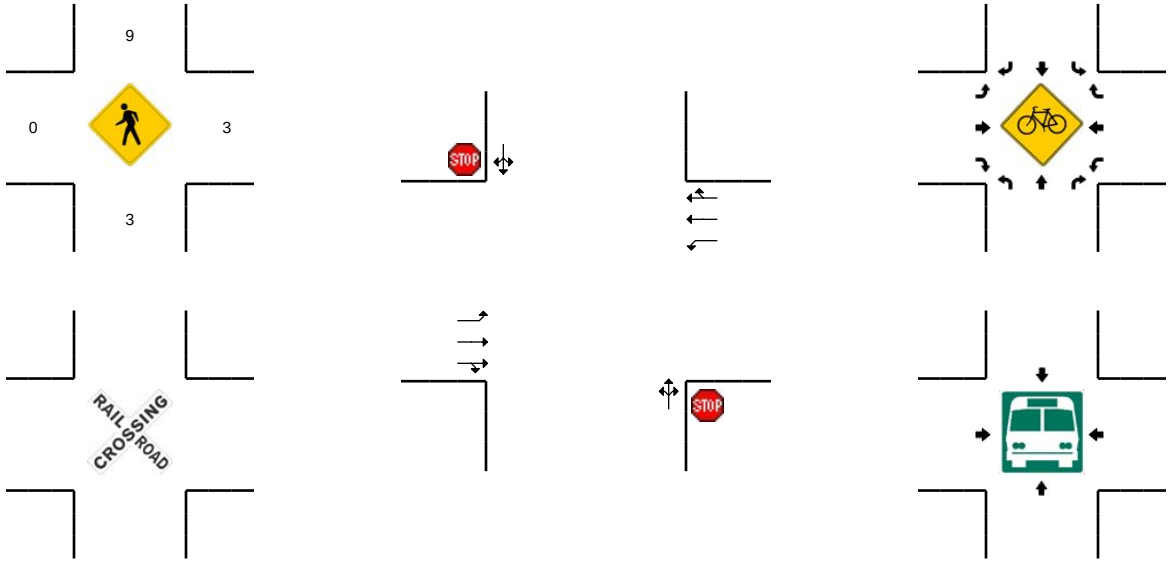
CITY/STATE: Tucson, AZ

DATE: 2/18/2009

Peak-Hour: 7:25 AM -- 8:25 AM
Peak 15-Min: 7:40 AM -- 7:55 AM







5-Min Count Period Beginning At	S Treat Ave (Northbound)			S Treat Ave (Southbound)			E Broadway Blvd (Eastbound)			E Broadway Blvd (Westbound)			Total	Hourly Totals
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
7:00 AM	0	0	1	0	0	0	2	43	0	0	77	1	124	
7:05 AM	0	0	0	0	0	1	2	47	0	1	76	0	127	
7:10 AM	0	0	2	0	0	1	0	60	1	0	79	0	143	
7:15 AM	0	0	0	0	0	1	2	63	1	0	100	1	168	
7:20 AM	0	0	0	2	0	0	1	63	0	0	103	0	169	
7:25 AM	0	0	1	0	0	2	2	74	0	0	132	3	214	
7:30 AM	0	0	0	0	0	3	0	75	1	0	118	1	198	
7:35 AM	1	0	0	0	0	3	0	82	3	0	116	0	205	
7:40 AM	0	0	0	0	0	1	1	92	1	2	174	3	274	
7:45 AM	0	0	0	0	0	1	2	104	2	1	135	1	246	
7:50 AM	1	0	0	1	0	1	1	102	0	0	122	1	229	
7:55 AM	0	0	1	0	0	0	0	89	3	1	143	2	239	2336
8:00 AM	1	0	1	0	0	0	3	85	4	2	128	3	227	2439
8:05 AM	1	0	0	1	0	0	1	80	2	3	127	1	216	2528
8:10 AM	0	0	0	0	0	1	0	88	0	1	125	2	217	2602
8:15 AM	2	0	0	1	0	1	2	81	1	2	124	1	215	2649
8:20 AM	1	0	2	0	0	1	0	97	2	2	131	2	238	2718
8:25 AM	0	0	1	0	0	0	1	79	1	3	97	2	184	2688
8:30 AM	0	0	0	0	0	1	2	100	4	3	100	1	211	2701
8:35 AM	0	0	0	0	0	2	2	90	3	0	112	0	209	2705
8:40 AM	0	0	0	0	1	0	0	77	1	11	121	0	211	2642
8:45 AM	0	0	0	0	0	0	0	102	3	2	115	1	223	2619
8:50 AM	0	0	4	0	0	0	1	86	0	6	86	0	183	2573
8:55 AM	0	0	2	0	1	0	0	92	2	7	130	1	235	2569

Peak 15-Min Flowrates	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
All Vehicles	4	0	0	4	0	12	16	1192	12	12	1724	20	2996
Heavy Trucks	0	0	0	0	0	4	4	28	0	0	24	0	60
Pedestrians		0			8			0			4		12
Bicycles													
Railroad													
Stopped Buses													

Comments:

Report generated on 3/11/2009 9:40 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

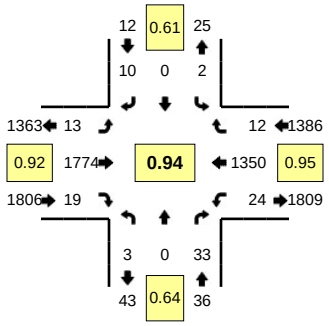
LOCATION: S Treat Ave -- E Broadway Blvd

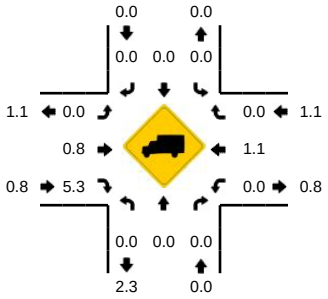
QC JOB #: 10411218

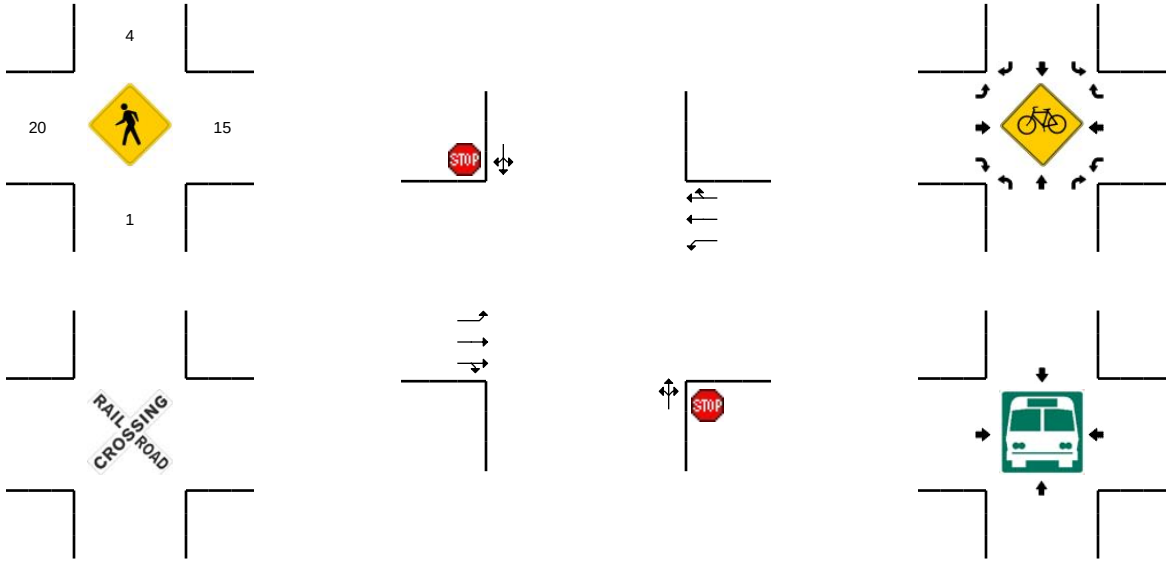
CITY/STATE: Tucson, AZ

DATE: 2/18/2009

Peak-Hour: 4:35 PM -- 5:35 PM
Peak 15-Min: 5:20 PM -- 5:35 PM







5-Min Count Period Beginning At	S Treat Ave (Northbound)			S Treat Ave (Southbound)			E Broadway Blvd (Eastbound)			E Broadway Blvd (Westbound)			Total	Hourly Totals
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
4:00 PM	0	0	1	0	0	0	3	142	3	0	93	1	243	
4:05 PM	0	0	4	0	0	0	2	142	1	3	98	2	252	
4:10 PM	0	0	1	0	0	0	0	141	1	0	115	1	259	
4:15 PM	0	0	1	0	0	1	1	141	1	0	105	0	250	
4:20 PM	0	0	2	0	0	1	2	125	0	0	109	3	242	
4:25 PM	0	0	0	0	0	2	2	120	0	1	92	0	217	
4:30 PM	1	0	0	1	0	0	1	155	1	0	108	1	268	
4:35 PM	1	0	3	0	0	0	1	163	0	2	98	2	270	
4:40 PM	1	0	0	0	0	2	1	117	0	1	110	0	232	
4:45 PM	0	0	2	0	0	0	2	124	1	2	126	1	258	
4:50 PM	0	0	1	0	0	1	2	152	1	3	97	0	257	
4:55 PM	0	0	1	0	0	0	0	128	1	3	130	2	265	3013
5:00 PM	1	0	5	0	0	2	0	148	2	0	84	1	243	3013
5:05 PM	0	0	6	1	0	2	2	154	0	0	111	0	276	3037
5:10 PM	0	0	2	0	0	0	0	152	1	2	143	2	302	3080
5:15 PM	0	0	5	0	0	0	1	160	2	1	105	1	275	3105
5:20 PM	0	0	2	0	0	1	2	159	6	3	109	0	282	3145
5:25 PM	0	0	3	1	0	2	1	148	4	5	117	1	282	3210
5:30 PM	0	0	3	0	0	0	1	169	1	2	120	2	298	3240
5:35 PM	0	0	1	0	0	2	1	144	1	2	84	2	237	3207
5:40 PM	0	0	0	0	0	3	1	128	1	2	121	2	258	3233
5:45 PM	1	0	0	0	0	2	0	140	1	1	90	4	239	3214
5:50 PM	0	0	0	0	0	0	3	112	1	2	87	1	206	3163
5:55 PM	0	0	1	0	0	1	4	122	2	3	96	4	233	3131

Peak 15-Min Flowrates	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
All Vehicles	0	0	32	4	0	12	16	1904	44	40	1384	12	3448
Heavy Trucks	0	0	0	0	0	0	0	16	4	0	4	0	24
Pedestrians		0			4			32			12		48
Bicycles													
Railroad													
Stopped Buses													

Comments:

Report generated on 3/11/2009 9:40 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

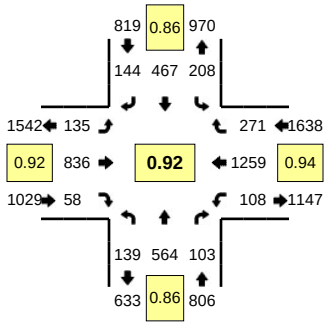
LOCATION: N Country Club Rd -- E Broadway Blvd

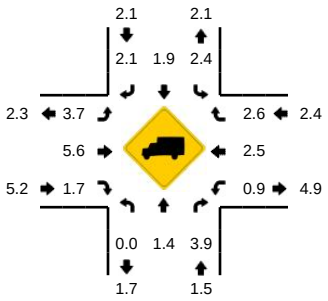
QC JOB #: 10411219

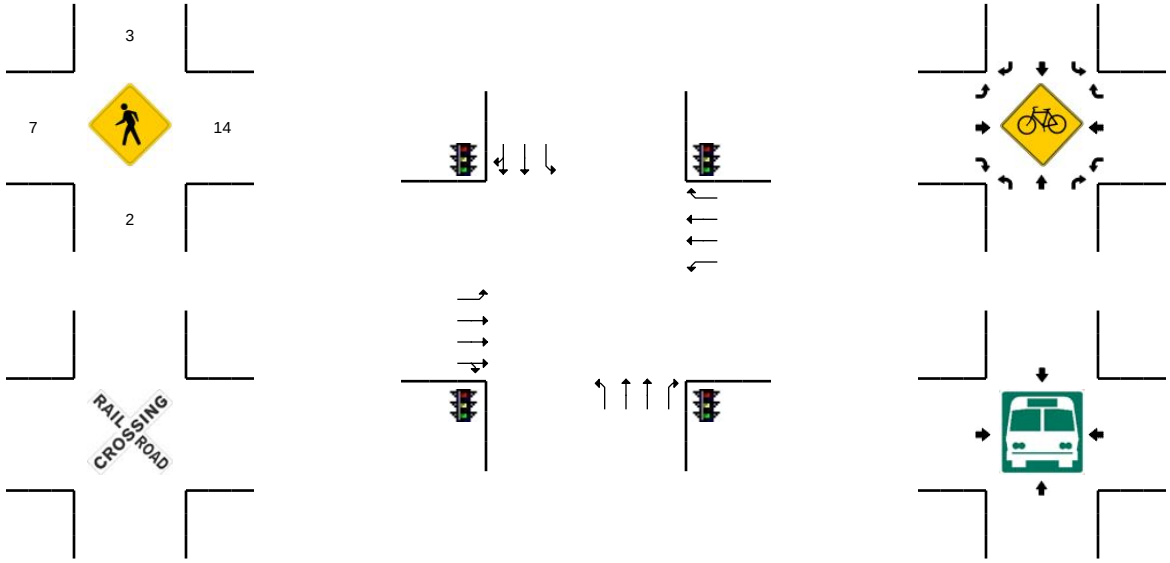
CITY/STATE: Tucson, AZ

DATE: 2/18/2009

Peak-Hour: 7:40 AM -- 8:40 AM
Peak 15-Min: 7:45 AM -- 8:00 AM







5-Min Count Period Beginning At	N Country Club Rd (Northbound)			N Country Club Rd (Southbound)			E Broadway Blvd (Eastbound)			E Broadway Blvd (Westbound)			Total	Hourly Totals
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
7:00 AM	4	30	6	6	26	12	4	35	2	6	55	7	193	
7:05 AM	3	21	5	3	27	5	5	46	5	3	70	8	201	
7:10 AM	0	30	1	7	26	6	2	55	0	6	70	14	217	
7:15 AM	9	49	6	11	37	11	10	37	2	7	85	8	272	
7:20 AM	8	44	8	14	38	13	7	75	1	3	105	11	327	
7:25 AM	9	38	3	12	44	7	6	62	3	2	98	10	294	
7:30 AM	12	41	8	16	41	9	8	51	0	7	98	27	318	
7:35 AM	12	34	6	17	28	13	10	68	7	6	112	25	338	
7:40 AM	17	43	7	13	38	9	18	68	6	9	127	23	378	
7:45 AM	17	63	9	12	60	17	9	71	5	9	105	26	403	
7:50 AM	13	56	9	14	37	8	15	85	2	15	113	17	384	
7:55 AM	8	54	6	17	42	12	20	65	3	12	112	28	379	3704
8:00 AM	16	57	13	20	60	15	4	59	6	8	98	17	373	3884
8:05 AM	9	30	10	19	37	18	7	70	4	6	118	20	348	4031
8:10 AM	12	31	5	24	41	11	10	71	9	13	103	23	353	4167
8:15 AM	6	40	16	23	29	14	13	64	4	6	92	32	339	4234
8:20 AM	11	43	8	11	32	8	7	73	3	8	106	26	336	4243
8:25 AM	11	52	8	17	28	10	14	66	4	13	88	18	329	4278
8:30 AM	9	61	2	23	44	11	9	62	4	5	75	20	325	4285
8:35 AM	10	34	10	15	19	11	9	82	8	4	122	21	345	4292
8:40 AM	11	41	9	12	29	12	11	54	3	8	92	19	301	4215
8:45 AM	8	40	7	10	46	15	17	75	4	11	84	21	338	4150
8:50 AM	10	29	8	30	33	9	11	61	6	6	72	20	295	4061
8:55 AM	10	38	6	12	35	13	13	74	3	9	114	14	341	4023

Peak 15-Min Flowrates	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
All Vehicles	152	692	96	172	556	148	176	884	40	144	1320	284	4664
Heavy Trucks	0	0	8	0	4	4	8	48	0	0	28	4	104
Pedestrians		0			4			0			28		32
Bicycles													
Railroad													
Stopped Buses													

Comments:

Report generated on 3/11/2009 9:40 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

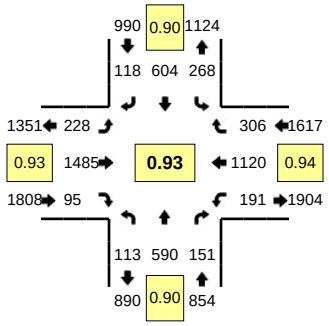
LOCATION: N Country Club Rd -- E Broadway Blvd

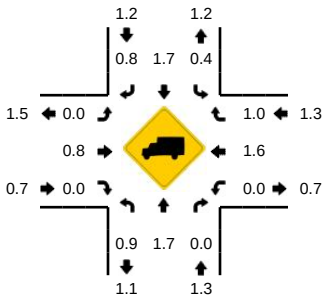
QC JOB #: 10411220

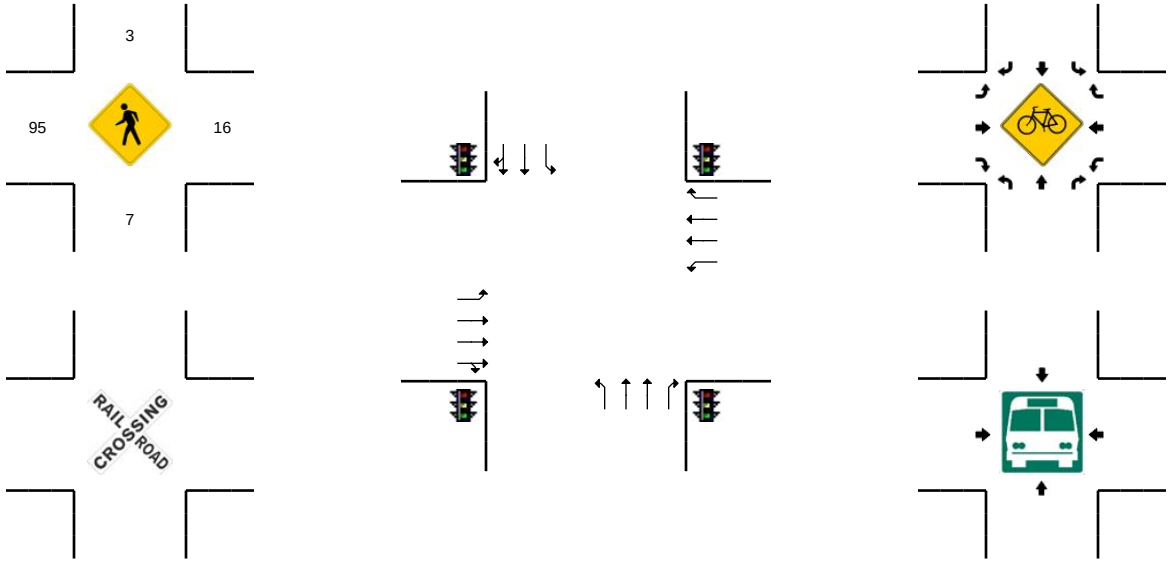
CITY/STATE: Tucson, AZ

DATE: 2/18/2009

Peak-Hour: 4:35 PM -- 5:35 PM
Peak 15-Min: 5:10 PM -- 5:25 PM







5-Min Count Period Beginning At	N Country Club Rd (Northbound)			N Country Club Rd (Southbound)			E Broadway Blvd (Eastbound)			E Broadway Blvd (Westbound)			Total	Hourly Totals
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
4:00 PM	13	44	20	16	50	13	9	103	5	4	64	23	364	
4:05 PM	8	38	12	23	41	9	17	116	12	8	99	30	413	
4:10 PM	5	30	11	28	46	10	22	126	9	15	90	23	415	
4:15 PM	7	51	12	32	63	11	15	111	3	10	83	29	427	
4:20 PM	5	35	12	28	51	9	9	109	8	13	104	22	405	
4:25 PM	10	43	11	18	40	3	12	116	6	19	64	29	371	
4:30 PM	10	53	8	25	56	12	17	123	9	12	89	20	434	
4:35 PM	6	34	18	23	43	9	17	135	5	12	100	40	442	
4:40 PM	8	46	6	21	47	13	25	108	5	19	76	27	401	
4:45 PM	11	61	20	27	62	10	15	91	5	14	99	20	435	
4:50 PM	12	49	12	27	37	13	20	127	3	12	91	18	421	
4:55 PM	12	46	7	16	41	13	25	106	10	20	97	22	415	4943
5:00 PM	7	67	11	23	62	7	10	111	14	12	74	27	425	5004
5:05 PM	5	50	2	22	45	8	18	139	15	13	108	30	455	5046
5:10 PM	7	48	20	16	51	5	23	142	6	20	113	27	478	5109
5:15 PM	13	63	19	24	65	9	20	121	8	13	72	28	455	5137
5:20 PM	10	43	17	27	41	12	14	148	9	18	107	32	478	5210
5:25 PM	4	36	7	19	52	7	22	133	7	23	93	17	420	5259
5:30 PM	18	47	12	23	58	12	19	124	8	15	90	18	444	5269
5:35 PM	6	36	9	27	42	3	19	128	14	14	88	23	409	5236
5:40 PM	11	39	13	20	44	10	17	124	7	19	94	16	414	5249
5:45 PM	8	49	12	27	58	16	11	93	10	12	69	20	385	5199
5:50 PM	6	41	8	19	36	7	13	106	6	12	83	27	364	5142
5:55 PM	7	30	4	25	30	8	11	98	6	14	83	28	344	5071

Peak 15-Min Flowrates	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
All Vehicles	120	616	224	268	628	104	228	1644	92	204	1168	348	5644
Heavy Trucks	4	0	0	0	16	0	0	20	0	0	16	0	56
Pedestrians		4			0			92			4		100
Bicycles													
Railroad													
Stopped Buses													

Comments:

Report generated on 3/11/2009 9:40 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

LOCATION: E Broadway between Campbell Ave and Tucson Blvd
SPECIFIC LOCATION: 500 ft from Campbell Ave
CITY/STATE: Tucson, AZ

QC JOB #: 10411221
DIRECTION: EB
DATE: Feb 16 2009

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Not Classified	Total
12:00 AM															
1:00 AM															
2:00 AM															
3:00 AM															
4:00 AM															
5:00 AM															
6:00 AM															
7:00 AM															
8:00 AM															
9:00 AM															
10:00 AM															
11:00 AM															
12:00 PM															
1:00 PM															
2:00 PM															
3:00 PM															
4:00 PM															
5:00 PM															
6:00 PM															
7:00 PM															
8:00 PM															
9:00 PM															
10:00 PM	**4**	**194**	**44**	**2**	**3**	0	0	0	0	0	0	0	0	**10**	**257**
11:00 PM	0	114	19	2	0	0	0	0	0	0	0	0	0	1	136
Day Total	4	308	63	4	3	0	0	0	0	0	0	0	0	11	393
Percent	1.0%	78.4%	16.0%	1.0%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.8%	
AM Peak Volume															
PM Peak Volume	10:00 PM 4	10:00 PM 194	10:00 PM 44	10:00 PM 2	10:00 PM 3									10:00 PM 10	10:00 PM 257

Comments:

LOCATION: E Broadway between Campbell Ave and Tucson Blvd
SPECIFIC LOCATION: 500 ft from Campbell Ave
CITY/STATE: Tucson, AZ

QC JOB #: 10411221
DIRECTION: EB
DATE: Feb 17 2009

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Not Classified	Total
12:00 AM	0	77	13	0	1	0	0	0	0	0	0	0	0	0	91
1:00 AM	1	41	4	0	0	0	0	0	0	0	0	0	0	0	46
2:00 AM	0	35	5	0	0	0	0	0	0	0	0	0	0	0	40
3:00 AM	0	25	6	0	2	0	0	0	0	0	0	0	0	0	33
4:00 AM	1	27	11	1	2	0	0	4	0	0	0	0	0	6	52
5:00 AM	2	74	24	5	9	3	0	2	1	0	0	0	0	1	121
6:00 AM	3	194	74	5	10	3	0	9	**3**	0	1	0	0	9	311
7:00 AM	9	560	153	**13**	29	7	0	19	3	**2**	1	1	0	36	833
8:00 AM	13	662	215	12	31	8	0	**26**	1	2	0	1	1	63	1035
9:00 AM	8	556	215	8	**41**	13	0	24	1	0	1	**2**	**2**	48	919
10:00 AM	11	645	**229**	6	40	15	**3**	23	0	2	**2**	0	0	69	1045
11:00 AM	**16**	**814**	228	7	36	**22**	0	26	1	1	0	0	1	**91**	**1243**
12:00 PM	23	817	217	11	25	19	**3**	21	**4**	4	0	**2**	0	85	1231
1:00 PM	13	849	**236**	6	28	19	2	26	0	**6**	0	0	0	70	1255
2:00 PM	15	904	223	6	**38**	25	0	32	2	4	0	1	**1**	92	1343
3:00 PM	**39**	924	180	**12**	17	**35**	1	**38**	1	4	0	0	1	**146**	1398
4:00 PM	23	967	186	11	26	23	1	23	0	1	0	0	0	136	1397
5:00 PM	32	**988**	171	6	24	31	1	18	0	5	1	0	0	146	**1423**
6:00 PM	18	882	147	6	8	16	2	21	1	2	**3**	0	0	72	1178
7:00 PM	9	590	97	3	6	5	1	8	0	1	0	0	1	25	746
8:00 PM	8	497	98	3	9	3	0	5	0	0	1	1	0	21	646
9:00 PM	3	388	59	2	2	4	0	6	1	1	0	0	1	10	477
10:00 PM	2	229	46	2	8	1	0	1	0	0	0	0	0	3	292
11:00 PM	2	156	22	2	1	0	0	0	0	0	0	0	0	1	184
Day Total	251	11901	2859	127	393	252	14	332	19	35	10	8	8	1130	17339
Percent	1.4%	68.6%	16.5%	0.7%	2.3%	1.5%	0.1%	1.9%	0.1%	0.2%	0.1%	0.0%	0.0%	6.5%	
AM Peak Volume	11:00 AM 16	11:00 AM 814	10:00 AM 229	7:00 AM 13	9:00 AM 41	11:00 AM 22	10:00 AM 3	8:00 AM 26	6:00 AM 3	7:00 AM 2	10:00 AM 2	9:00 AM 2	9:00 AM 2	11:00 AM 91	11:00 AM 1243
PM Peak Volume	3:00 PM 39	5:00 PM 988	1:00 PM 236	3:00 PM 12	2:00 PM 38	3:00 PM 35	12:00 PM 3	3:00 PM 38	12:00 PM 4	1:00 PM 6	6:00 PM 3	12:00 PM 2	2:00 PM 1	3:00 PM 146	5:00 PM 1423

Comments:

LOCATION: E Broadway between Campbell Ave and Tucson Blvd
SPECIFIC LOCATION: 500 ft from Campbell Ave
CITY/STATE: Tucson, AZ

QC JOB #: 10411221
DIRECTION: EB
DATE: Feb 18 2009

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Not Classified	Total
12:00 AM	0	92	10	1	0	0	0	0	0	0	0	0	0	1	104
1:00 AM	0	50	15	0	1	0	0	0	0	0	0	0	0	0	66
2:00 AM	0	28	8	0	1	0	0	0	2	0	0	0	0	0	39
3:00 AM	0	24	7	0	1	0	0	0	0	0	0	0	0	2	34
4:00 AM	0	29	9	0	4	0	0	3	2	0	0	0	0	0	47
5:00 AM	1	80	33	7	5	0	0	0	1	0	0	0	0	2	129
6:00 AM	2	205	72	8	19	5	0	14	0	0	0	0	0	3	328
7:00 AM	15	551	165	9	39	14	1	**30**	1	3	1	0	0	45	874
8:00 AM	**25**	**634**	188	**18**	29	**16**	**2**	22	**3**	**8**	0	**2**	**1**	61	**1009**
9:00 AM	8	569	**191**	9	**46**	15	2	30	2	0	0	0	0	49	921
10:00 AM	14	631	178	10	37	15	1	24	2	2	**2**	0	1	**69**	986
11:00 AM															
12:00 PM															
1:00 PM															
2:00 PM															
3:00 PM															
4:00 PM															
5:00 PM															
6:00 PM															
7:00 PM															
8:00 PM															
9:00 PM															
10:00 PM															
11:00 PM															
Day Total	65	2893	876	62	182	65	6	123	13	13	3	2	2	232	4537
Percent	1.4%	63.8%	19.3%	1.4%	4.0%	1.4%	0.1%	2.7%	0.3%	0.3%	0.1%	0.0%	0.0%	5.1%	
AM Peak Volume	8:00 AM 25	8:00 AM 634	9:00 AM 191	8:00 AM 18	9:00 AM 46	8:00 AM 16	8:00 AM 2	7:00 AM 30	8:00 AM 3	8:00 AM 8	10:00 AM 2	8:00 AM 2	8:00 AM 1	10:00 AM 69	8:00 AM 1009
PM Peak Volume															

Comments:

SUMMARY - Tube Count - Vehicle Classification Data

LOCATION: E Broadway between Campbell Ave and Tucson Blvd
SPECIFIC LOCATION: 500 ft from Campbell Ave
CITY/STATE: Tucson, AZ

QC JOB #: 10411221
DIRECTION: EB
DATE: Feb 16 2009 - Feb 18 2009

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Not Classified	Total
Grand Total	320	15102	3798	193	578	317	20	455	32	48	13	10	10	1373	22269
Percent	1.4%	67.8%	17.1%	0.9%	2.6%	1.4%	0.1%	2.0%	0.1%	0.2%	0.1%	0.0%	0.0%	6.2%	

Comments:

Report generated on 3/12/2009 9:26 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: E Broadway between Campbell Ave and Tucson Blvd
SPECIFIC LOCATION: 500 ft from Campbell Ave
CITY/STATE: Tucson, AZ

QC JOB #: 10411221
DIRECTION: EB
DATE: Feb 16 2009 - Feb 18 2009

Start Time	Mon 16-Feb-09	Tue 17-Feb-09	Wed 18-Feb-09	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		91	104			97			97	
1:00 AM		46	66			56			56	
2:00 AM		40	39			39			39	
3:00 AM		33	34			33			33	
4:00 AM		52	47			49			49	
5:00 AM		121	129			125			125	
6:00 AM		311	328			319			319	
7:00 AM		833	874			853			853	
8:00 AM		1035	**1009**			1022			1022	
9:00 AM		919	921			920			920	
10:00 AM		1045	986			1015			1015	
11:00 AM		**1243**				**1243**			**1243**	
12:00 PM		1231				1231			1231	
1:00 PM		1255				1255			1255	
2:00 PM		1343				1343			1343	
3:00 PM		1398				1398			1398	
4:00 PM		1397				1397			1397	
5:00 PM		**1423**				**1423**			**1423**	
6:00 PM		1178				1178			1178	
7:00 PM		746				746			746	
8:00 PM		646				646			646	
9:00 PM		477				477			477	
10:00 PM	**257**	292				274			274	
11:00 PM	136	184				160			160	
Day Total	393	17339	4537			17299			17299	
% Weekday Average	2.3%	100.2%	26.2%							
% Week Average	2.3%	100.2%	26.2%			100.0%				
AM Peak Volume		11:00 AM 1243	8:00 AM 1009			11:00 AM 1243			11:00 AM 1243	
PM Peak Volume	10:00 PM 257	5:00 PM 1423				5:00 PM 1423			5:00 PM 1423	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: E Broadway between Campbell Ave and Tucson Blvd
SPECIFIC LOCATION: 500 ft from Campbell Ave
CITY/STATE: Tucson, AZ

QC JOB #: 10411221
DIRECTION: WB
DATE: Feb 16 2009

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Not Classified	Total
12:00 AM															
1:00 AM															
2:00 AM															
3:00 AM															
4:00 AM															
5:00 AM															
6:00 AM															
7:00 AM															
8:00 AM															
9:00 AM															
10:00 AM															
11:00 AM															
12:00 PM															
1:00 PM															
2:00 PM															
3:00 PM															
4:00 PM															
5:00 PM															
6:00 PM															
7:00 PM															
8:00 PM															
9:00 PM															
10:00 PM	**2**	**252**	**40**	**2**	**3**	0	**1**	**2**	0	0	0	0	0	**18**	**320**
11:00 PM	0	172	33	2	0	**1**	0	1	0	0	0	0	0	2	211
Day Total	2	424	73	4	3	1	1	3	0	0	0	0	0	20	531
Percent	0.4%	79.8%	13.7%	0.8%	0.6%	0.2%	0.2%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	3.8%	
AM Peak Volume															
PM Peak Volume	10:00 PM 2	10:00 PM 252	10:00 PM 40	10:00 PM 2	10:00 PM 3	11:00 PM 1	10:00 PM 1	10:00 PM 2						10:00 PM 18	10:00 PM 320

Comments:

LOCATION: E Broadway between Campbell Ave and Tucson Blvd
SPECIFIC LOCATION: 500 ft from Campbell Ave
CITY/STATE: Tucson, AZ

QC JOB #: 10411221
DIRECTION: WB
DATE: Feb 17 2009

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Not Classified	Total
12:00 AM	0	74	11	1	2	0	0	1	0	0	0	0	0	1	90
1:00 AM	0	35	12	0	2	0	0	1	0	0	0	0	0	0	50
2:00 AM	1	17	6	0	1	0	0	1	0	0	0	0	0	0	26
3:00 AM	0	28	8	0	0	0	0	1	0	0	0	0	0	0	37
4:00 AM	0	33	24	2	1	0	0	0	0	0	0	0	0	2	62
5:00 AM	0	128	51	4	7	1	0	6	0	0	0	0	0	4	201
6:00 AM	6	378	122	6	29	3	0	13	0	2	1	0	1	22	583
7:00 AM	**18**	885	170	13	28	9	**4**	29	0	**6**	2	0	**4**	65	1233
8:00 AM	10	**904**	167	**16**	26	**14**	1	**31**	1	6	**4**	**1**	2	**79**	**1262**
9:00 AM	7	744	165	11	20	9	0	26	**3**	1	2	1	1	41	1031
10:00 AM	8	668	**201**	6	**44**	4	0	21	1	2	1	0	0	43	999
11:00 AM	6	741	193	8	29	7	1	22	2	2	4	1	0	39	1055
12:00 PM	6	803	**193**	7	19	10	**1**	**32**	0	3	4	0	1	64	1143
1:00 PM	**15**	804	173	12	21	14	1	23	0	**7**	3	**1**	1	67	1142
2:00 PM	7	812	193	9	**33**	11	0	29	1	7	4	0	1	65	1172
3:00 PM	13	837	184	14	28	**18**	1	22	**4**	3	2	0	2	**85**	1213
4:00 PM	8	**937**	149	**16**	21	16	0	23	1	1	1	0	1	75	**1249**
5:00 PM	9	898	157	2	12	16	1	30	0	4	**5**	0	**3**	63	1200
6:00 PM	3	774	121	5	6	8	0	15	0	0	0	0	2	40	974
7:00 PM	3	577	114	2	5	4	0	10	0	1	1	1	0	23	741
8:00 PM	5	518	94	3	12	2	0	5	0	0	0	0	0	17	656
9:00 PM	6	496	61	2	5	2	1	1	0	0	0	0	0	14	588
10:00 PM	3	257	37	2	2	2	0	1	0	0	0	0	0	8	312
11:00 PM	1	161	31	1	1	0	0	0	0	0	0	0	0	2	197
Day Total	135	12509	2637	142	354	150	11	343	13	45	34	5	19	819	17216
Percent	0.8%	72.7%	15.3%	0.8%	2.1%	0.9%	0.1%	2.0%	0.1%	0.3%	0.2%	0.0%	0.1%	4.8%	
AM Peak	7:00 AM	8:00 AM	10:00 AM	8:00 AM	10:00 AM	8:00 AM	7:00 AM	8:00 AM	9:00 AM	7:00 AM	8:00 AM	8:00 AM	7:00 AM	8:00 AM	8:00 AM
Volume	18	904	201	16	44	14	4	31	3	6	4	1	4	79	1262
PM Peak	1:00 PM	4:00 PM	12:00 PM	4:00 PM	2:00 PM	3:00 PM	12:00 PM	12:00 PM	3:00 PM	1:00 PM	5:00 PM	1:00 PM	5:00 PM	3:00 PM	4:00 PM
Volume	15	937	193	16	33	18	1	32	4	7	5	1	3	85	1249

Comments:

LOCATION: E Broadway between Campbell Ave and Tucson Blvd
SPECIFIC LOCATION: 500 ft from Campbell Ave
CITY/STATE: Tucson, AZ

QC JOB #: 10411221
DIRECTION: WB
DATE: Feb 18 2009

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Not Classified	Total
12:00 AM	0	96	15	1	2	0	0	0	0	0	0	0	0	1	115
1:00 AM	0	49	19	0	1	0	0	0	0	0	0	0	0	0	69
2:00 AM	0	26	4	0	0	0	0	0	0	0	0	0	0	0	30
3:00 AM	1	35	10	0	1	0	0	3	0	0	0	0	0	0	50
4:00 AM	0	46	18	1	2	1	0	0	0	0	0	0	0	2	70
5:00 AM	2	148	53	3	11	0	0	4	0	0	0	0	0	6	227
6:00 AM	2	388	139	7	24	4	0	11	0	1	2	0	0	22	600
7:00 AM	**10**	891	156	**14**	22	7	0	**27**	**2**	**5**	**5**	**2**	1	**72**	1214
8:00 AM	7	**931**	**175**	13	**39**	**19**	0	26	2	3	4	1	0	69	**1289**
9:00 AM	9	645	172	9	28	15	**1**	21	0	4	0	0	**2**	51	957
10:00 AM	0	638	170	6	35	10	0	20	1	1	2	0	0	49	932
11:00 AM															
12:00 PM															
1:00 PM															
2:00 PM															
3:00 PM															
4:00 PM															
5:00 PM															
6:00 PM															
7:00 PM															
8:00 PM															
9:00 PM															
10:00 PM															
11:00 PM															
Day Total	31	3893	931	54	165	56	1	112	5	14	13	3	3	272	5553
Percent	0.6%	70.1%	16.8%	1.0%	3.0%	1.0%	0.0%	2.0%	0.1%	0.3%	0.2%	0.1%	0.1%	4.9%	
AM Peak Volume	7:00 AM 10	8:00 AM 931	8:00 AM 175	7:00 AM 14	8:00 AM 39	8:00 AM 19	9:00 AM 1	7:00 AM 27	7:00 AM 2	7:00 AM 5	7:00 AM 5	7:00 AM 2	9:00 AM 2	7:00 AM 72	8:00 AM 1289
PM Peak Volume															

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

SUMMARY - Tube Count - Vehicle Classification Data

LOCATION: E Broadway between Campbell Ave and Tucson Blvd
SPECIFIC LOCATION: 500 ft from Campbell Ave
CITY/STATE: Tucson, AZ

QC JOB #: 10411221
DIRECTION: WB
DATE: Feb 16 2009 - Feb 18 2009

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Not Classified	Total
Grand Total	168	16826	3641	200	522	207	13	458	18	59	47	8	22	1111	23300
Percent	0.7%	72.2%	15.6%	0.9%	2.2%	0.9%	0.1%	2.0%	0.1%	0.3%	0.2%	0.0%	0.1%	4.8%	

Comments:

Report generated on 3/12/2009 9:26 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: E Broadway between Campbell Ave and Tucson Blvd
SPECIFIC LOCATION: 500 ft from Campbell Ave
CITY/STATE: Tucson, AZ

QC JOB #: 10411221
DIRECTION: WB
DATE: Feb 16 2009 - Feb 18 2009

Start Time	Mon 16-Feb-09	Tue 17-Feb-09	Wed 18-Feb-09	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		90	115			102			102	
1:00 AM		50	69			59			59	
2:00 AM		26	30			28			28	
3:00 AM		37	50			43			43	
4:00 AM		62	70			66			66	
5:00 AM		201	227			214			214	
6:00 AM		583	600			591			591	
7:00 AM		1233	1214			1223			1223	
8:00 AM		**1262**	**1289**			**1275**			**1275**	
9:00 AM		1031	957			994			994	
10:00 AM		999	932			965			965	
11:00 AM		1055				1055			1055	
12:00 PM		1143				1143			1143	
1:00 PM		1142				1142			1142	
2:00 PM		1172				1172			1172	
3:00 PM		1213				1213			1213	
4:00 PM		**1249**				**1249**			**1249**	
5:00 PM		1200				1200			1200	
6:00 PM		974				974			974	
7:00 PM		741				741			741	
8:00 PM		656				656			656	
9:00 PM		588				588			588	
10:00 PM	**320**	312				316			316	
11:00 PM	211	197				204			204	
Day Total	531	17216	5553			17213			17213	
% Weekday Average	3.1%	100.0%	32.3%							
% Week Average	3.1%	100.0%	32.3%			100.0%				
AM Peak Volume		8:00 AM 1262	8:00 AM 1289			8:00 AM 1275			8:00 AM 1275	
PM Peak Volume	10:00 PM 320	4:00 PM 1249				4:00 PM 1249			4:00 PM 1249	

Comments:

LOCATION: N Tyndell Ave just north of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411222
DIRECTION: NB
DATE: Feb 18 2009 - Feb 19 2009

Start Time	Mon	Tue	Wed 18-Feb-09	Thu 19-Feb-09	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				3		3			3	
1:00 AM				0		0			0	
2:00 AM				0		0			0	
3:00 AM				1		1			1	
4:00 AM				1		1			1	
5:00 AM				0		0			0	
6:00 AM				11		11			11	
7:00 AM				**87**		**87**			**87**	
8:00 AM				28		28			28	
9:00 AM				16		16			16	
10:00 AM				6		6			6	
11:00 AM				17		17			17	
12:00 PM				14		14			14	
1:00 PM				14		14			14	
2:00 PM				21		21			21	
3:00 PM				**28**		**28**			**28**	
4:00 PM				14		14			14	
5:00 PM			12	22		17			17	
6:00 PM			12	10		11			11	
7:00 PM			**14**	15		14			14	
8:00 PM			9			9			9	
9:00 PM			10			10			10	
10:00 PM			4			4			4	
11:00 PM			5			5			5	
Day Total			66	308		331			331	
% Weekday Average			19.9%	93.1%						
% Week Average			19.9%	93.1%		100.0%				
AM Peak Volume				7:00 AM 87		7:00 AM 87			7:00 AM 87	
PM Peak Volume			7:00 PM 14	3:00 PM 28		3:00 PM 28			3:00 PM 28	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: N Tyndell Ave just north of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411222
DIRECTION: SB
DATE: Feb 18 2009 - Feb 19 2009

Start Time	Mon	Tue	Wed 18-Feb-09	Thu 19-Feb-09	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				2		2			2	
1:00 AM				1		1			1	
2:00 AM				0		0			0	
3:00 AM				0		0			0	
4:00 AM				3		3			3	
5:00 AM				2		2			2	
6:00 AM				5		5			5	
7:00 AM				**38**		**38**			**38**	
8:00 AM				13		13			13	
9:00 AM				3		3			3	
10:00 AM				8		8			8	
11:00 AM				6		6			6	
12:00 PM				10		10			10	
1:00 PM				15		15			15	
2:00 PM				12		12			12	
3:00 PM				**35**		**35**			**35**	
4:00 PM				16		16			16	
5:00 PM			**15**	17		16			16	
6:00 PM			11	12		11			11	
7:00 PM			5	13		9			9	
8:00 PM			7			7			7	
9:00 PM			7			7			7	
10:00 PM			3			3			3	
11:00 PM			3			3			3	
Day Total			51	211		225			225	
% Weekday Average			22.7%	93.8%						
% Week Average			22.7%	93.8%		100.0%				
AM Peak Volume				7:00 AM 38		7:00 AM 38			7:00 AM 38	
PM Peak Volume			5:00 PM 15	3:00 PM 35		3:00 PM 35			3:00 PM 35	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: S Tyndell Ave just south of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411223
DIRECTION: NB
DATE: Feb 18 2009 - Feb 19 2009

Start Time	Mon	Tue	Wed 18-Feb-09	Thu 19-Feb-09	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				1		1			1	
1:00 AM				0		0			0	
2:00 AM				0		0			0	
3:00 AM				0		0			0	
4:00 AM				1		1			1	
5:00 AM				0		0			0	
6:00 AM				1		1			1	
7:00 AM				22		22			22	
8:00 AM				20		20			20	
9:00 AM				22		22			22	
10:00 AM				**38**		**38**			**38**	
11:00 AM				33		33			33	
12:00 PM				**57**		**57**			**57**	
1:00 PM				36		36			36	
2:00 PM				20		20			20	
3:00 PM				25		25			25	
4:00 PM			**32**	29		30			30	
5:00 PM			23	28		25			25	
6:00 PM			15	20		17			17	
7:00 PM			8			8			8	
8:00 PM			6			6			6	
9:00 PM			3			3			3	
10:00 PM			1			1			1	
11:00 PM			1			1			1	
Day Total			89	353		367			367	
% Weekday Average			24.3%	96.2%						
% Week Average			24.3%	96.2%		100.0%				
AM Peak Volume				10:00 AM 38		10:00 AM 38			10:00 AM 38	
PM Peak Volume			4:00 PM 32	12:00 PM 57		12:00 PM 57			12:00 PM 57	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: S Tyndell Ave just south of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411223
DIRECTION: SB
DATE: Feb 18 2009 - Feb 19 2009

Start Time	Mon	Tue	Wed 18-Feb-09	Thu 19-Feb-09	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				4		4			4	
1:00 AM				1		1			1	
2:00 AM				2		2			2	
3:00 AM				0		0			0	
4:00 AM				3		3			3	
5:00 AM				1		1			1	
6:00 AM				8		8			8	
7:00 AM				20		20			20	
8:00 AM				**41**		**41**			**41**	
9:00 AM				22		22			22	
10:00 AM				30		30			30	
11:00 AM				32		32			32	
12:00 PM				**65**		**65**			**65**	
1:00 PM				44		44			44	
2:00 PM				35		35			35	
3:00 PM				29		29			29	
4:00 PM			**29**	32		30			30	
5:00 PM			25	24		24			24	
6:00 PM			12	17		14			14	
7:00 PM			25			25			25	
8:00 PM			18			18			18	
9:00 PM			5			5			5	
10:00 PM			5			5			5	
11:00 PM			3			3			3	
Day Total			122	410		461			461	
% Weekday Average			26.5%	88.9%						
% Week Average			26.5%	88.9%		100.0%				
AM Peak Volume				8:00 AM 41		8:00 AM 41			8:00 AM 41	
PM Peak Volume			4:00 PM 29	12:00 PM 65		12:00 PM 65			12:00 PM 65	

Comments:

LOCATION: N Freemont Ave just north of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411224
DIRECTION: NB
DATE: Feb 18 2009 - Feb 19 2009

Start Time	Mon	Tue	Wed 18-Feb-09	Thu 19-Feb-09	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				2		2			2	
1:00 AM				0		0			0	
2:00 AM				1		1			1	
3:00 AM				0		0			0	
4:00 AM				2		2			2	
5:00 AM				2		2			2	
6:00 AM				11		11			11	
7:00 AM				**70**		**70**			**70**	
8:00 AM				38		38			38	
9:00 AM				24		24			24	
10:00 AM				20		20			20	
11:00 AM				20		20			20	
12:00 PM				**44**		**44**			**44**	
1:00 PM				32		32			32	
2:00 PM				39		39			39	
3:00 PM				16		16			16	
4:00 PM			**20**	30		25			25	
5:00 PM			12	18		15			15	
6:00 PM			6	7		6			6	
7:00 PM			12			12			12	
8:00 PM			7			7			7	
9:00 PM			7			7			7	
10:00 PM			4			4			4	
11:00 PM			5			5			5	
Day Total			73	376		402			402	
% Weekday Average			18.2%	93.5%						
% Week Average			18.2%	93.5%		100.0%				
AM Peak Volume				7:00 AM 70		7:00 AM 70			7:00 AM 70	
PM Peak Volume			4:00 PM 20	12:00 PM 44		12:00 PM 44			12:00 PM 44	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: N Freemont Ave just north of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411224
DIRECTION: SB
DATE: Feb 18 2009 - Feb 19 2009

Start Time	Mon	Tue	Wed 18-Feb-09	Thu 19-Feb-09	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				2		2			2	
1:00 AM				1		1			1	
2:00 AM				1		1			1	
3:00 AM				0		0			0	
4:00 AM				1		1			1	
5:00 AM				2		2			2	
6:00 AM				7		7			7	
7:00 AM				13		13			13	
8:00 AM				16		16			16	
9:00 AM				14		14			14	
10:00 AM				17		17			17	
11:00 AM				**31**		**31**			**31**	
12:00 PM				40		40			40	
1:00 PM				27		27			27	
2:00 PM				37		37			37	
3:00 PM				**43**		**43**			**43**	
4:00 PM			**41**	41		41			41	
5:00 PM			31	30		30			30	
6:00 PM			13	14		13			13	
7:00 PM			11			11			11	
8:00 PM			9			9			9	
9:00 PM			7			7			7	
10:00 PM			7			7			7	
11:00 PM			2			2			2	
Day Total			121	337		372			372	
% Weekday Average			32.5%	90.6%						
% Week Average			32.5%	90.6%		100.0%				
AM Peak Volume				11:00 AM 31		11:00 AM 31			11:00 AM 31	
PM Peak Volume			4:00 PM 41	3:00 PM 43		3:00 PM 43			3:00 PM 43	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: S Freemont Ave just south of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411225
DIRECTION: NB
DATE: Feb 18 2009 - Feb 19 2009

Start Time	Mon	Tue	Wed 18-Feb-09	Thu 19-Feb-09	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				0		0			0	
1:00 AM				2		2			2	
2:00 AM				0		0			0	
3:00 AM				0		0			0	
4:00 AM				0		0			0	
5:00 AM				1		1			1	
6:00 AM				1		1			1	
7:00 AM				3		3			3	
8:00 AM				**8**		**8**			**8**	
9:00 AM				5		5			5	
10:00 AM				2		2			2	
11:00 AM				4		4			4	
12:00 PM				4		4			4	
1:00 PM				3		3			3	
2:00 PM				3		3			3	
3:00 PM				**7**		**7**			**7**	
4:00 PM			3	2		2			2	
5:00 PM			1	4		2			2	
6:00 PM			3	5		4			4	
7:00 PM			**5**			5			5	
8:00 PM			1			1			1	
9:00 PM			0			0			0	
10:00 PM			2			2			2	
11:00 PM			1			1			1	
Day Total			16	54		60			60	
% Weekday Average			26.7%	90.0%						
% Week Average			26.7%	90.0%		100.0%				
AM Peak Volume				8:00 AM 8		8:00 AM 8			8:00 AM 8	
PM Peak Volume			7:00 PM 5	3:00 PM 7		3:00 PM 7			3:00 PM 7	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: S Freemont Ave just south of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411225
DIRECTION: SB
DATE: Feb 18 2009 - Feb 19 2009

Start Time	Mon	Tue	Wed 18-Feb-09	Thu 19-Feb-09	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				1		1			1	
1:00 AM				1		1			1	
2:00 AM				1		1			1	
3:00 AM				0		0			0	
4:00 AM				0		0			0	
5:00 AM				0		0			0	
6:00 AM				0		0			0	
7:00 AM				**5**		**5**			**5**	
8:00 AM				5		5			5	
9:00 AM				3		3			3	
10:00 AM				4		4			4	
11:00 AM				3		3			3	
12:00 PM				3		3			3	
1:00 PM				2		2			2	
2:00 PM				**8**		**8**			**8**	
3:00 PM				4		4			4	
4:00 PM			4	8		6			6	
5:00 PM			**7**	8		7			7	
6:00 PM			6	5		5			5	
7:00 PM			4			4			4	
8:00 PM			0			0			0	
9:00 PM			3			3			3	
10:00 PM			1			1			1	
11:00 PM			1			1			1	
Day Total			26	61		67			67	
% Weekday Average			38.8%	91.0%						
% Week Average			38.8%	91.0%		100.0%				
AM Peak Volume				7:00 AM 5		7:00 AM 5			7:00 AM 5	
PM Peak Volume			5:00 PM 7	2:00 PM 8		2:00 PM 8			2:00 PM 8	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: N Santa Rita Ave just north of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411226
DIRECTION: NB
DATE: Feb 18 2009 - Feb 19 2009

Start Time	Mon	Tue	Wed 18-Feb-09	Thu 19-Feb-09	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				0		0			0	
1:00 AM				0		0			0	
2:00 AM				1		1			1	
3:00 AM				1		1			1	
4:00 AM				0		0			0	
5:00 AM				1		1			1	
6:00 AM				7		7			7	
7:00 AM				**37**		**37**			**37**	
8:00 AM				30		30			30	
9:00 AM				23		23			23	
10:00 AM				9		9			9	
11:00 AM				14		14			14	
12:00 PM				11		11			11	
1:00 PM				**29**		**29**			**29**	
2:00 PM				14		14			14	
3:00 PM			14	21		17			17	
4:00 PM			**22**	21		21			21	
5:00 PM			18	17		17			17	
6:00 PM			17	16		16			16	
7:00 PM			5			5			5	
8:00 PM			8			8			8	
9:00 PM			11			11			11	
10:00 PM			10			10			10	
11:00 PM			5			5			5	
Day Total			110	252		287			287	
% Weekday Average			38.3%	87.8%						
% Week Average			38.3%	87.8%		100.0%				
AM Peak Volume				7:00 AM 37		7:00 AM 37			7:00 AM 37	
PM Peak Volume			4:00 PM 22	1:00 PM 29		1:00 PM 29			1:00 PM 29	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: N Santa Rita Ave just north of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411226
DIRECTION: SB
DATE: Feb 18 2009 - Feb 19 2009

Start Time	Mon	Tue	Wed 18-Feb-09	Thu 19-Feb-09	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				3		3			3	
1:00 AM				4		4			4	
2:00 AM				0		0			0	
3:00 AM				2		2			2	
4:00 AM				1		1			1	
5:00 AM				1		1			1	
6:00 AM				4		4			4	
7:00 AM				**28**		**28**			**28**	
8:00 AM				14		14			14	
9:00 AM				12		12			12	
10:00 AM				13		13			13	
11:00 AM				9		9			9	
12:00 PM				11		11			11	
1:00 PM				28		**28**			**28**	
2:00 PM				28		28			28	
3:00 PM			25	**32**		28			28	
4:00 PM			**31**	23		27			27	
5:00 PM			16	18		17			17	
6:00 PM			12	20		16			16	
7:00 PM			7			7			7	
8:00 PM			5			5			5	
9:00 PM			8			8			8	
10:00 PM			7			7			7	
11:00 PM			3			3			3	
Day Total			114	251		276			276	
% Weekday Average			41.3%	90.9%						
% Week Average			41.3%	90.9%		100.0%				
AM Peak Volume				7:00 AM 28		7:00 AM 28			7:00 AM 28	
PM Peak Volume			4:00 PM 31	3:00 PM 32		1:00 PM 28			1:00 PM 28	

Comments:

LOCATION: S Santa Rita Ave just south of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411227
DIRECTION: NB
DATE: Feb 18 2009 - Feb 19 2009

Start Time	Mon	Tue	Wed 18-Feb-09	Thu 19-Feb-09	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				0		0			0	
1:00 AM				1		1			1	
2:00 AM				0		0			0	
3:00 AM				0		0			0	
4:00 AM				2		2			2	
5:00 AM				4		4			4	
6:00 AM				6		6			6	
7:00 AM				9		9			9	
8:00 AM				**13**		**13**			**13**	
9:00 AM				5		5			5	
10:00 AM				5		5			5	
11:00 AM				8		8			8	
12:00 PM				6		6			6	
1:00 PM				10		10			10	
2:00 PM				11		11			11	
3:00 PM			**13**	9		11			11	
4:00 PM			5	4		4			4	
5:00 PM			12	8		10			10	
6:00 PM			10	**16**		**13**			**13**	
7:00 PM			12			12			12	
8:00 PM			6			6			6	
9:00 PM			8			8			8	
10:00 PM			5			5			5	
11:00 PM			1			1			1	
Day Total			72	117		150			150	
% Weekday Average			48.0%	78.0%						
% Week Average			48.0%	78.0%		100.0%				
AM Peak Volume				8:00 AM 13		8:00 AM 13			8:00 AM 13	
PM Peak Volume			3:00 PM 13	6:00 PM 16		6:00 PM 13			6:00 PM 13	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: S Santa Rita Ave just south of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411227
DIRECTION: SB
DATE: Feb 18 2009 - Feb 19 2009

Start Time	Mon	Tue	Wed 18-Feb-09	Thu 19-Feb-09	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				1		1			1	
1:00 AM				1		1			1	
2:00 AM				1		1			1	
3:00 AM				1		1			1	
4:00 AM				1		1			1	
5:00 AM				2		2			2	
6:00 AM				3		3			3	
7:00 AM				13		13			13	
8:00 AM				**14**		**14**			**14**	
9:00 AM				6		6			6	
10:00 AM				7		7			7	
11:00 AM				14		14			14	
12:00 PM				8		8			8	
1:00 PM				8		8			8	
2:00 PM				13		13			13	
3:00 PM			11	**24**		**17**			**17**	
4:00 PM			9	10		9			9	
5:00 PM			13	22		17			17	
6:00 PM			**17**	16		16			16	
7:00 PM			12			12			12	
8:00 PM			9			9			9	
9:00 PM			6			6			6	
10:00 PM			7			7			7	
11:00 PM			3			3			3	
Day Total			87	165		189			189	
% Weekday Average			46.0%	87.3%						
% Week Average			46.0%	87.3%		100.0%				
AM Peak Volume				8:00 AM 14		8:00 AM 14			8:00 AM 14	
PM Peak Volume			6:00 PM 17	3:00 PM 24		3:00 PM 17			3:00 PM 17	

Comments:

LOCATION: N Mountain Ave just north of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411228
DIRECTION: NB
DATE: Feb 18 2009 - Feb 19 2009

Start Time	Mon	Tue	Wed 18-Feb-09	Thu 19-Feb-09	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				4		4			4	
1:00 AM				1		1			1	
2:00 AM				1		1			1	
3:00 AM				0		0			0	
4:00 AM				0		0			0	
5:00 AM				0		0			0	
6:00 AM				1		1			1	
7:00 AM				**9**		**9**			**9**	
8:00 AM				8		8			8	
9:00 AM				4		4			4	
10:00 AM				5		5			5	
11:00 AM				6		6			6	
12:00 PM				**10**		**10**			**10**	
1:00 PM				6		6			6	
2:00 PM				9		9			9	
3:00 PM			**9**	7		8			8	
4:00 PM			7	8		7			7	
5:00 PM			5	8		6			6	
6:00 PM			4	5		4			4	
7:00 PM			4			4			4	
8:00 PM			5			5			5	
9:00 PM			6			6			6	
10:00 PM			5			5			5	
11:00 PM			1			1			1	
Day Total			46	92		110			110	
% Weekday Average			41.8%	83.6%						
% Week Average			41.8%	83.6%		100.0%				
AM Peak Volume				7:00 AM 9		7:00 AM 9			7:00 AM 9	
PM Peak Volume			3:00 PM 9	12:00 PM 10		12:00 PM 10			12:00 PM 10	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: N Mountain Ave just north of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411228
DIRECTION: SB
DATE: Feb 18 2009 - Feb 19 2009

Start Time	Mon	Tue	Wed 18-Feb-09	Thu 19-Feb-09	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				2		2			2	
1:00 AM				0		0			0	
2:00 AM				0		0			0	
3:00 AM				0		0			0	
4:00 AM				0		0			0	
5:00 AM				0		0			0	
6:00 AM				**7**		**7**			**7**	
7:00 AM				6		6			6	
8:00 AM				4		4			4	
9:00 AM				5		5			5	
10:00 AM				2		2			2	
11:00 AM				3		3			3	
12:00 PM				4		4			4	
1:00 PM				**8**		**8**			**8**	
2:00 PM				2		2			2	
3:00 PM			6	6		6			6	
4:00 PM			**8**	6		7			7	
5:00 PM			6	3		4			4	
6:00 PM			4	5		4			4	
7:00 PM			6			6			6	
8:00 PM			3			3			3	
9:00 PM			2			2			2	
10:00 PM			1			1			1	
11:00 PM			0			0			0	
Day Total			36	63		76			76	
% Weekday Average			47.4%	82.9%						
% Week Average			47.4%	82.9%		100.0%				
AM Peak Volume				6:00 AM 7		6:00 AM 7			6:00 AM 7	
PM Peak Volume			4:00 PM 8	1:00 PM 8		1:00 PM 8			1:00 PM 8	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: N Vine Ave just north of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411229
DIRECTION: NB
DATE: Feb 18 2009 - Feb 19 2009

Start Time	Mon	Tue	Wed 18-Feb-09	Thu 19-Feb-09	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				0		0			0	
1:00 AM				1		1			1	
2:00 AM				1		1			1	
3:00 AM				1		1			1	
4:00 AM				1		1			1	
5:00 AM				1		1			1	
6:00 AM				3		3			3	
7:00 AM				**12**		**12**			**12**	
8:00 AM				6		6			6	
9:00 AM				7		7			7	
10:00 AM				6		6			6	
11:00 AM				5		5			5	
12:00 PM				9		9			9	
1:00 PM				3		3			3	
2:00 PM			**12**	8		10			10	
3:00 PM			12	10		**11**			**11**	
4:00 PM			5	10		7			7	
5:00 PM			12	5		8			8	
6:00 PM			3	**11**		7			7	
7:00 PM			4			4			4	
8:00 PM			2			2			2	
9:00 PM			5			5			5	
10:00 PM			3			3			3	
11:00 PM			1			1			1	
Day Total			59	100		114			114	
% Weekday Average			51.8%	87.7%						
% Week Average			51.8%	87.7%		100.0%				
AM Peak Volume				7:00 AM 12		7:00 AM 12			7:00 AM 12	
PM Peak Volume			2:00 PM 12	6:00 PM 11		3:00 PM 11			3:00 PM 11	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: N Vine Ave just north of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411229
DIRECTION: SB
DATE: Feb 18 2009 - Feb 19 2009

Start Time	Mon	Tue	Wed 18-Feb-09	Thu 19-Feb-09	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				0		0			0	
1:00 AM				1		1			1	
2:00 AM				1		1			1	
3:00 AM				0		0			0	
4:00 AM				1		1			1	
5:00 AM				2		2			2	
6:00 AM				0		0			0	
7:00 AM				1		1			1	
8:00 AM				**4**		**4**			**4**	
9:00 AM				3		3			3	
10:00 AM				3		3			3	
11:00 AM				3		3			3	
12:00 PM				4		4			4	
1:00 PM				5		5			5	
2:00 PM			6	7		6			6	
3:00 PM			**8**	6		7			7	
4:00 PM			5	3		4			4	
5:00 PM			3	2		2			2	
6:00 PM			2	**14**		**8**			**8**	
7:00 PM			4			4			4	
8:00 PM			2			2			2	
9:00 PM			4			4			4	
10:00 PM			3			3			3	
11:00 PM			3			3			3	
Day Total			40	60		71			71	
% Weekday Average			56.3%	84.5%						
% Week Average			56.3%	84.5%		100.0%				
AM Peak Volume				8:00 AM 4		8:00 AM 4			8:00 AM 4	
PM Peak Volume			3:00 PM 8	6:00 PM 14		6:00 PM 8			6:00 PM 8	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: S Vine Ave just south of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411230
DIRECTION: NB
DATE: Feb 18 2009 - Feb 19 2009

Start Time	Mon	Tue	Wed 18-Feb-09	Thu 19-Feb-09	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				1		1			1	
1:00 AM				1		1			1	
2:00 AM				0		0			0	
3:00 AM				0		0			0	
4:00 AM				1		1			1	
5:00 AM				2		2			2	
6:00 AM				6		6			6	
7:00 AM				23		23			23	
8:00 AM				**24**		**24**			**24**	
9:00 AM				17		17			17	
10:00 AM				8		8			8	
11:00 AM				10		10			10	
12:00 PM				6		6			6	
1:00 PM				10		10			10	
2:00 PM			**25**	14		19			19	
3:00 PM			22	**20**		**21**			**21**	
4:00 PM			15	18		16			16	
5:00 PM			14	17		15			15	
6:00 PM			14			14			14	
7:00 PM			17			17			17	
8:00 PM			7			7			7	
9:00 PM			7			7			7	
10:00 PM			4			4			4	
11:00 PM			2			2			2	
Day Total			127	178		231			231	
% Weekday Average			55.0%	77.1%						
% Week Average			55.0%	77.1%		100.0%				
AM Peak Volume				8:00 AM 24		8:00 AM 24			8:00 AM 24	
PM Peak Volume			2:00 PM 25	3:00 PM 20		3:00 PM 21			3:00 PM 21	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: S Vine Ave just south of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411230
DIRECTION: SB
DATE: Feb 18 2009 - Feb 19 2009

Start Time	Mon	Tue	Wed 18-Feb-09	Thu 19-Feb-09	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				0		0			0	
1:00 AM				1		1			1	
2:00 AM				1		1			1	
3:00 AM				0		0			0	
4:00 AM				2		2			2	
5:00 AM				2		2			2	
6:00 AM				5		5			5	
7:00 AM				43		43			43	
8:00 AM				**46**		**46**			**46**	
9:00 AM				17		17			17	
10:00 AM				6		6			6	
11:00 AM				18		18			18	
12:00 PM				17		17			17	
1:00 PM				16		16			16	
2:00 PM			18	29		23			23	
3:00 PM			**21**	**48**		**34**			**34**	
4:00 PM			19	24		21			21	
5:00 PM			18	27		22			22	
6:00 PM			10			10			10	
7:00 PM			9			9			9	
8:00 PM			7			7			7	
9:00 PM			5			5			5	
10:00 PM			8			8			8	
11:00 PM			2			2			2	
Day Total			117	302		315			315	
% Weekday Average			37.1%	95.9%						
% Week Average			37.1%	95.9%		100.0%				
AM Peak Volume				8:00 AM 46		8:00 AM 46			8:00 AM 46	
PM Peak Volume			3:00 PM 21	3:00 PM 48		3:00 PM 34			3:00 PM 34	

Comments:

LOCATION: N Warren Ave just north of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411231
DIRECTION: NB
DATE: Feb 16 2009 - Feb 18 2009

Start Time	Mon 16-Feb-09	Tue 17-Feb-09	Wed 18-Feb-09	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		2	2			2			2	
1:00 AM		0	0			0			0	
2:00 AM		1	1			1			1	
3:00 AM		1	0			0			0	
4:00 AM		2	3			2			2	
5:00 AM		0	0			0			0	
6:00 AM		2	1			1			1	
7:00 AM		9	8			8			8	
8:00 AM		8	**18**			**13**			**13**	
9:00 AM		**14**	12			13			13	
10:00 AM		12	9			10			10	
11:00 AM		8	10			9			9	
12:00 PM		16				16			16	
1:00 PM		10				10			10	
2:00 PM		15				15			15	
3:00 PM		16				16			16	
4:00 PM		**18**				**18**			**18**	
5:00 PM		15				15			15	
6:00 PM		14				14			14	
7:00 PM		12				12			12	
8:00 PM		3				3			3	
9:00 PM	**7**	2				4			4	
10:00 PM	1	3				2			2	
11:00 PM	1	1				1			1	
Day Total	9	184	64			185			185	
% Weekday Average	4.9%	99.5%	34.6%							
% Week Average	4.9%	99.5%	34.6%			100.0%				
AM Peak Volume		9:00 AM 14	8:00 AM 18			8:00 AM 13			8:00 AM 13	
PM Peak Volume	9:00 PM 7	4:00 PM 18				4:00 PM 18			4:00 PM 18	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: N Warren Ave just north of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411231
DIRECTION: SB
DATE: Feb 16 2009 - Feb 18 2009

Start Time	Mon 16-Feb-09	Tue 17-Feb-09	Wed 18-Feb-09	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		0	0			0			0	
1:00 AM		0	2			1			1	
2:00 AM		0	0			0			0	
3:00 AM		0	0			0			0	
4:00 AM		0	0			0			0	
5:00 AM		1	1			1			1	
6:00 AM		2	1			1			1	
7:00 AM		5	5			**5**			**5**	
8:00 AM		5	**6**			5			5	
9:00 AM		2	2			2			2	
10:00 AM		7	3			5			5	
11:00 AM		**8**	1			4			4	
12:00 PM		7				7			7	
1:00 PM		4				4			4	
2:00 PM		5				5			5	
3:00 PM		7				7			7	
4:00 PM		4				4			4	
5:00 PM		8				8			8	
6:00 PM		**9**				**9**			**9**	
7:00 PM		6				6			6	
8:00 PM		2				2			2	
9:00 PM	**3**	2				2			2	
10:00 PM	1	0				0			0	
11:00 PM	0	4				2			2	
Day Total	4	88	21			80			80	
% Weekday Average	5.0%	110.0%	26.3%							
% Week Average	5.0%	110.0%	26.3%			100.0%				
AM Peak Volume		11:00 AM 8	8:00 AM 6			7:00 AM 5			7:00 AM 5	
PM Peak Volume	9:00 PM 3	6:00 PM 9				6:00 PM 9			6:00 PM 9	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: S Warren Ave just southth of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411232
DIRECTION: NB
DATE: Feb 16 2009 - Feb 18 2009

Start Time	Mon 16-Feb-09	Tue 17-Feb-09	Wed 18-Feb-09	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		0	1			0			0	
1:00 AM		0	0			0			0	
2:00 AM		0	0			0			0	
3:00 AM		0	0			0			0	
4:00 AM		0	1			0			0	
5:00 AM		0	2			1			1	
6:00 AM		4	6			5			5	
7:00 AM		13	6			9			9	
8:00 AM		11	**12**			11			11	
9:00 AM		11	10			10			10	
10:00 AM		10	11			10			10	
11:00 AM		**14**	10			**12**			**12**	
12:00 PM		13	**14**			13			13	
1:00 PM		**19**				**19**			**19**	
2:00 PM		16				16			16	
3:00 PM		10				10			10	
4:00 PM		15				15			15	
5:00 PM		17				17			17	
6:00 PM		12				12			12	
7:00 PM		8				8			8	
8:00 PM		7				7			7	
9:00 PM		8				8			8	
10:00 PM	**1**	1				1			1	
11:00 PM	1	4				2			2	
Day Total	2	193	73			186			186	
% Weekday Average	1.1%	103.8%	39.2%							
% Week Average	1.1%	103.8%	39.2%			100.0%				
AM Peak Volume		11:00 AM 14	8:00 AM 12			11:00 AM 12			11:00 AM 12	
PM Peak Volume	10:00 PM 1	1:00 PM 19	12:00 PM 14			1:00 PM 19			1:00 PM 19	

Comments:

LOCATION: S Warren Ave just southth of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411232
DIRECTION: SB
DATE: Feb 16 2009 - Feb 18 2009

Start Time	Mon 16-Feb-09	Tue 17-Feb-09	Wed 18-Feb-09	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		2	4			3			3	
1:00 AM		1	1			1			1	
2:00 AM		0	1			0			0	
3:00 AM		0	0			0			0	
4:00 AM		0	1			0			0	
5:00 AM		0	0			0			0	
6:00 AM		2	3			2			2	
7:00 AM		4	8			6			6	
8:00 AM		8	10			9			9	
9:00 AM		**13**	**12**			**12**			**12**	
10:00 AM		6	3			4			4	
11:00 AM		12	9			10			10	
12:00 PM		14	**10**			12			12	
1:00 PM		7				7			7	
2:00 PM		5				5			5	
3:00 PM		12				12			12	
4:00 PM		11				11			11	
5:00 PM		**25**				**25**			**25**	
6:00 PM		8				8			8	
7:00 PM		5				5			5	
8:00 PM		3				3			3	
9:00 PM		5				5			5	
10:00 PM	**5**	7				6			6	
11:00 PM	3	2				2			2	
Day Total	8	152	62			148			148	
% Weekday Average	5.4%	102.7%	41.9%							
% Week Average	5.4%	102.7%	41.9%			100.0%				
AM Peak Volume		9:00 AM 13	9:00 AM 12			9:00 AM 12			9:00 AM 12	
PM Peak Volume	10:00 PM 5	5:00 PM 25	12:00 PM 10			5:00 PM 25			5:00 PM 25	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: N Martin Ave just north of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411233
DIRECTION: NB
DATE: Feb 16 2009 - Feb 18 2009

Start Time	Mon 16-Feb-09	Tue 17-Feb-09	Wed 18-Feb-09	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		1	1			1			1	
1:00 AM		1	0			0			0	
2:00 AM		0	0			0			0	
3:00 AM		1	0			0			0	
4:00 AM		0	0			0			0	
5:00 AM		0	0			0			0	
6:00 AM		5	8			6			6	
7:00 AM		26	28			27			27	
8:00 AM		30	29			29			29	
9:00 AM		**41**	**32**			**36**			**36**	
10:00 AM		29	27			28			28	
11:00 AM		37	24			30			30	
12:00 PM		**35**				**35**			**35**	
1:00 PM		17				17			17	
2:00 PM		26				26			26	
3:00 PM		16				16			16	
4:00 PM		23				23			23	
5:00 PM		24				24			24	
6:00 PM		8				8			8	
7:00 PM		12				12			12	
8:00 PM		14				14			14	
9:00 PM	**12**	17				14			14	
10:00 PM	11	14				12			12	
11:00 PM	3	3				3			3	
Day Total	26	380	149			361			361	
% Weekday Average	7.2%	105.3%	41.3%							
% Week Average	7.2%	105.3%	41.3%			100.0%				
AM Peak Volume		9:00 AM 41	9:00 AM 32			9:00 AM 36			9:00 AM 36	
PM Peak Volume	9:00 PM 12	12:00 PM 35				12:00 PM 35			12:00 PM 35	

Comments:

LOCATION: N Martin Ave just north of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411233
DIRECTION: SB
DATE: Feb 16 2009 - Feb 18 2009

Start Time	Mon 16-Feb-09	Tue 17-Feb-09	Wed 18-Feb-09	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		0	0			0			0	
1:00 AM		0	0			0			0	
2:00 AM		0	0			0			0	
3:00 AM		4	0			2			2	
4:00 AM		1	1			1			1	
5:00 AM		0	3			1			1	
6:00 AM		7	10			8			8	
7:00 AM		31	16			23			23	
8:00 AM		25	**35**			**30**			**30**	
9:00 AM		**36**	24			30			30	
10:00 AM		14	12			13			13	
11:00 AM		12	13			12			12	
12:00 PM		14				14			14	
1:00 PM		12				12			12	
2:00 PM		7				7			7	
3:00 PM		**23**				**23**			**23**	
4:00 PM		17				17			17	
5:00 PM		16				16			16	
6:00 PM		6				6			6	
7:00 PM		5				5			5	
8:00 PM		9				9			9	
9:00 PM	**7**	9				8			8	
10:00 PM	6	2				4			4	
11:00 PM	3	0				1			1	
Day Total	16	250	114			242			242	
% Weekday Average	6.6%	103.3%	47.1%							
% Week Average	6.6%	103.3%	47.1%			100.0%				
AM Peak Volume		9:00 AM 36	8:00 AM 35			8:00 AM 30			8:00 AM 30	
PM Peak Volume	9:00 PM 7	3:00 PM 23				3:00 PM 23			3:00 PM 23	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: N Olsen Ave just north of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411234
DIRECTION: NB
DATE: Feb 16 2009 - Feb 18 2009

Start Time	Mon 16-Feb-09	Tue 17-Feb-09	Wed 18-Feb-09	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		1	0			0			0	
1:00 AM		1	1			1			1	
2:00 AM		0	0			0			0	
3:00 AM		0	0			0			0	
4:00 AM		0	0			0			0	
5:00 AM		0	0			0			0	
6:00 AM		1	3			2			2	
7:00 AM		8	7			7			7	
8:00 AM		10	7			8			8	
9:00 AM		9	2			5			5	
10:00 AM		9	5			7			7	
11:00 AM		**11**	**8**			**9**			**9**	
12:00 PM		16				16			16	
1:00 PM		8				8			8	
2:00 PM		9				9			9	
3:00 PM		**21**				**21**			**21**	
4:00 PM		12				12			12	
5:00 PM		13				13			13	
6:00 PM		6				6			6	
7:00 PM		12				12			12	
8:00 PM	**8**	7				7			7	
9:00 PM	3	2				2			2	
10:00 PM	3	1				2			2	
11:00 PM	4	3				3			3	
Day Total	18	160	33			150			150	
% Weekday Average	12.0%	106.7%	22.0%							
% Week Average	12.0%	106.7%	22.0%			100.0%				
AM Peak Volume		11:00 AM 11	11:00 AM 8			11:00 AM 9			11:00 AM 9	
PM Peak Volume	8:00 PM 8	3:00 PM 21				3:00 PM 21			3:00 PM 21	

Comments:

LOCATION: N Olsen Ave just north of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411234
DIRECTION: SB
DATE: Feb 16 2009 - Feb 18 2009

Start Time	Mon 16-Feb-09	Tue 17-Feb-09	Wed 18-Feb-09	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		1	1			1			1	
1:00 AM		1	0			0			0	
2:00 AM		0	0			0			0	
3:00 AM		0	0			0			0	
4:00 AM		0	0			0			0	
5:00 AM		1	3			2			2	
6:00 AM		6	6			6			6	
7:00 AM		5	3			4			4	
8:00 AM		8	6			7			7	
9:00 AM		**12**	**8**			**10**			**10**	
10:00 AM		11	5			8			8	
11:00 AM		10	1			5			5	
12:00 PM		**13**				**13**			**13**	
1:00 PM		11				11			11	
2:00 PM		9				9			9	
3:00 PM		10				10			10	
4:00 PM		13				13			13	
5:00 PM		6				6			6	
6:00 PM		6				6			6	
7:00 PM		2				2			2	
8:00 PM	**6**	4				5			5	
9:00 PM	1	4				2			2	
10:00 PM	1	0				0			0	
11:00 PM	3	2				2			2	
Day Total	11	135	33			122			122	
% Weekday Average	9.0%	110.7%	27.0%							
% Week Average	9.0%	110.7%	27.0%			100.0%				
AM Peak Volume		9:00 AM 12	9:00 AM 8			9:00 AM 10			9:00 AM 10	
PM Peak Volume	8:00 PM 6	12:00 PM 13				12:00 PM 13			12:00 PM 13	

Comments:

LOCATION: S Olsen Ave just south of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411235
DIRECTION: NB
DATE: Feb 16 2009 - Feb 18 2009

Start Time	Mon 16-Feb-09	Tue 17-Feb-09	Wed 18-Feb-09	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		1	2			1			1	
1:00 AM		1	0			0			0	
2:00 AM		0	0			0			0	
3:00 AM		0	0			0			0	
4:00 AM		0	0			0			0	
5:00 AM		2	1			1			1	
6:00 AM		8	8			8			8	
7:00 AM		12	11			11			11	
8:00 AM		19	11			15			15	
9:00 AM		19	27			23			23	
10:00 AM		**29**	27			**28**			**28**	
11:00 AM		26	**28**			27			27	
12:00 PM		19				19			19	
1:00 PM		**37**				**37**			**37**	
2:00 PM		28				28			28	
3:00 PM		20				20			20	
4:00 PM		35				35			35	
5:00 PM		22				22			22	
6:00 PM		4				4			4	
7:00 PM		9				9			9	
8:00 PM		1				1			1	
9:00 PM	**3**	4				3			3	
10:00 PM	2	4				3			3	
11:00 PM	0	0				0			0	
Day Total	5	300	115			295			295	
% Weekday Average	1.7%	101.7%	39.0%							
% Week Average	1.7%	101.7%	39.0%			100.0%				
AM Peak Volume		10:00 AM 29	11:00 AM 28			10:00 AM 28			10:00 AM 28	
PM Peak Volume	9:00 PM 3	1:00 PM 37				1:00 PM 37			1:00 PM 37	

Comments:

LOCATION: S Olsen Ave just south of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411235
DIRECTION: SB
DATE: Feb 16 2009 - Feb 18 2009

Start Time	Mon 16-Feb-09	Tue 17-Feb-09	Wed 18-Feb-09	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		0	2			1			1	
1:00 AM		0	0			0			0	
2:00 AM		0	0			0			0	
3:00 AM		0	0			0			0	
4:00 AM		0	0			0			0	
5:00 AM		4	5			4			4	
6:00 AM		12	12			12			12	
7:00 AM		18	18			18			18	
8:00 AM		35	**42**			38			38	
9:00 AM		38	30			34			34	
10:00 AM		**45**	37			**41**			**41**	
11:00 AM		29	33			31			31	
12:00 PM		22				22			22	
1:00 PM		**41**				**41**			**41**	
2:00 PM		37				37			37	
3:00 PM		30				30			30	
4:00 PM		28				28			28	
5:00 PM		28				28			28	
6:00 PM		18				18			18	
7:00 PM		9				9			9	
8:00 PM		5				5			5	
9:00 PM	**4**	3				3			3	
10:00 PM	1	2				1			1	
11:00 PM	0	2				1			1	
Day Total	5	406	179			402			402	
% Weekday Average	1.2%	101.0%	44.5%							
% Week Average	1.2%	101.0%	44.5%			100.0%				
AM Peak Volume		10:00 AM 45	8:00 AM 42			10:00 AM 41			10:00 AM 41	
PM Peak Volume	9:00 PM 4	1:00 PM 41				1:00 PM 41			1:00 PM 41	

Comments:

LOCATION: N Norton Ave just north of E Broadwy
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411236
DIRECTION: NB
DATE: Feb 16 2009 - Feb 18 2009

Start Time	Mon 16-Feb-09	Tue 17-Feb-09	Wed 18-Feb-09	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		1	0			0			0	
1:00 AM		0	0			0			0	
2:00 AM		0	0			0			0	
3:00 AM		0	0			0			0	
4:00 AM		0	9			4			4	
5:00 AM		2	10			6			6	
6:00 AM		13	11			12			12	
7:00 AM		**29**	**32**			**30**			**30**	
8:00 AM		26	29			27			27	
9:00 AM		25	16			20			20	
10:00 AM		23				23			23	
11:00 AM		23				23			23	
12:00 PM		29				29			29	
1:00 PM		21				21			21	
2:00 PM		28				28			28	
3:00 PM		**32**				**32**			**32**	
4:00 PM		32				32			32	
5:00 PM		22				22			22	
6:00 PM		11				11			11	
7:00 PM		2				2			2	
8:00 PM		7				7			7	
9:00 PM	**1**	1				1			1	
10:00 PM	0	1				0			0	
11:00 PM	0	0				0			0	
Day Total	1	328	107			330			330	
% Weekday Average	0.3%	99.4%	32.4%							
% Week Average	0.3%	99.4%	32.4%			100.0%				
AM Peak Volume		7:00 AM 29	7:00 AM 32			7:00 AM 30			7:00 AM 30	
PM Peak Volume	9:00 PM 1	3:00 PM 32				3:00 PM 32			3:00 PM 32	

Comments:

LOCATION: N Norton Ave just north of E Broadwy
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411236
DIRECTION: SB
DATE: Feb 16 2009 - Feb 18 2009

Start Time	Mon 16-Feb-09	Tue 17-Feb-09	Wed 18-Feb-09	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		0	0			0			0	
1:00 AM		0	0			0			0	
2:00 AM		1	0			0			0	
3:00 AM		0	0			0			0	
4:00 AM		1	1			1			1	
5:00 AM		2	3			2			2	
6:00 AM		10	14			12			12	
7:00 AM		16	**20**			18			18	
8:00 AM		15	13			14			14	
9:00 AM		22	12			17			17	
10:00 AM		**27**				**27**			**27**	
11:00 AM		25				25			25	
12:00 PM		21				21			21	
1:00 PM		17				17			17	
2:00 PM		18				18			18	
3:00 PM		**26**				**26**			**26**	
4:00 PM		25				25			25	
5:00 PM		10				10			10	
6:00 PM		4				4			4	
7:00 PM		10				10			10	
8:00 PM		5				5			5	
9:00 PM	**2**	1				1			1	
10:00 PM	1	2				1			1	
11:00 PM	1	0				0			0	
Day Total	4	258	63			254			254	
% Weekday Average	1.6%	101.6%	24.8%							
% Week Average	1.6%	101.6%	24.8%			100.0%				
AM Peak Volume		10:00 AM 27	7:00 AM 20			10:00 AM 27			10:00 AM 27	
PM Peak Volume	9:00 PM 2	3:00 PM 26				3:00 PM 26			3:00 PM 26	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: N Stewart Ave just north of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411237
DIRECTION: NB
DATE: Feb 16 2009 - Feb 18 2009

Start Time	Mon 16-Feb-09	Tue 17-Feb-09	Wed 18-Feb-09	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		0	2			1			1	
1:00 AM		0	1			0			0	
2:00 AM		0	0			0			0	
3:00 AM		0	0			0			0	
4:00 AM		0	1			0			0	
5:00 AM		1	1			1			1	
6:00 AM		2	2			2			2	
7:00 AM		9	14			11			11	
8:00 AM		14	16			**15**			**15**	
9:00 AM		9	10			9			9	
10:00 AM		14	**17**			15			15	
11:00 AM		**15**				15			15	
12:00 PM		16				16			16	
1:00 PM		17				17			17	
2:00 PM		19				19			19	
3:00 PM		**55**				**55**			**55**	
4:00 PM		36				36			36	
5:00 PM		22				22			22	
6:00 PM		13				13			13	
7:00 PM		3				3			3	
8:00 PM	**5**	2				3			3	
9:00 PM	5	3				4			4	
10:00 PM	1	3				2			2	
11:00 PM	0	2				1			1	
Day Total	11	255	64			260			260	
% Weekday Average	4.2%	98.1%	24.6%							
% Week Average	4.2%	98.1%	24.6%			100.0%				
AM Peak Volume		11:00 AM 15	10:00 AM 17			8:00 AM 15			8:00 AM 15	
PM Peak Volume	8:00 PM 5	3:00 PM 55				3:00 PM 55			3:00 PM 55	

Comments:

LOCATION: N Stewart Ave just north of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411237
DIRECTION: SB
DATE: Feb 16 2009 - Feb 18 2009

Start Time	Mon 16-Feb-09	Tue 17-Feb-09	Wed 18-Feb-09	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		0	0			0			0	
1:00 AM		0	1			0			0	
2:00 AM		0	0			0			0	
3:00 AM		0	0			0			0	
4:00 AM		0	1			0			0	
5:00 AM		4	2			3			3	
6:00 AM		3	5			4			4	
7:00 AM		16	**31**			**23**			**23**	
8:00 AM		**18**	15			16			16	
9:00 AM		8	5			6			6	
10:00 AM		5	9			7			7	
11:00 AM		7				7			7	
12:00 PM		9				9			9	
1:00 PM		10				10			10	
2:00 PM		9				9			9	
3:00 PM		20				20			20	
4:00 PM		**26**				**26**			**26**	
5:00 PM		14				14			14	
6:00 PM		7				7			7	
7:00 PM		1				1			1	
8:00 PM	2	0				1			1	
9:00 PM	**3**	3				3			3	
10:00 PM	1	0				0			0	
11:00 PM	0	0				0			0	
Day Total	6	160	69			166			166	
% Weekday Average	3.6%	96.4%	41.6%							
% Week Average	3.6%	96.4%	41.6%			100.0%				
AM Peak Volume		8:00 AM 18	7:00 AM 31			7:00 AM 23			7:00 AM 23	
PM Peak Volume	9:00 PM 3	4:00 PM 26				4:00 PM 26			4:00 PM 26	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: S Eastbourne Ave just south of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411238
DIRECTION: NB
DATE: Feb 16 2009 - Feb 18 2009

Start Time	Mon 16-Feb-09	Tue 17-Feb-09	Wed 18-Feb-09	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		0	0			0			0	
1:00 AM		0	0			0			0	
2:00 AM		0	0			0			0	
3:00 AM		0	1			0			0	
4:00 AM		0	1			0			0	
5:00 AM		1	1			1			1	
6:00 AM		6	5			5			5	
7:00 AM		20	18			19			19	
8:00 AM		18	14			16			16	
9:00 AM		18	21			19			19	
10:00 AM		17	25			21			21	
11:00 AM		**29**	**32**			**30**			**30**	
12:00 PM		27				27			27	
1:00 PM		26				26			26	
2:00 PM		22				22			22	
3:00 PM		**32**				**32**			**32**	
4:00 PM		21				21			21	
5:00 PM		16				16			16	
6:00 PM		17				17			17	
7:00 PM	10	17				13			13	
8:00 PM	**11**	5				8			8	
9:00 PM	3	6				4			4	
10:00 PM	6	5				5			5	
11:00 PM	1	2				1			1	
Day Total	31	305	118			303			303	
% Weekday Average	10.2%	100.7%	38.9%							
% Week Average	10.2%	100.7%	38.9%			100.0%				
AM Peak Volume		11:00 AM 29	11:00 AM 32			11:00 AM 30			11:00 AM 30	
PM Peak Volume	8:00 PM 11	3:00 PM 32				3:00 PM 32			3:00 PM 32	

Comments:

LOCATION: S Eastbourne Ave just south of E Broadway
SPECIFIC LOCATION: 100 ft from E Broadway
CITY/STATE: Tucson, AZ

QC JOB #: 10411238
DIRECTION: SB
DATE: Feb 16 2009 - Feb 18 2009

Start Time	Mon 16-Feb-09	Tue 17-Feb-09	Wed 18-Feb-09	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		0	1			0			0	
1:00 AM		0	0			0			0	
2:00 AM		0	0			0			0	
3:00 AM		0	0			0			0	
4:00 AM		0	0			0			0	
5:00 AM		2	1			1			1	
6:00 AM		0	0			0			0	
7:00 AM		5	5			5			5	
8:00 AM		5	6			5			5	
9:00 AM		17	13			15			15	
10:00 AM		15	17			16			16	
11:00 AM		**21**	**34**			**27**			**27**	
12:00 PM		24				24			24	
1:00 PM		21				21			21	
2:00 PM		23				23			23	
3:00 PM		23				23			23	
4:00 PM		**28**				**28**			**28**	
5:00 PM		22				22			22	
6:00 PM		25				25			25	
7:00 PM	**16**	9				12			12	
8:00 PM	6	2				4			4	
9:00 PM	2	9				5			5	
10:00 PM	3	1				2			2	
11:00 PM	0	2				1			1	
Day Total	27	254	77			259			259	
% Weekday Average	10.4%	98.1%	29.7%							
% Week Average	10.4%	98.1%	29.7%			100.0%				
AM Peak Volume		11:00 AM 21	11:00 AM 34			11:00 AM 27			11:00 AM 27	
PM Peak Volume	7:00 PM 16	4:00 PM 28				4:00 PM 28			4:00 PM 28	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

Quality Counts, LLC
16285 SW 85th Ave
Tigard, OR 97224
503-620-4242

Date 2/19/09 Travel Time Runs from Euclid to Country Club Eastbound

	Euclid	Park	Santa Rita	Highland	Cherry	Campbell	Plumer	Tucson	Treat	Country Club	Total
Run 1	7:01:46	7:02:13	7:02:34	7:02:48	7:03:06	7:03:41	7:04:14	7:04:37	7:05:02	7:05:30	4:44
Run 2	7:12:02	7:12:29	7:12:50	7:13:05	7:13:23	7:14:03	7:14:37	7:14:59	7:15:23	7:15:49	3:47
Run 3	7:22:28	7:22:56	7:23:17	7:23:32	7:23:52	7:24:33	7:25:06	7:25:31	7:25:54	7:26:25	4:03
Run 4	7:33:12	7:33:37	7:33:56	7:34:11	7:34:29	7:35:09	7:35:38	7:36:03	7:36:25	7:36:52	3:40
Run 5	7:45:12	7:45:36	7:45:55	7:46:14	7:46:35	7:47:15	7:47:49	7:48:14	7:48:38	7:49:04	3:52
Run 6	7:58:51	7:59:15	7:59:34	7:59:50	8:00:08	8:00:56	8:01:15	8:01:39	8:02:02	8:02:27	3:36
Run 7	8:15:00	8:15:31	8:15:49	8:16:04	8:16:21	8:17:01	8:17:44	8:18:13	8:18:36	8:19:01	4:01
Run 8	8:25:37	8:26:03	8:26:21	8:26:34	8:26:52	8:27:38	8:28:24	8:28:53	8:29:16	8:29:43	4:06
Run 9	8:37:36	8:38:01	8:38:18	8:38:35	8:38:53	8:39:33	8:40:03	8:40:31	8:40:54	8:41:22	4:14
Run 10	8:48:22	8:48:46	8:49:06	8:49:22	8:49:53	8:50:29	8:50:59	8:51:26	8:51:53	8:52:22	4:00

Date 2/19/09 Travel Time Runs from Country Club to Euclid Westbound

	Country Club	Treat	Tucson	Plumer	Campbell	Cherry	Highland	Santa Rita	Park	Euclid	Total
Run 1	7:06:10	7:06:44	7:07:09	7:07:34	7:08:05	7:08:35	7:08:54	7:09:08	7:09:29	7:10:29	4:19
Run 2	7:16:43	7:17:17	7:17:51	7:18:22	7:18:51	7:19:20	7:19:42	7:19:57	7:20:20	7:21:09	4:26
Run 3	7:27:26	7:27:59	7:28:23	7:28:47	7:29:15	7:29:41	7:30:00	7:30:14	7:30:36	7:31:32	4:06
Run 4	7:37:59	7:38:33	7:38:58	7:39:25	7:39:53	7:40:18	7:40:36	7:40:50	7:41:09	7:42:15	4:16
Run 5	7:49:58	7:50:30	7:51:13	7:51:57	7:53:24	7:54:00	7:54:21	7:54:37	7:54:57	7:55:54	5:56
Run 6	8:03:30	8:04:01	8:04:32	8:05:23	8:06:41	8:07:10	8:07:28	8:07:41	8:08:01	8:08:44	5:14
Run 7	8:19:54	8:20:26	8:20:49	8:21:16	8:21:58	8:22:26	8:22:46	8:22:59	8:23:19	8:23:43	3:49
Run 8	8:30:25	8:30:55	8:31:24	8:31:51	8:33:46	8:34:14	8:34:32	8:34:45	8:35:05	8:35:25	5:00
Run 9	8:42:14	8:42:46	8:43:23	8:43:55	8:44:27	8:44:54	8:45:11	8:45:23	8:45:43	8:46:09	3:55
Run 10	8:53:12	8:53:43	8:54:08	8:54:34	8:55:10	8:55:38	8:55:57	8:56:11	8:56:34	8:57:04	3:52

Quality Counts, LLC
16285 SW 85th Ave
Tigard, OR 97224
503-620-4242

Date 2/19/09 Travel Time Runs from Euclid to Country Club Eastbound

	Euclid	Park	Santa Rita	Highland	Cherry	Campbell	Plumer	Tucson	Treat	Country Club	Total
Run 1	4:01:30	4:01:54	4:02:14	4:02:31	4:02:52	4:03:31	4:04:03	4:04:29	4:04:54	4:05:24	3:54
Run 2	4:11:57	4:12:22	4:12:42	4:12:57	4:13:15	4:14:12	4:15:04	4:16:19	4:16:46	4:17:15	5:18
Run 3	4:24:05	4:24:28	4:24:46	4:25:00	4:28:18	4:26:05	4:26:42	4:27:07	4:27:33	4:28:03	3:58
Run 4	4:35:54	4:36:27	4:36:48	4:37:01	4:37:18	4:38:05	4:38:43	4:39:20	4:39:47	4:40:16	4:22
Run 5	4:48:01	4:48:25	4:48:45	4:49:03	4:49:23	4:49:49	4:50:32	4:51:02	4:51:25	4:51:53	3:52
Run 6	5:05:56	5:06:24	5:06:43	5:07:02	5:07:21	5:08:06	5:08:44	5:10:13	5:10:40	5:11:22	5:26
Run 7	5:34:28	5:34:51	5:35:10	5:35:37	5:35:58	5:36:46	5:37:18	5:37:45	5:38:08	5:38:37	4:09
Run 8	5:46:37	5:47:01	5:47:21	5:47:35	5:47:53	5:48:39	5:49:13	5:49:51	5:50:23	5:51:43	5:06

Date 2/19/09 Travel Time Runs from Country Club to Euclid Westbound

	Country Club	Treat	Tucson	Plumer	Campbell	Cherry	Highland	Santa Rita	Park	Euclid	Total
Run 1	4:06:22	4:06:52	4:07:30	4:08:01	4:09:28	4:09:57	4:10:16	4:10:29	4:10:48	4:11:09	4:47
Run 2	4:18:22	4:18:53	4:19:26	4:19:55	4:20:21	4:20:45	4:21:04	4:21:18	4:21:38	4:22:04	3:42
Run 3	4:29:04	4:29:34	4:30:04	4:30:58	4:32:00	4:32:27	4:32:45	4:32:58	4:33:18	4:33:40	4:36
Run 4	4:40:54	4:41:25	4:41:55	4:42:38	4:43:58	4:44:27	4:44:44	4:44:57	4:45:15	4:45:38	4:44
Run 5	4:57:22	4:57:55	4:58:31	4:59:02	5:00:32	5:01:06	5:01:24	5:01:41	5:02:18	5:03:02	5:40
Run 6	5:24:20	5:24:52	5:25:27	5:25:54	5:27:34	5:28:22	5:28:43	5:28:57	5:29:25	5:30:06	5:46
Run 7	5:39:24	5:39:55	5:40:26	5:40:54	5:42:22	5:42:50	5:43:08	5:43:21	5:43:55	5:44:18	4:54
Run 8	5:54:16	5:54:50	5:55:19	5:56:04	5:57:25	5:57:55	5:58:13	5:58:27	5:58:48	5:59:11	4:55

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

16285 SW 85th Ave, Ste 302
Tigard, OR 97224
503-620-4242
www.qualitycounts.net

Broadway & Plumber HAWK Signal

9/1/2011	Peds Crossing	# Of Signal Changes
7:00	2	1
7:15	2	1
7:30	3	2
7:45	5	4
8:00	6	4
8:15	3	2
8:30	3	2
8:45	7	4
9:00	3	3
9:15	2	2
9:30	8	7
9:45	3	3
10:00	3	3
10:15	7	5
10:30	4	5
10:45	2	2
11:00	1	1
11:15	3	3
11:30	0	0
11:45	4	3
12:00	0	0
12:15	0	0
12:30	0	0
12:45	1	2
13:00	0	0
13:15	3	2
13:30	0	0
13:45	2	2
14:00	1	1
14:15	1	1
14:30	2	2
14:45	2	2
15:00	4	2
15:15	9	5
15:30	8	2
15:45	6	1
16:00	4	4
16:15	0	0
16:30	5	5
16:45	4	3
17:00	3	3
17:15	2	2
17:30	3	3
17:45	5	4
18:00	6	6
18:15	4	3
18:30	1	2
18:45	2	2
Total	149	116

16285 SW 85th Ave, Ste 302
Tigard, OR 97224
503-620-4242
www.qualitycounts.net

Broadway & Norris HAWK Signal

9/1/2011	Peds Crossing	# Of Signal Changes
7:00	2	2
7:15	3	3
7:30	1	1
7:45	0	1
8:00	0	0
8:15	2	2
8:30	3	2
8:45	4	4
9:00	2	2
9:15	2	2
9:30	1	1
9:45	1	1
10:00	2	2
10:15	4	3
10:30	4	3
10:45	4	4
11:00	2	2
11:15	3	3
11:30	5	5
11:45	0	0
12:00	4	3
12:15	4	3
12:30	4	4
12:45	1	1
13:00	2	2
13:15	0	0
13:30	1	0
13:45	0	0
14:00	3	3
14:15	3	2
14:30	5	3
14:45	1	1
15:00	2	1
15:15	6	4
15:30	2	1
15:45	3	2
16:00	4	2
16:15	3	3
16:30	2	1
16:45	1	1
17:00	2	2
17:15	1	1
17:30	3	2
17:45	2	2
18:00	1	1
18:15	1	1
18:30	2	2
18:45	4	2
Total	112	93

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

16285 SW 85th Ave, Ste 302
Tigard, OR 97224
503-620-4242
www.qualitycounts.net

Broadway & Park HAWK Signal

9/1/2011	Peds Crossing	# Of Signal Changes
7:00	2	1
7:15	1	1
7:30	6	5
7:45	3	3
8:00	6	5
8:15	7	5
8:30	3	2
8:45	3	3
9:00	3	3
9:15	11	6
9:30	6	2
9:45	12	2
10:00	12	5
10:15	4	3
10:30	0	0
10:45	2	2
11:00	2	2
11:15	0	0
11:30	10	4
11:45	5	4
12:00	3	2
12:15	1	0
12:30	2	1
12:45	1	1
13:00	3	3
13:15	1	1
13:30	5	2
13:45	3	1
14:00	0	0
14:15	0	0
14:30	0	0
14:45	0	0
15:00	0	0
15:15	3	2
15:30	4	2
15:45	4	4
16:00	3	2
16:15	5	4
16:30	2	2
16:45	6	4
17:00	2	2
17:15	1	1
17:30	2	1
17:45	1	1
18:00	3	2
18:15	2	1
18:30	3	1
18:45	2	4
Total	160	102

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

16285 SW 85th Ave, Ste 302
Tigard, OR 97224
503-620-4242
www.qualitycounts.net

Broadway & Cherry HAWK Signal

9/1/2011	Peds Crossing	# Of Signal Changes
7:00	1	1
7:15	4	3
7:30	3	1
7:45	4	2
8:00	5	4
8:15	7	4
8:30	5	3
8:45	1	2
9:00	3	1
9:15	5	4
9:30	7	5
9:45	3	2
10:00	3	2
10:15	2	2
10:30	1	1
10:45	3	3
11:00	3	2
11:15	1	1
11:30	4	0
11:45	3	2
12:00	7	5
12:15	1	1
12:30	6	4
12:45	4	3
13:00	5	4
13:15	1	1
13:30	2	2
13:45	6	6
14:00	4	2
14:15	3	2
14:30	3	3
14:45	1	1
15:00	2	2
15:15	6	7
15:30	0	0
15:45	1	1
16:00	7	3
16:15	3	2
16:30	2	2
16:45	5	5
17:00	0	0
17:15	7	5
17:30	1	1
17:45	6	3
18:00	3	3
18:15	2	1
18:30	6	3
18:45	8	5
Total	170	122

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

16285 SW 85th Ave, Ste 302
Tigard, OR 97224
503-620-4242
www.qualitycounts.net

Broadway & Treat Ped Crossing

9/1/2011	Peds Crossing	Hourly Totals
7:00	0	
7:15	1	
7:30	1	
7:45	0	2
8:00	0	2
8:15	0	1
8:30	0	0
8:45	0	0
9:00	0	0
9:15	2	2
9:30	0	2
9:45	1	3
10:00	1	4
10:15	3	5
10:30	1	6
10:45	0	5
11:00	0	4
11:15	0	1
11:30	0	0
11:45	1	1
12:00	0	1
12:15	0	1
12:30	1	2
12:45	1	2
13:00	1	3
13:15	0	3
13:30	0	2
13:45	1	2
14:00	1	2
14:15	0	2
14:30	0	2
14:45	2	3
15:00	0	2
15:15	3	5
15:30	0	5
15:45	0	3
16:00	1	4
16:15	0	1
16:30	0	1
16:45	0	1
17:00	0	0
17:15	1	1
17:30	3	4
17:45	0	4
18:00	0	4
18:15	0	3
18:30	0	0
18:45	4	4
Total	30	

16285 SW 85th Ave, Ste 302
Tigard, OR 97224
503-620-4242
www.qualitycounts.net

Broadway & Treat Ave Gap Study - Combined

9/1/2011	2 - 3 Secs.	4 - 5 Secs.	6 - 7 Secs.	8 - 9 Secs.	10 - 11 Secs.	12 - 13 Secs.	14 - 15 Secs.	16 - 17 Secs.	18 - 19 Secs.	20 - 21 Secs.	22 - 23 Secs.	24 - 25 Secs.	26 - 27 Secs.	28 - 29 Secs.	>29 Secs.	**Gaps 16 Seconds and Greater**
9:45:00 AM	19	7	1	2	0	0	1	0	0	0	0	0	0	0	0	0
9:50:00 AM	25	7	2	1	1	0	0	0	0	0	0	0	0	0	0	0
9:55:00 AM	19	7	5	1	1	0	0	0	0	0	0	0	0	0	0	0
10:00:00 AM	23	8	5	1	0	0	0	0	1	0	0	0	0	0	0	1
10:05:00 AM	19	5	2	1	3	0	0	0	0	0	0	0	0	0	0	0
10:10:00 AM	18	5	4	1	2	1	0	1	0	0	0	0	0	0	0	1
10:15:00 AM	17	7	2	0	0	1	1	0	0	0	0	0	0	0	0	0
10:20:00 AM	22	6	3	1	1	2	0	0	0	0	0	0	0	0	0	0
10:25:00 AM	24	8	2	2	1	0	1	0	0	0	0	0	0	0	0	0
10:30:00 AM	26	5	1	1	1	0	0	0	0	0	0	0	0	0	0	0
10:35:00 AM	26	11	0	1	0	1	0	0	0	0	0	0	0	0	0	0
															Total	**2**

Broadway & Treat Ave Gap Study - EB

9/1/2011	2 - 3 Secs.	4 - 5 Secs.	6 - 7 Secs.	8 - 9 Secs.	10 - 11 Secs.	12 - 13 Secs.	14 - 15 Secs.	16 - 17 Secs.	18 - 19 Secs.	20 - 21 Secs.	22 - 23 Secs.	24 - 25 Secs.	26 - 27 Secs.	28 - 29 Secs.	>29 Secs.	Gaps 16 Seconds and Greater
9:45:00 AM	9	3	3	1	3	1	1	1	2	1	0	0	0	0	0	4
9:50:00 AM	10	6	1	1	3	1	2	0	2	0	0	0	1	0	0	3
9:55:00 AM	11	4	2	1	3	0	1	0	0	1	1	0	0	0	1	3
10:00:00 AM	16	4	4	1	2	0	2	2	0	0	0	0	0	0	1	3
10:05:00 AM	14	8	1	2	1	1	0	0	2	1	1	0	0	0	0	4
10:10:00 AM	6	5	1	2	2	1	0	0	0	1	1	0	0	1	1	4
10:15:00 AM	7	4	3	2	1	2	1	1	1	1	0	1	0	0	0	4
10:20:00 AM	10	2	5	1	2	3	0	1	0	0	0	0	0	0	1	2
10:25:00 AM	19	3	2	2	1	1	1	0	0	0	2	0	1	0	0	3
10:30:00 AM	15	4	4	2	1	1	3	0	0	0	0	0	0	0	1	1
10:35:00 AM	12	7	1	0	1	1	0	0	0	0	1	0	1	0	1	3

Broadway & Treat Ave Gap Study - WB

9/1/2011	2 - 3 Secs.	4 - 5 Secs.	6 - 7 Secs.	8 - 9 Secs.	10 - 11 Secs.	12 - 13 Secs.	14 - 15 Secs.	16 - 17 Secs.	18 - 19 Secs.	20 - 21 Secs.	22 - 23 Secs.	24 - 25 Secs.	26 - 27 Secs.	28 - 29 Secs.	>29 Secs.	Gaps 16 Seconds and Greater
9:45:00 AM	17	7	1	2	1	0	2	1	0	0	0	0	0	0	1	2
9:50:00 AM	17	7	1	1	1	3	0	1	0	1	1	0	0	0	0	3
9:55:00 AM	17	5	5	0	2	0	0	0	1	1	0	0	0	1	0	3
10:00:00 AM	17	10	5	0	2	1	2	0	0	0	0	1	0	0	0	1
10:05:00 AM	15	6	2	0	1	2	1	0	0	1	0	1	0	0	0	2
10:10:00 AM	14	6	3	1	2	2	1	2	0	0	0	0	1	0	0	3
10:15:00 AM	16	7	1	3	0	1	0	1	1	0	0	0	1	0	0	3
10:20:00 AM	14	5	1	1	2	0	1	0	1	0	0	1	0	1	1	4
10:25:00 AM	14	6	3	3	2	2	1	0	0	1	0	0	1	0	0	2
10:30:00 AM	18	10	3	1	3	1	0	1	0	0	0	0	1	0	0	2
10:35:00 AM	15	4	4	2	2	0	0	0	1	1	2	0	0	0	1	5

B. Capacity Analysis Worksheets – Existing

AM Peak Period
Level of Service
Results

HCM Signalized Intersection Capacity Analysis
573: Broadway Blvd & Euclid Ave

4/8/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	373	820	77	221	869	289	71	705	266	222	656	280
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	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	5085	1352	1752	5085	1541	1597	3347	1473	1752	3505	1538
Flt Permitted	0.17	1.00	1.00	0.16	1.00	1.00	0.16	1.00	1.00	0.16	1.00	1.00
Satd. Flow (perm)	310	5085	1352	294	5085	1541	271	3347	1473	297	3505	1538
Peak-hour factor, PHF	0.81	0.81	0.81	0.88	0.88	0.88	0.86	0.86	0.86	0.88	0.88	0.88
Adj. Flow (vph)	460	1012	95	251	988	328	83	820	309	252	745	318
RTOR Reduction (vph)	0	0	66	0	0	138	0	0	214	0	0	228
Lane Group Flow (vph)	460	1012	29	251	988	190	83	820	95	252	745	90
Confl. Peds. (#/hr)	5		8	8		5			9	9		
Heavy Vehicles (%)	3%	2%	17%	3%	2%	3%	13%	7%	7%	3%	3%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	4	0	0	0	0
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	41.5	28.4	28.4	41.5	28.4	28.4	31.0	23.8	23.8	31.0	23.8	23.8
Effective Green, g (s)	43.5	27.9	27.9	43.5	27.9	27.9	33.0	23.8	23.8	33.0	23.8	23.8
Actuated g/C Ratio	0.48	0.31	0.31	0.48	0.31	0.31	0.37	0.26	0.26	0.37	0.26	0.26
Clearance Time (s)	5.0	3.5	3.5	5.0	3.5	3.5	5.0	4.0	4.0	5.0	4.0	4.0
Vehicle Extension (s)	2.0	5.0	5.0	2.0	5.0	5.0	2.0	3.0	3.0	2.0	3.0	3.0
Lane Grp Cap (vph)	376	1576	419	371	1576	478	220	885	390	241	927	407
v/s Ratio Prot	c0.19	0.20		0.11	0.19		0.03	0.25		c0.10	0.21	
v/s Ratio Perm	c0.40		0.02	0.22		0.12	0.10		0.06	c0.29		0.06
v/c Ratio	1.22	0.64	0.07	0.68	0.63	0.40	0.38	0.93	0.24	1.05	0.80	0.22
Uniform Delay, d1	28.7	26.7	21.9	26.4	26.6	24.4	32.5	32.2	26.0	35.9	30.9	25.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	122.1	2.0	0.3	3.8	1.9	2.5	0.4	15.3	0.3	70.4	5.1	0.3
Delay (s)	150.8	28.8	22.2	30.2	28.5	26.9	32.9	47.5	26.3	106.4	36.0	26.1
Level of Service	F	C	C	C	C	C	C	D	C	F	D	C
Approach Delay (s)		64.2			28.4			41.1			47.1	
Approach LOS		E			C			D			D	

Intersection Summary			
HCM Average Control Delay	45.4	HCM Level of Service	D
HCM Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	86.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	93	1103	32	25	1377	22	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.0	4.0	4.5	4.0							
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95							
Frt	1.00	1.00	0.85	1.00	1.00							
Flt Protected	0.95	1.00	1.00	0.95	1.00							
Satd. Flow (prot)	1770	3505	1482	1736	3531							
Flt Permitted	0.17	1.00	1.00	0.22	1.00							
Satd. Flow (perm)	321	3505	1482	407	3531							
Peak-hour factor, PHF	0.88	0.88	0.88	0.93	0.93	0.93	0.79	0.79	0.79	0.58	0.58	0.58
Adj. Flow (vph)	106	1253	36	27	1481	24	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	106	1253	36	27	1505	0	0	0	0	0	0	0
Heavy Vehicles (%)	2%	3%	9%	4%	2%	2%	17%	2%	8%	2%	2%	2%
Turn Type	Perm		Perm	Perm								
Protected Phases		2			6							
Permitted Phases	2		2	6								
Actuated Green, G (s)	49.5	49.5	49.5	49.5	49.5							
Effective Green, g (s)	49.5	49.5	49.5	49.5	49.5							
Actuated g/C Ratio	1.00	1.00	1.00	1.00	1.00							
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5							
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0							
Lane Grp Cap (vph)	321	3505	1482	407	3531							
v/s Ratio Prot		0.36			c0.43							
v/s Ratio Perm	0.33		0.02	0.07								
v/c Ratio	0.33	0.36	0.02	0.07	0.43							
Uniform Delay, d1	0.0	0.0	0.0	0.0	0.0							
Progression Factor	1.00	1.00	1.00	1.00	1.00							
Incremental Delay, d2	2.7	0.3	0.0	0.3	0.4							
Delay (s)	2.7	0.3	0.0	0.3	0.4							
Level of Service	A	A	A	A	A							
Approach Delay (s)		0.5			0.4			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	0.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	0.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	37	924	43	34	1322	80	102	57	56	52	36	27
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	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.98	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.93		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3403		1696	3460		1759	1671		1730	1715	
Flt Permitted	0.13	1.00		0.24	1.00		0.70	1.00		0.51	1.00	
Satd. Flow (perm)	249	3403		420	3460		1303	1671		930	1715	
Peak-hour factor, PHF	0.90	0.90	0.90	0.94	0.94	0.94	0.66	0.66	0.66	0.77	0.77	0.77
Adj. Flow (vph)	41	1027	48	36	1406	85	155	86	85	68	47	35
RTOR Reduction (vph)	0	3	0	0	4	0	0	45	0	0	28	0
Lane Group Flow (vph)	41	1072	0	36	1487	0	155	126	0	68	54	0
Confl. Peds. (#/hr)	5		8	8		5	5		23	23		5
Heavy Vehicles (%)	2%	4%	2%	6%	2%	2%	2%	4%	2%	2%	2%	4%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	0	0	0	0	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	63.9	63.9		63.9	63.9		15.6	15.6		15.6	15.6	
Effective Green, g (s)	64.9	64.9		64.9	64.9		17.1	17.1		17.1	17.1	
Actuated g/C Ratio	0.72	0.72		0.72	0.72		0.19	0.19		0.19	0.19	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	180	2454		303	2495		248	317		177	326	
v/s Ratio Prot		0.32			c0.43			0.08			0.03	
v/s Ratio Perm	0.16			0.09			c0.12			0.07		
v/c Ratio	0.23	0.44		0.12	0.60		0.62	0.40		0.38	0.16	
Uniform Delay, d1	4.2	5.1		3.8	6.1		33.5	31.9		31.8	30.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.9	0.6		0.8	1.1		3.5	0.3		0.5	0.1	
Delay (s)	7.1	5.7		4.6	7.2		37.0	32.2		32.4	30.6	
Level of Service	A	A		A	A		D	C		C	C	
Approach Delay (s)		5.7			7.1			34.5			31.4	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	10.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	987	23	21	1461	26	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.0		4.5	4.0							
Lane Util. Factor	1.00	0.95		1.00	0.95							
Frpb, ped/bikes	1.00	1.00		1.00	1.00							
Flpb, ped/bikes	1.00	1.00		1.00	1.00							
Frt	1.00	1.00		1.00	1.00							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1769	3492		1639	3527							
Flt Permitted	0.16	1.00		0.25	1.00							
Satd. Flow (perm)	307	3492		432	3527							
Peak-hour factor, PHF	0.89	0.89	0.89	0.96	0.96	0.96	0.66	0.66	0.66	0.58	0.58	0.58
Adj. Flow (vph)	22	1109	26	22	1522	27	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	22	1135	0	22	1549	0	0	0	0	0	0	0
Confl. Peds. (#/hr)	10		11	11		10	9		22	22		9
Heavy Vehicles (%)	2%	3%	2%	10%	2%	4%	7%	2%	5%	2%	2%	10%
Turn Type	Perm			Perm								
Protected Phases		2			6							
Permitted Phases	2			6								
Actuated Green, G (s)	49.5	49.5		49.5	49.5							
Effective Green, g (s)	49.5	49.5		49.5	49.5							
Actuated g/C Ratio	1.00	1.00		1.00	1.00							
Clearance Time (s)	4.5	4.5		4.5	4.5							
Vehicle Extension (s)	3.0	3.0		3.0	3.0							
Lane Grp Cap (vph)	307	3492		432	3527							
v/s Ratio Prot		0.33			c0.44							
v/s Ratio Perm	0.07			0.05								
v/c Ratio	0.07	0.33		0.05	0.44							
Uniform Delay, d1	0.0	0.0		0.0	0.0							
Progression Factor	1.00	1.00		1.00	1.00							
Incremental Delay, d2	0.5	0.2		0.2	0.4							
Delay (s)	0.5	0.2		0.2	0.4							
Level of Service	A	A		A	A							
Approach Delay (s)		0.3			0.4			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	0.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	0.0
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	749	99	165	1135	159	174	1289	146	236	1110	248
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
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3397	1523	1702	3418		3365	4914	1436	3303	5036	1522
Flt Permitted	0.10	1.00	1.00	0.20	1.00		0.16	1.00	1.00	0.16	1.00	1.00
Satd. Flow (perm)	185	3397	1523	362	3418		567	4914	1436	556	5036	1522
Peak-hour factor, PHF	0.84	0.84	0.84	0.90	0.90	0.90	0.90	0.90	0.90	0.95	0.95	0.95
Adj. Flow (vph)	155	892	118	183	1261	177	193	1432	162	248	1168	261
RTOR Reduction (vph)	0	0	62	0	12	0	0	0	101	0	0	100
Lane Group Flow (vph)	155	892	56	183	1426	0	193	1432	61	248	1168	161
Confl. Peds. (#/hr)	27		21	21		27	20		14	14		20
Heavy Vehicles (%)	5%	5%	3%	6%	2%	2%	4%	5%	9%	6%	3%	2%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	4	0	0	0	0
Turn Type	pm+pt		Perm	pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6			8		8	4		4
Actuated Green, G (s)	43.1	38.1	38.1	43.1	38.1		28.9	24.0	24.0	28.9	24.0	24.0
Effective Green, g (s)	45.1	38.1	38.1	45.1	38.1		30.9	24.0	24.0	30.9	24.0	24.0
Actuated g/C Ratio	0.50	0.42	0.42	0.50	0.42		0.34	0.27	0.27	0.34	0.27	0.27
Clearance Time (s)	5.0	4.0	4.0	5.0	4.0		5.0	4.0	4.0	5.0	4.0	4.0
Vehicle Extension (s)	2.0	5.0	5.0	2.0	5.0		2.0	3.0	3.0	2.0	3.0	3.0
Lane Grp Cap (vph)	195	1438	645	271	1447		378	1310	383	371	1343	406
v/s Ratio Prot	c0.05	0.26		0.05	c0.42		0.03	c0.29		c0.04	0.23	
v/s Ratio Perm	0.35		0.04	0.29			0.14		0.04	0.19		0.11
v/c Ratio	0.79	0.62	0.09	0.68	0.99		0.51	1.09	0.16	0.67	0.87	0.40
Uniform Delay, d1	37.5	20.3	15.5	27.8	25.7		35.4	33.0	25.3	37.8	31.5	27.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	18.5	2.0	0.3	5.2	20.4		0.5	54.3	0.2	3.5	6.3	0.6
Delay (s)	55.9	22.3	15.8	32.9	46.1		35.9	87.3	25.5	41.3	37.8	27.7
Level of Service	E	C	B	C	D		D	F	C	D	D	C
Approach Delay (s)		26.1			44.6			76.2			36.7	
Approach LOS		C			D			E			D	

Intersection Summary			
HCM Average Control Delay	48.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	18	1077	50	91	1501	21	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5							
Lane Util. Factor	1.00	0.95		1.00	0.95							
Frpb, ped/bikes	1.00	1.00		1.00	1.00							
Flpb, ped/bikes	1.00	1.00		1.00	1.00							
Frt	1.00	0.99		1.00	1.00							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1703	3413		1752	3531							
Flt Permitted	0.14	1.00		0.21	1.00							
Satd. Flow (perm)	246	3413		381	3531							
Peak-hour factor, PHF	0.85	0.85	0.85	0.88	0.88	0.88	0.57	0.57	0.57	0.73	0.73	0.73
Adj. Flow (vph)	21	1267	59	103	1706	24	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	21	1326	0	103	1730	0	0	0	0	0	0	0
Confl. Peds. (#/hr)	1		5	5		1			16	16		
Heavy Vehicles (%)	6%	5%	4%	3%	2%	2%	2%	2%	12%	50%	2%	4%
Turn Type	Perm			Perm								
Protected Phases		2			6							
Permitted Phases	2			6								
Actuated Green, G (s)	49.5	49.5		49.5	49.5							
Effective Green, g (s)	49.5	49.5		49.5	49.5							
Actuated g/C Ratio	1.00	1.00		1.00	1.00							
Clearance Time (s)	4.5	4.5		4.5	4.5							
Vehicle Extension (s)	3.0	3.0		3.0	3.0							
Lane Grp Cap (vph)	246	3413		381	3531							
v/s Ratio Prot		0.39			c0.49							
v/s Ratio Perm	0.09			0.27								
v/c Ratio	0.09	0.39		0.27	0.49							
Uniform Delay, d1	0.0	0.0		0.0	0.0							
Progression Factor	1.00	1.00		1.00	1.00							
Incremental Delay, d2	0.7	0.3		1.7	0.5							
Delay (s)	0.7	0.3		1.7	0.5							
Level of Service	A	A		A	A							
Approach Delay (s)		0.3			0.6			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	0.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	0.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	950	98	53	1385	83	147	281	112	103	261	117
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
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1626	3349		1654	3456		1768	1827	1498	1734	1810	1537
Flt Permitted	0.08	1.00		0.16	1.00		0.31	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)	138	3349		279	3456		573	1827	1498	393	1810	1537
Peak-hour factor, PHF	0.90	0.90	0.90	0.92	0.92	0.92	0.76	0.76	0.76	0.83	0.83	0.83
Adj. Flow (vph)	49	1056	109	58	1505	90	193	370	147	124	314	141
RTOR Reduction (vph)	0	8	0	0	5	0	0	0	83	0	0	39
Lane Group Flow (vph)	49	1157	0	58	1591	0	193	370	64	124	314	102
Confl. Peds. (#/hr)	16		4	4		16	6		11	11		6
Heavy Vehicles (%)	11%	5%	2%	9%	2%	2%	2%	4%	5%	4%	5%	3%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	0	0	0	0	0
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		2			6		3	8		7	4	
Permitted Phases	2			6			8		8	4		4
Actuated Green, G (s)	47.5	47.5		47.5	47.5		27.5	21.7	21.7	27.5	21.7	21.7
Effective Green, g (s)	49.5	49.5		49.5	49.5		29.5	21.7	21.7	29.5	21.7	21.7
Actuated g/C Ratio	0.55	0.55		0.55	0.55		0.33	0.24	0.24	0.33	0.24	0.24
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	4.0	4.0	5.0	4.0	4.0
Vehicle Extension (s)	5.0	5.0		5.0	5.0		2.0	3.0	3.0	2.0	3.0	3.0
Lane Grp Cap (vph)	76	1842		153	1901		278	441	361	230	436	371
v/s Ratio Prot		0.35			c0.46		c0.05	c0.20		0.04	0.17	
v/s Ratio Perm	0.35			0.21			0.18		0.04	0.14		0.07
v/c Ratio	0.64	0.63		0.38	0.84		0.69	0.84	0.18	0.54	0.72	0.28
Uniform Delay, d1	14.1	13.9		11.5	16.9		33.0	32.5	27.1	34.4	31.4	27.8
Progression Factor	1.00	1.00		0.67	0.56		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	35.2	1.6		3.5	2.4		5.9	13.1	0.2	1.2	5.8	0.4
Delay (s)	49.3	15.6		11.3	11.7		39.0	45.6	27.3	35.6	37.1	28.2
Level of Service	D	B		B	B		D	D	C	D	D	C
Approach Delay (s)		16.9			11.7			40.0			34.6	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	836	58	108	1259	271	139	564	103	208	467	144
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	
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.97	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1736	4814		1769	3505	1506	1769	3525	1500	1768	3382	
Flt Permitted	0.11	1.00		0.21	1.00	1.00	0.19	1.00	1.00	0.19	1.00	
Satd. Flow (perm)	195	4814		397	3505	1506	351	3525	1500	351	3382	
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	147	909	63	115	1339	288	162	656	120	242	543	167
RTOR Reduction (vph)	0	8	0	0	0	171	0	0	93	0	32	0
Lane Group Flow (vph)	147	964	0	115	1339	117	162	656	27	242	678	0
Confl. Peds. (#/hr)	3		2	2		3	7		14	14		7
Heavy Vehicles (%)	4%	6%	2%	2%	3%	3%	2%	2%	4%	2%	2%	2%
Bus Blockages (#/hr)	0	6	0	0	0	6	0	2	0	0	2	0
Turn Type	pm+pt			pm+pt		Perm	pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8	4		
Actuated Green, G (s)	43.3	36.5		43.3	36.5	36.5	28.7	20.2	20.2	28.7	20.2	
Effective Green, g (s)	45.3	36.5		45.3	36.5	36.5	30.7	20.2	20.2	30.7	20.2	
Actuated g/C Ratio	0.50	0.41		0.50	0.41	0.41	0.34	0.22	0.22	0.34	0.22	
Clearance Time (s)	5.0	4.0		5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0	
Vehicle Extension (s)	2.0	5.0		2.0	5.0	5.0	2.0	3.0	3.0	2.0	3.0	
Lane Grp Cap (vph)	232	1952		319	1421	611	269	791	337	269	759	
v/s Ratio Prot	c0.05	0.20		0.03	c0.38		0.06	0.19		c0.09	0.20	
v/s Ratio Perm	0.26			0.15		0.08	0.14		0.02	c0.21		
v/c Ratio	0.63	0.49		0.36	0.94	0.19	0.60	0.83	0.08	0.90	0.89	
Uniform Delay, d1	34.9	19.9		20.6	25.7	17.2	33.6	33.3	27.6	34.4	33.9	
Progression Factor	0.84	0.56		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.4	0.7		0.3	13.6	0.7	2.6	7.2	0.1	29.2	12.9	
Delay (s)	32.5	11.9		20.9	39.3	17.9	36.2	40.5	27.7	63.6	46.8	
Level of Service	C	B		C	D	B	D	D	C	E	D	
Approach Delay (s)		14.6			34.6			38.1			51.0	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM Average Control Delay	33.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	82.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	1128	22	43	1440	31	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.5		4.5	3.5							
Lane Util. Factor	1.00	0.95		1.00	0.95							
Frpb, ped/bikes	1.00	1.00		1.00	1.00							
Flpb, ped/bikes	1.00	1.00		1.00	1.00							
Frt	1.00	1.00		1.00	1.00							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1543	3419		1769	3526							
Flt Permitted	0.15	1.00		0.22	1.00							
Satd. Flow (perm)	241	3419		410	3526							
Peak-hour factor, PHF	0.91	0.91	0.91	0.89	0.89	0.89	0.70	0.70	0.70	0.57	0.57	0.57
Adj. Flow (vph)	7	1240	24	48	1618	35	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	7	1264	0	48	1653	0	0	0	0	0	0	0
Confl. Peds. (#/hr)	2		1	1		2	1					1
Heavy Vehicles (%)	17%	5%	18%	2%	2%	2%	2%	2%	10%	2%	2%	20%
Turn Type	Perm			Perm								
Protected Phases		2			6							
Permitted Phases	2			6								
Actuated Green, G (s)	49.5	49.5		49.5	49.5							
Effective Green, g (s)	49.5	49.5		49.5	49.5							
Actuated g/C Ratio	1.00	1.00		1.00	1.00							
Clearance Time (s)	4.5	4.5		4.5	4.5							
Vehicle Extension (s)	3.0	3.0		3.0	3.0							
Lane Grp Cap (vph)	241	3419		410	3526							
v/s Ratio Prot		0.37			c0.47							
v/s Ratio Perm	0.03			0.12								
v/c Ratio	0.03	0.37		0.12	0.47							
Uniform Delay, d1	0.0	0.0		0.0	0.0							
Progression Factor	1.00	1.00		1.00	1.00							
Incremental Delay, d2	0.2	0.3		0.6	0.4							
Delay (s)	0.2	0.3		0.6	0.4							
Level of Service	A	A		A	A							
Approach Delay (s)		0.3			0.5			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	0.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	0.0
Intersection Capacity Utilization	44.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
574: Broadway Blvd & Park Ave

4/6/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	93	1103	32	25	1377	22	6	1	26	2	1	27
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.93	0.93	0.93	0.79	0.79	0.79	0.58	0.58	0.58
Hourly flow rate (vph)	106	1253	36	27	1481	24	8	1	33	3	2	47
Pedestrians					25							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					4.0							
Percent Blockage					2							
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		976										
pX, platoon unblocked				0.82			0.82	0.82	0.82	0.82	0.82	
vC, conflicting volume	1504			1290			2306	3023	652	2443	3047	752
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1504			908			2152	3028	128	2319	3058	752
tC, single (s)	4.1			4.2			7.8	6.5	7.1	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.7	4.0	3.4	3.5	4.0	3.3
p0 queue free %	76			96			26	83	95	68	76	87
cM capacity (veh/h)	441			599			10	8	704	11	7	353

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	106	627	627	36	27	987	517	42	52
Volume Left	106	0	0	0	27	0	0	8	3
Volume Right	0	0	0	36	0	0	24	33	47
cSH	441	1700	1700	1700	599	1700	1700	44	75
Volume to Capacity	0.24	0.37	0.37	0.02	0.04	0.58	0.30	0.95	0.69
Queue Length 95th (ft)	23	0	0	0	4	0	0	96	80
Control Delay (s)	15.7	0.0	0.0	0.0	11.3	0.0	0.0	262.7	125.1
Lane LOS	C				B			F	F
Approach Delay (s)	1.2				0.2			262.7	125.1
Approach LOS								F	F

Intersection Summary			
Average Delay	6.4		
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	987	23	21	1461	26	15	1	43	0	1	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.96	0.96	0.96	0.66	0.66	0.66	0.58	0.58	0.58
Hourly flow rate (vph)	22	1109	26	22	1522	27	23	2	65	0	2	17
Pedestrians		9			22			11			10	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		1			2			1			1	
Right turn flare (veh)									6			6
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		611										
pX, platoon unblocked				0.90			0.90	0.90	0.90	0.90	0.90	
vC, conflicting volume	1559			1146			1992	2781	600	2211	2780	793
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1559			932			1876	2755	324	2121	2755	793
tC, single (s)	4.1			4.3			7.6	6.5	7.0	7.5	6.5	7.1
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.6	4.0	3.3	3.5	4.0	3.4
p0 queue free %	95			96			22	90	89	100	89	94
cM capacity (veh/h)	417			606			29	16	578	19	16	310

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	22	739	396	22	1015	534	23	67	0	19
Volume Left	22	0	0	22	0	0	23	0	0	0
Volume Right	0	0	26	0	0	27	0	65	0	17
cSH	417	1700	1700	606	1700	1700	29	592	1700	171
Volume to Capacity	0.05	0.43	0.23	0.04	0.60	0.31	0.78	0.11	0.00	0.11
Queue Length 95th (ft)	4	0	0	3	0	0	64	9	0	9
Control Delay (s)	14.1	0.0	0.0	11.2	0.0	0.0	293.5	17.7	0.0	39.7
Lane LOS	B			B			F	C	A	E
Approach Delay (s)	0.3			0.2			87.8		39.7	
Approach LOS							F		E	

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	18	1077	50	91	1501	21	5	0	42	2	0	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.88	0.88	0.88	0.57	0.57	0.57	0.73	0.73	0.73
Hourly flow rate (vph)	21	1267	59	103	1706	24	9	0	74	3	0	34
Pedestrians					16			5			1	
Lane Width (ft)					12.0			12.0			12.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					1			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					1308							
pX, platoon unblocked	0.62						0.62	0.62		0.62	0.62	0.62
vC, conflicting volume	1731			1331			2438	3281	684	2691	3299	866
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	957			1331			2095	3453	684	2503	3481	0
tC, single (s)	4.2			4.2			7.5	6.5	7.1	8.5	6.5	7.0
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.4	4.0	4.0	3.3
p0 queue free %	95			80			38	100	80	4	100	95
cM capacity (veh/h)	429			507			14	3	362	3	3	669

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	21	845	481	103	1137	592	9	74	3	34
Volume Left	21	0	0	103	0	0	9	0	3	0
Volume Right	0	0	59	0	0	24	0	74	0	34
cSH	429	1700	1700	507	1700	1700	14	362	3	669
Volume to Capacity	0.05	0.50	0.28	0.20	0.67	0.35	0.62	0.20	0.96	0.05
Queue Length 95th (ft)	4	0	0	19	0	0	38	19	25	4
Control Delay (s)	13.8	0.0	0.0	13.9	0.0	0.0	451.5	17.5	1990.5	10.7
Lane LOS	B			B			F	C	F	B
Approach Delay (s)	0.2			0.8			63.6		157.3	
Approach LOS							F		F	

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	12	1049	19	14	1575	20	7	0	5	3	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.63	0.63	0.63	0.56	0.56	0.56
Hourly flow rate (vph)	13	1140	21	15	1712	22	11	0	8	5	0	18
Pedestrians					3			3			9	
Lane Width (ft)					12.0			12.0			12.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1743			1164			2084	2953	586	2369	2952	876
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1743			1164			2084	2953	586	2369	2952	876
tC, single (s)	4.3			4.1			7.5	6.5	6.9	7.5	6.5	7.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	96			97			59	100	98	68	100	93
cM capacity (veh/h)	329			594			27	13	451	17	13	267

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	13	760	401	15	1141	592	19	23
Volume Left	13	0	0	15	0	0	11	5
Volume Right	0	0	21	0	0	22	8	18
cSH	329	1700	1700	594	1700	1700	44	60
Volume to Capacity	0.04	0.45	0.24	0.03	0.67	0.35	0.43	0.38
Queue Length 95th (ft)	3	0	0	2	0	0	38	36
Control Delay (s)	16.4	0.0	0.0	11.2	0.0	0.0	138.6	97.8
Lane LOS	C			B			F	F
Approach Delay (s)	0.2			0.1			138.6	97.8
Approach LOS							F	F

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	1128	22	43	1440	31	3	0	29	1	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.89	0.89	0.89	0.70	0.70	0.70	0.57	0.57	0.57
Hourly flow rate (vph)	7	1240	24	48	1618	35	4	0	41	2	0	9
Pedestrians		1						1			2	
Lane Width (ft)		12.0						12.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		0						0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		464										
pX, platoon unblocked				0.77			0.77	0.77	0.77	0.77	0.77	
vC, conflicting volume	1655			1265			2181	3017	633	2408	3012	829
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1655			749			1938	3022	0	2233	3015	829
tC, single (s)	4.4			4.1			7.5	6.5	7.1	7.5	6.5	7.3
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.5	4.0	3.4	3.5	4.0	3.5
p0 queue free %	98			93			84	100	95	89	100	97
cM capacity (veh/h)	323			659			27	9	816	16	9	278

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	7	826	437	48	1079	574	46	11
Volume Left	7	0	0	48	0	0	4	2
Volume Right	0	0	24	0	0	35	41	9
cSH	323	1700	1700	659	1700	1700	220	74
Volume to Capacity	0.02	0.49	0.26	0.07	0.63	0.34	0.21	0.14
Queue Length 95th (ft)	2	0	0	6	0	0	19	12
Control Delay (s)	16.4	0.0	0.0	10.9	0.0	0.0	25.7	61.4
Lane LOS	C			B			D	F
Approach Delay (s)	0.1			0.3			25.7	61.4
Approach LOS							D	F

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

PM Peak Period Level of Service Results

HCM Signalized Intersection Capacity Analysis
573: Broadway Blvd & Euclid Ave

4/8/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	263	924	64	272	829	265	135	678	186	218	642	376
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	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1750	5085	1407	1769	5085	1514	1686	3511	1535	1769	3438	1530
Flt Permitted	0.23	1.00	1.00	0.18	1.00	1.00	0.21	1.00	1.00	0.16	1.00	1.00
Satd. Flow (perm)	416	5085	1407	334	5085	1514	369	3511	1535	296	3438	1530
Peak-hour factor, PHF	0.94	0.94	0.94	0.96	0.96	0.96	0.89	0.89	0.89	0.96	0.96	0.96
Adj. Flow (vph)	280	983	68	283	864	276	152	762	209	227	669	392
RTOR Reduction (vph)	0	0	46	0	0	155	0	0	145	0	0	170
Lane Group Flow (vph)	280	983	22	283	864	121	152	762	64	227	669	222
Confl. Peds. (#/hr)	30		20	20		30	9		14	14		9
Heavy Vehicles (%)	3%	2%	11%	2%	2%	2%	7%	2%	2%	2%	5%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	4	0	0	0	0
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	40.3	30.1	30.1	40.3	30.1	30.1	32.2	24.2	24.2	32.2	24.2	24.2
Effective Green, g (s)	42.3	29.6	29.6	42.3	29.6	29.6	34.2	24.2	24.2	34.2	24.2	24.2
Actuated g/C Ratio	0.47	0.33	0.33	0.47	0.33	0.33	0.38	0.27	0.27	0.38	0.27	0.27
Clearance Time (s)	5.0	3.5	3.5	5.0	3.5	3.5	5.0	4.0	4.0	5.0	4.0	4.0
Vehicle Extension (s)	2.0	5.0	5.0	2.0	5.0	5.0	2.0	3.0	3.0	2.0	3.0	3.0
Lane Grp Cap (vph)	362	1672	463	336	1672	498	272	944	413	260	924	411
v/s Ratio Prot	0.10	0.19		c0.10	0.17		0.06	0.22		c0.09	0.19	
v/s Ratio Perm	0.27		0.02	c0.29		0.08	0.16		0.04	c0.25		0.15
v/c Ratio	0.77	0.59	0.05	0.84	0.52	0.24	0.56	0.81	0.16	0.87	0.72	0.54
Uniform Delay, d1	26.0	25.1	20.6	27.7	24.4	22.0	30.8	30.7	25.1	33.8	29.9	28.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.0	1.5	0.2	16.5	1.1	1.2	1.4	5.1	0.2	25.3	2.8	1.5
Delay (s)	35.1	26.6	20.8	44.2	25.6	23.2	32.2	35.8	25.3	59.0	32.7	29.6
Level of Service	D	C	C	D	C	C	C	D	C	E	C	C
Approach Delay (s)		28.1			28.8			33.4			36.4	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	31.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	1283	15	10	1354	26	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.0		4.5	4.0							
Lane Util. Factor	1.00	0.95		1.00	0.95							
Frpb, ped/bikes	1.00	1.00		1.00	1.00							
Flpb, ped/bikes	1.00	1.00		1.00	1.00							
Frt	1.00	1.00		1.00	1.00							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1767	3532		1768	3526							
Flt Permitted	0.18	1.00		0.19	1.00							
Satd. Flow (perm)	339	3532		353	3526							
Peak-hour factor, PHF	0.92	0.92	0.92	0.95	0.95	0.95	0.64	0.64	0.64	0.68	0.68	0.68
Adj. Flow (vph)	8	1395	16	11	1425	27	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	8	1411	0	11	1452	0	0	0	0	0	0	0
Confl. Peds. (#/hr)	18		16	16		18	12		7	7		12
Heavy Vehicles (%)	2%	2%	2%	2%	2%	4%	2%	2%	2%	5%	2%	3%
Turn Type	Perm			Perm								
Protected Phases		2			6							
Permitted Phases	2			6								
Actuated Green, G (s)	49.5	49.5		49.5	49.5							
Effective Green, g (s)	49.5	49.5		49.5	49.5							
Actuated g/C Ratio	1.00	1.00		1.00	1.00							
Clearance Time (s)	4.5	4.5		4.5	4.5							
Vehicle Extension (s)	3.0	3.0		3.0	3.0							
Lane Grp Cap (vph)	339	3532		353	3526							
v/s Ratio Prot		0.40			c0.41							
v/s Ratio Perm	0.02			0.03								
v/c Ratio	0.02	0.40		0.03	0.41							
Uniform Delay, d1	0.0	0.0		0.0	0.0							
Progression Factor	1.00	1.00		1.00	1.00							
Incremental Delay, d2	0.1	0.3		0.2	0.4							
Delay (s)	0.1	0.3		0.2	0.4							
Level of Service	A	A		A	A							
Approach Delay (s)		0.3			0.4			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	0.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	0.0
Intersection Capacity Utilization	41.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	1301	15	26	1194	33	54	11	26	83	32	28
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	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.89		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1768	3489		1764	3480		1742	1576		1758	1708	
Flt Permitted	0.18	1.00		0.16	1.00		0.71	1.00		0.73	1.00	
Satd. Flow (perm)	343	3489		291	3480		1296	1576		1347	1708	
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.82	0.82	0.82	0.78	0.78	0.78
Adj. Flow (vph)	37	1414	16	28	1270	35	66	13	32	106	41	36
RTOR Reduction (vph)	0	0	0	0	1	0	0	27	0	0	31	0
Lane Group Flow (vph)	37	1430	0	28	1304	0	66	18	0	106	46	0
Confl. Peds. (#/hr)	2		12	12		2	13		5	5		13
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	8%	2%	2%	2%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	0	0	0	0	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	68.3	68.3		68.3	68.3		11.2	11.2		11.2	11.2	
Effective Green, g (s)	69.3	69.3		69.3	69.3		12.7	12.7		12.7	12.7	
Actuated g/C Ratio	0.77	0.77		0.77	0.77		0.14	0.14		0.14	0.14	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	264	2687		224	2680		183	222		190	241	
v/s Ratio Prot		c0.41			0.37			0.01			0.03	
v/s Ratio Perm	0.11			0.10			0.05			c0.08		
v/c Ratio	0.14	0.53		0.12	0.49		0.36	0.08		0.56	0.19	
Uniform Delay, d1	2.7	4.0		2.6	3.8		35.0	33.6		36.0	34.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.8		1.1	0.6		1.2	0.2		3.5	0.4	
Delay (s)	3.8	4.8		3.8	4.4		36.2	33.7		39.6	34.5	
Level of Service	A	A		A	A		D	C		D	C	
Approach Delay (s)		4.8			4.4			35.2			37.4	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	1391	22	16	1213	10	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.0		4.5	4.0							
Lane Util. Factor	1.00	0.95		1.00	0.95							
Frpb, ped/bikes	1.00	1.00		1.00	1.00							
Flpb, ped/bikes	1.00	1.00		1.00	1.00							
Frt	1.00	1.00		1.00	1.00							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1768	3530		1769	3534							
Flt Permitted	0.21	1.00		0.16	1.00							
Satd. Flow (perm)	395	3530		306	3534							
Peak-hour factor, PHF	0.91	0.91	0.91	0.94	0.94	0.94	0.63	0.63	0.63	0.68	0.68	0.68
Adj. Flow (vph)	14	1529	24	17	1290	11	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	14	1553	0	17	1301	0	0	0	0	0	0	0
Confl. Peds. (#/hr)	10		7	7		10	23		17	17		23
Turn Type	Perm			Perm								
Protected Phases		2			6							
Permitted Phases	2			6								
Actuated Green, G (s)	49.5	49.5		49.5	49.5							
Effective Green, g (s)	49.5	49.5		49.5	49.5							
Actuated g/C Ratio	1.00	1.00		1.00	1.00							
Clearance Time (s)	4.5	4.5		4.5	4.5							
Vehicle Extension (s)	3.0	3.0		3.0	3.0							
Lane Grp Cap (vph)	395	3530		306	3534							
v/s Ratio Prot		c0.44			0.37							
v/s Ratio Perm	0.04			0.06								
v/c Ratio	0.04	0.44		0.06	0.37							
Uniform Delay, d1	0.0	0.0		0.0	0.0							
Progression Factor	1.00	1.00		1.00	1.00							
Incremental Delay, d2	0.2	0.4		0.3	0.3							
Delay (s)	0.2	0.4		0.3	0.3							
Level of Service	A	A		A	A							
Approach Delay (s)		0.4			0.3			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	0.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	0.0
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	218	1165	94	220	864	218	172	1278	217	367	1110	133
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
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	0.99		1.00	1.00	0.94	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1769	3497	1524	1769	3369		3431	5058	1494	3430	5085	1515
Flt Permitted	0.11	1.00	1.00	0.11	1.00		0.16	1.00	1.00	0.16	1.00	1.00
Satd. Flow (perm)	204	3497	1524	204	3369		578	5058	1494	578	5085	1515
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.94	0.94	0.94
Adj. Flow (vph)	237	1266	102	239	939	237	177	1318	224	390	1181	141
RTOR Reduction (vph)	0	0	38	0	25	0	0	0	108	0	0	103
Lane Group Flow (vph)	237	1266	64	239	1151	0	177	1318	116	390	1181	38
Confl. Peds. (#/hr)	25		32	32		25	26		37	37		26
Bus Blockages (#/hr)	0	6	0	0	6	0	0	4	0	0	0	0
Turn Type	pm+pt		Perm	pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6			8		8	4		4
Actuated Green, G (s)	42.0	35.6	35.6	42.0	35.6		30.0	24.0	24.0	30.0	24.0	24.0
Effective Green, g (s)	44.0	35.6	35.6	44.0	35.6		32.0	24.0	24.0	32.0	24.0	24.0
Actuated g/C Ratio	0.49	0.40	0.40	0.49	0.40		0.36	0.27	0.27	0.36	0.27	0.27
Clearance Time (s)	5.0	4.0	4.0	5.0	4.0		5.0	4.0	4.0	5.0	4.0	4.0
Vehicle Extension (s)	2.0	5.0	5.0	2.0	5.0		2.0	3.0	3.0	2.0	3.0	3.0
Lane Grp Cap (vph)	228	1383	603	228	1333		427	1349	398	427	1356	404
v/s Ratio Prot	0.09	0.36		c0.09	0.34		0.03	c0.26		c0.07	0.23	
v/s Ratio Perm	0.42		0.04	c0.43			0.12		0.08	0.25		0.02
v/c Ratio	1.04	0.92	0.11	1.05	0.86		0.41	0.98	0.29	0.91	0.87	0.09
Uniform Delay, d1	34.5	25.8	17.2	36.0	25.0		34.6	32.7	26.2	37.6	31.5	24.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	70.3	10.9	0.4	72.8	7.6		0.2	19.0	0.4	23.3	6.4	0.1
Delay (s)	104.8	36.7	17.5	108.9	32.6		34.8	51.7	26.7	60.9	37.9	24.9
Level of Service	F	D	B	F	C		C	D	C	E	D	C
Approach Delay (s)		45.5			45.5			46.7			42.1	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	44.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	92.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	1608	27	23	1415	9	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5							
Lane Util. Factor	1.00	0.95		1.00	0.95							
Frpb, ped/bikes	1.00	1.00		1.00	1.00							
Flpb, ped/bikes	1.00	1.00		1.00	1.00							
Frt	1.00	1.00		1.00	1.00							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1769	3529		1768	3535							
Flt Permitted	0.16	1.00		0.13	1.00							
Satd. Flow (perm)	297	3529		248	3535							
Peak-hour factor, PHF	0.93	0.93	0.93	0.90	0.90	0.90	0.79	0.79	0.79	0.56	0.56	0.56
Adj. Flow (vph)	17	1729	29	26	1572	10	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	17	1758	0	26	1582	0	0	0	0	0	0	0
Confl. Peds. (#/hr)	4		15	15		4			15	15		
Turn Type	Perm			Perm								
Protected Phases		2			6							
Permitted Phases	2			6								
Actuated Green, G (s)	49.5	49.5		49.5	49.5							
Effective Green, g (s)	49.5	49.5		49.5	49.5							
Actuated g/C Ratio	1.00	1.00		1.00	1.00							
Clearance Time (s)	4.5	4.5		4.5	4.5							
Vehicle Extension (s)	3.0	3.0		3.0	3.0							
Lane Grp Cap (vph)	297	3529		248	3535							
v/s Ratio Prot		c0.50			0.45							
v/s Ratio Perm	0.06			0.10								
v/c Ratio	0.06	0.50		0.10	0.45							
Uniform Delay, d1	0.0	0.0		0.0	0.0							
Progression Factor	1.00	1.00		1.00	1.00							
Incremental Delay, d2	0.4	0.5		0.8	0.4							
Delay (s)	0.4	0.5		0.8	0.4							
Level of Service	A	A		A	A							
Approach Delay (s)		0.5			0.4			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	0.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	0.0
Intersection Capacity Utilization	48.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	63	1496	98	41	1215	111	88	307	123	167	328	107
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
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	3450		1770	3435		1769	1863	1546	1767	1863	1548
Flt Permitted	0.10	1.00		0.08	1.00		0.20	1.00	1.00	0.30	1.00	1.00
Satd. Flow (perm)	186	3450		152	3435		364	1863	1546	554	1863	1548
Peak-hour factor, PHF	0.94	0.94	0.94	0.96	0.96	0.96	0.95	0.95	0.95	0.85	0.85	0.85
Adj. Flow (vph)	67	1591	104	43	1266	116	93	323	129	196	386	126
RTOR Reduction (vph)	0	5	0	0	7	0	0	0	35	0	0	72
Lane Group Flow (vph)	67	1690	0	43	1375	0	93	323	94	196	386	54
Confl. Peds. (#/hr)	17		21	21		17	8		9	9		8
Heavy Vehicles (%)	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	0	0	0	0	0
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		2			6		3	8		7	4	
Permitted Phases	2			6			8		8	4		4
Actuated Green, G (s)	47.1	47.1		47.1	47.1		27.9	22.0	22.0	27.9	22.0	22.0
Effective Green, g (s)	49.1	49.1		49.1	49.1		29.9	22.0	22.0	29.9	22.0	22.0
Actuated g/C Ratio	0.55	0.55		0.55	0.55		0.33	0.24	0.24	0.33	0.24	0.24
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	4.0	4.0	5.0	4.0	4.0
Vehicle Extension (s)	5.0	5.0		5.0	5.0		2.0	3.0	3.0	2.0	3.0	3.0
Lane Grp Cap (vph)	101	1882		83	1874		229	455	378	277	455	378
v/s Ratio Prot		c0.49			0.40		0.03	0.17		c0.05	c0.21	
v/s Ratio Perm	0.36			0.28			0.10		0.06	0.18		0.04
v/c Ratio	0.66	0.90		0.52	0.73		0.41	0.71	0.25	0.71	0.85	0.14
Uniform Delay, d1	14.6	18.2		13.0	15.5		34.2	31.1	27.4	33.1	32.4	26.6
Progression Factor	1.00	1.00		0.49	0.42		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	29.4	7.3		12.3	1.5		0.4	5.0	0.3	6.6	13.7	0.2
Delay (s)	44.0	25.5		18.6	7.9		34.6	36.1	27.7	39.6	46.1	26.8
Level of Service	D	C		B	A		C	D	C	D	D	C
Approach Delay (s)		26.2			8.3			33.9			40.9	
Approach LOS		C			A			C			D	

Intersection Summary			
HCM Average Control Delay	23.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	228	1485	95	191	1120	306	113	590	151	268	604	118
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	
Lane Util. Factor	1.00	0.91		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.96	1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	4993		1770	3539	1521	1770	3525	1525	1768	3349	
Flt Permitted	0.11	1.00		0.11	1.00	1.00	0.19	1.00	1.00	0.19	1.00	
Satd. Flow (perm)	203	4993		203	3539	1521	355	3525	1525	354	3349	
Peak-hour factor, PHF	0.93	0.93	0.93	0.94	0.94	0.94	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	245	1597	102	203	1191	326	126	656	168	298	671	131
RTOR Reduction (vph)	0	8	0	0	0	168	0	0	131	0	18	0
Lane Group Flow (vph)	245	1691	0	203	1191	158	126	656	37	298	784	0
Confl. Peds. (#/hr)	3		7	7		3	95		16	16		95
Bus Blockages (#/hr)	0	6	0	0	0	6	0	2	0	0	2	0
Turn Type	pm+pt			pm+pt		Perm	pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8	4		
Actuated Green, G (s)	44.0	35.7		44.0	35.7	35.7	28.0	20.0	20.0	28.0	20.0	
Effective Green, g (s)	46.0	35.7		46.0	35.7	35.7	30.0	20.0	20.0	30.0	20.0	
Actuated g/C Ratio	0.51	0.40		0.51	0.40	0.40	0.33	0.22	0.22	0.33	0.22	
Clearance Time (s)	5.0	4.0		5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0	
Vehicle Extension (s)	2.0	5.0		2.0	5.0	5.0	2.0	3.0	3.0	2.0	3.0	
Lane Grp Cap (vph)	266	1981		266	1404	603	260	783	339	259	744	
v/s Ratio Prot	c0.10	0.34		0.08	0.34		0.05	0.19		c0.11	0.23	
v/s Ratio Perm	c0.38			0.31		0.10	0.11		0.02	c0.27		
v/c Ratio	0.92	0.85		0.76	0.85	0.26	0.48	0.84	0.11	1.15	1.05	
Uniform Delay, d1	33.3	24.8		32.3	24.7	18.3	34.9	33.4	27.9	35.3	35.0	
Progression Factor	0.77	0.60		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	23.7	3.0		11.1	6.5	1.1	0.5	7.8	0.1	102.8	48.1	
Delay (s)	49.4	17.8		43.3	31.2	19.3	35.4	41.3	28.0	138.1	83.1	
Level of Service	D	B		D	C	B	D	D	C	F	F	
Approach Delay (s)		21.8			30.4			38.1			98.0	
Approach LOS		C			C			D			F	

Intersection Summary			
HCM Average Control Delay	41.8	HCM Level of Service	D
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	1622	27	82	1325	20	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.5		4.5	3.5							
Lane Util. Factor	1.00	0.95		1.00	0.95							
Frpb, ped/bikes	1.00	1.00		1.00	1.00							
Flpb, ped/bikes	1.00	1.00		1.00	1.00							
Frt	1.00	1.00		1.00	1.00							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1769	3529		1769	3530							
Flt Permitted	0.18	1.00		0.13	1.00							
Satd. Flow (perm)	341	3529		249	3530							
Peak-hour factor, PHF	0.94	0.94	0.94	0.93	0.93	0.93	0.77	0.77	0.77	0.59	0.59	0.59
Adj. Flow (vph)	17	1726	29	88	1425	22	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	17	1755	0	88	1447	0	0	0	0	0	0	0
Confl. Peds. (#/hr)	6		7	7		6	15					15
Turn Type	Perm			Perm								
Protected Phases		2			6							
Permitted Phases	2			6								
Actuated Green, G (s)	49.5	49.5		49.5	49.5							
Effective Green, g (s)	49.5	49.5		49.5	49.5							
Actuated g/C Ratio	1.00	1.00		1.00	1.00							
Clearance Time (s)	4.5	4.5		4.5	4.5							
Vehicle Extension (s)	3.0	3.0		3.0	3.0							
Lane Grp Cap (vph)	341	3529		249	3530							
v/s Ratio Prot		c0.50			0.41							
v/s Ratio Perm	0.05			0.35								
v/c Ratio	0.05	0.50		0.35	0.41							
Uniform Delay, d1	0.0	0.0		0.0	0.0							
Progression Factor	1.00	1.00		1.00	1.00							
Incremental Delay, d2	0.3	0.5		3.9	0.4							
Delay (s)	0.3	0.5		3.9	0.4							
Level of Service	A	A		A	A							
Approach Delay (s)		0.5			0.6			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	0.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	0.0
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
574: Broadway Blvd & Park Ave

4/6/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	7	1283	15	10	1354	26	14	3	49	19	1	34
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.95	0.64	0.64	0.64	0.68	0.68	0.68
Hourly flow rate (vph)	8	1395	16	11	1425	27	22	5	77	28	1	50
Pedestrians		12			7			16			18	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		976										
pX, platoon unblocked				0.78			0.78	0.78	0.78	0.78	0.78	
vC, conflicting volume	1471			1427			2230	2926	728	2276	2920	756
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1471			987			2015	2905	93	2074	2898	756
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.6	6.5	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			98			0	59	89	0	87	85
cM capacity (veh/h)	448			537			19	11	725	13	11	340

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	8	930	481	11	950	502	103	79
Volume Left	8	0	0	11	0	0	22	28
Volume Right	0	0	16	0	0	27	77	50
cSH	448	1700	1700	537	1700	1700	62	33
Volume to Capacity	0.02	0.55	0.28	0.02	0.56	0.30	1.66	2.39
Queue Length 95th (ft)	1	0	0	1	0	0	232	227
Control Delay (s)	13.2	0.0	0.0	11.8	0.0	0.0	466.2	889.5
Lane LOS	B			B			F	F
Approach Delay (s)	0.1			0.1			466.2	889.5
Approach LOS							F	F

Intersection Summary			
Average Delay	38.8		
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	13	1391	22	16	1213	10	13	5	25	5	2	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.94	0.94	0.94	0.63	0.63	0.63	0.68	0.68	0.68
Hourly flow rate (vph)	14	1529	24	17	1290	11	21	8	40	7	3	25
Pedestrians		23			17			7			10	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		2			1			1			1	
Right turn flare (veh)									6			6
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		611										
pX, platoon unblocked				0.83			0.83	0.83	0.83	0.83	0.83	
vC, conflicting volume	1311			1560			2280	2921	800	2154	2928	684
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1311			1261			2131	2905	344	1978	2913	684
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			96			0	33	93	38	75	93
cM capacity (veh/h)	519			451			16	12	529	12	12	381

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	14	1019	534	17	860	441	21	48	7	28
Volume Left	14	0	0	17	0	0	21	0	7	0
Volume Right	0	0	24	0	0	11	0	40	0	25
cSH	519	1700	1700	451	1700	1700	16	71	12	111
Volume to Capacity	0.03	0.60	0.31	0.04	0.51	0.26	1.28	0.67	0.62	0.25
Queue Length 95th (ft)	2	0	0	3	0	0	77	76	35	23
Control Delay (s)	12.1	0.0	0.0	13.3	0.0	0.0	657.3	101.9	521.8	55.4
Lane LOS	B			B			F	F	F	F
Approach Delay (s)	0.1			0.2			269.8		152.6	
Approach LOS							F		F	

Intersection Summary			
Average Delay	8.1		
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	16	1608	27	23	1415	9	16	1	62	4	0	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.90	0.90	0.90	0.79	0.79	0.79	0.56	0.56	0.56
Hourly flow rate (vph)	17	1729	29	26	1572	10	20	1	78	7	0	20
Pedestrians					15			15			4	
Lane Width (ft)					12.0			12.0			12.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					1			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					1308							
pX, platoon unblocked	0.72						0.72	0.72		0.72	0.72	0.72
vC, conflicting volume	1586			1773			2650	3430	909	2625	3440	795
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1029			1773			2512	3600	909	2478	3613	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			93			0	62	71	0	100	97
cM capacity (veh/h)	480			343			9	3	271	5	3	775

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	17	1153	605	26	1048	534	20	80	7	20
Volume Left	17	0	0	26	0	0	20	0	7	0
Volume Right	0	0	29	0	0	10	0	78	0	20
cSH	480	1700	1700	343	1700	1700	9	119	5	775
Volume to Capacity	0.04	0.68	0.36	0.07	0.62	0.31	2.27	0.67	1.46	0.03
Queue Length 95th (ft)	3	0	0	6	0	0	89	88	45	2
Control Delay (s)	12.8	0.0	0.0	16.3	0.0	0.0	1396.1	81.8	1548.4	9.8
Lane LOS	B			C			F	F	F	A
Approach Delay (s)	0.1			0.3			348.0		420.1	
Approach LOS							F		F	

Intersection Summary			
Average Delay	13.3		
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	13	1774	19	24	1350	12	3	0	33	2	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.95	0.64	0.64	0.64	0.61	0.61	0.61
Hourly flow rate (vph)	14	1928	21	25	1421	13	5	0	52	3	0	16
Pedestrians		20			15			1			4	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		2			1			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1438			1950			2765	3456	990	2541	3460	741
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1438			1950			2765	3456	990	2541	3460	741
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			91			39	100	79	66	100	95
cM capacity (veh/h)	466			296			8	6	242	10	6	352

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	14	1286	663	25	947	486	56	20
Volume Left	14	0	0	25	0	0	5	3
Volume Right	0	0	21	0	0	13	52	16
cSH	466	1700	1700	296	1700	1700	69	50
Volume to Capacity	0.03	0.76	0.39	0.09	0.56	0.29	0.82	0.39
Queue Length 95th (ft)	2	0	0	7	0	0	97	35
Control Delay (s)	13.0	0.0	0.0	18.3	0.0	0.0	162.2	116.2
Lane LOS	B			C			F	F
Approach Delay (s)	0.1			0.3			162.2	116.2
Approach LOS							F	F

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	16	1622	27	82	1325	20	5	0	57	1	0	22
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.93	0.93	0.93	0.77	0.77	0.77	0.59	0.59	0.59
Hourly flow rate (vph)	17	1726	29	88	1425	22	6	0	74	2	0	37
Pedestrians		15						7			6	
Lane Width (ft)		12.0						12.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		1						1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		464										
pX, platoon unblocked				0.59			0.59	0.59	0.59	0.59	0.59	
vC, conflicting volume	1452			1761			2722	3410	884	2589	3413	744
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1452			885			2525	3699	0	2298	3705	744
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			80			0	100	88	81	100	89
cM capacity (veh/h)	460			443			6	2	631	9	2	351

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	17	1150	604	88	950	496	81	39
Volume Left	17	0	0	88	0	0	6	2
Volume Right	0	0	29	0	0	22	74	37
cSH	460	1700	1700	443	1700	1700	66	130
Volume to Capacity	0.04	0.68	0.36	0.20	0.56	0.29	1.23	0.30
Queue Length 95th (ft)	3	0	0	18	0	0	163	29
Control Delay (s)	13.1	0.0	0.0	15.1	0.0	0.0	292.7	44.0
Lane LOS	B			C			F	E
Approach Delay (s)	0.1			0.9			292.7	44.0
Approach LOS							F	E

Intersection Summary			
Average Delay	7.8		
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		

C. Signal Warrants

CITY/COUNTY HAWK FLASHER PRIORITY EVALUATION

POINTS:____16____

LOCATION:_____Treat Avenue/Broadway Blvd _ ___STUDY DATE:_09/01/2011

1. Accidents involving pedestrians/bicycles at the crossing:

   Latest 12-month period (01-12) . . . 3 points per accident
   Middle 12-month period (13-24) . . . 2 points per accident
   Earliest 12-month period (25-36). . . 1 point per accident __0___

2. Peak hour pedestrian/bicycle activity in crossing:

   0-10 . . . . 0 points
   11-20 . . . . 3 points
   21-40 . . . . 6 points
   over 40 . . . . 9 points ___0___

3. Proximity of nearest signalized or stop controlled intersection:

   Less than 0.125 mi (660 ft). . . . . -10 points
   0.125 - 0.25 mi (660 – 1320 ft). . . 0 points
   Over 0.25 mi (1320 ft) . . . . . 10 points _ _0___

4. Posted speed limit:

   Under 30 0 points
   30 and 35 3 points
   40 and over 6 points ___3___

5. Roadway traffic volume (ADT):

	2 Lanes	3 Lanes	++4 Lanes with median	++4 Lanes w/o median
0 – <= 9000	0	0	0	0
> 9k - <= 12k	2	4	4	6
> 12k - <= 15k	4	6	6	8
> 15k	6	8	8	10

___8___

6. When the roadway does not have a midpoint safety haven, 5 points should be assigned. When the roadway has a midpoint safety haven, 0 points should be assigned.

   ___5___

7. When the crossing is part of a designated bike and/or pedestrian route, 5 points should be assigned.

   ___0___

8. When the crossing is identified on the "School Route Plan" and/or is **known to be a special needs route, 5 points should be assigned.**

   ___**0**___

9. Meets state crosswalk marking warrant, yes = 0 points, no = -10 points.

   ___0___

10. Area is illuminated, yes = 0 points, no = 5 points.

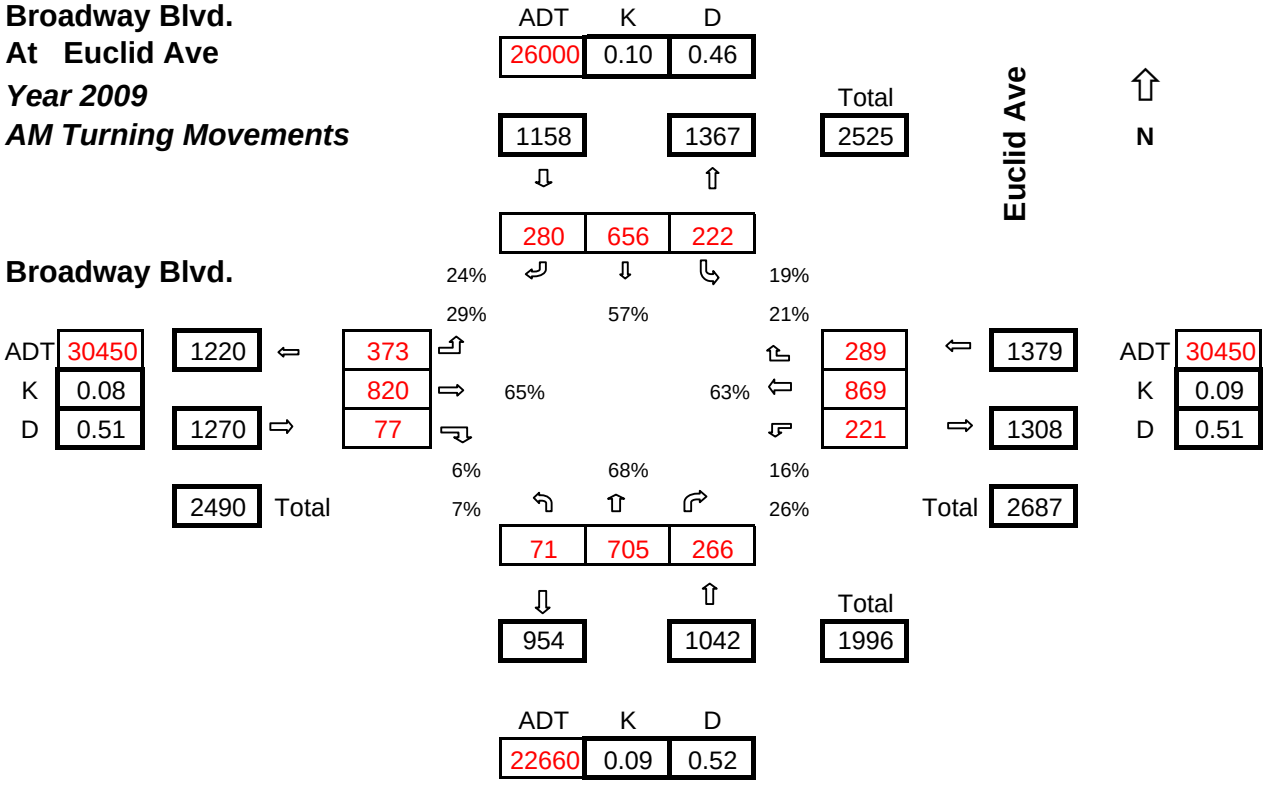
   ___0___

Locations with fewer than 25 total points should not be considered for HAWK flasher installation. Unmarked locations should be considered for signing/striping enhancements before HAWK flasher installation is considered.

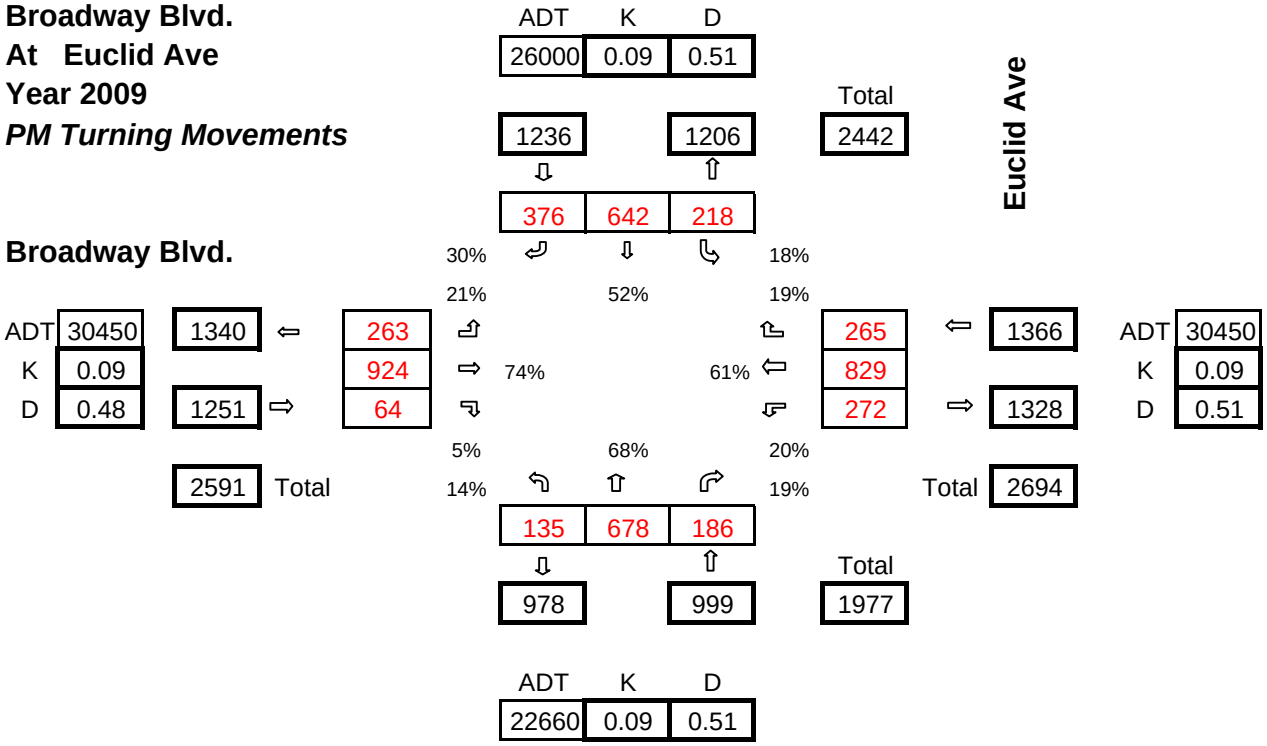
D. 2040 Turning Volume Worksheets

Existing TMC Calculations

Broadway Blvd.
At Euclid Ave
Year 2009
AM Turning Movements

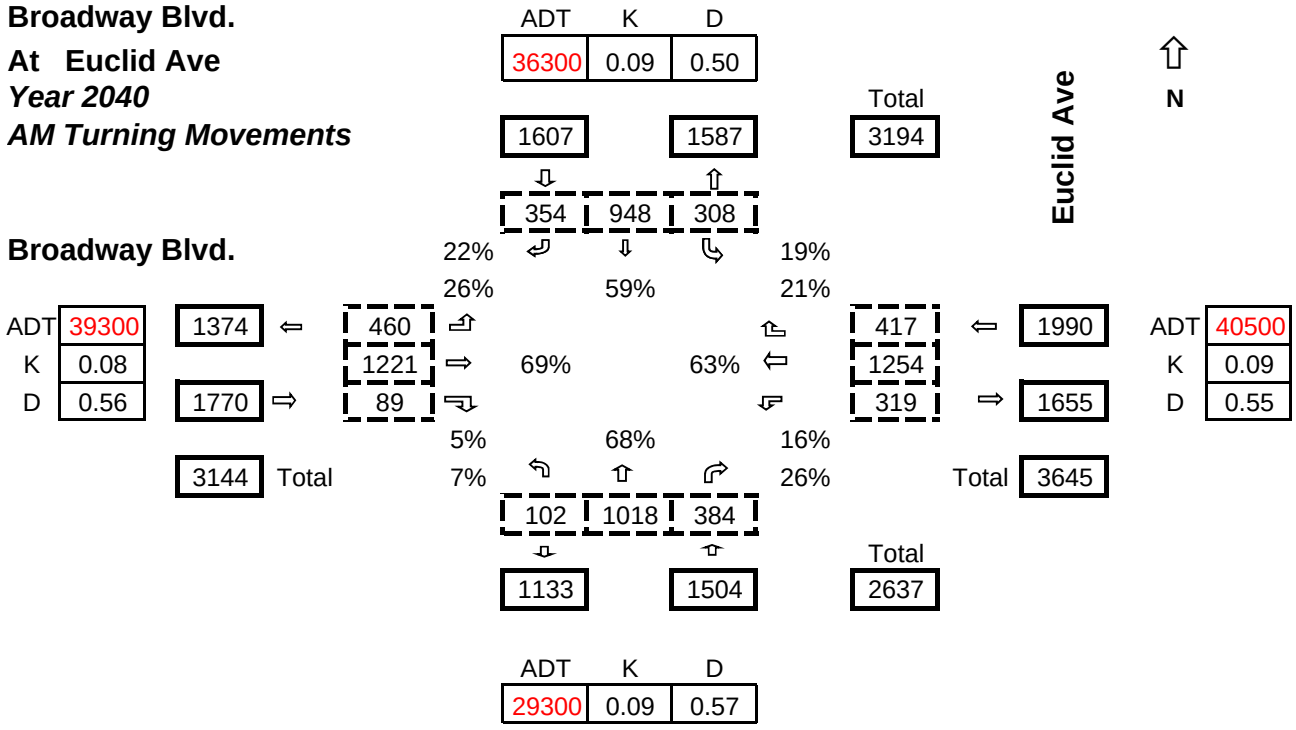


Broadway Blvd.
At Euclid Ave
Year 2009
PM Turning Movements

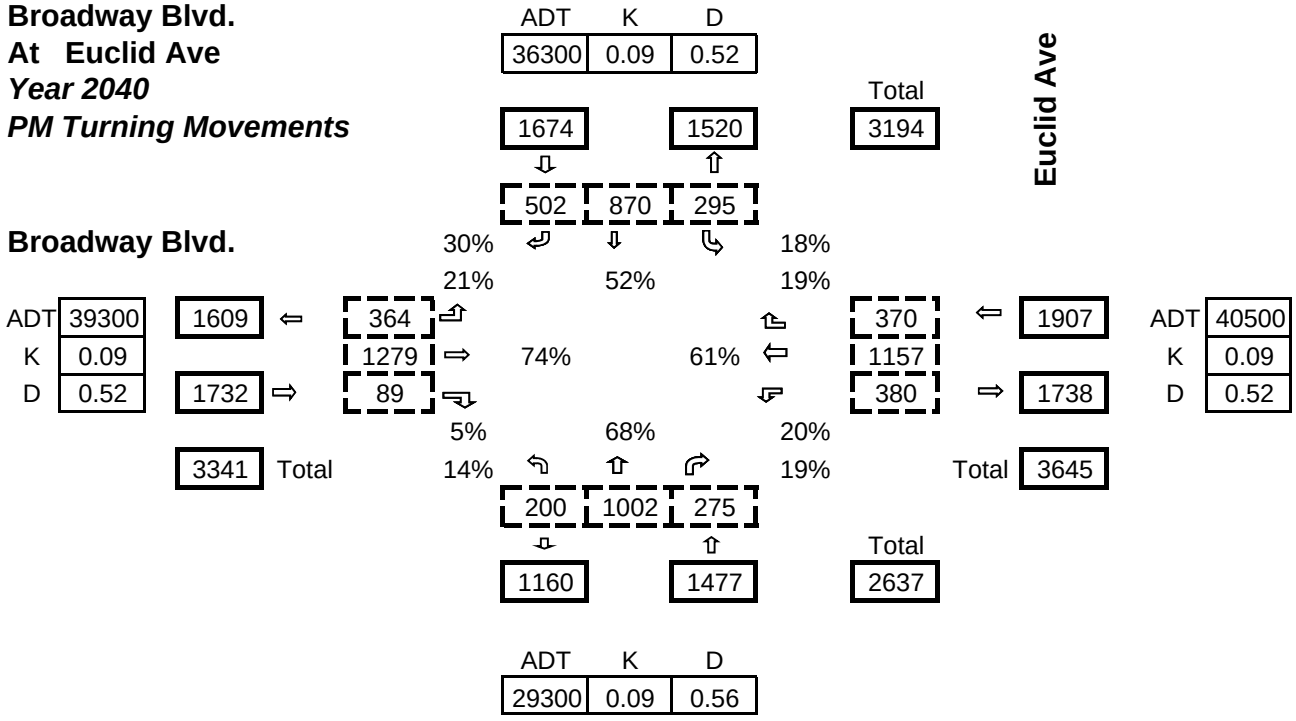


Future Turning Movement Volume Calculations

Broadway Blvd.
At Euclid Ave
Year 2040
AM Turning Movements

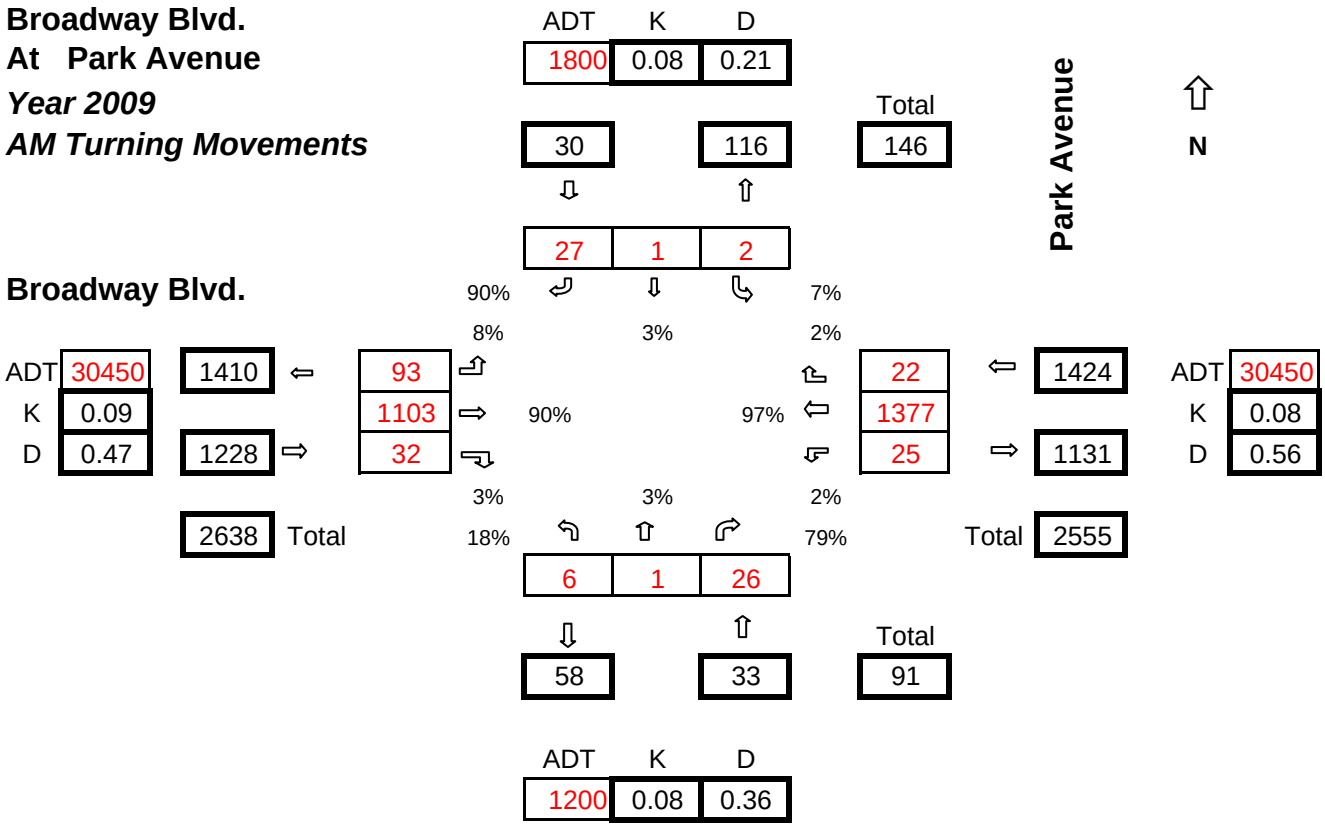


Broadway Blvd.
At Euclid Ave
Year 2040
PM Turning Movements

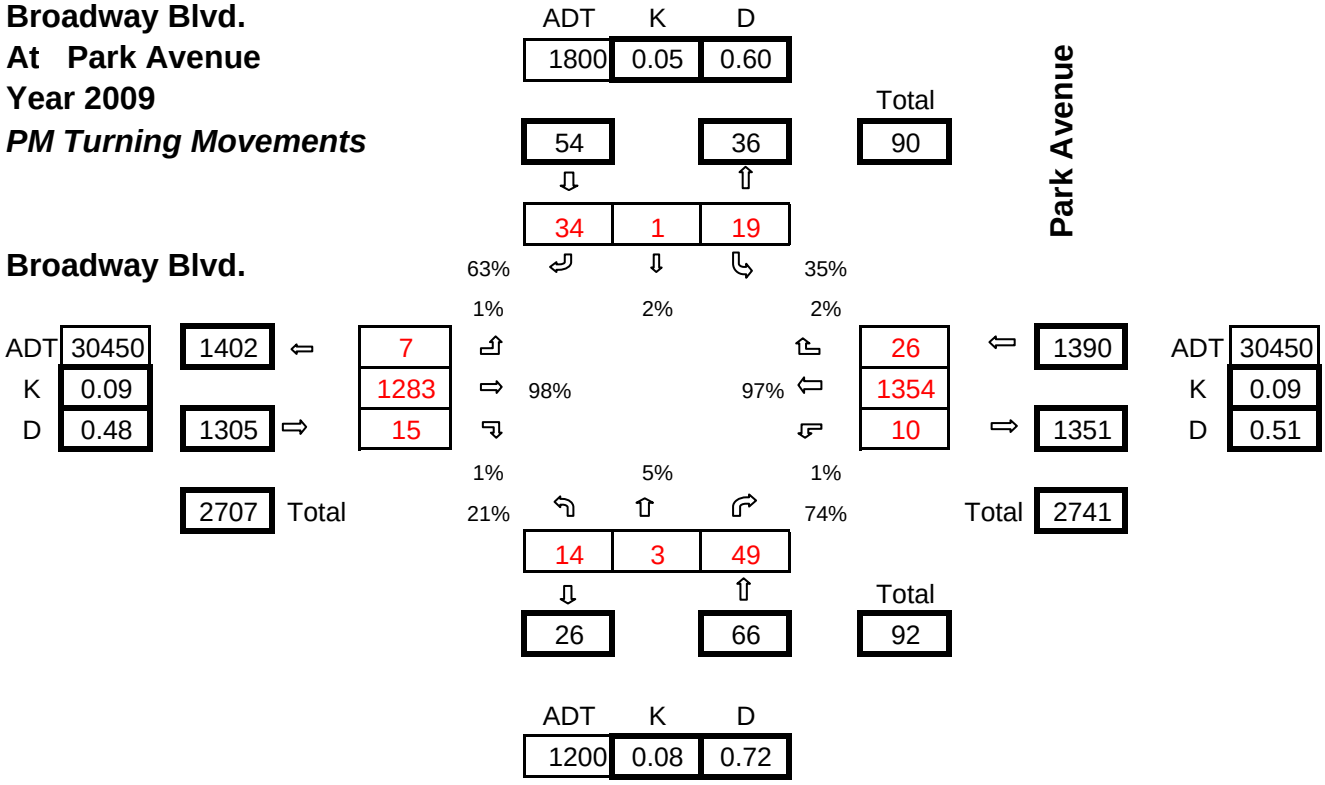


Existing TMC Calculations

Broadway Blvd.
At Park Avenue
Year 2009
AM Turning Movements



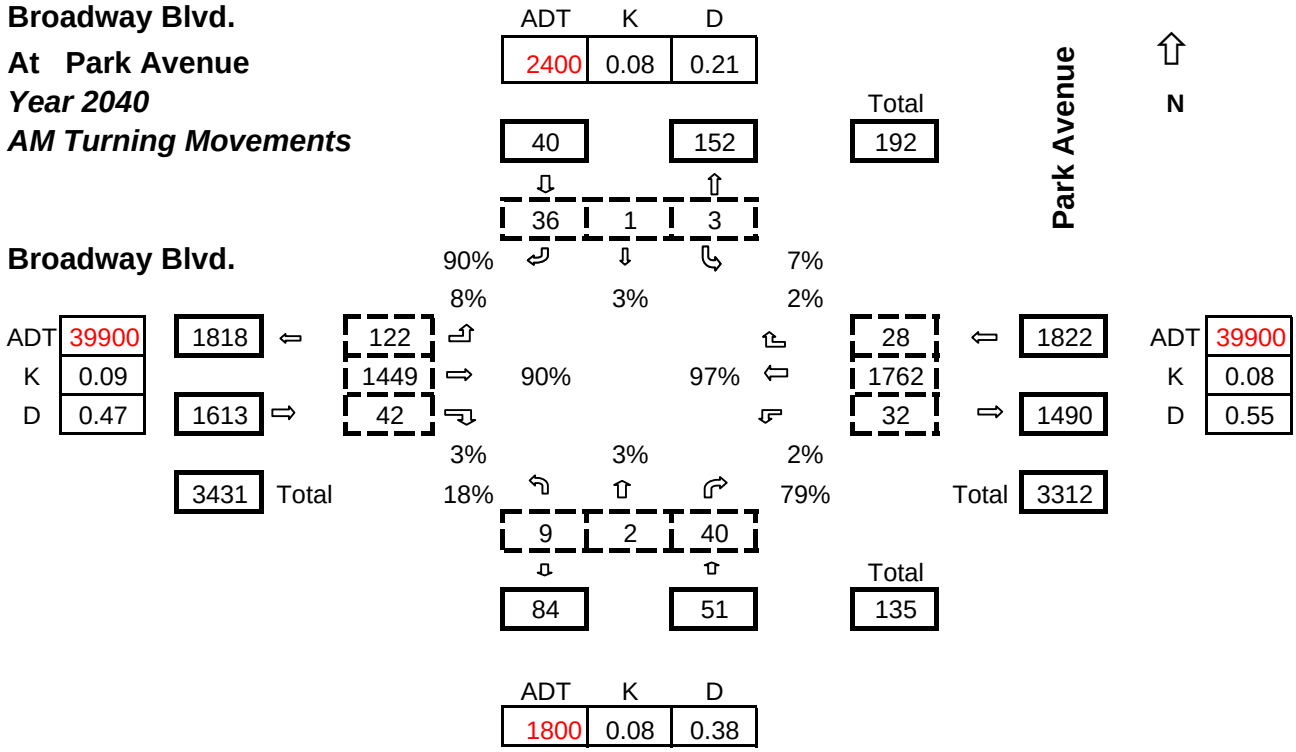
Broadway Blvd.
At Park Avenue
Year 2009
PM Turning Movements



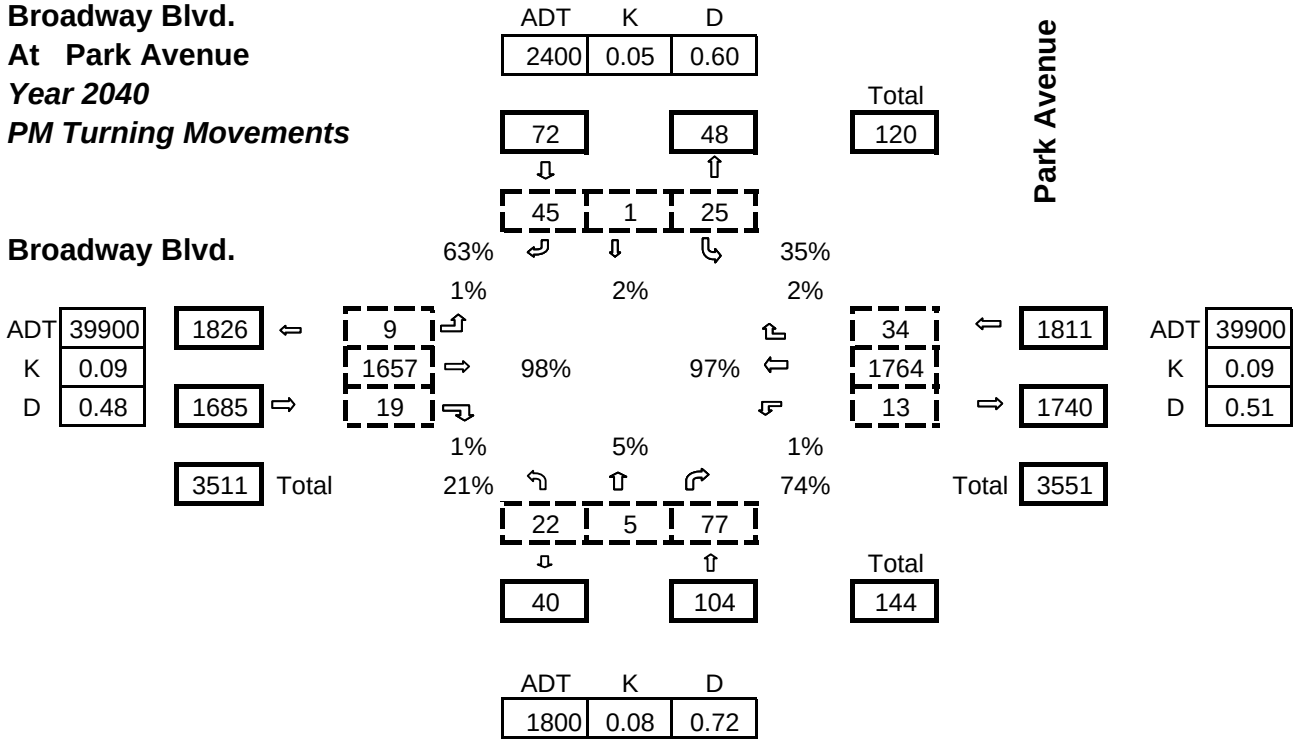
H:\projfile\8795 - Broadway\data\Traffic data\2030 turning\2030Broadway_Park.xls
5/11/2009

Future TMC Calculations

Broadway Blvd.
At Park Avenue
Year 2040
AM Turning Movements

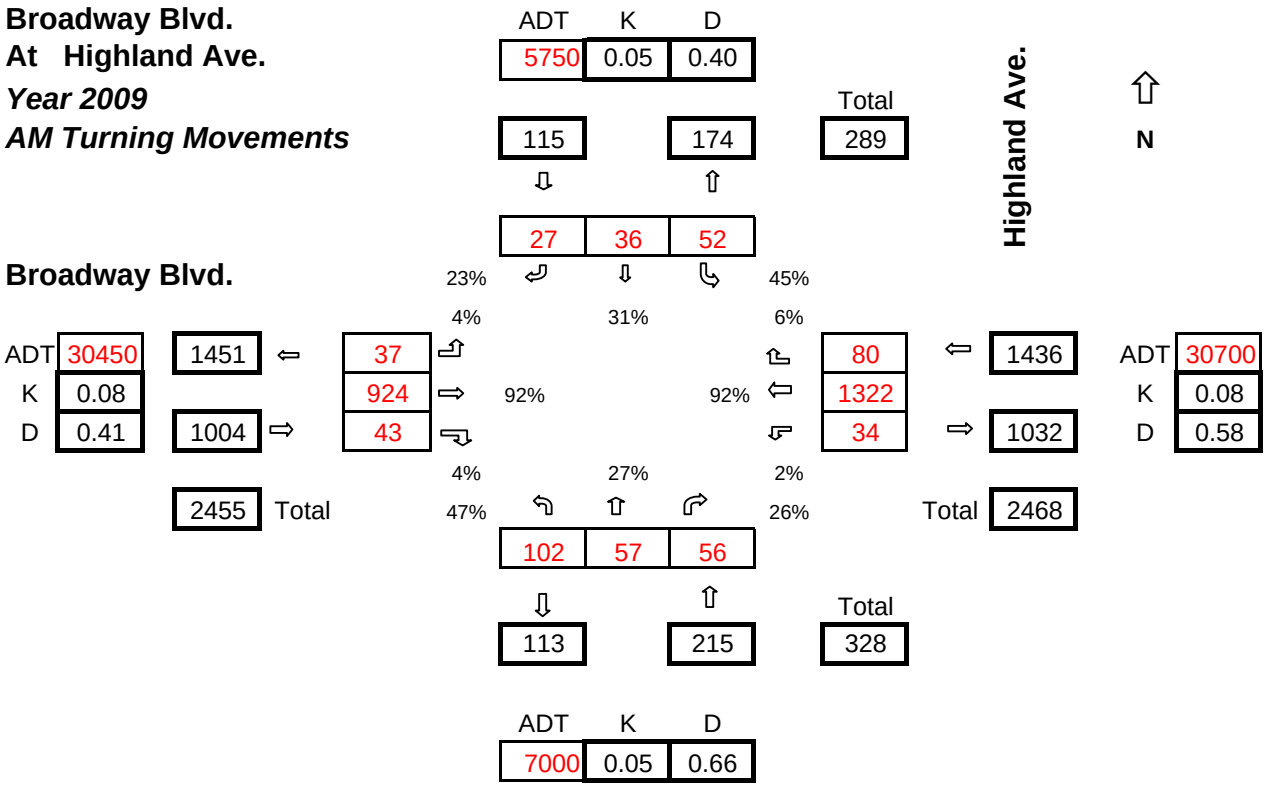


Broadway Blvd.
At Park Avenue
Year 2040
PM Turning Movements

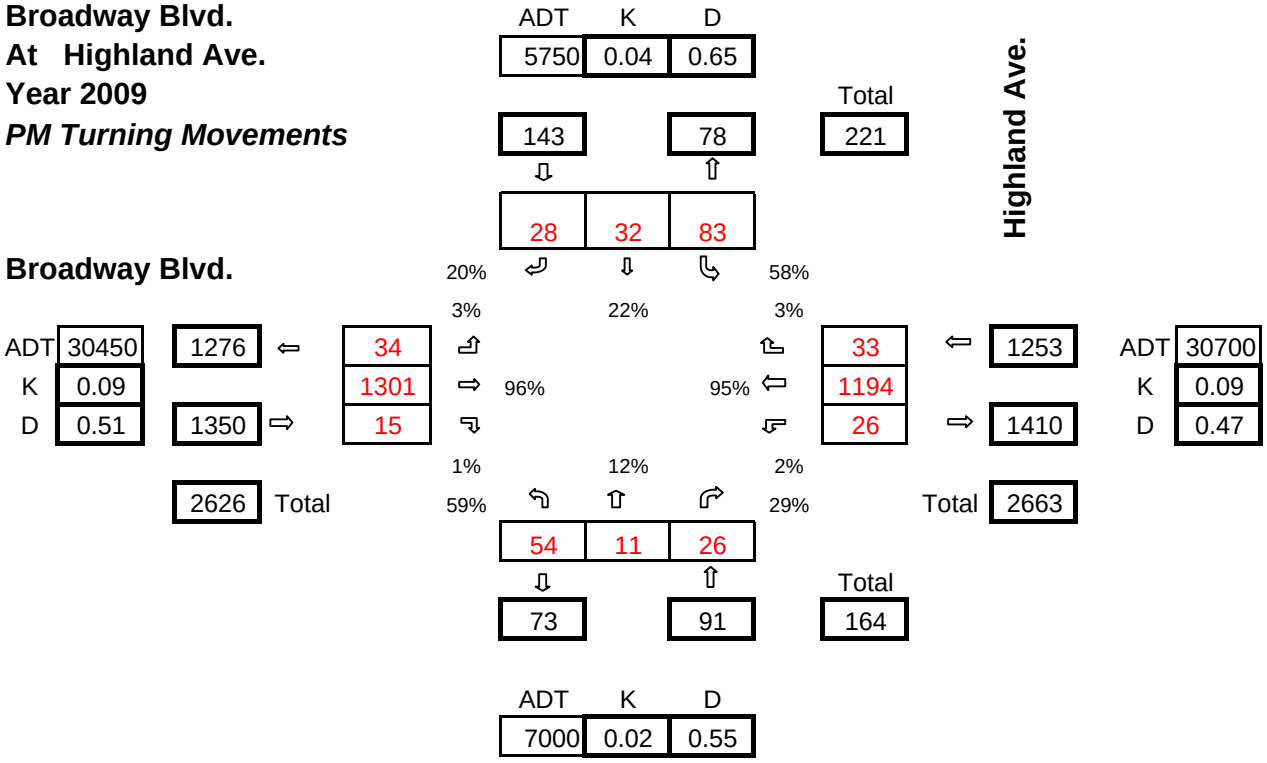


Existing TMC Calculations

Broadway Blvd.
At Highland Ave.
Year 2009
AM Turning Movements

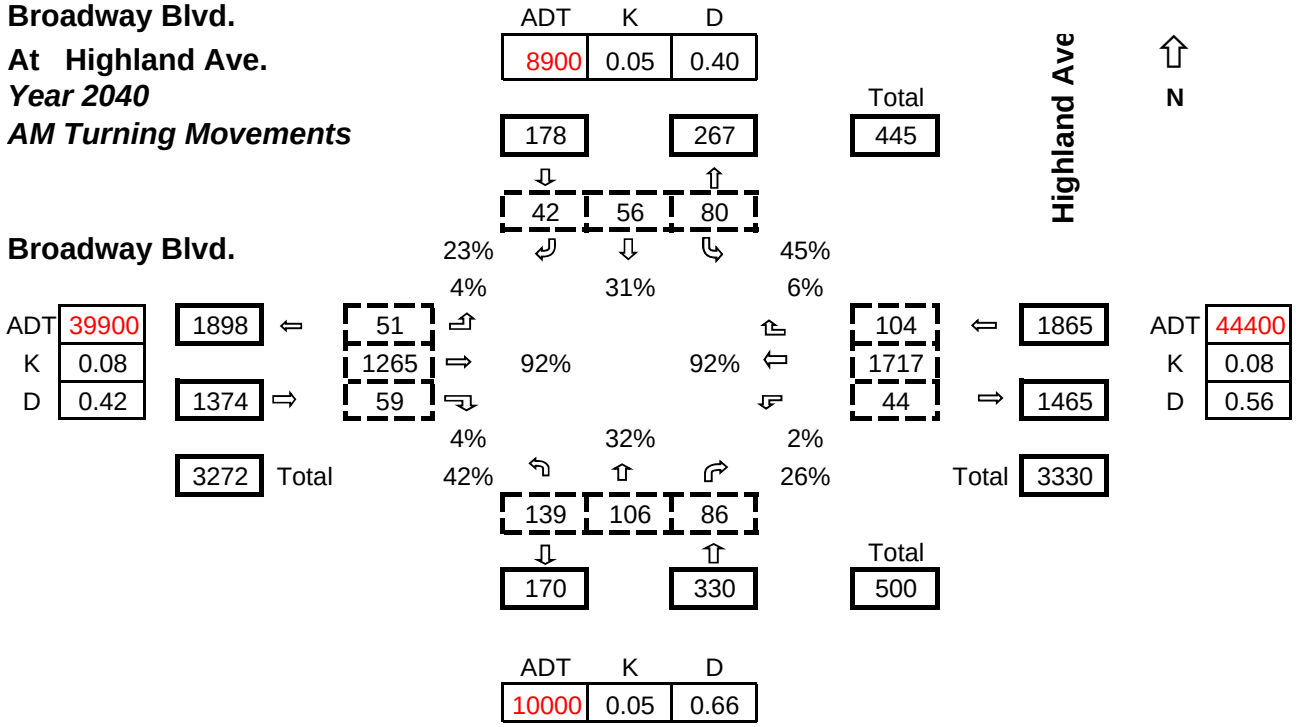


Broadway Blvd.
At Highland Ave.
Year 2009
PM Turning Movements

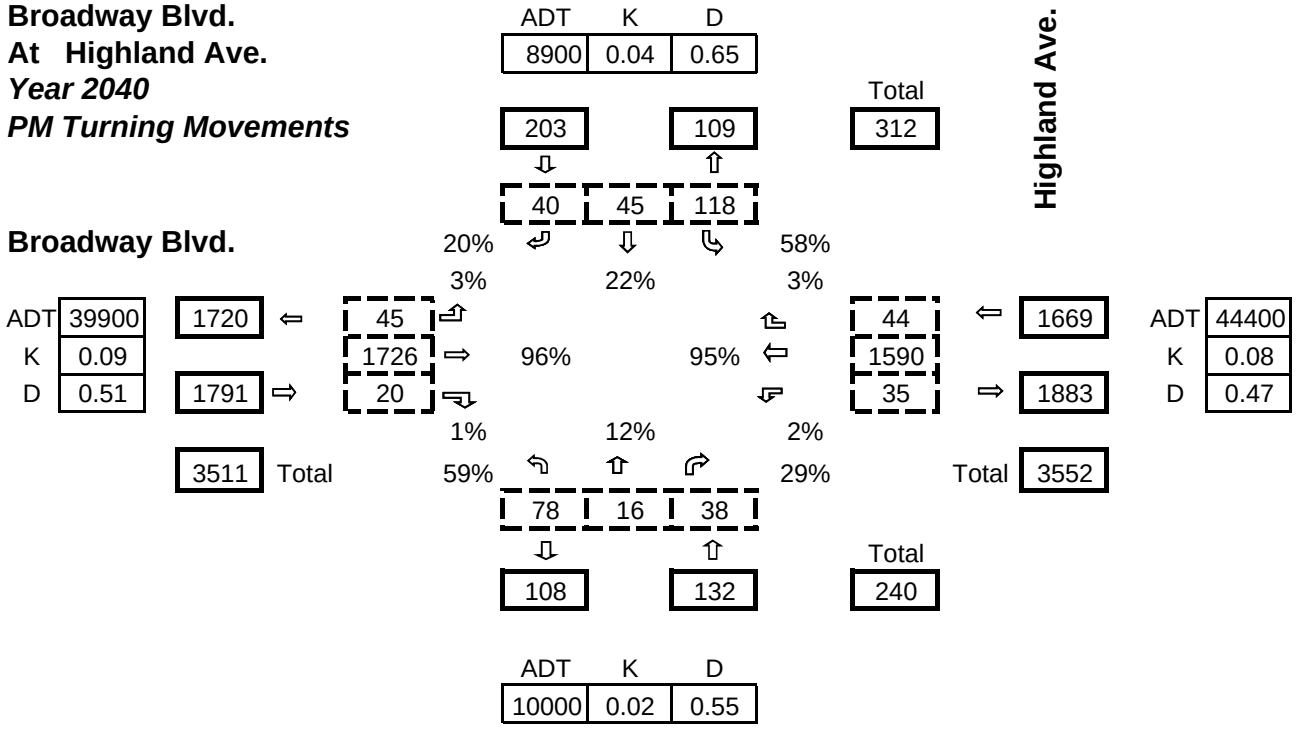


Future TMC Calculations

Broadway Blvd.
At Highland Ave.
Year 2040
AM Turning Movements



Broadway Blvd.
At Highland Ave.
Year 2040
PM Turning Movements



Existing TMC Calculations

Broadway Blvd.
At Cherry Ave
Year 2009
AM Turning Movements

Cherry Ave

N

Broadway Blvd.

	ADT	K	D
	800	0.07	0.19

Total 58

11 47

10 1 0

91% 0%
2% 9% 2%

	ADT	K	D
	30700	0.08	0.41

1486 ⇦ 20 ⇧ 26 ⇦ 1508

987 ⇨ 96% 97% ⇦ 1461

1030 ⇨ 23 ⇩ 21 ⇨ 1030

	ADT	K	D
	30700	0.08	0.59

2% 2% 1%

2516 Total 25% 73% Total 2538

15 1 43

Total 104

45 59

	ADT	K	D
	1400	0.07	0.57

Broadway Blvd.
At Cherry Ave
Year 2009
PM Turning Movements

Cherry Ave

Broadway Blvd.

	ADT	K	D
	800	0.07	0.46

Total 52

24 28

17 2 5

71% 21%
1% 8% 1%

	ADT	K	D
	30700	0.09	0.53

1243 ⇦ 13 ⇧ 10 ⇦ 1239

1391 ⇨ 98% 98% ⇦ 1213

1426 ⇨ 22 ⇩ 16 ⇨ 1421

	ADT	K	D
	30700	0.09	0.47

2% 12% 1%

2669 Total 30% 58% Total 2660

13 5 25

Total 83

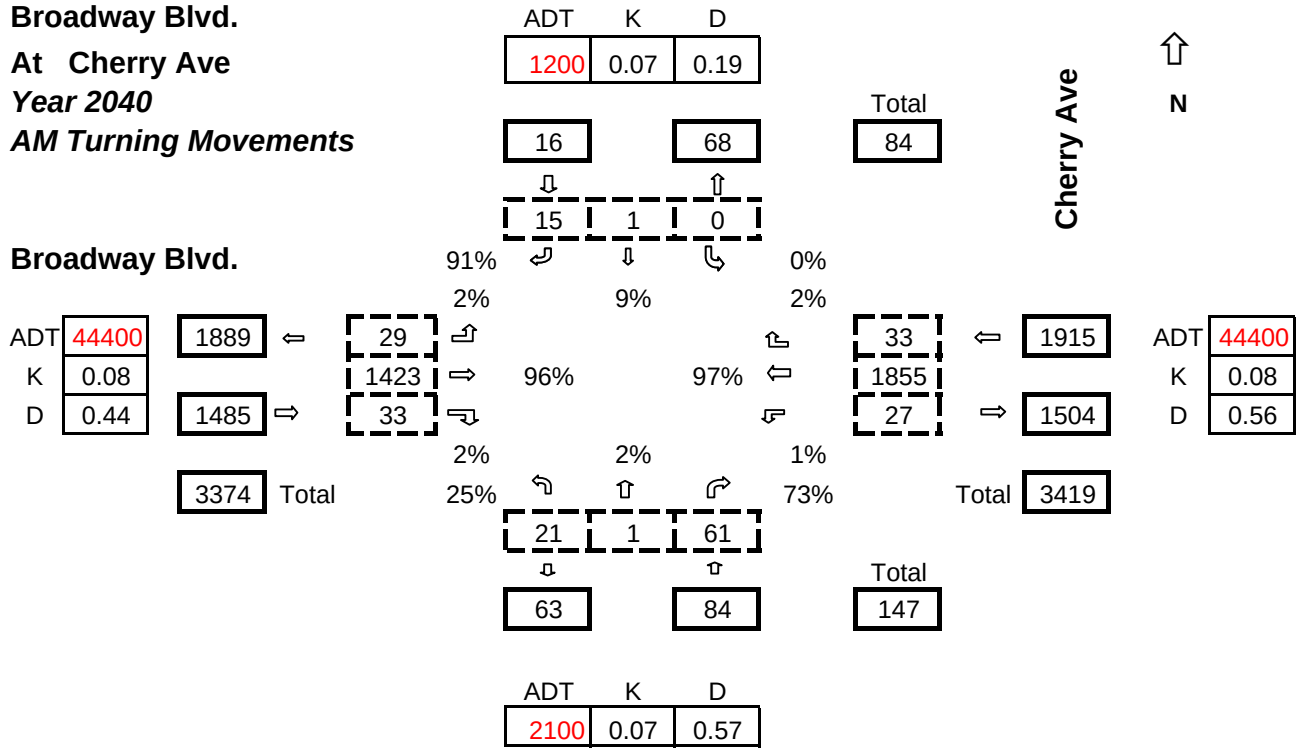
40 43

	ADT	K	D
	1400	0.06	0.52

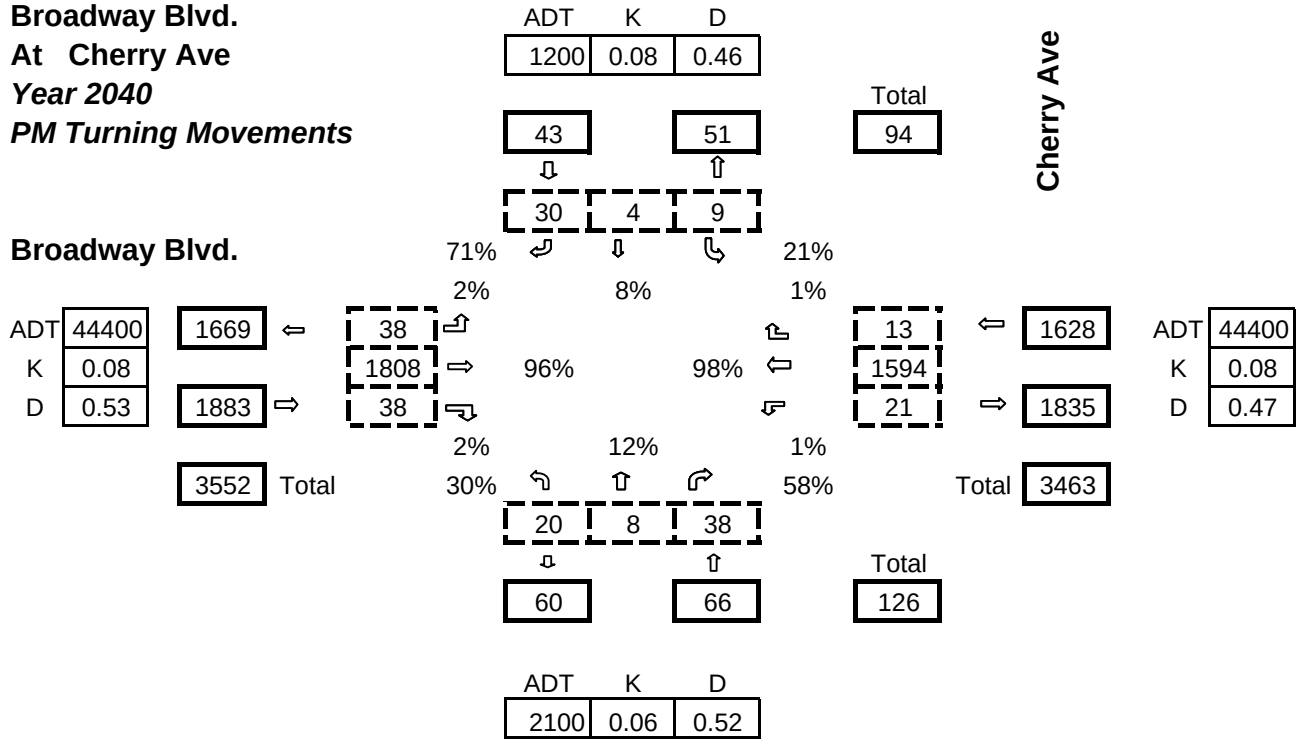
H:\projfile\8795 - Broadway\data\Traffic data\2030 turning\2030Broadway_Cherry.xls
5/11/2009

Future TMC Calculations

Broadway Blvd.
At Cherry Ave
Year 2040
AM Turning Movements

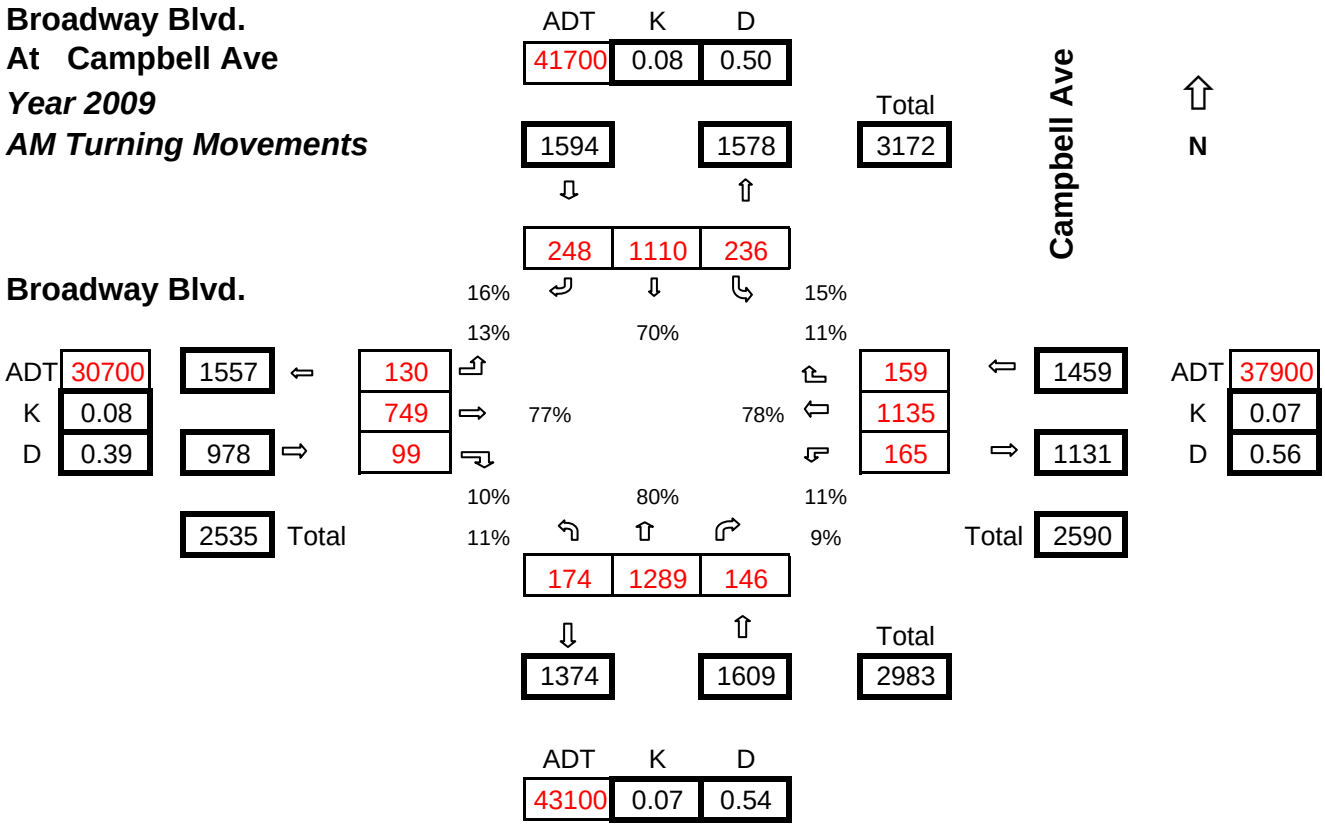


Broadway Blvd.
At Cherry Ave
Year 2040
PM Turning Movements

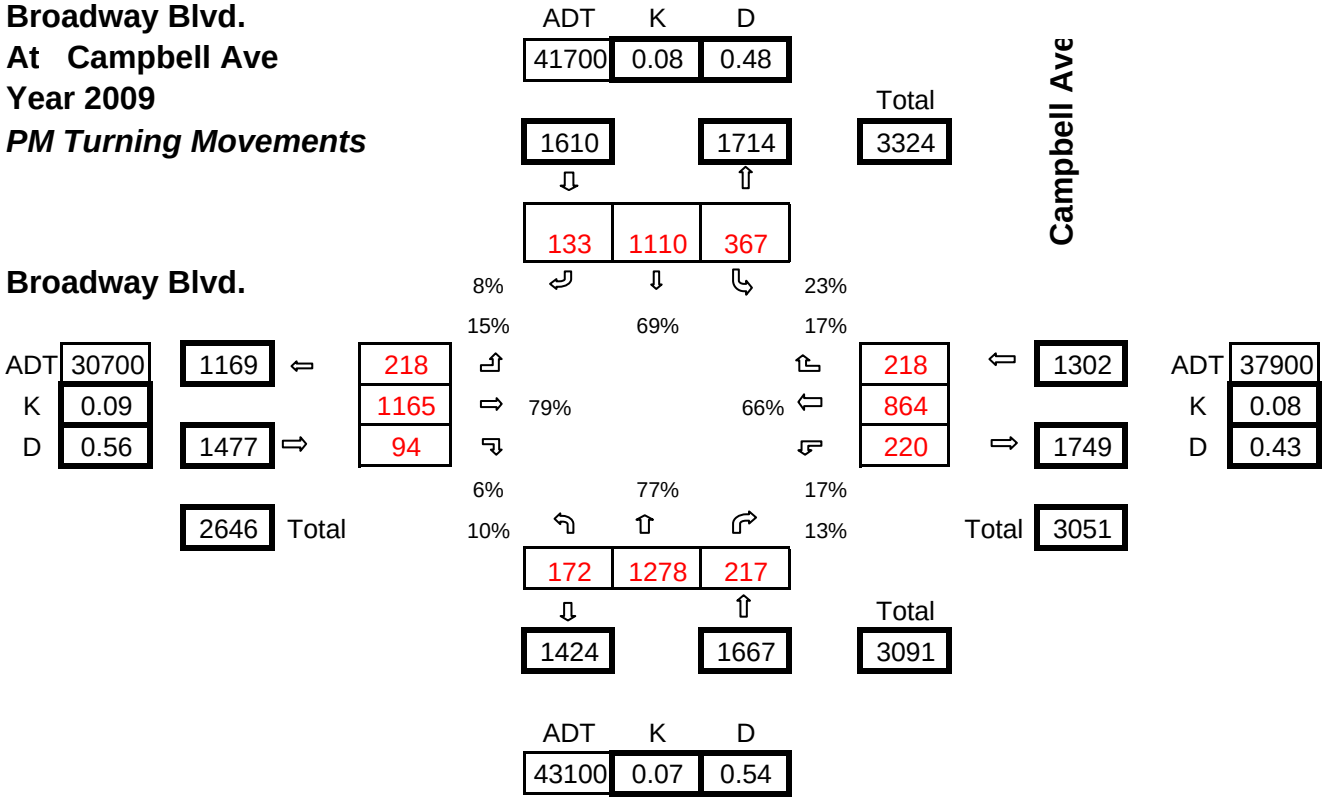


Existing TMC Calculations

Broadway Blvd.
At Campbell Ave
Year 2009
AM Turning Movements



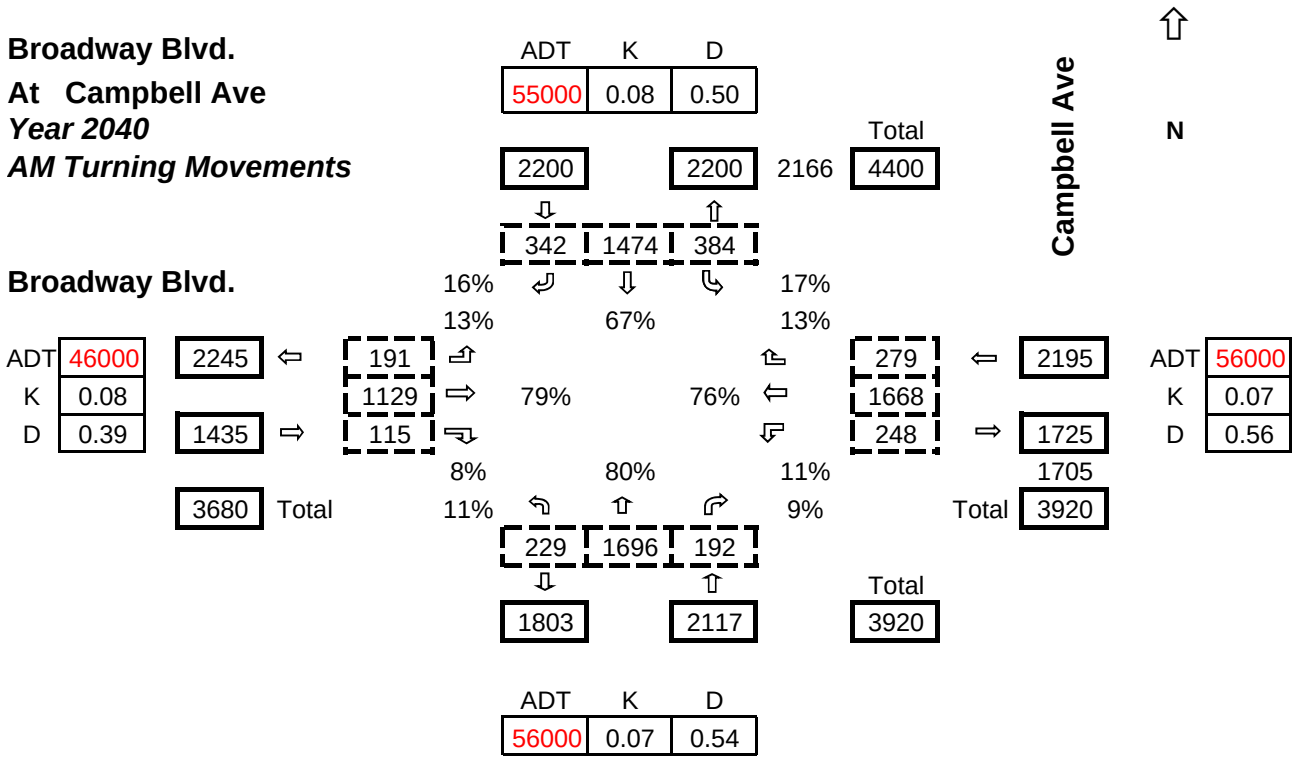
Broadway Blvd.
At Campbell Ave
Year 2009
PM Turning Movements



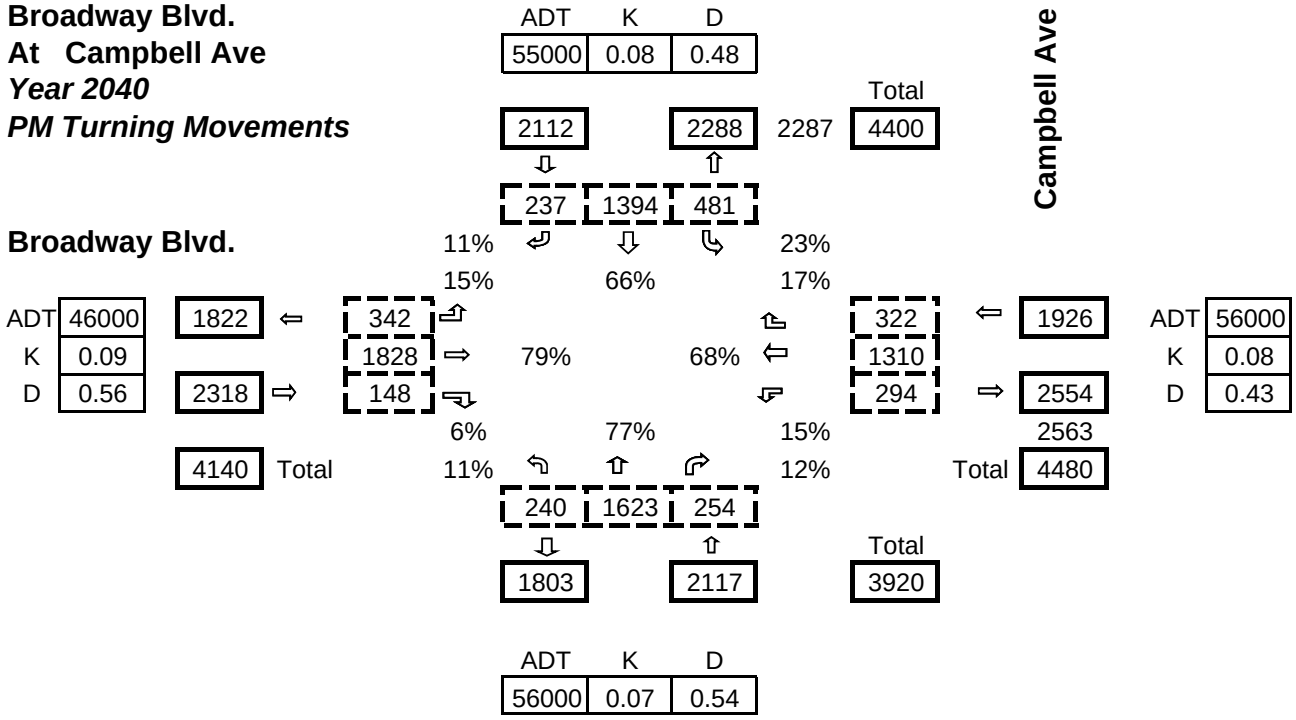
H:\projfile\8795 - Broadway\data\Traffic data\2030 turning\2030Broadway_Campbell.xls
5/11/2009

Future Turning Movement Volume Calculations

Broadway Blvd.
At Campbell Ave
Year 2040
AM Turning Movements

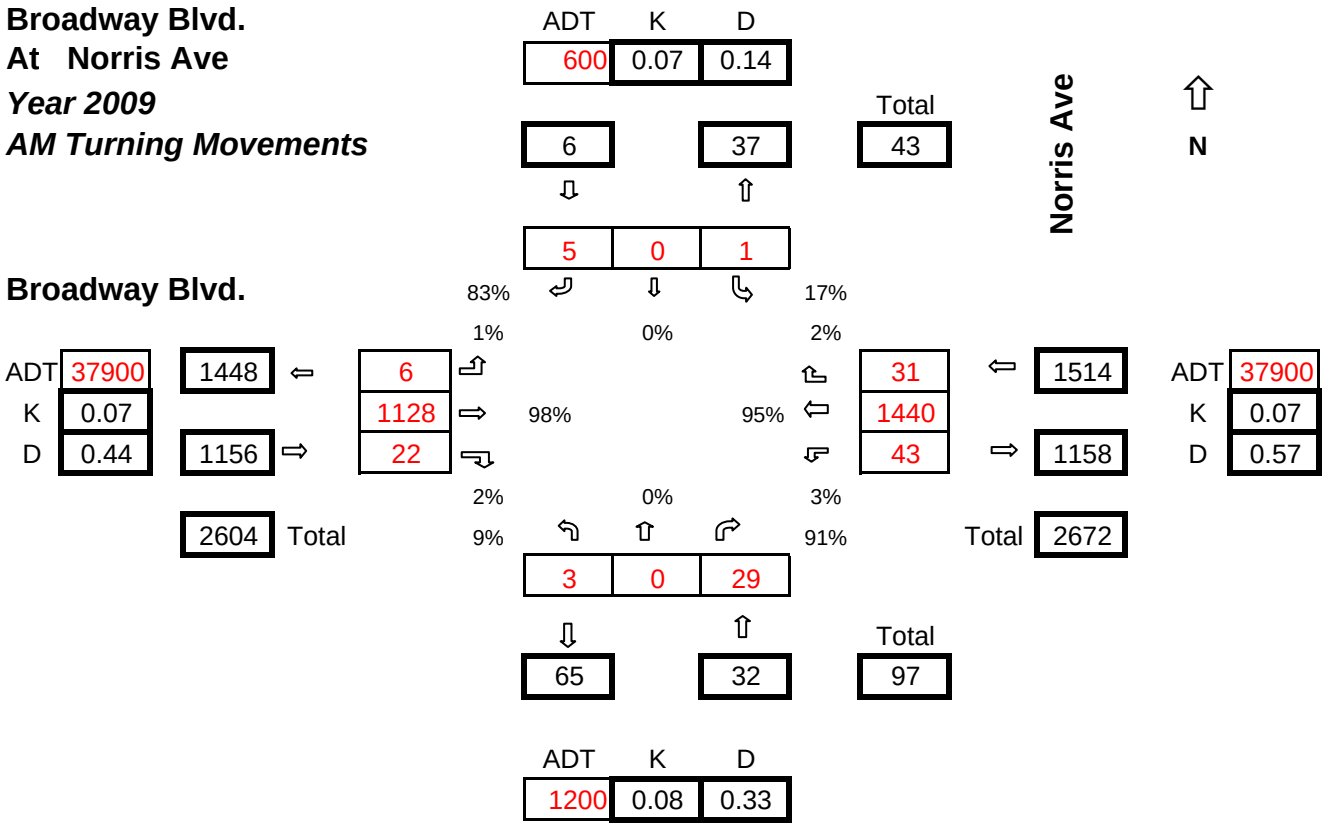


Broadway Blvd.
At Campbell Ave
Year 2040
PM Turning Movements

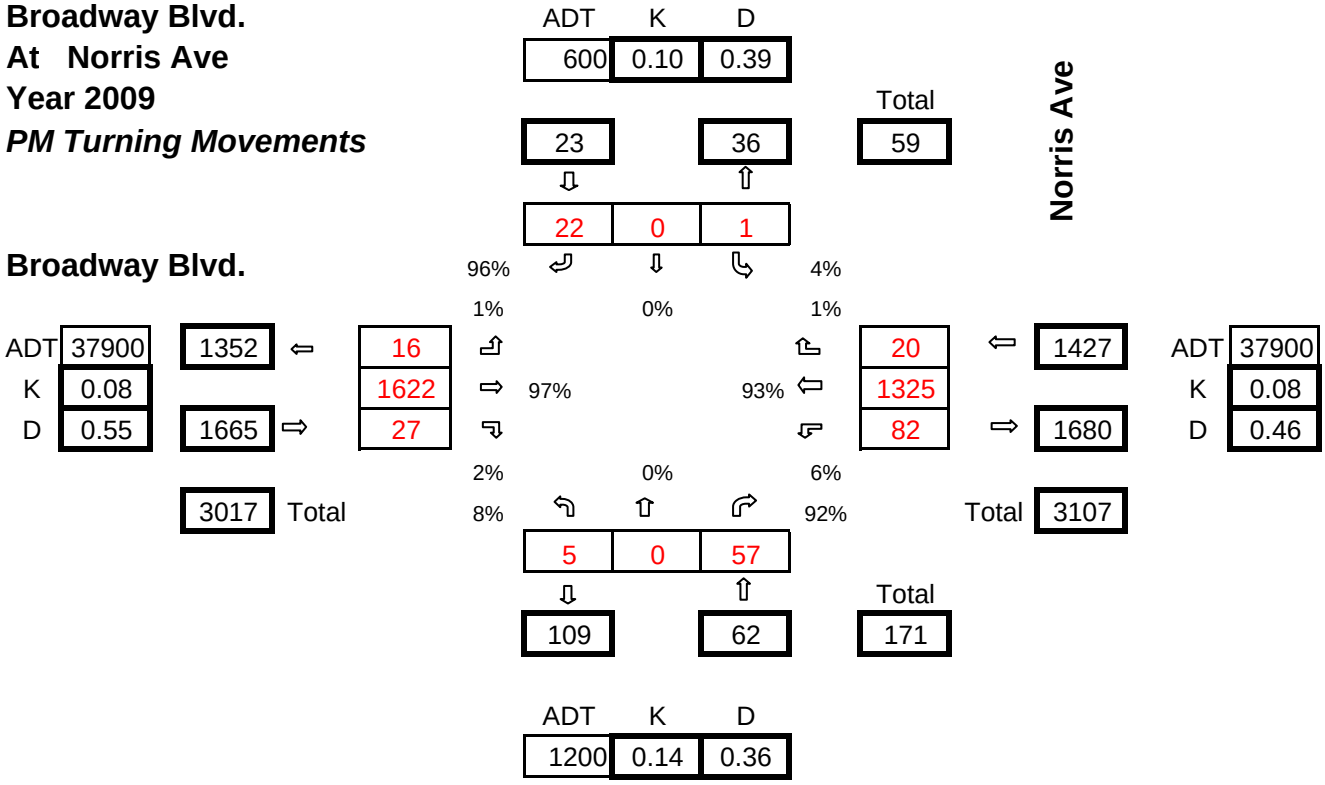


Existing TMC Calculations

Broadway Blvd.
At Norris Ave
Year 2009
AM Turning Movements



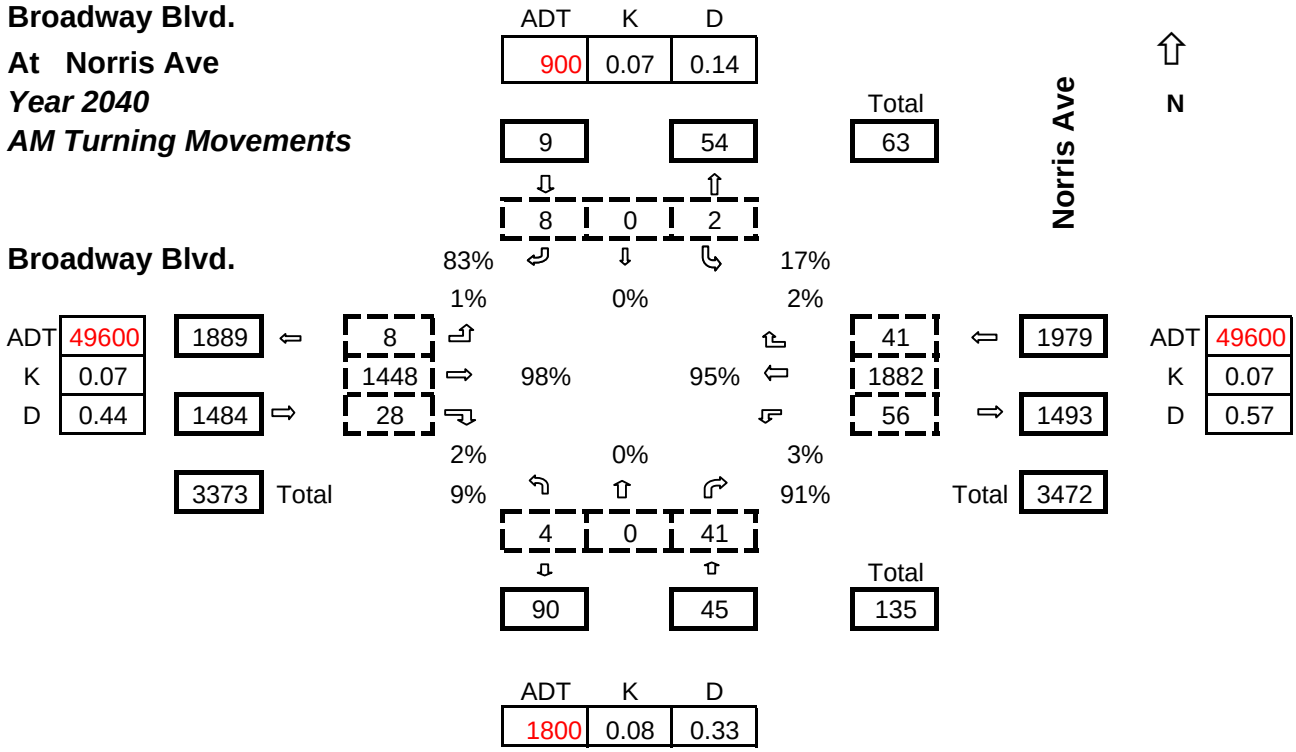
Broadway Blvd.
At Norris Ave
Year 2009
PM Turning Movements



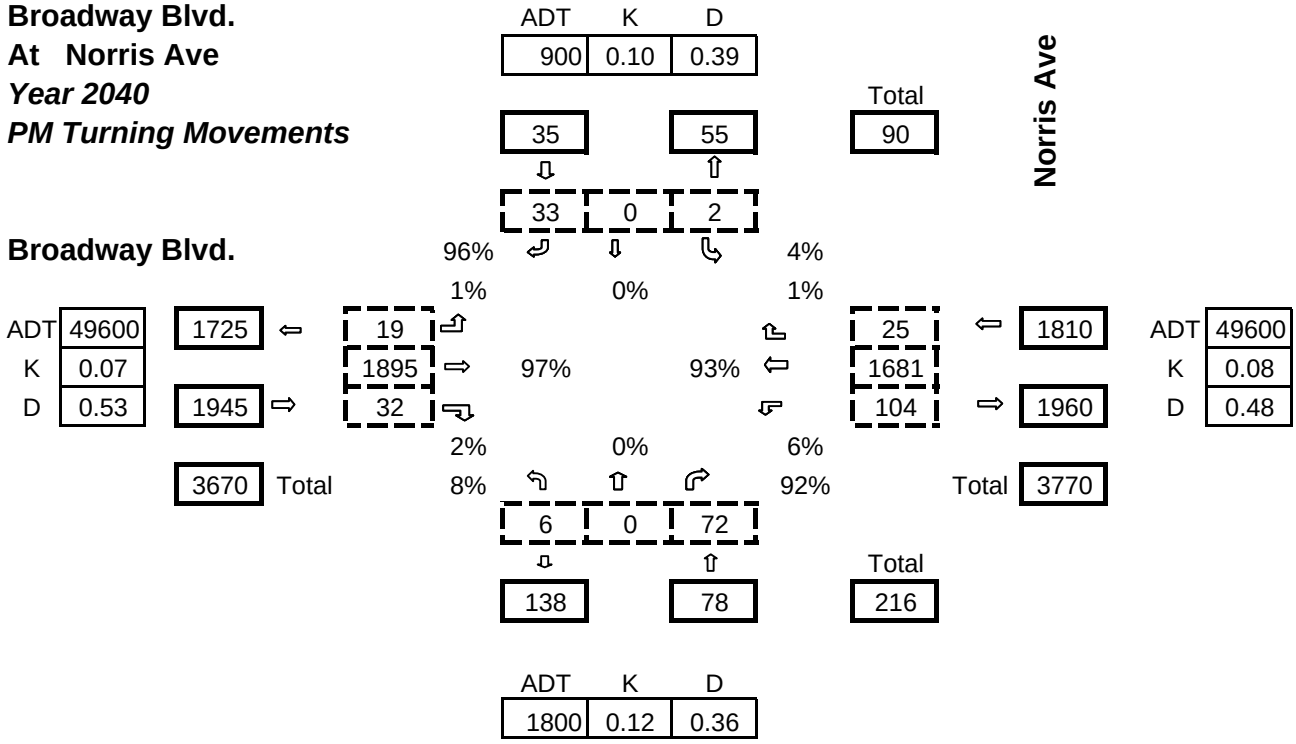
H:\projfile\8795 - Broadway\data\Traffic data\2030 turning\2030Broadway_Norris.xls
5/11/2009

Future TMC Calculations

Broadway Blvd.
At Norris Ave
Year 2040
AM Turning Movements

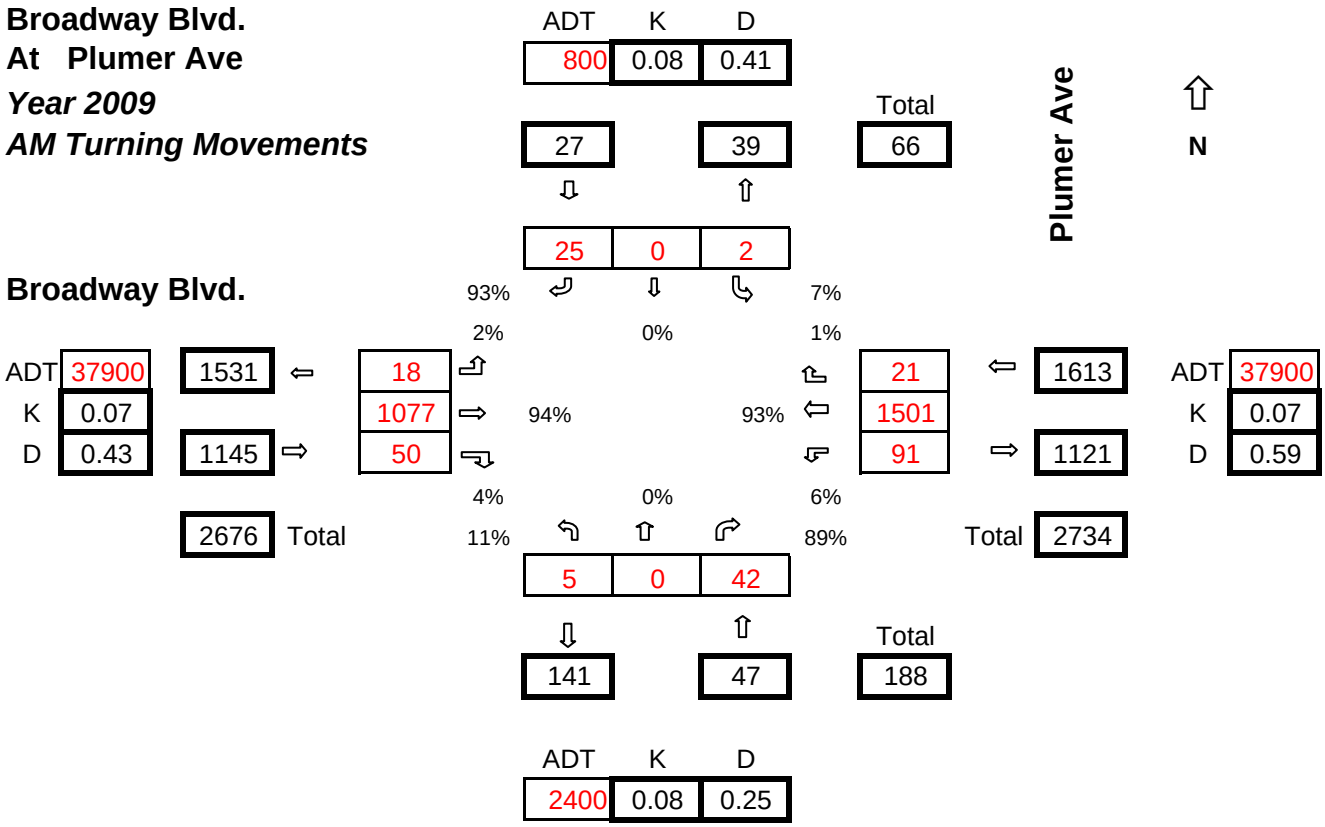


Broadway Blvd.
At Norris Ave
Year 2040
PM Turning Movements

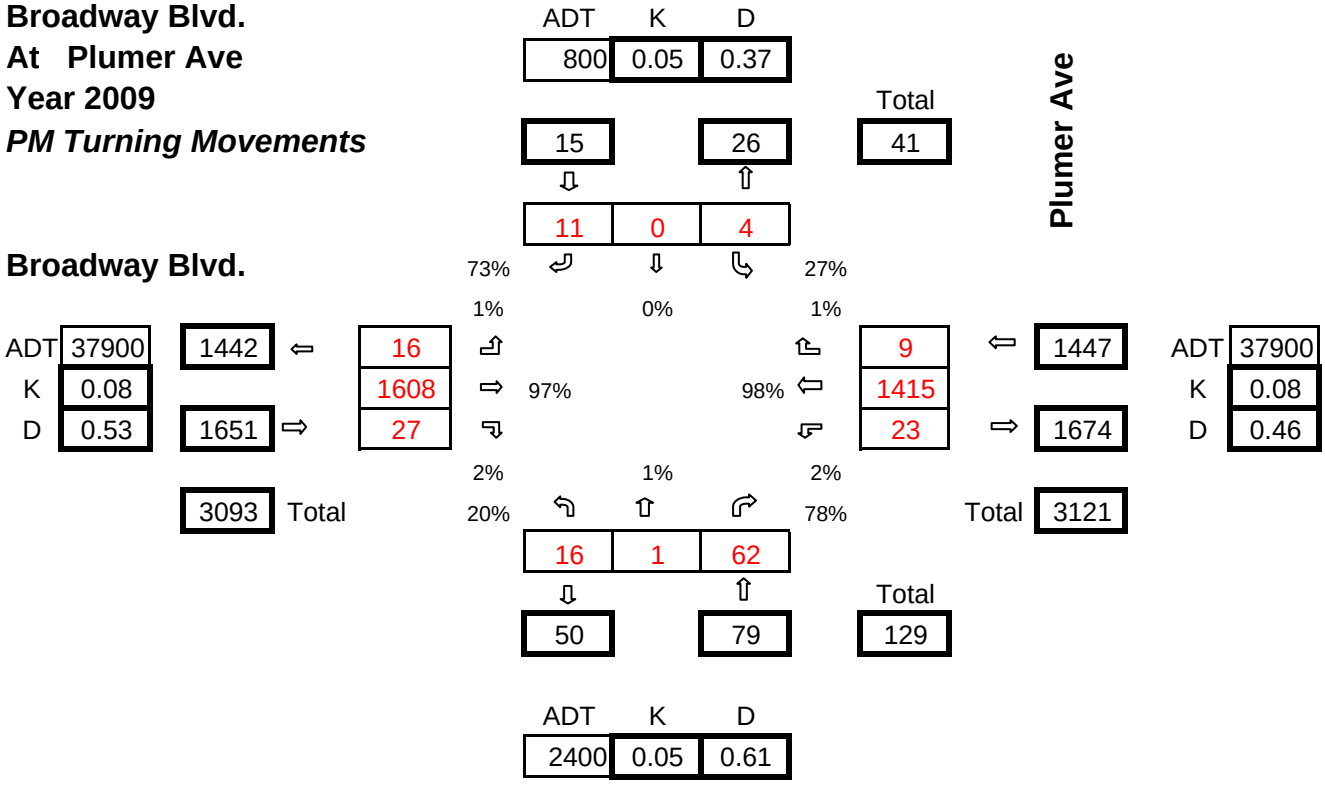


Existing TMC Calculations

Broadway Blvd.
At Plumer Ave
Year 2009
AM Turning Movements



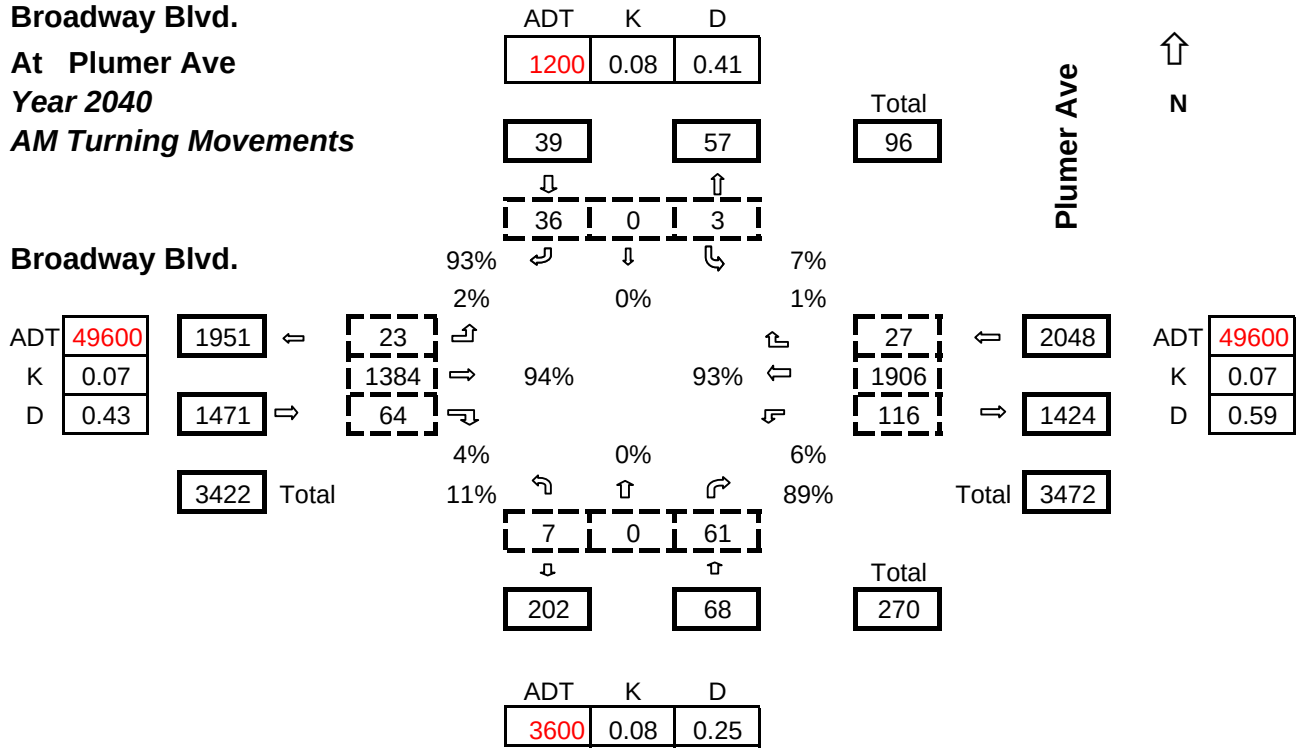
Broadway Blvd.
At Plumer Ave
Year 2009
PM Turning Movements



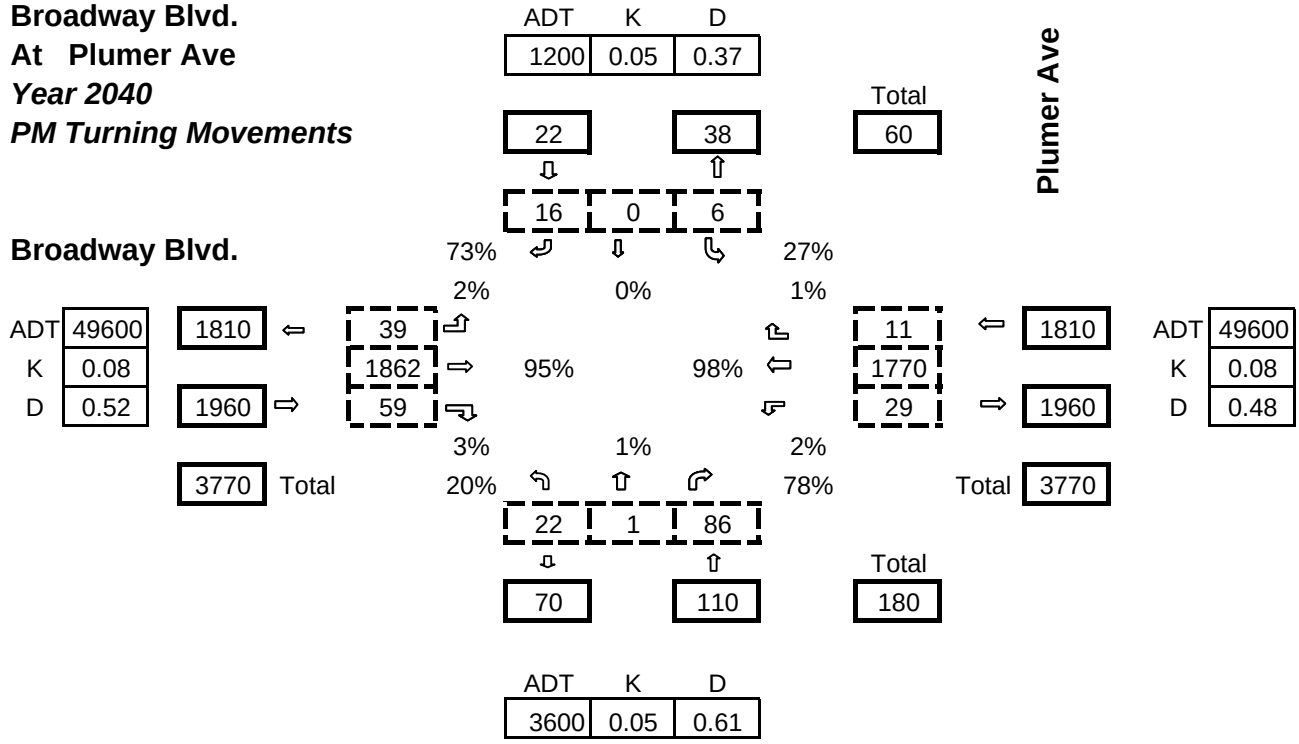
H:\projfile\8795 - Broadway\data\Traffic data\2030 turning\2030Broadway_Plumer.xls
5/11/2009

Future TMC Calculations

Broadway Blvd.
At Plumer Ave
Year 2040
AM Turning Movements

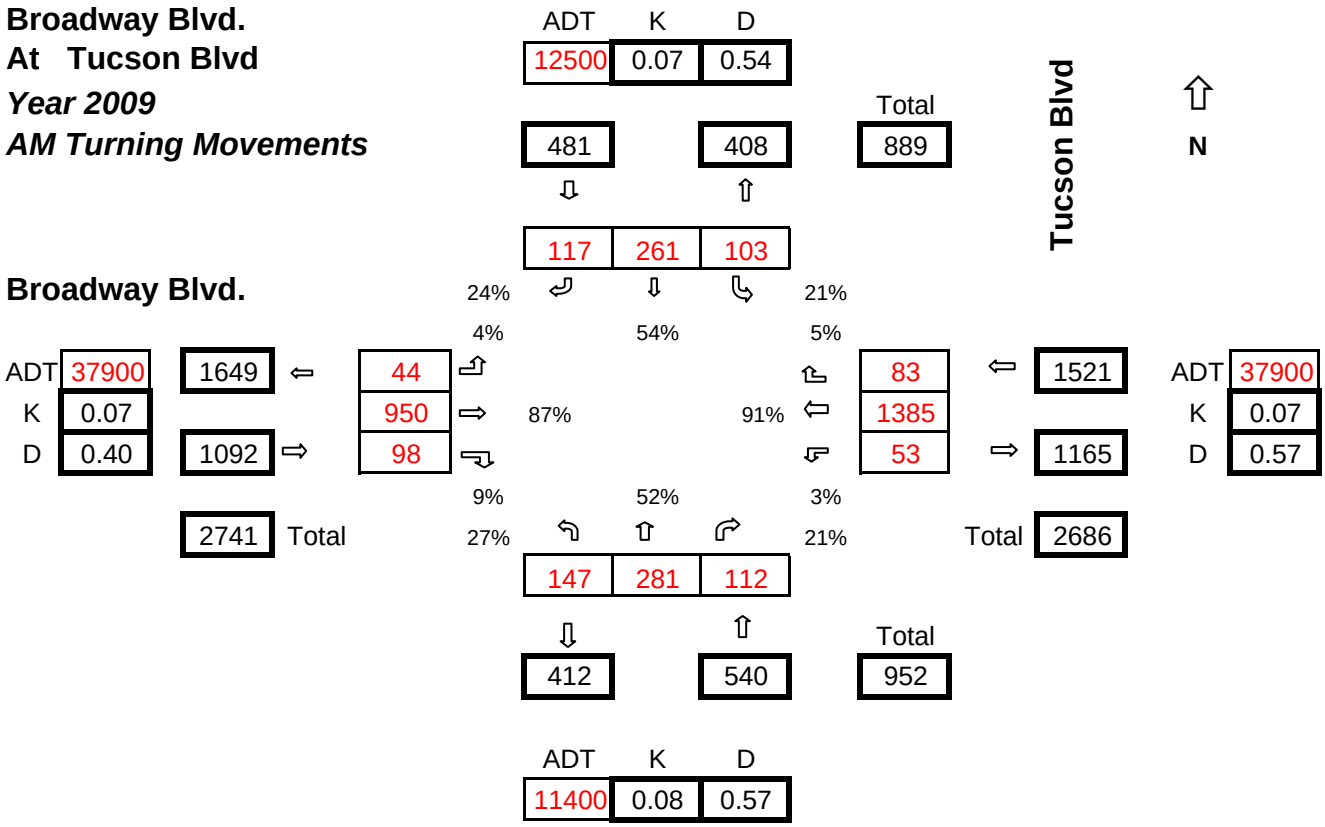


Broadway Blvd.
At Plumer Ave
Year 2040
PM Turning Movements

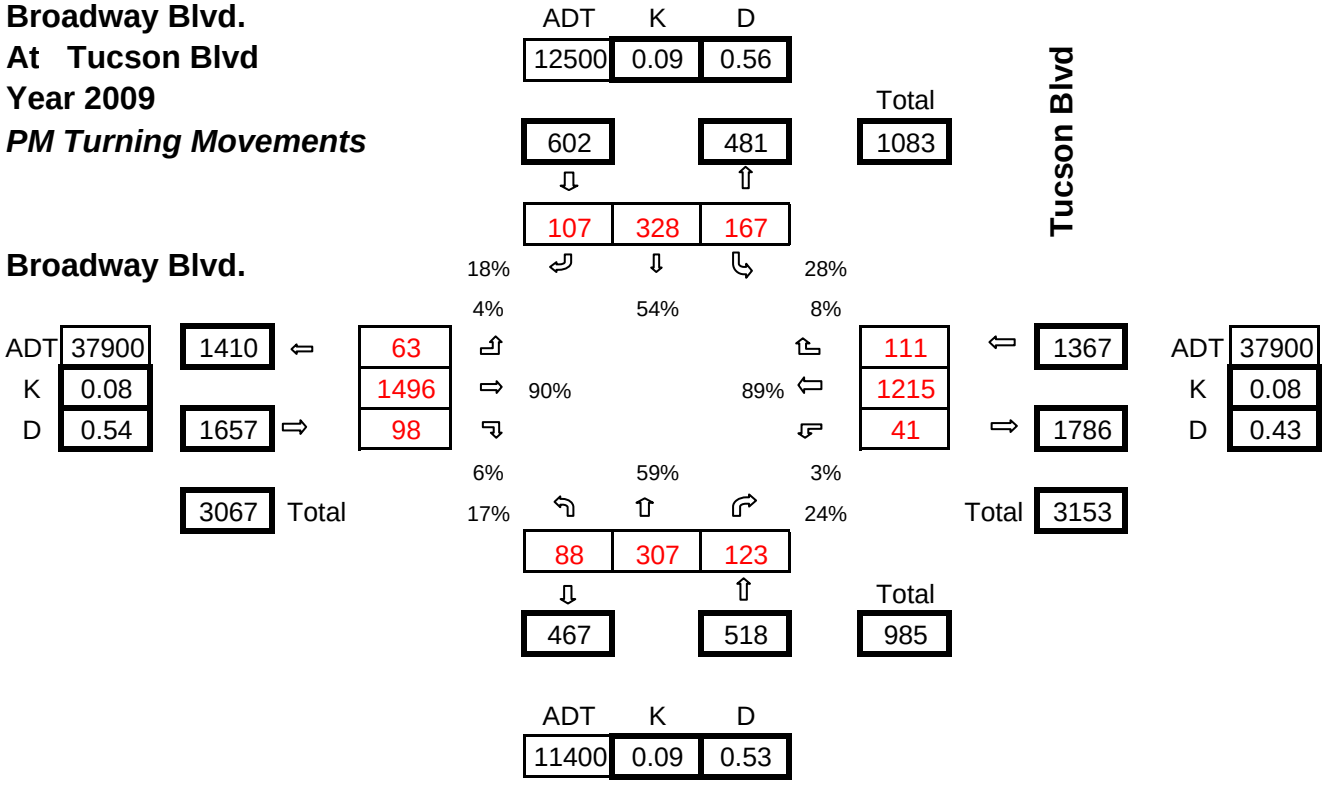


Existing TMC Calculations

Broadway Blvd.
At Tucson Blvd
Year 2009
AM Turning Movements



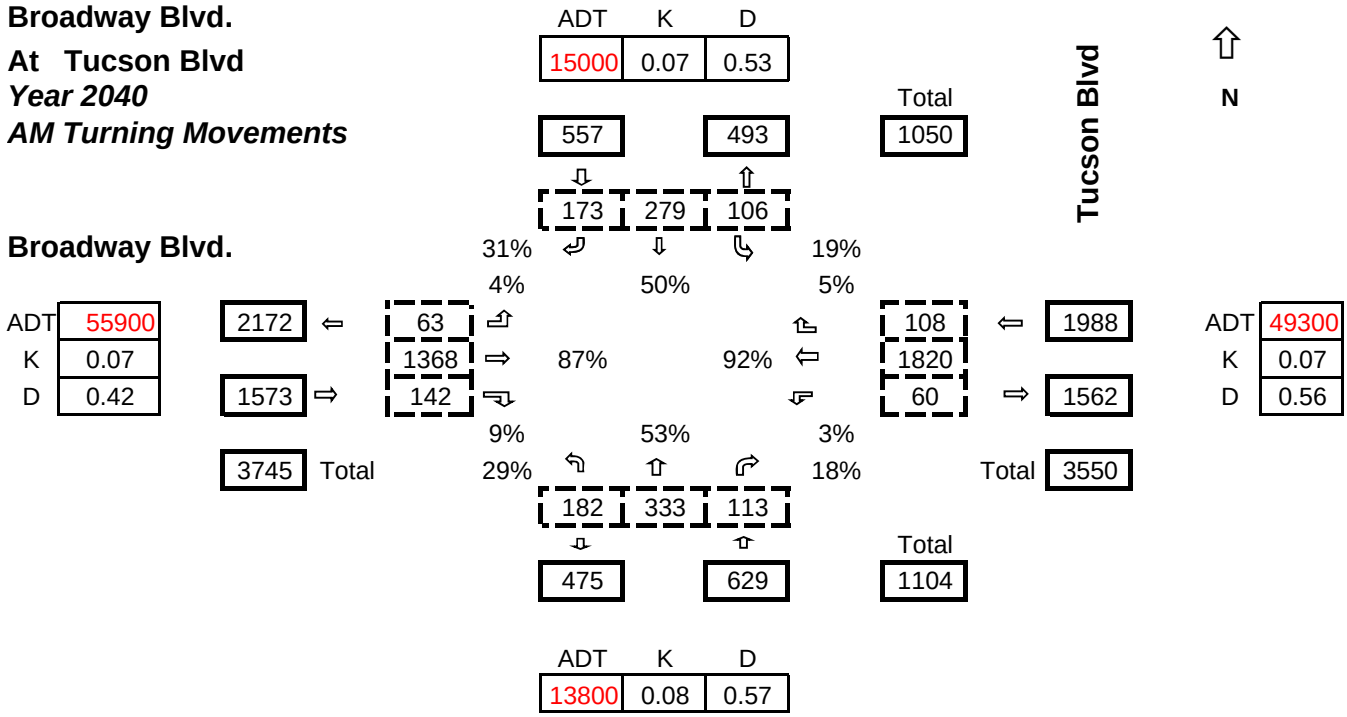
Broadway Blvd.
At Tucson Blvd
Year 2009
PM Turning Movements



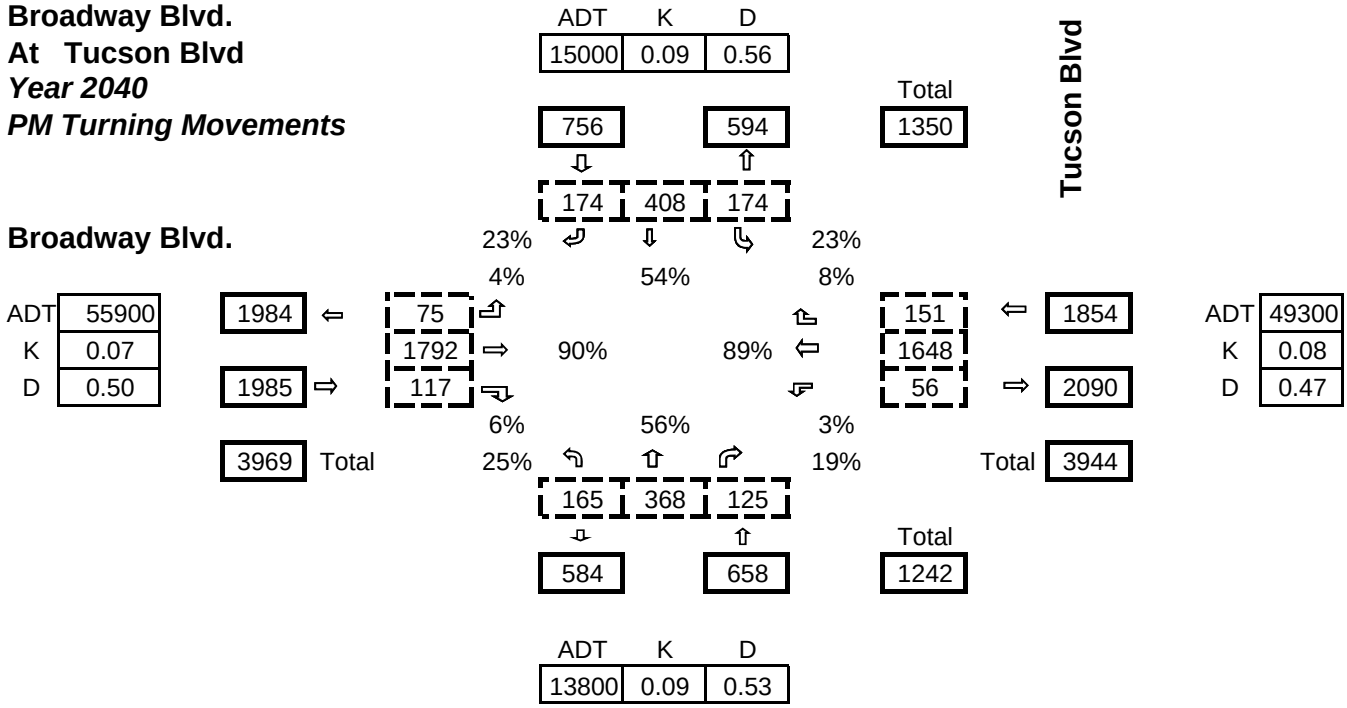
H:\projfile\8795 - Broadway\data\Traffic data\2030 turning\2030Broadway_Tucson.xls
5/11/2009

Future Turning Movement Volume Calculations

Broadway Blvd.
At Tucson Blvd
Year 2040
AM Turning Movements

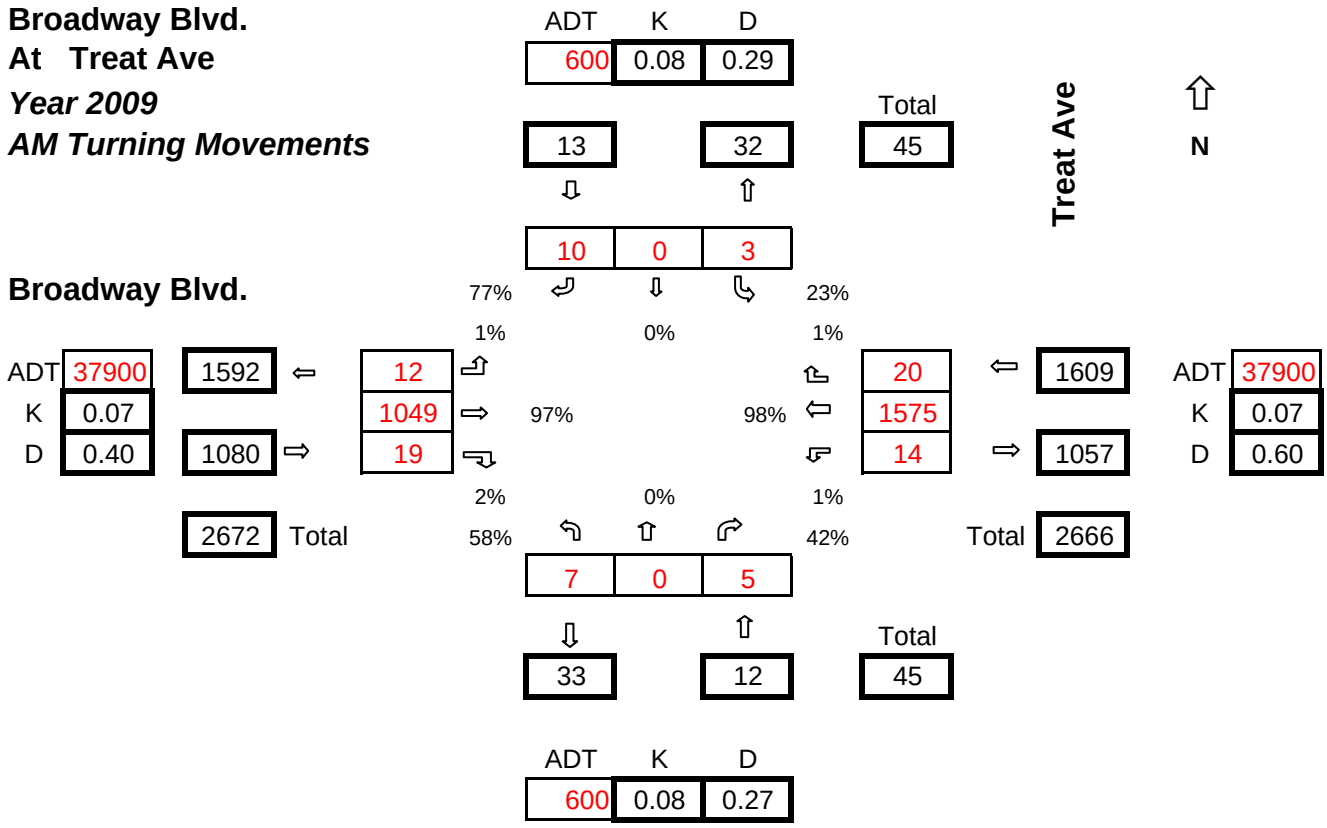


Broadway Blvd.
At Tucson Blvd
Year 2040
PM Turning Movements

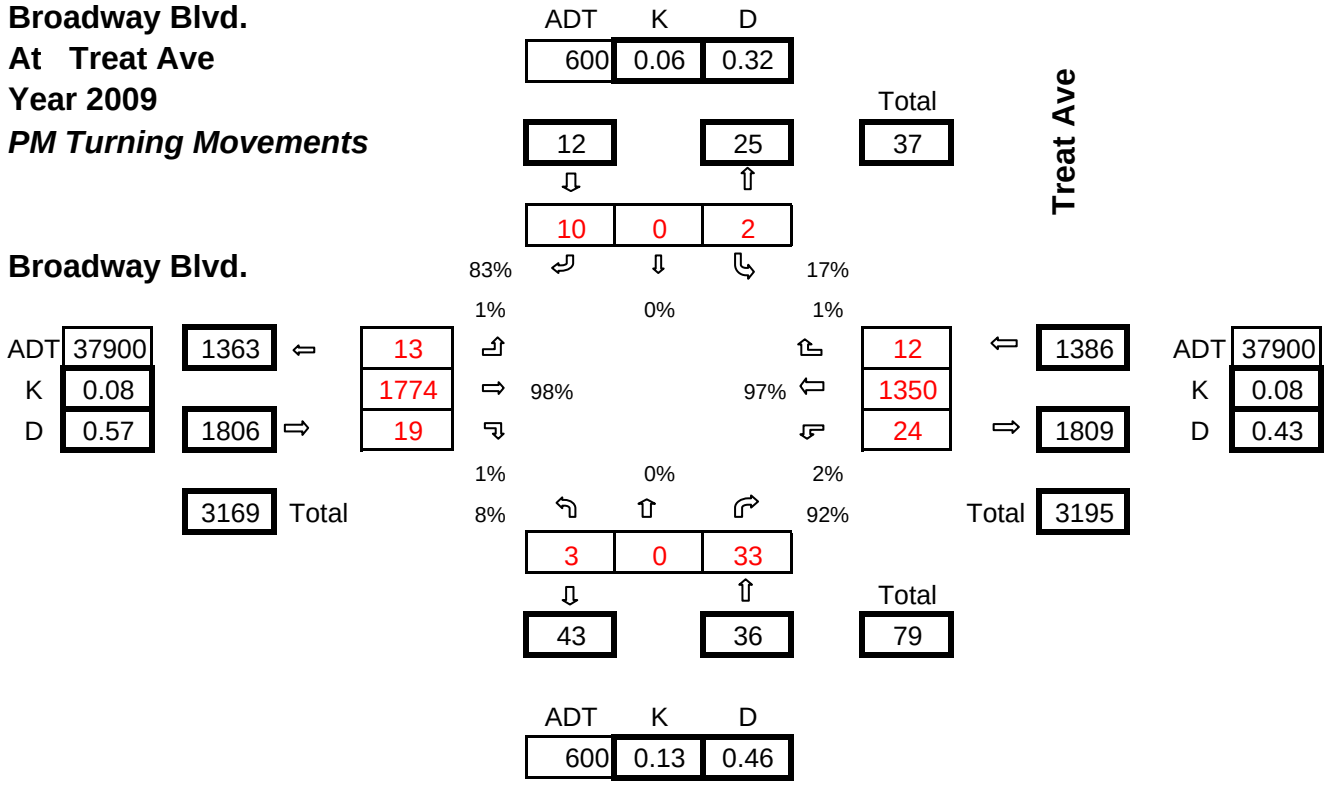


Existing TMC Calculations

Broadway Blvd.
At Treat Ave
Year 2009
AM Turning Movements

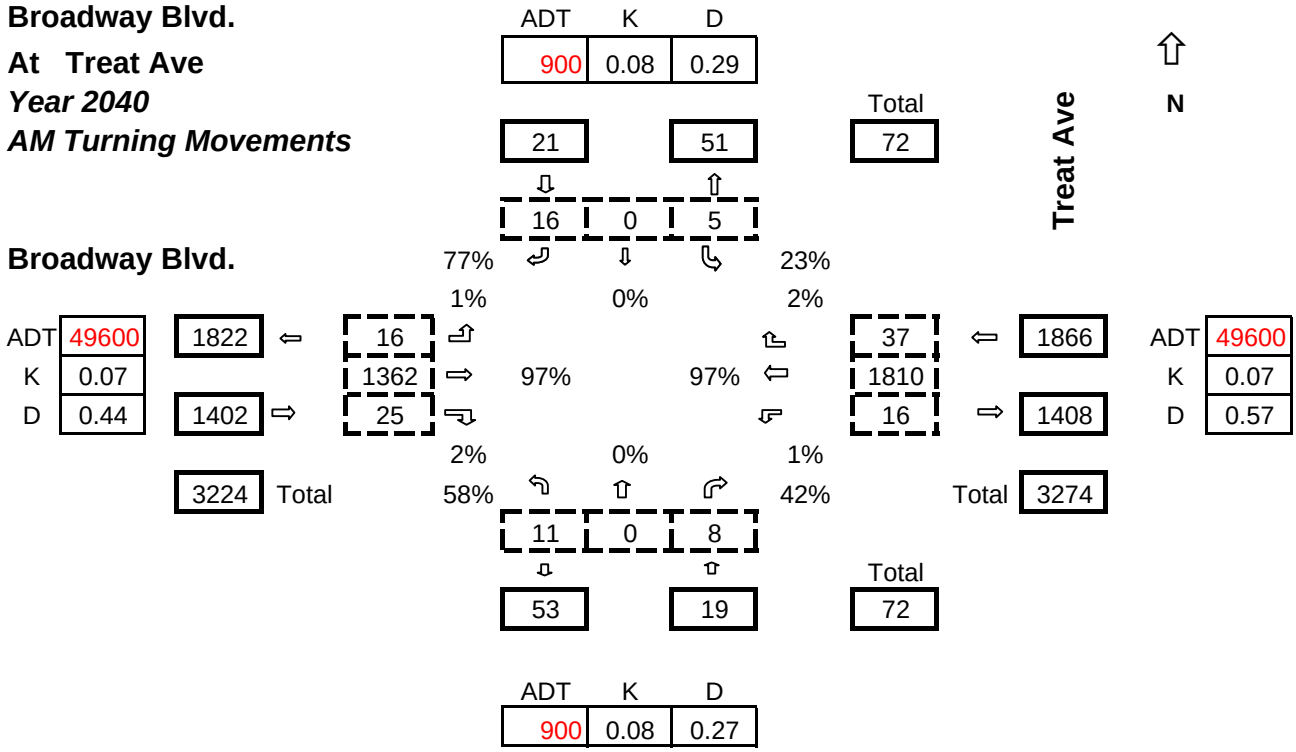


Broadway Blvd.
At Treat Ave
Year 2009
PM Turning Movements

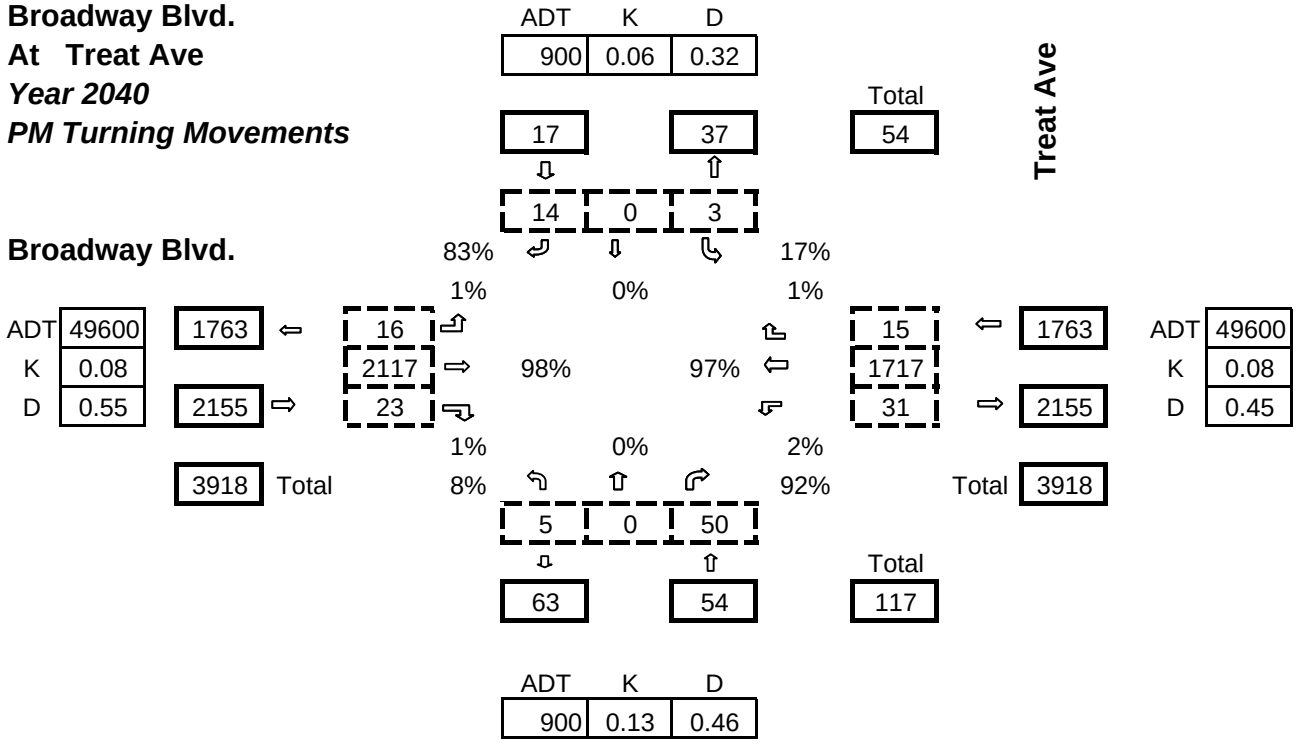


Future TMC Calculations

Broadway Blvd.
At Treat Ave
Year 2040
AM Turning Movements

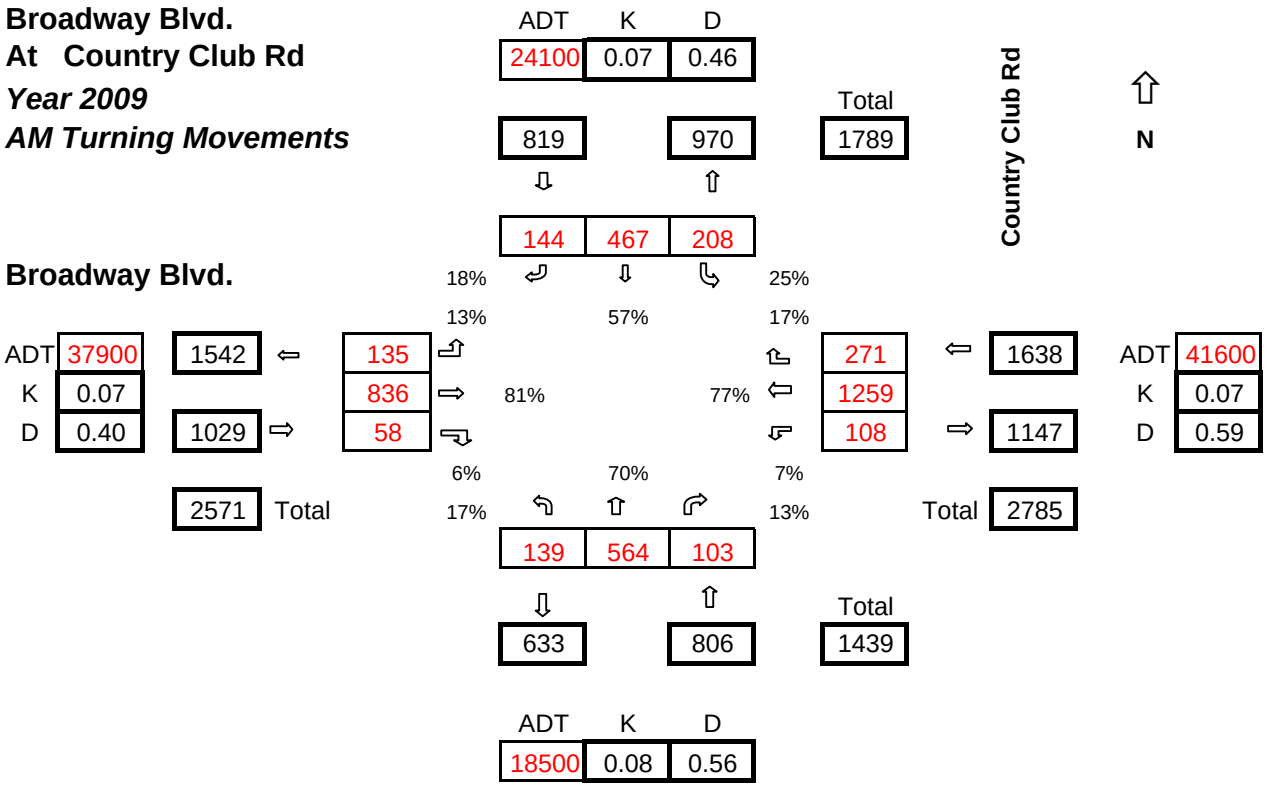


Broadway Blvd.
At Treat Ave
Year 2040
PM Turning Movements

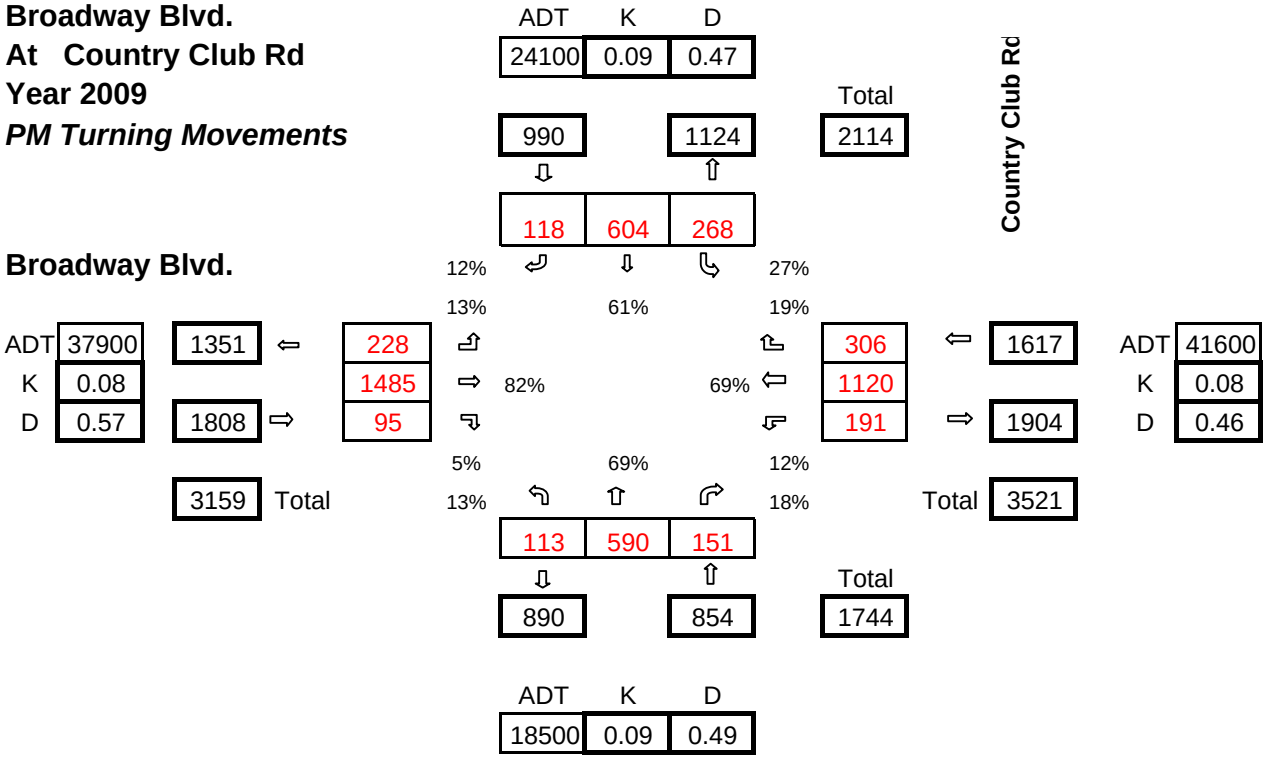


Existing TMC Calculations

Broadway Blvd.
At Country Club Rd
Year 2009
AM Turning Movements

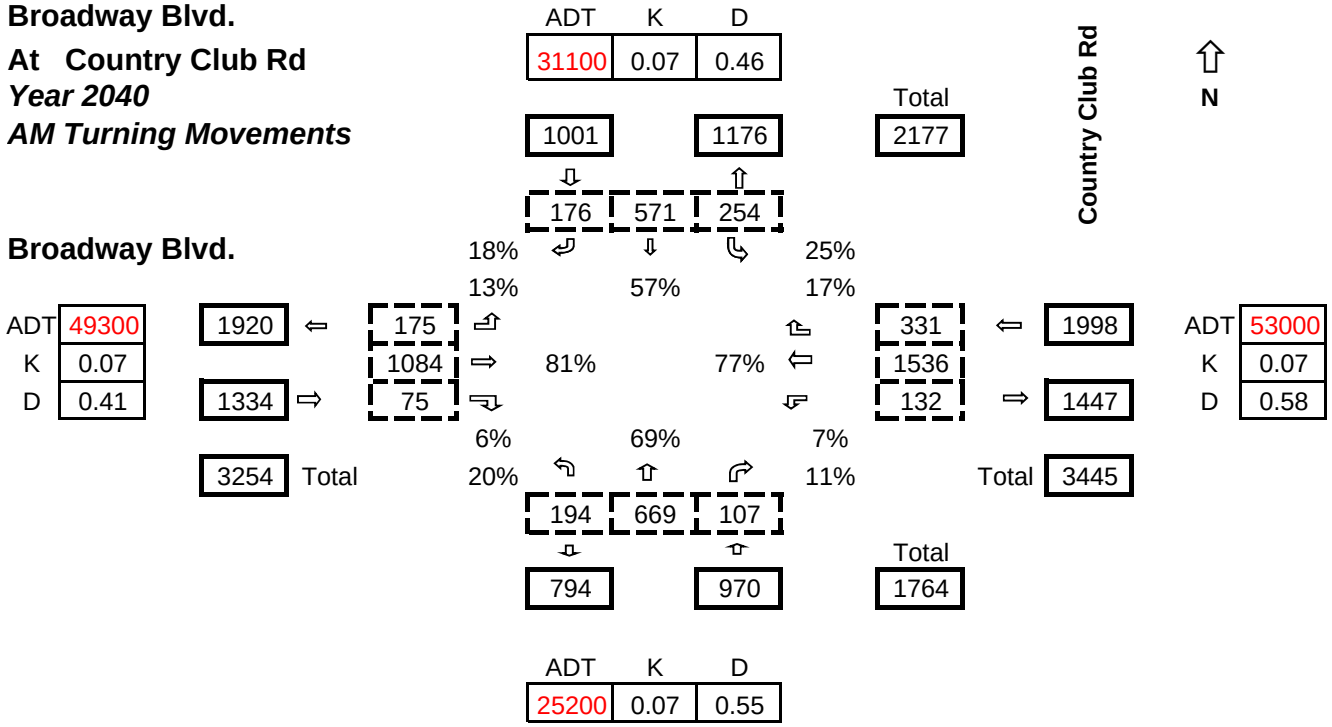


Broadway Blvd.
At Country Club Rd
Year 2009
PM Turning Movements

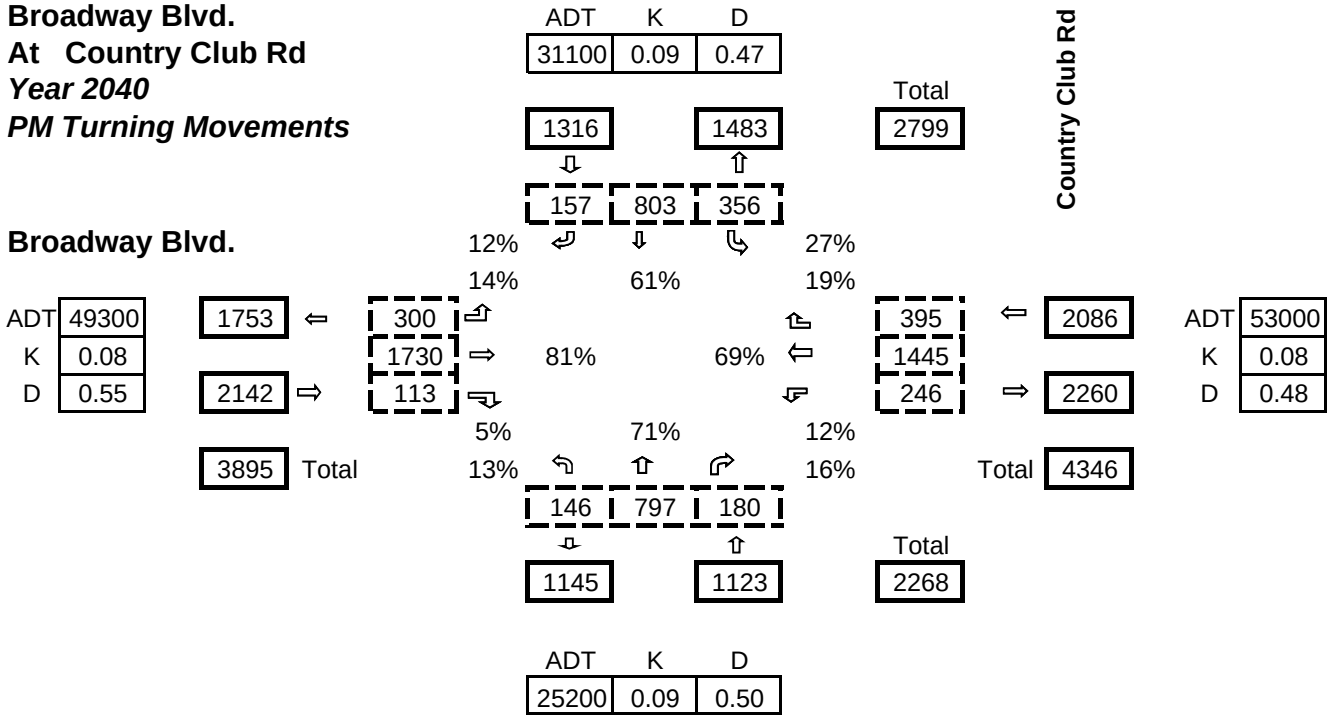


Future Turning Movement Volume Calculations

Broadway Blvd.
At Country Club Rd
Year 2040
AM Turning Movements



Broadway Blvd.
At Country Club Rd
Year 2040
PM Turning Movements



E. Capacity Analysis Worksheets – 2040

AM Peak Period
Level of Service and
Queuing Results

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	460	1221	88	318	1254	417	102	1018	385	308	948	353
v/c Ratio	0.79	0.81	0.19	0.55	0.83	0.75	0.29	0.92	0.57	0.80	0.82	0.49
Control Delay	41.9	34.5	6.7	30.8	35.5	29.3	23.0	43.5	10.2	47.8	34.6	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.9	34.5	6.7	30.8	35.5	29.3	23.0	43.5	10.2	47.8	34.6	6.2
Queue Length 50th (ft)	79	236	0	52	245	148	16	288	39	53	256	12
Queue Length 95th (ft)	#147	292	34	78	302	#293	30	#413	124	#100	334	74
Internal Link Dist (ft)		820			910			2329			1787	
Turn Bay Length (ft)	300		200	300		200	300		200	300		350
Base Capacity (vph)	604	1515	465	604	1515	555	349	1117	684	384	1170	729
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.81	0.19	0.53	0.83	0.75	0.29	0.91	0.56	0.80	0.81	0.48

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	423	1123	81	293	1154	384	94	937	354	283	872	325
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3399	5085	1352	3399	5085	1541	3099	3347	1477	3399	3505	1538
Flt Permitted	0.14	1.00	1.00	0.14	1.00	1.00	0.13	1.00	1.00	0.13	1.00	1.00
Satd. Flow (perm)	506	5085	1352	506	5085	1541	425	3347	1477	466	3505	1538
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)	460	1221	88	318	1254	417	102	1018	385	308	948	353
RTOR Reduction (vph)	0	0	62	0	0	96	0	0	192	0	0	216
Lane Group Flow (vph)	460	1221	26	318	1254	321	102	1018	193	308	948	137
Confl. Peds. (#/hr)	5		8	8		5			9	9		
Heavy Vehicles (%)	3%	2%	17%	3%	2%	3%	13%	7%	7%	3%	3%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	4	0	0	0	0
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	37.7	27.3	27.3	37.7	27.3	27.3	34.8	29.7	29.7	34.8	29.7	29.7
Effective Green, g (s)	39.7	26.8	26.8	39.7	26.8	26.8	36.8	29.7	29.7	36.8	29.7	29.7
Actuated g/C Ratio	0.44	0.30	0.30	0.44	0.30	0.30	0.41	0.33	0.33	0.41	0.33	0.33
Clearance Time (s)	5.0	3.5	3.5	5.0	3.5	3.5	5.0	4.0	4.0	5.0	4.0	4.0
Vehicle Extension (s)	2.0	5.0	5.0	2.0	5.0	5.0	2.0	3.0	3.0	2.0	3.0	3.0
Lane Grp Cap (vph)	590	1514	403	590	1514	459	355	1105	487	389	1157	508
v/s Ratio Prot	c0.10	0.24		0.07	c0.25		0.02	c0.30		c0.05	0.27	
v/s Ratio Perm	0.25		0.02	0.17		0.21	0.10		0.13	0.27		0.09
v/c Ratio	0.78	0.81	0.07	0.54	0.83	0.70	0.29	0.92	0.40	0.79	0.82	0.27
Uniform Delay, d1	31.7	29.2	22.6	30.1	29.5	28.0	32.0	29.0	23.2	35.7	27.7	22.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.9	4.7	0.3	0.5	5.4	8.6	0.2	12.3	0.5	9.9	4.6	0.3
Delay (s)	37.6	33.9	22.9	30.5	34.8	36.7	32.1	41.4	23.8	45.5	32.3	22.5
Level of Service	D	C	C	C	C	D	C	D	C	D	C	C
Approach Delay (s)		34.3			34.5			36.2			32.7	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM Average Control Delay	34.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT
Lane Group Flow (vph)	133	1621	34	1925
v/c Ratio	0.69	0.32	0.13	0.38
Control Delay	24.7	0.2	1.0	0.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	24.7	0.2	1.0	0.2
Queue Length 50th (ft)	0	0	0	0
Queue Length 95th (ft)	#47	0	0	0
Internal Link Dist (ft)		910		1568
Turn Bay Length (ft)	150		150	
Base Capacity (vph)	192	5008	261	5075
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.69	0.32	0.13	0.38

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	122	1449	42	32	1762	28	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.0		4.5	4.0							
Lane Util. Factor	1.00	0.91		1.00	0.91							
Frt	1.00	1.00		1.00	1.00							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1770	5006		1736	5073							
Flt Permitted	0.10	1.00		0.14	1.00							
Satd. Flow (perm)	191	5006		260	5073							
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.79	0.79	0.79	0.58	0.58	0.58
Adj. Flow (vph)	133	1575	46	34	1895	30	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	133	1621	0	34	1925	0	0	0	0	0	0	0
Heavy Vehicles (%)	2%	3%	9%	4%	2%	2%	17%	2%	8%	2%	2%	2%
Turn Type	Perm			Perm								
Protected Phases		2			6							
Permitted Phases	2			6								
Actuated Green, G (s)	49.5	49.5		49.5	49.5							
Effective Green, g (s)	49.5	49.5		49.5	49.5							
Actuated g/C Ratio	1.00	1.00		1.00	1.00							
Clearance Time (s)	4.5	4.5		4.5	4.5							
Vehicle Extension (s)	3.0	3.0		3.0	3.0							
Lane Grp Cap (vph)	191	5006		260	5073							
v/s Ratio Prot		0.32			0.38							
v/s Ratio Perm	c0.69			0.13								
v/c Ratio	0.70	0.32		0.13	0.38							
Uniform Delay, d1	0.0	0.0		0.0	0.0							
Progression Factor	1.00	1.00		1.00	1.00							
Incremental Delay, d2	19.0	0.2		1.0	0.2							
Delay (s)	19.0	0.2		1.0	0.2							
Level of Service	B	A		A	A							
Approach Delay (s)		1.6			0.2			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	0.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	0.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	55	1439	47	1938	211	291	104	128
v/c Ratio	0.57	0.43	0.26	0.57	0.76	0.68	0.74	0.31
Control Delay	40.2	7.8	12.1	9.2	49.3	33.4	60.6	24.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.2	7.8	12.1	9.2	49.3	33.4	60.6	24.6
Queue Length 50th (ft)	15	124	10	193	110	125	54	50
Queue Length 95th (ft)	#90	181	35	277	119	125	88	75
Internal Link Dist (ft)		1568		822		776		2264
Turn Bay Length (ft)	300		300		120		130	
Base Capacity (vph)	96	3322	181	3379	353	538	180	527
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.43	0.26	0.57	0.60	0.54	0.58	0.24

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	51	1265	59	44	1717	104	139	106	86	80	56	42
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	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.98	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.93		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1769	4910		1699	4992		1759	1685		1740	1714	
Flt Permitted	0.08	1.00		0.15	1.00		0.63	1.00		0.33	1.00	
Satd. Flow (perm)	142	4910		268	4992		1175	1685		600	1714	
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.66	0.66	0.66	0.77	0.77	0.77
Adj. Flow (vph)	55	1375	64	47	1827	111	211	161	130	104	73	55
RTOR Reduction (vph)	0	5	0	0	6	0	0	35	0	0	14	0
Lane Group Flow (vph)	55	1434	0	47	1932	0	211	256	0	104	114	0
Confl. Peds. (#/hr)	5		8	8		5	5		23	23		5
Heavy Vehicles (%)	2%	4%	2%	6%	2%	2%	2%	4%	2%	2%	2%	4%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	0	0	0	0	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	59.8	59.8		59.8	59.8		19.7	19.7		19.7	19.7	
Effective Green, g (s)	60.8	60.8		60.8	60.8		21.2	21.2		21.2	21.2	
Actuated g/C Ratio	0.68	0.68		0.68	0.68		0.24	0.24		0.24	0.24	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	96	3317		181	3372		277	397		141	404	
v/s Ratio Prot		0.29			0.39			0.15			0.07	
v/s Ratio Perm	c0.39			0.18			c0.18			0.17		
v/c Ratio	0.57	0.43		0.26	0.57		0.76	0.64		0.74	0.28	
Uniform Delay, d1	7.7	6.7		5.7	7.7		32.0	31.0		31.8	28.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	22.5	0.4		3.5	0.7		10.6	2.7		15.8	0.1	
Delay (s)	30.2	7.1		9.2	8.4		42.6	33.7		47.6	28.3	
Level of Service	C	A		A	A		D	C		D	C	
Approach Delay (s)		8.0			8.5			37.4			37.0	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	13.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT
Lane Group Flow (vph)	32	1583	28	1966
v/c Ratio	0.18	0.32	0.11	0.39
Control Delay	2.1	0.2	0.9	0.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	2.1	0.2	0.9	0.2
Queue Length 50th (ft)	0	0	0	0
Queue Length 95th (ft)	0	0	0	0
Internal Link Dist (ft)		822		1190
Turn Bay Length (ft)	150		150	
Base Capacity (vph)	182	5018	255	5066
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.18	0.32	0.11	0.39

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	1423	33	27	1855	33	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.0		4.5	4.0							
Lane Util. Factor	1.00	0.91		1.00	0.91							
Frpb, ped/bikes	1.00	1.00		1.00	1.00							
Flpb, ped/bikes	1.00	1.00		1.00	1.00							
Frt	1.00	1.00		1.00	1.00							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1769	5017		1640	5068							
Flt Permitted	0.10	1.00		0.15	1.00							
Satd. Flow (perm)	183	5017		256	5068							
Peak-hour factor, PHF	0.92	0.92	0.92	0.96	0.96	0.96	0.66	0.66	0.66	0.58	0.58	0.58
Adj. Flow (vph)	32	1547	36	28	1932	34	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	32	1583	0	28	1966	0	0	0	0	0	0	0
Confl. Peds. (#/hr)	10		11	11		10	9		22	22		9
Heavy Vehicles (%)	2%	3%	2%	10%	2%	4%	7%	2%	5%	2%	2%	10%
Turn Type	Perm			Perm								
Protected Phases		2			6							
Permitted Phases	2			6								
Actuated Green, G (s)	49.5	49.5		49.5	49.5							
Effective Green, g (s)	49.5	49.5		49.5	49.5							
Actuated g/C Ratio	1.00	1.00		1.00	1.00							
Clearance Time (s)	4.5	4.5		4.5	4.5							
Vehicle Extension (s)	3.0	3.0		3.0	3.0							
Lane Grp Cap (vph)	183	5017		256	5068							
v/s Ratio Prot		0.32			c0.39							
v/s Ratio Perm	0.17			0.11								
v/c Ratio	0.17	0.32		0.11	0.39							
Uniform Delay, d1	0.0	0.0		0.0	0.0							
Progression Factor	1.00	1.00		1.00	1.00							
Incremental Delay, d2	2.1	0.2		0.9	0.2							
Delay (s)	2.1	0.2		0.9	0.2							
Level of Service	A	A		A	A							
Approach Delay (s)		0.2			0.2			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	0.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	0.0
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	207	1220	124	270	1802	310	249	1840	209	412	1519	356
v/c Ratio	0.69	0.72	0.21	0.91	1.04	0.51	0.66	1.02	0.36	1.11	0.82	0.58
Control Delay	41.0	28.7	5.0	66.9	62.0	16.0	36.4	56.0	13.5	112.8	30.4	21.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.0	28.7	5.0	66.9	62.0	16.0	36.4	56.0	13.5	112.8	30.4	21.1
Queue Length 50th (ft)	35	219	0	47	~408	73	39	~394	46	~91	282	117
Queue Length 95th (ft)	#63	271	36	#105	#504	152	61	#506	102	#185	342	208
Internal Link Dist (ft)		1190			400			2690			2243	
Turn Bay Length (ft)	300		200	300		200	220		180	260		280
Base Capacity (vph)	299	1688	602	296	1738	612	378	1802	585	371	1847	618
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.72	0.21	0.91	1.04	0.51	0.66	1.02	0.36	1.11	0.82	0.58

Intersection Summary

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

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	1122	114	248	1658	285	229	1693	192	391	1443	338
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.96	1.00	1.00	0.97	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3335	4900	1511	3303	5045	1515	3367	4914	1440	3303	5036	1528
Flt Permitted	0.12	1.00	1.00	0.12	1.00	1.00	0.12	1.00	1.00	0.12	1.00	1.00
Satd. Flow (perm)	439	4900	1511	435	5045	1515	417	4914	1440	409	5036	1528
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.95	0.95
Adj. Flow (vph)	207	1220	124	270	1802	310	249	1840	209	412	1519	356
RTOR Reduction (vph)	0	0	81	0	0	90	0	0	57	0	0	58
Lane Group Flow (vph)	207	1220	43	270	1802	220	249	1840	152	412	1519	298
Confl. Peds. (#/hr)	27		21	21		27	20		14	14		20
Heavy Vehicles (%)	5%	5%	3%	6%	2%	2%	4%	5%	9%	6%	3%	2%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	4	0	0	0	0
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	34.0	31.0	31.0	34.0	31.0	31.0	38.0	33.0	33.0	38.0	33.0	33.0
Effective Green, g (s)	36.0	31.0	31.0	36.0	31.0	31.0	40.0	33.0	33.0	40.0	33.0	33.0
Actuated g/C Ratio	0.40	0.34	0.34	0.40	0.34	0.34	0.44	0.37	0.37	0.44	0.37	0.37
Clearance Time (s)	5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0	4.0
Vehicle Extension (s)	2.0	5.0	5.0	2.0	5.0	5.0	2.0	3.0	3.0	2.0	3.0	3.0
Lane Grp Cap (vph)	304	1688	520	301	1738	522	382	1802	528	375	1847	560
v/s Ratio Prot	0.03	0.25		c0.04	c0.36		0.04	0.37		c0.07	0.30	
v/s Ratio Perm	0.24		0.03	0.32		0.15	0.25		0.11	c0.42		0.20
v/c Ratio	0.68	0.72	0.08	0.90	1.04	0.42	0.65	1.02	0.29	1.10	0.82	0.53
Uniform Delay, d1	39.3	25.7	19.9	33.9	29.5	22.6	33.8	28.5	20.2	38.9	25.8	22.4
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	4.9	2.7	0.3	26.6	31.8	2.5	3.0	26.7	0.3	75.7	3.1	1.0
Delay (s)	44.3	28.5	20.2	60.4	61.3	25.1	36.8	55.2	20.5	114.7	28.9	23.4
Level of Service	D	C	C	E	E	C	D	E	C	F	C	C
Approach Delay (s)		29.9			56.5			50.0			43.5	
Approach LOS		C			E			D			D	

Intersection Summary			
HCM Average Control Delay	46.4	HCM Level of Service	D
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	94.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT
Lane Group Flow (vph)	25	1574	126	2101
v/c Ratio	0.16	0.32	0.45	0.41
Control Delay	2.3	0.2	5.3	0.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	2.3	0.2	5.3	0.3
Queue Length 50th (ft)	0	0	0	0
Queue Length 95th (ft)	0	0	0	0
Internal Link Dist (ft)		836		1238
Turn Bay Length (ft)	150		150	
Base Capacity (vph)	152	4902	277	5074
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.16	0.32	0.45	0.41

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	1384	64	116	1906	27	0	0	0	0	0	0
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							
Lane Util. Factor	1.00	0.91		1.00	0.91							
Frpb, ped/bikes	1.00	1.00		1.00	1.00							
Flpb, ped/bikes	1.00	1.00		1.00	1.00							
Frt	1.00	0.99		1.00	1.00							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1703	4904		1752	5073							
Flt Permitted	0.08	1.00		0.15	1.00							
Satd. Flow (perm)	152	4904		276	5073							
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.57	0.57	0.57	0.73	0.73	0.73
Adj. Flow (vph)	25	1504	70	126	2072	29	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	25	1574	0	126	2101	0	0	0	0	0	0	0
Confl. Peds. (#/hr)	1		5	5		1			16	16		
Heavy Vehicles (%)	6%	5%	4%	3%	2%	2%	2%	2%	12%	50%	2%	4%
Turn Type	Perm			Perm								
Protected Phases		2			6							
Permitted Phases	2			6								
Actuated Green, G (s)	49.5	49.5		49.5	49.5							
Effective Green, g (s)	49.5	49.5		49.5	49.5							
Actuated g/C Ratio	1.00	1.00		1.00	1.00							
Clearance Time (s)	5.0	5.0		5.0	5.0							
Vehicle Extension (s)	3.0	3.0		3.0	3.0							
Lane Grp Cap (vph)	152	4904		276	5073							
v/s Ratio Prot		0.32			0.41							
v/s Ratio Perm	0.16			c0.46								
v/c Ratio	0.16	0.32		0.46	0.41							
Uniform Delay, d1	0.0	0.0		0.0	0.0							
Progression Factor	1.00	1.00		1.00	1.00							
Incremental Delay, d2	2.3	0.2		5.4	0.3							
Delay (s)	2.3	0.2		5.4	0.3							
Level of Service	A	A		A	A							
Approach Delay (s)		0.2			0.5			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	0.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	0.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	68	1487	154	65	1978	117	198	362	123	115	303	188
v/c Ratio	0.46	0.58	0.18	0.40	0.75	0.15	0.74	0.85	0.29	0.53	0.71	0.45
Control Delay	32.6	17.0	3.1	16.4	7.8	0.5	46.7	51.5	9.9	36.9	41.5	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.6	17.0	3.1	16.4	7.8	0.5	46.7	51.5	9.9	36.9	41.5	20.7
Queue Length 50th (ft)	17	222	0	8	96	1	78	191	9	43	154	52
Queue Length 95th (ft)	37	271	32	m11	111	m1	#146	#323	51	80	243	114
Internal Link Dist (ft)		1238			1244			5249			2236	
Turn Bay Length (ft)	300		200	300		200	300		200	300		200
Base Capacity (vph)	149	2545	842	164	2620	800	275	467	459	227	463	448
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.58	0.18	0.40	0.75	0.15	0.72	0.78	0.27	0.51	0.65	0.42

Intersection Summary

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

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	63	1368	142	60	1820	108	182	333	113	106	279	173
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	2.0	4.0	3.0	2.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1626	4900	1539	1656	5045	1501	1768	1827	1499	1734	1810	1538
Flt Permitted	0.09	1.00	1.00	0.10	1.00	1.00	0.32	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)	150	4900	1539	179	5045	1501	589	1827	1499	394	1810	1538
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)	68	1487	154	65	1978	117	198	362	123	115	303	188
RTOR Reduction (vph)	0	0	79	0	0	55	0	0	78	0	0	57
Lane Group Flow (vph)	68	1487	75	65	1978	62	198	362	45	115	303	131
Confl. Peds. (#/hr)	16		4	4		16	6		11	11		6
Heavy Vehicles (%)	11%	5%	2%	9%	2%	2%	2%	4%	5%	4%	5%	3%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	0	0	0	0	0
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	45.3	43.7	43.7	45.3	43.7	43.7	26.7	21.1	21.1	26.7	21.1	21.1
Effective Green, g (s)	49.3	45.7	43.7	49.3	45.7	43.7	28.7	21.1	21.1	28.7	21.1	21.1
Actuated g/C Ratio	0.55	0.51	0.49	0.55	0.51	0.49	0.32	0.23	0.23	0.32	0.23	0.23
Clearance Time (s)	5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0	4.0
Vehicle Extension (s)	2.0	5.0	5.0	2.0	5.0	5.0	2.0	3.0	3.0	2.0	3.0	3.0
Lane Grp Cap (vph)	141	2488	747	157	2562	729	274	428	351	224	424	361
v/s Ratio Prot	c0.02	0.30		0.02	c0.39		c0.05	c0.20		0.04	0.17	
v/s Ratio Perm	0.24		0.05	0.21		0.04	0.18		0.03	0.13		0.09
v/c Ratio	0.48	0.60	0.10	0.41	0.77	0.08	0.72	0.85	0.13	0.51	0.71	0.36
Uniform Delay, d1	31.7	15.7	12.5	24.1	17.9	12.4	33.3	32.9	27.2	34.7	31.7	28.8
Progression Factor	1.00	1.00	1.00	0.54	0.34	0.07	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	1.1	0.3	0.5	1.9	0.2	7.7	14.2	0.2	0.8	5.6	0.6
Delay (s)	32.7	16.7	12.8	13.6	7.9	1.0	41.0	47.1	27.4	35.5	37.3	29.5
Level of Service	C	B	B	B	A	A	D	D	C	D	D	C
Approach Delay (s)		17.0			7.7			41.8			34.5	
Approach LOS		B			A			D			C	

Intersection Summary			
HCM Average Control Delay	18.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	16	1362	25	16	1810	37	11	0	8	5	0	16
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.63	0.63	0.63	0.56	0.56	0.56
Hourly flow rate (vph)	17	1480	27	17	1967	40	17	0	13	9	0	29
Pedestrians					3			3			9	
Lane Width (ft)					12.0			12.0			12.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					1319							
pX, platoon unblocked	0.75						0.75	0.75		0.75	0.75	0.75
vC, conflicting volume	2017			1511			2251	3583	513	2575	3577	685
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1184			1511			1497	3276	513	1930	3267	0
tC, single (s)	4.3			4.1			7.5	6.5	6.9	7.5	6.5	7.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	96			96			69	100	97	67	100	96
cM capacity (veh/h)	411			438			57	6	504	27	6	778

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	17	592	592	323	17	787	787	434	30	38
Volume Left	17	0	0	0	17	0	0	0	17	9
Volume Right	0	0	0	27	0	0	0	40	13	29
cSH	411	1700	1700	1700	438	1700	1700	1700	91	102
Volume to Capacity	0.04	0.35	0.35	0.19	0.04	0.46	0.46	0.26	0.33	0.37
Queue Length 95th (ft)	3	0	0	0	3	0	0	0	32	37
Control Delay (s)	14.1	0.0	0.0	0.0	13.6	0.0	0.0	0.0	63.3	59.8
Lane LOS	B				B				F	F
Approach Delay (s)	0.2				0.1				63.3	59.8
Approach LOS									F	F

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	190	1178	82	140	1634	352	211	727	116	276	621	191
v/c Ratio	0.60	0.55	0.11	0.33	0.73	0.45	0.46	0.80	0.25	0.69	0.68	0.41
Control Delay	18.9	9.3	0.5	17.1	23.5	10.2	27.4	38.0	9.0	40.5	33.8	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.9	9.3	0.5	17.1	23.5	10.2	27.4	38.0	9.0	40.5	33.8	16.6
Queue Length 50th (ft)	11	63	0	20	282	58	38	200	8	51	164	44
Queue Length 95th (ft)	#39	75	m2	34	342	131	61	258	47	#79	216	101
Internal Link Dist (ft)		1239			2639			5229			2445	
Turn Bay Length (ft)	300		200	300		200	300		200	300		200
Base Capacity (vph)	315	2155	739	424	2236	775	463	1018	505	401	1018	513
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.55	0.11	0.33	0.73	0.45	0.46	0.71	0.23	0.69	0.61	0.37

Intersection Summary

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

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	1084	75	132	1536	331	194	669	107	254	571	176
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3367	4854	1562	3433	5036	1508	3431	3525	1511	3431	3525	1553
Flt Permitted	0.10	1.00	1.00	0.16	1.00	1.00	0.23	1.00	1.00	0.16	1.00	1.00
Satd. Flow (perm)	346	4854	1562	587	5036	1508	836	3525	1511	595	3525	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	190	1178	82	140	1634	352	211	727	116	276	621	191
RTOR Reduction (vph)	0	0	46	0	0	106	0	0	71	0	0	67
Lane Group Flow (vph)	190	1178	36	140	1634	246	211	727	45	276	621	124
Confl. Peds. (#/hr)	3		2	2		3	7		14	14		7
Heavy Vehicles (%)	4%	6%	2%	2%	3%	3%	2%	2%	4%	2%	2%	2%
Bus Blockages (#/hr)	0	6	0	0	0	6	0	2	0	0	2	0
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	43.3	40.0	40.0	43.3	40.0	40.0	28.7	23.3	23.3	28.7	23.3	23.3
Effective Green, g (s)	45.3	40.0	40.0	45.3	40.0	40.0	30.7	23.3	23.3	30.7	23.3	23.3
Actuated g/C Ratio	0.50	0.44	0.44	0.50	0.44	0.44	0.34	0.26	0.26	0.34	0.26	0.26
Clearance Time (s)	5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0	4.0
Vehicle Extension (s)	2.0	5.0	5.0	2.0	5.0	5.0	2.0	3.0	3.0	2.0	3.0	3.0
Lane Grp Cap (vph)	318	2157	694	431	2238	670	470	913	391	405	913	402
v/s Ratio Prot	c0.03	0.24		0.02	c0.32		0.03	c0.21		c0.05	0.18	
v/s Ratio Perm	0.27		0.02	0.15		0.16	0.12		0.03	0.18		0.08
v/c Ratio	0.60	0.55	0.05	0.32	0.73	0.37	0.45	0.80	0.11	0.68	0.68	0.31
Uniform Delay, d1	31.4	18.3	14.2	21.3	20.6	16.6	31.8	31.1	25.5	34.6	30.0	26.9
Progression Factor	0.47	0.45	0.07	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	0.8	0.1	0.2	2.1	1.6	0.2	4.9	0.1	3.7	2.1	0.4
Delay (s)	16.6	9.0	1.2	21.5	22.7	18.2	32.0	36.0	25.6	38.3	32.1	27.3
Level of Service	B	A	A	C	C	B	C	D	C	D	C	C
Approach Delay (s)		9.6			21.9			34.1			32.8	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM Average Control Delay	23.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT
Lane Group Flow (vph)	9	1604	61	2091
v/c Ratio	0.06	0.33	0.23	0.41
Control Delay	0.9	0.2	1.9	0.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	0.9	0.2	1.9	0.2
Queue Length 50th (ft)	0	0	0	0
Queue Length 95th (ft)	0	0	0	0
Internal Link Dist (ft)		400		836
Turn Bay Length (ft)	150		150	
Base Capacity (vph)	140	4912	270	5068
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.06	0.33	0.23	0.41

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	1448	28	56	1882	41	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.5		5.0	4.5							
Lane Util. Factor	1.00	0.91		1.00	0.91							
Frpb, ped/bikes	1.00	1.00		1.00	1.00							
Flpb, ped/bikes	1.00	1.00		1.00	1.00							
Frt	1.00	1.00		1.00	1.00							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1543	4913		1770	5067							
Flt Permitted	0.09	1.00		0.15	1.00							
Satd. Flow (perm)	139	4913		270	5067							
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.70	0.70	0.70	0.57	0.57	0.57
Adj. Flow (vph)	9	1574	30	61	2046	45	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	9	1604	0	61	2091	0	0	0	0	0	0	0
Confl. Peds. (#/hr)	2		1	1		2	1					1
Heavy Vehicles (%)	17%	5%	18%	2%	2%	2%	2%	2%	10%	2%	2%	20%
Turn Type	Perm			Perm								
Protected Phases		2			6							
Permitted Phases	2			6								
Actuated Green, G (s)	49.5	49.5		49.5	49.5							
Effective Green, g (s)	49.5	49.5		49.5	49.5							
Actuated g/C Ratio	1.00	1.00		1.00	1.00							
Clearance Time (s)	5.0	5.0		5.0	5.0							
Vehicle Extension (s)	3.0	3.0		3.0	3.0							
Lane Grp Cap (vph)	139	4913		270	5067							
v/s Ratio Prot		0.33			c0.41							
v/s Ratio Perm	0.06			0.23								
v/c Ratio	0.06	0.33		0.23	0.41							
Uniform Delay, d1	0.0	0.0		0.0	0.0							
Progression Factor	1.00	1.00		1.00	1.00							
Incremental Delay, d2	0.9	0.2		1.9	0.2							
Delay (s)	0.9	0.2		1.9	0.2							
Level of Service	A	A		A	A							
Approach Delay (s)		0.2			0.3			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	0.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	0.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

PM Peak Period
Level of Service and
Queuing Results

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	364	1279	88	380	1157	370	200	1002	275	295	870	502
v/c Ratio	0.82	0.72	0.16	0.87	0.65	0.59	0.52	0.88	0.45	0.76	0.78	0.81
Control Delay	47.1	28.5	5.6	54.2	27.0	18.6	30.3	38.8	12.2	44.4	33.0	30.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.1	28.5	5.6	54.2	27.0	18.6	30.3	38.8	12.2	44.4	33.0	30.0
Queue Length 50th (ft)	61	230	0	64	202	100	33	276	46	51	230	172
Queue Length 95th (ft)	#128	283	31	#147	250	194	54	#372	113	#89	302	#345
Internal Link Dist (ft)		823			886			2326			1787	
Turn Bay Length (ft)	300		200	300		200	300		200	300		350
Base Capacity (vph)	444	1768	548	435	1768	626	383	1170	622	386	1146	627
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.72	0.16	0.87	0.65	0.59	0.52	0.86	0.44	0.76	0.76	0.80

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	342	1202	83	365	1111	355	184	922	253	283	835	482
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3398	5085	1413	3432	5085	1524	3272	3511	1541	3432	3438	1534
Flt Permitted	0.13	1.00	1.00	0.12	1.00	1.00	0.15	1.00	1.00	0.13	1.00	1.00
Satd. Flow (perm)	475	5085	1413	441	5085	1524	504	3511	1541	477	3438	1534
Peak-hour factor, PHF	0.94	0.94	0.94	0.96	0.96	0.96	0.92	0.92	0.92	0.96	0.96	0.96
Adj. Flow (vph)	364	1279	88	380	1157	370	200	1002	275	295	870	502
RTOR Reduction (vph)	0	0	57	0	0	97	0	0	109	0	0	117
Lane Group Flow (vph)	364	1279	31	380	1157	273	200	1002	166	295	870	385
Confl. Peds. (#/hr)	30		20	20		30	9		14	14		9
Heavy Vehicles (%)	3%	2%	11%	2%	2%	2%	7%	2%	2%	2%	5%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	4	0	0	0	0
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	38.2	31.8	31.8	38.2	31.8	31.8	34.3	29.3	29.3	34.3	29.3	29.3
Effective Green, g (s)	40.2	31.3	31.3	40.2	31.3	31.3	36.3	29.3	29.3	36.3	29.3	29.3
Actuated g/C Ratio	0.45	0.35	0.35	0.45	0.35	0.35	0.40	0.33	0.33	0.40	0.33	0.33
Clearance Time (s)	5.0	3.5	3.5	5.0	3.5	3.5	5.0	4.0	4.0	5.0	4.0	4.0
Vehicle Extension (s)	2.0	5.0	5.0	2.0	5.0	5.0	2.0	3.0	3.0	2.0	3.0	3.0
Lane Grp Cap (vph)	453	1768	491	443	1768	530	388	1143	502	389	1119	499
v/s Ratio Prot	0.07	0.25		c0.07	0.23		0.03	c0.29		c0.05	0.25	
v/s Ratio Perm	0.29		0.02	c0.31		0.18	0.17		0.11	0.26		0.25
v/c Ratio	0.80	0.72	0.06	0.86	0.65	0.52	0.52	0.88	0.33	0.76	0.78	0.77
Uniform Delay, d1	30.5	25.6	19.6	32.0	24.8	23.3	33.0	28.6	22.9	35.6	27.4	27.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.4	2.6	0.2	14.6	1.9	3.6	0.5	7.8	0.4	7.3	3.5	7.2
Delay (s)	39.9	28.2	19.8	46.5	26.7	26.9	33.4	36.4	23.3	43.0	30.9	34.6
Level of Service	D	C	B	D	C	C	C	D	C	D	C	C
Approach Delay (s)		30.2			30.7			33.6			34.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	32.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT
Lane Group Flow (vph)	10	1822	14	1893
v/c Ratio	0.05	0.36	0.07	0.37
Control Delay	0.4	0.2	0.6	0.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	0.4	0.2	0.6	0.2
Queue Length 50th (ft)	0	0	0	0
Queue Length 95th (ft)	0	0	0	0
Internal Link Dist (ft)		886		1570
Turn Bay Length (ft)	150		150	
Base Capacity (vph)	197	5073	214	5064
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.05	0.36	0.07	0.37

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	1657	19	13	1764	34	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.0		4.5	4.0							
Lane Util. Factor	1.00	0.91		1.00	0.91							
Frpb, ped/bikes	1.00	1.00		1.00	1.00							
Flpb, ped/bikes	1.00	1.00		1.00	1.00							
Frt	1.00	1.00		1.00	1.00							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1768	5075		1768	5066							
Flt Permitted	0.11	1.00		0.11	1.00							
Satd. Flow (perm)	198	5075		214	5066							
Peak-hour factor, PHF	0.92	0.92	0.92	0.95	0.95	0.95	0.64	0.64	0.64	0.68	0.68	0.68
Adj. Flow (vph)	10	1801	21	14	1857	36	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	10	1822	0	14	1893	0	0	0	0	0	0	0
Confl. Peds. (#/hr)	18		16	16		18	12		7	7		12
Heavy Vehicles (%)	2%	2%	2%	2%	2%	4%	2%	2%	2%	5%	2%	3%
Turn Type	Perm			Perm								
Protected Phases		2			6							
Permitted Phases	2			6								
Actuated Green, G (s)	49.5	49.5		49.5	49.5							
Effective Green, g (s)	49.5	49.5		49.5	49.5							
Actuated g/C Ratio	1.00	1.00		1.00	1.00							
Clearance Time (s)	4.5	4.5		4.5	4.5							
Vehicle Extension (s)	3.0	3.0		3.0	3.0							
Lane Grp Cap (vph)	198	5075		214	5066							
v/s Ratio Prot		0.36			c0.37							
v/s Ratio Perm	0.05			0.07								
v/c Ratio	0.05	0.36		0.07	0.37							
Uniform Delay, d1	0.0	0.0		0.0	0.0							
Progression Factor	1.00	1.00		1.00	1.00							
Incremental Delay, d2	0.5	0.2		0.6	0.2							
Delay (s)	0.5	0.2		0.6	0.2							
Level of Service	A	A		A	A							
Approach Delay (s)		0.2			0.2			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	0.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	0.0
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	49	1898	37	1738	95	66	151	109
v/c Ratio	0.34	0.52	0.31	0.48	0.43	0.21	0.62	0.32
Control Delay	13.8	6.5	14.5	6.1	37.1	22.3	44.1	23.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.8	6.5	14.5	6.1	37.1	22.3	44.1	23.1
Queue Length 50th (ft)	9	147	6	127	48	21	79	36
Queue Length 95th (ft)	41	222	34	194	80	47	112	63
Internal Link Dist (ft)		1570		828		776		2264
Turn Bay Length (ft)	300		300		120		130	
Base Capacity (vph)	145	3654	118	3648	295	404	323	444
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.52	0.31	0.48	0.32	0.16	0.47	0.25

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	1726	20	35	1590	44	78	16	38	118	45	40
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	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.90		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1769	5033		1767	5021		1742	1581		1758	1708	
Flt Permitted	0.11	1.00		0.09	1.00		0.66	1.00		0.71	1.00	
Satd. Flow (perm)	200	5033		162	5021		1205	1581		1321	1708	
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.82	0.82	0.82	0.78	0.78	0.78
Adj. Flow (vph)	49	1876	22	37	1691	47	95	20	46	151	58	51
RTOR Reduction (vph)	0	1	0	0	3	0	0	19	0	0	29	0
Lane Group Flow (vph)	49	1897	0	37	1735	0	95	47	0	151	80	0
Confl. Peds. (#/hr)	2		12	12		2	13		5	5		13
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	8%	2%	2%	2%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	0	0	0	0	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	64.3	64.3		64.3	64.3		15.2	15.2		15.2	15.2	
Effective Green, g (s)	65.3	65.3		65.3	65.3		16.7	16.7		16.7	16.7	
Actuated g/C Ratio	0.73	0.73		0.73	0.73		0.19	0.19		0.19	0.19	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	145	3652		118	3643		224	293		245	317	
v/s Ratio Prot		c0.38			0.35			0.03			0.05	
v/s Ratio Perm	0.25			0.23			0.08			c0.11		
v/c Ratio	0.34	0.52		0.31	0.48		0.42	0.16		0.62	0.25	
Uniform Delay, d1	4.5	5.4		4.4	5.2		32.4	30.8		33.7	31.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.2	0.5		6.8	0.4		1.3	0.3		4.6	0.4	
Delay (s)	10.7	6.0		11.2	5.6		33.7	31.0		38.3	31.7	
Level of Service	B	A		B	A		C	C		D	C	
Approach Delay (s)		6.1			5.7			32.6			35.5	
Approach LOS		A			A			C			D	

Intersection Summary			
HCM Average Control Delay	8.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT
Lane Group Flow (vph)	41	2006	22	1710
v/c Ratio	0.17	0.40	0.13	0.34
Control Delay	1.5	0.2	1.5	0.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	1.5	0.2	1.5	0.2
Queue Length 50th (ft)	0	0	0	0
Queue Length 95th (ft)	0	0	0	0
Internal Link Dist (ft)		828		1166
Turn Bay Length (ft)	200		200	
Base Capacity (vph)	242	5067	175	5079
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.17	0.40	0.13	0.34

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	1808	38	21	1594	13	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	2.5		4.5	4.0							
Lane Util. Factor	1.00	0.91		1.00	0.91							
Frpb, ped/bikes	1.00	1.00		1.00	1.00							
Flpb, ped/bikes	1.00	1.00		1.00	1.00							
Frt	1.00	1.00		1.00	1.00							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1769	5067		1769	5078							
Flt Permitted	0.13	1.00		0.09	1.00							
Satd. Flow (perm)	241	5067		175	5078							
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.63	0.63	0.63	0.68	0.68	0.68
Adj. Flow (vph)	41	1965	41	22	1696	14	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	41	2006	0	22	1710	0	0	0	0	0	0	0
Confl. Peds. (#/hr)	10		7	7		10	23		17	17		23
Turn Type	Perm			Perm								
Protected Phases		2			6							
Permitted Phases	2			6								
Actuated Green, G (s)	49.5	49.5		49.5	49.5							
Effective Green, g (s)	49.5	49.5		49.5	49.5							
Actuated g/C Ratio	1.00	1.00		1.00	1.00							
Clearance Time (s)	3.0	3.0		4.5	4.5							
Vehicle Extension (s)	3.0	3.0		3.0	3.0							
Lane Grp Cap (vph)	241	5067		175	5078							
v/s Ratio Prot		c0.40			0.34							
v/s Ratio Perm	0.17			0.13								
v/c Ratio	0.17	0.40		0.13	0.34							
Uniform Delay, d1	0.0	0.0		0.0	0.0							
Progression Factor	1.00	1.00		1.00	1.00							
Incremental Delay, d2	1.5	0.2		1.5	0.2							
Delay (s)	1.5	0.2		1.5	0.2							
Level of Service	A	A		A	A							
Approach Delay (s)		0.3			0.2			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	0.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	0.0
Intersection Capacity Utilization	39.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	370	1975	160	313	1427	350	262	1633	284	505	1447	266
v/c Ratio	1.07	1.04	0.25	0.90	0.75	0.50	0.57	1.08	0.55	1.10	0.95	0.50
Control Delay	101.0	59.4	6.6	61.5	27.3	11.5	33.1	78.3	21.5	105.0	45.3	18.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	101.0	59.4	6.6	61.5	27.3	11.5	33.1	78.3	21.5	105.0	45.3	18.2
Queue Length 50th (ft)	~68	~447	11	50	253	57	45	~382	86	~110	293	68
Queue Length 95th (ft)	#161	#542	52	#120	308	136	70	#476	167	#220	#392	143
Internal Link Dist (ft)		1166			430			2647			2249	
Turn Bay Length (ft)	300		200	300		200	300		200	300		200
Base Capacity (vph)	346	1906	649	346	1906	700	460	1517	518	460	1526	534
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.07	1.04	0.25	0.90	0.75	0.50	0.57	1.08	0.55	1.10	0.95	0.50

Intersection Summary

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

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	340	1817	147	288	1313	322	254	1584	275	475	1360	250
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.96	1.00	1.00	0.95	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3432	5045	1506	3433	5045	1519	3432	5058	1497	3433	5085	1517
Flt Permitted	0.11	1.00	1.00	0.11	1.00	1.00	0.14	1.00	1.00	0.14	1.00	1.00
Satd. Flow (perm)	413	5045	1506	413	5045	1519	516	5058	1497	516	5085	1517
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.94	0.94	0.94
Adj. Flow (vph)	370	1975	160	313	1427	350	262	1633	284	505	1447	266
RTOR Reduction (vph)	0	0	80	0	0	126	0	0	69	0	0	79
Lane Group Flow (vph)	370	1975	80	313	1427	224	262	1633	215	505	1447	187
Confl. Peds. (#/hr)	25		32	32		25	26		37	37		26
Bus Blockages (#/hr)	0	6	0	0	6	0	0	4	0	0	0	0
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	38.0	34.0	34.0	38.0	34.0	34.0	34.0	27.0	27.0	34.0	27.0	27.0
Effective Green, g (s)	40.0	34.0	34.0	40.0	34.0	34.0	36.0	27.0	27.0	36.0	27.0	27.0
Actuated g/C Ratio	0.44	0.38	0.38	0.44	0.38	0.38	0.40	0.30	0.30	0.40	0.30	0.30
Clearance Time (s)	5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0	4.0
Vehicle Extension (s)	2.0	5.0	5.0	2.0	5.0	5.0	2.0	3.0	3.0	2.0	3.0	3.0
Lane Grp Cap (vph)	351	1906	569	351	1906	574	466	1517	449	466	1526	455
v/s Ratio Prot	c0.06	0.39		0.05	0.28		0.05	0.32		c0.10	0.28	
v/s Ratio Perm	c0.41		0.05	0.35		0.15	0.18		0.14	c0.34		0.12
v/c Ratio	1.05	1.04	0.14	0.89	0.75	0.39	0.56	1.08	0.48	1.08	0.95	0.41
Uniform Delay, d1	33.8	28.0	18.4	39.1	24.3	20.4	35.1	31.5	25.8	37.8	30.8	25.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	63.0	30.7	0.5	23.0	2.7	2.0	0.9	46.7	0.8	66.1	12.7	0.6
Delay (s)	96.8	58.7	18.9	62.1	27.0	22.4	36.0	78.2	26.6	104.0	43.5	25.8
Level of Service	F	E	B	E	C	C	D	E	C	F	D	C
Approach Delay (s)		61.8			31.5			66.4			55.1	
Approach LOS		E			C			E			E	

Intersection Summary			
HCM Average Control Delay	54.2	HCM Level of Service	D
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	100.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT
Lane Group Flow (vph)	42	2065	32	1936
v/c Ratio	0.22	0.41	0.20	0.38
Control Delay	2.7	0.2	2.7	0.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	2.7	0.2	2.7	0.2
Queue Length 50th (ft)	0	0	0	0
Queue Length 95th (ft)	0	0	0	0
Internal Link Dist (ft)		820		1243
Turn Bay Length (ft)	150		150	
Base Capacity (vph)	190	5054	164	5079
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.22	0.41	0.20	0.38

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	39	1862	59	29	1770	11	0	0	0	0	0	0
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							
Lane Util. Factor	1.00	0.91		1.00	0.91							
Frpb, ped/bikes	1.00	1.00		1.00	1.00							
Flpb, ped/bikes	1.00	1.00		1.00	1.00							
Frt	1.00	1.00		1.00	1.00							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1769	5058		1769	5080							
Flt Permitted	0.10	1.00		0.09	1.00							
Satd. Flow (perm)	189	5058		164	5080							
Peak-hour factor, PHF	0.93	0.93	0.93	0.92	0.92	0.92	0.79	0.79	0.79	0.56	0.56	0.56
Adj. Flow (vph)	42	2002	63	32	1924	12	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	42	2065	0	32	1936	0	0	0	0	0	0	0
Confl. Peds. (#/hr)	4		15	15		4			15	15		
Turn Type	Perm			Perm								
Protected Phases		2			6							
Permitted Phases	2			6								
Actuated Green, G (s)	49.5	49.5		49.5	49.5							
Effective Green, g (s)	49.5	49.5		49.5	49.5							
Actuated g/C Ratio	1.00	1.00		1.00	1.00							
Clearance Time (s)	5.0	5.0		5.0	5.0							
Vehicle Extension (s)	3.0	3.0		3.0	3.0							
Lane Grp Cap (vph)	189	5058		164	5080							
v/s Ratio Prot		c0.41			0.38							
v/s Ratio Perm	0.22			0.19								
v/c Ratio	0.22	0.41		0.20	0.38							
Uniform Delay, d1	0.0	0.0		0.0	0.0							
Progression Factor	1.00	1.00		1.00	1.00							
Incremental Delay, d2	2.7	0.2		2.6	0.2							
Delay (s)	2.7	0.2		2.6	0.2							
Level of Service	A	A		A	A							
Approach Delay (s)		0.3			0.3			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	0.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	0.0
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	80	1906	124	58	1717	157	174	387	132	189	443	189
v/c Ratio	0.49	0.79	0.17	0.35	0.71	0.20	0.80	0.77	0.28	0.74	0.88	0.40
Control Delay	34.8	23.5	4.8	11.9	7.8	0.5	59.5	41.4	13.3	47.4	51.8	18.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.8	23.5	4.8	11.9	7.8	0.5	59.5	41.4	13.3	47.4	51.8	18.3
Queue Length 50th (ft)	22	342	4	5	87	0	63	197	23	69	234	50
Queue Length 95th (ft)	#47	410	36	m8	104	m1	#146	301	68	#141	#391	109
Internal Link Dist (ft)		1243			1218			5249			2236	
Turn Bay Length (ft)	300		200	300		200	300		200	300		200
Base Capacity (vph)	164	2420	740	165	2420	770	220	538	501	258	538	500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.79	0.17	0.35	0.71	0.20	0.79	0.72	0.26	0.73	0.82	0.38

Intersection Summary

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

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	1792	117	56	1648	151	165	368	125	174	408	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	2.0	4.0	3.0	2.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00	0.95	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	5045	1485	1770	5045	1498	1769	1863	1547	1768	1863	1549
Flt Permitted	0.09	1.00	1.00	0.09	1.00	1.00	0.16	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)	175	5045	1485	177	5045	1498	296	1863	1547	440	1863	1549
Peak-hour factor, PHF	0.94	0.94	0.94	0.96	0.96	0.96	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	80	1906	124	58	1717	157	174	387	132	189	443	189
RTOR Reduction (vph)	0	0	61	0	0	86	0	0	56	0	0	54
Lane Group Flow (vph)	80	1906	63	58	1717	71	174	387	76	189	443	135
Confl. Peds. (#/hr)	17		21	21		17	8		9	9		8
Heavy Vehicles (%)	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	0	0	0	0	0
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	41.8	40.2	40.2	41.8	40.2	40.2	30.2	24.2	24.2	30.2	24.2	24.2
Effective Green, g (s)	45.8	42.2	40.2	45.8	42.2	40.2	32.2	24.2	24.2	32.2	24.2	24.2
Actuated g/C Ratio	0.51	0.47	0.45	0.51	0.47	0.45	0.36	0.27	0.27	0.36	0.27	0.27
Clearance Time (s)	5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0	4.0
Vehicle Extension (s)	2.0	5.0	5.0	2.0	5.0	5.0	2.0	3.0	3.0	2.0	3.0	3.0
Lane Grp Cap (vph)	152	2366	663	154	2366	669	220	501	416	261	501	417
v/s Ratio Prot	c0.02	c0.38		0.02	0.34		c0.06	0.21		0.06	c0.24	
v/s Ratio Perm	0.25		0.04	0.18		0.05	0.22		0.05	0.20		0.09
v/c Ratio	0.53	0.81	0.09	0.38	0.73	0.11	0.79	0.77	0.18	0.72	0.88	0.32
Uniform Delay, d1	32.0	20.4	14.4	32.7	19.2	14.5	35.7	30.4	25.3	33.6	31.6	26.3
Progression Factor	1.00	1.00	1.00	0.34	0.33	0.03	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	3.0	0.3	0.4	1.6	0.3	16.3	7.3	0.2	8.2	16.8	0.5
Delay (s)	33.5	23.4	14.7	11.7	7.9	0.6	52.1	37.6	25.5	41.7	48.3	26.8
Level of Service	C	C	B	B	A	A	D	D	C	D	D	C
Approach Delay (s)		23.3			7.4			38.9			41.9	
Approach LOS		C			A			D			D	

Intersection Summary			
HCM Average Control Delay	22.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	16	2117	23	31	1717	15	5	0	50	3	0	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.95	0.64	0.64	0.64	0.61	0.61	0.61
Hourly flow rate (vph)	17	2301	25	33	1807	16	8	0	78	5	0	23
Pedestrians		20			15			1			4	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		2			1			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		1298										
pX, platoon unblocked				0.67			0.67	0.67	0.67	0.67	0.67	
vC, conflicting volume	1827			2327			3060	4242	796	2779	4246	634
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1827			1266			2357	4116	0	1939	4123	634
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			91			25	100	89	76	100	94
cM capacity (veh/h)	330			366			10	1	719	21	1	413

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	17	920	920	485	33	723	723	377	86	28
Volume Left	17	0	0	0	33	0	0	0	8	5
Volume Right	0	0	0	25	0	0	0	16	78	23
cSH	330	1700	1700	1700	366	1700	1700	1700	100	95
Volume to Capacity	0.05	0.54	0.54	0.29	0.09	0.43	0.43	0.22	0.86	0.29
Queue Length 95th (ft)	4	0	0	0	7	0	0	0	121	28
Control Delay (s)	16.5	0.0	0.0	0.0	15.8	0.0	0.0	0.0	130.4	58.0
Lane LOS	C				C				F	F
Approach Delay (s)	0.1				0.3				130.4	58.0
Approach LOS									F	F

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	323	1860	122	262	1537	420	159	866	196	387	873	171
v/c Ratio	0.92	0.87	0.17	0.75	0.72	0.57	0.40	0.90	0.40	0.97	0.91	0.36
Control Delay	44.7	15.9	1.4	41.6	23.9	14.6	28.8	45.0	16.2	75.3	45.8	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.7	15.9	1.4	41.6	23.9	14.6	28.8	45.0	16.2	75.3	45.8	12.1
Queue Length 50th (ft)	42	100	0	37	257	99	29	247	44	~77	250	23
Queue Length 95th (ft)	m#100	180	m3	#81	312	192	49	#355	104	#161	#360	76
Internal Link Dist (ft)		1277			2639			5229			2445	
Turn Bay Length (ft)	300		200	300		200	300		200	300		200
Base Capacity (vph)	351	2130	721	351	2147	742	394	979	497	397	979	474
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.87	0.17	0.75	0.72	0.57	0.40	0.88	0.39	0.97	0.89	0.36

Intersection Summary

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

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

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	1730	113	246	1445	395	146	797	180	356	803	157
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.89
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5045	1555	3433	5085	1523	3426	3525	1538	3432	3525	1405
Flt Permitted	0.10	1.00	1.00	0.10	1.00	1.00	0.16	1.00	1.00	0.16	1.00	1.00
Satd. Flow (perm)	372	5045	1555	372	5085	1523	563	3525	1538	564	3525	1405
Peak-hour factor, PHF	0.93	0.93	0.93	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	323	1860	122	262	1537	420	159	866	196	387	873	171
RTOR Reduction (vph)	0	0	65	0	0	100	0	0	70	0	0	84
Lane Group Flow (vph)	323	1860	57	262	1537	320	159	866	126	387	873	87
Confl. Peds. (#/hr)	3		7	7		3	95		16	16		95
Bus Blockages (#/hr)	0	6	0	0	0	6	0	2	0	0	2	0
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	42.0	37.9	37.9	42.0	37.9	37.9	30.0	24.6	24.6	30.0	24.6	24.6
Effective Green, g (s)	44.0	37.9	37.9	44.0	37.9	37.9	32.0	24.6	24.6	32.0	24.6	24.6
Actuated g/C Ratio	0.49	0.42	0.42	0.49	0.42	0.42	0.36	0.27	0.27	0.36	0.27	0.27
Clearance Time (s)	5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0	4.0
Vehicle Extension (s)	2.0	5.0	5.0	2.0	5.0	5.0	2.0	3.0	3.0	2.0	3.0	3.0
Lane Grp Cap (vph)	355	2125	655	355	2141	641	404	964	420	404	964	384
v/s Ratio Prot	c0.05	0.37		0.04	0.30		0.03	0.25		c0.07	0.25	
v/s Ratio Perm	c0.39		0.04	0.32		0.21	0.11		0.08	c0.27		0.06
v/c Ratio	0.91	0.88	0.09	0.74	0.72	0.50	0.39	0.90	0.30	0.96	0.91	0.23
Uniform Delay, d1	32.0	23.9	15.7	35.2	21.6	19.1	35.2	31.5	25.9	36.9	31.6	25.3
Progression Factor	0.53	0.48	0.26	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	20.0	4.0	0.2	6.8	2.1	2.8	0.2	11.0	0.4	33.4	11.8	0.3
Delay (s)	37.1	15.4	4.3	42.0	23.7	21.9	35.5	42.5	26.3	70.3	43.4	25.6
Level of Service	D	B	A	D	C	C	D	D	C	E	D	C
Approach Delay (s)		17.8			25.5			39.0			48.5	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM Average Control Delay	29.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT
Lane Group Flow (vph)	20	2050	112	1835
v/c Ratio	0.10	0.40	0.67	0.36
Control Delay	0.9	0.2	25.4	0.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	0.9	0.2	25.4	0.2
Queue Length 50th (ft)	0	0	0	0
Queue Length 95th (ft)	0	0	#42	0
Internal Link Dist (ft)		430		820
Turn Bay Length (ft)	150		150	
Base Capacity (vph)	210	5073	168	5073
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.10	0.40	0.67	0.36

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	1895	32	104	1681	25	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.0		5.0	4.0							
Lane Util. Factor	1.00	0.91		1.00	0.91							
Frpb, ped/bikes	1.00	1.00		1.00	1.00							
Flpb, ped/bikes	1.00	1.00		1.00	1.00							
Frt	1.00	1.00		1.00	1.00							
Flt Protected	0.95	1.00		0.95	1.00							
Satd. Flow (prot)	1769	5071		1769	5072							
Flt Permitted	0.11	1.00		0.09	1.00							
Satd. Flow (perm)	211	5071		167	5072							
Peak-hour factor, PHF	0.94	0.94	0.94	0.93	0.93	0.93	0.77	0.77	0.77	0.59	0.59	0.59
Adj. Flow (vph)	20	2016	34	112	1808	27	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	20	2050	0	112	1835	0	0	0	0	0	0	0
Confl. Peds. (#/hr)	6		7	7		6	15					15
Turn Type	Perm			Perm								
Protected Phases		2			6							
Permitted Phases	2			6								
Actuated Green, G (s)	49.5	49.5		49.5	49.5							
Effective Green, g (s)	49.5	49.5		49.5	49.5							
Actuated g/C Ratio	1.00	1.00		1.00	1.00							
Clearance Time (s)	5.0	5.0		5.0	5.0							
Vehicle Extension (s)	3.0	3.0		3.0	3.0							
Lane Grp Cap (vph)	211	5071		167	5072							
v/s Ratio Prot		0.40			0.36							
v/s Ratio Perm	0.09			c0.67								
v/c Ratio	0.09	0.40		0.67	0.36							
Uniform Delay, d1	0.0	0.0		0.0	0.0							
Progression Factor	1.00	1.00		1.00	1.00							
Incremental Delay, d2	0.9	0.2		19.4	0.2							
Delay (s)	0.9	0.2		19.4	0.2							
Level of Service	A	A		B	A							
Approach Delay (s)		0.2			1.3			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	0.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	0.0
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Broadway/Campbell Overlap Phasing

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	207	1220	124	270	1802	310	249	1840	209	412	1519	356
v/c Ratio	0.79	0.80	0.22	0.81	1.07	0.52	0.60	1.02	0.37	0.93	0.80	0.57
Control Delay	51.0	33.3	5.6	51.6	74.2	16.5	32.9	56.0	15.9	61.6	28.6	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.0	33.3	5.6	51.6	74.2	16.5	32.9	56.0	15.9	61.6	28.6	21.5
Queue Length 50th (ft)	37	231	0	49	~420	74	37	~394	55	71	271	123
Queue Length 95th (ft)	#78	286	38	#96	#516	153	58	#506	113	#159	329	211
Internal Link Dist (ft)		1190			400			2690			2243	
Turn Bay Length (ft)	300		200	300		200	220		180	260		280
Base Capacity (vph)	262	1524	556	333	1682	598	415	1802	571	444	1958	638
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.80	0.22	0.81	1.07	0.52	0.60	1.02	0.37	0.93	0.78	0.56

Intersection Summary

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

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	1122	114	248	1658	285	229	1693	192	391	1443	338
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.96	1.00	1.00	0.97	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3335	4900	1511	3303	5045	1515	3367	4914	1440	3303	5036	1528
Flt Permitted	0.14	1.00	1.00	0.13	1.00	1.00	0.12	1.00	1.00	0.11	1.00	1.00
Satd. Flow (perm)	484	4900	1511	449	5045	1515	417	4914	1440	397	5036	1528
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.95	0.95
Adj. Flow (vph)	207	1220	124	270	1802	310	249	1840	209	412	1519	356
RTOR Reduction (vph)	0	0	85	0	0	93	0	0	43	0	0	44
Lane Group Flow (vph)	207	1220	39	270	1802	217	249	1840	166	412	1519	312
Confl. Peds. (#/hr)	27		21	21		27	20		14	14		20
Heavy Vehicles (%)	5%	5%	3%	6%	2%	2%	4%	5%	9%	6%	3%	2%
Bus Blockages (#/hr)	0	6	0	0	6	0	0	4	0	0	0	0
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	30.0	28.0	28.0	34.0	30.0	30.0	39.0	33.0	33.0	41.0	34.0	34.0
Effective Green, g (s)	32.0	28.0	28.0	36.0	30.0	30.0	41.0	33.0	33.0	43.0	34.0	34.0
Actuated g/C Ratio	0.36	0.31	0.31	0.40	0.33	0.33	0.46	0.37	0.37	0.48	0.38	0.38
Clearance Time (s)	5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0	4.0
Vehicle Extension (s)	2.0	5.0	5.0	2.0	5.0	5.0	2.0	3.0	3.0	2.0	3.0	3.0
Lane Grp Cap (vph)	267	1524	470	338	1682	505	419	1802	528	448	1902	577
v/s Ratio Prot	0.03	0.25		c0.04	c0.36		0.05	c0.37		c0.08	0.30	
v/s Ratio Perm	0.25		0.03	0.28		0.14	0.22		0.12	0.36		0.20
v/c Ratio	0.78	0.80	0.08	0.80	1.07	0.43	0.59	1.02	0.31	0.92	0.80	0.54
Uniform Delay, d1	40.3	28.4	21.9	33.9	30.0	23.3	32.7	28.5	20.4	37.0	24.9	21.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.1	4.5	0.3	11.6	43.9	2.7	1.5	26.7	0.3	23.4	2.4	1.0
Delay (s)	52.3	33.0	22.3	45.5	73.9	26.0	34.2	55.2	20.7	60.4	27.4	22.9
Level of Service	D	C	C	D	E	C	C	E	C	E	C	C
Approach Delay (s)		34.7			64.4			49.8			32.6	
Approach LOS		C			E			D			C	

Intersection Summary			
HCM Average Control Delay	46.5	HCM Level of Service	D
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	94.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	370	1975	160	313	1427	350	262	1633	284	505	1447	266
v/c Ratio	0.84	1.03	0.25	0.90	0.80	0.56	0.71	1.04	0.52	1.13	0.85	0.45
Control Delay	54.3	60.1	8.0	64.7	33.3	19.4	44.9	68.9	19.9	118.4	36.8	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.3	60.1	8.0	64.7	33.3	19.4	44.9	68.9	19.9	118.4	36.8	16.0
Queue Length 50th (ft)	68	~496	18	56	293	105	51	~415	82	~141	308	65
Queue Length 95th (ft)	#154	#593	61	#131	352	197	#88	#510	165	#246	369	138
Internal Link Dist (ft)		1166			430			2647			2249	
Turn Bay Length (ft)	300		200	300		200	300		200	300		200
Base Capacity (vph)	440	1917	642	346	1816	631	367	1568	544	448	1729	597
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	1.03	0.25	0.90	0.79	0.55	0.71	1.04	0.52	1.13	0.84	0.45

Intersection Summary

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

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	340	1817	147	288	1313	322	254	1584	275	475	1360	250
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.96	1.00	1.00	0.94	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5045	1500	3433	5045	1514	3433	5058	1489	3433	5085	1512
Flt Permitted	0.10	1.00	1.00	0.11	1.00	1.00	0.12	1.00	1.00	0.12	1.00	1.00
Satd. Flow (perm)	371	5045	1500	398	5045	1514	452	5058	1489	420	5085	1512
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.94	0.94	0.94
Adj. Flow (vph)	370	1975	160	313	1427	350	262	1633	284	505	1447	266
RTOR Reduction (vph)	0	0	72	0	0	87	0	0	83	0	0	83
Lane Group Flow (vph)	370	1975	88	313	1427	263	262	1633	201	505	1447	183
Confl. Peds. (#/hr)	25		32	32		25	26		37	37		26
Bus Blockages (#/hr)	0	6	0	0	6	0	0	4	0	0	0	0
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	45.7	38.0	38.0	40.3	35.3	35.3	36.6	31.0	31.0	41.4	33.4	33.4
Effective Green, g (s)	47.7	38.0	38.0	42.3	35.3	35.3	38.6	31.0	31.0	43.4	33.4	33.4
Actuated g/C Ratio	0.48	0.38	0.38	0.42	0.35	0.35	0.39	0.31	0.31	0.43	0.33	0.33
Clearance Time (s)	5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0	4.0
Vehicle Extension (s)	2.0	5.0	5.0	2.0	5.0	5.0	2.0	3.0	3.0	2.0	3.0	3.0
Lane Grp Cap (vph)	443	1917	570	350	1781	534	371	1568	462	453	1698	505
v/s Ratio Prot	c0.07	c0.39		0.05	0.28		0.05	0.32		c0.10	0.28	
v/s Ratio Perm	0.33		0.06	0.32		0.17	0.23		0.14	c0.38		0.12
v/c Ratio	0.84	1.03	0.15	0.89	0.80	0.49	0.71	1.04	0.44	1.11	0.85	0.36
Uniform Delay, d1	35.9	31.0	20.4	43.5	29.2	25.3	40.4	34.5	27.5	42.2	31.0	25.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.3	28.8	0.6	23.4	3.9	3.2	4.9	34.3	0.7	77.4	4.4	0.4
Delay (s)	48.1	59.8	21.0	66.9	33.1	28.5	45.4	68.8	28.2	119.6	35.4	25.7
Level of Service	D	E	C	E	C	C	D	E	C	F	D	C
Approach Delay (s)		55.6			37.4			60.7			53.4	
Approach LOS		E			D			E			D	

Intersection Summary			
HCM Average Control Delay	52.0	HCM Level of Service	D
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	100.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Broadway/Country Club
Alternative A

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	190	1260	140	1634	352	211	727	116	276	621	191
v/c Ratio	0.72	0.84	0.48	1.00	0.51	0.64	0.87	0.26	0.80	0.72	0.36
Control Delay	54.6	43.4	36.7	54.1	7.5	44.1	45.5	7.2	48.0	35.6	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.6	43.4	36.7	54.1	7.5	44.1	45.5	7.2	48.0	35.6	5.8
Queue Length 50th (ft)	100	232	59	~372	18	103	207	0	141	171	0
Queue Length 95th (ft)	#187	#287	106	#467	88	#204	#299	41	#208	208	47
Internal Link Dist (ft)		1239		2639			5229			2445	
Turn Bay Length (ft)	300		300		200	300		200	300		200
Base Capacity (vph)	269	1502	294	1635	697	328	862	457	346	1097	615
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.84	0.48	1.00	0.51	0.64	0.84	0.25	0.80	0.57	0.31

Intersection Summary

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

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	1084	75	132	1536	331	194	669	107	254	571	176
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
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1736	4814		1770	5036	1508	1767	3525	1511	1766	3525	1553
Flt Permitted	0.21	1.00		0.21	1.00	1.00	0.43	1.00	1.00	0.43	1.00	1.00
Satd. Flow (perm)	381	4814		388	5036	1508	792	3525	1511	791	3525	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	190	1178	82	140	1634	352	211	727	116	276	621	191
RTOR Reduction (vph)	0	8	0	0	0	207	0	0	88	0	0	144
Lane Group Flow (vph)	190	1252	0	140	1634	145	211	727	28	276	621	47
Confl. Peds. (#/hr)	3		2	2		3	7		14	14		7
Heavy Vehicles (%)	4%	6%	2%	2%	3%	3%	2%	2%	4%	2%	2%	2%
Bus Blockages (#/hr)	0	6	0	0	0	6	0	2	0	0	2	0
Turn Type	pm+pt			pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	27.9	27.9		29.2	29.2	29.2	21.4	21.4	21.4	22.1	22.1	22.1
Effective Green, g (s)	28.9	27.9		30.2	29.2	29.2	22.4	21.4	21.4	23.1	22.1	22.1
Actuated g/C Ratio	0.32	0.31		0.34	0.32	0.32	0.25	0.24	0.24	0.26	0.25	0.25
Clearance Time (s)	5.0	4.0		5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0	4.0
Vehicle Extension (s)	2.0	5.0		2.0	5.0	5.0	2.0	3.0	3.0	2.0	3.0	3.0
Lane Grp Cap (vph)	268	1492		299	1634	489	338	838	359	351	866	381
v/s Ratio Prot	0.08	c0.26		0.06	c0.32		0.09	c0.21		c0.12	0.18	
v/s Ratio Perm	0.15			0.10		0.10	0.07		0.02	c0.08		0.03
v/c Ratio	0.71	0.84		0.47	1.00	0.30	0.62	0.87	0.08	0.79	0.72	0.12
Uniform Delay, d1	24.7	29.0		28.3	30.4	22.7	30.3	32.9	26.6	29.7	31.1	26.4
Progression Factor	1.63	1.31		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.8	5.0		0.4	22.3	1.5	2.6	9.4	0.1	10.2	2.9	0.1
Delay (s)	46.0	43.0		28.7	52.7	24.3	32.9	42.4	26.7	39.9	33.9	26.6
Level of Service	D	D		C	D	C	C	D	C	D	C	C
Approach Delay (s)		43.4			46.4			38.7			34.2	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	41.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	323	1982	262	1537	420	159	866	196	387	873	171
v/c Ratio	0.92	1.07	1.34	1.07	0.64	0.67	0.98	0.40	1.33	0.87	0.33
Control Delay	57.0	71.4	214.7	77.7	13.0	50.5	62.0	12.7	195.7	41.9	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.0	71.4	214.7	77.7	13.0	50.5	62.0	12.7	195.7	41.9	5.9
Queue Length 50th (ft)	140	~472	~171	~366	49	75	264	27	~238	250	0
Queue Length 95th (ft)	#296	#569	#306	#460	151	#154	#393	86	#419	#348	46
Internal Link Dist (ft)		1277		2639			5229			2445	
Turn Bay Length (ft)	300		300		200	300		200	300		200
Base Capacity (vph)	350	1854	196	1437	653	237	881	486	292	1035	532
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	1.07	1.34	1.07	0.64	0.67	0.98	0.40	1.33	0.84	0.32

Intersection Summary

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

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	1730	113	246	1445	395	146	797	180	356	803	157
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.89
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4992		1770	5085	1523	1757	3525	1537	1768	3525	1402
Flt Permitted	0.19	1.00		0.19	1.00	1.00	0.27	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)	355	4992		355	5085	1523	507	3525	1537	460	3525	1402
Peak-hour factor, PHF	0.93	0.93	0.93	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	323	1860	122	262	1537	420	159	866	196	387	873	171
RTOR Reduction (vph)	0	8	0	0	0	222	0	0	102	0	0	122
Lane Group Flow (vph)	323	1974	0	262	1537	198	159	866	94	387	873	49
Confl. Peds. (#/hr)	3		7	7		3	95		16	16		95
Bus Blockages (#/hr)	0	6	0	0	0	6	0	2	0	0	2	0
Turn Type	pm+pt			pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	34.0	34.0		26.0	26.0	26.0	23.0	23.0	23.0	26.2	26.2	26.2
Effective Green, g (s)	35.0	34.0		27.0	26.0	26.0	24.0	23.0	23.0	27.2	26.2	26.2
Actuated g/C Ratio	0.38	0.37		0.29	0.28	0.28	0.26	0.25	0.25	0.30	0.28	0.28
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.0	5.0		2.0	5.0	5.0	2.0	3.0	3.0	2.0	3.0	3.0
Lane Grp Cap (vph)	350	1845		196	1437	430	238	881	384	292	1004	399
v/s Ratio Prot	0.14	c0.40		c0.09	0.30		0.06	c0.25		c0.16	0.25	
v/s Ratio Perm	0.21			c0.30		0.13	0.12		0.06	c0.23		0.03
v/c Ratio	0.92	1.07		1.34	1.07	0.46	0.67	0.98	0.24	1.33	0.87	0.12
Uniform Delay, d1	23.5	29.0		39.4	33.0	27.2	32.9	34.3	27.6	29.7	31.3	24.4
Progression Factor	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	28.8	42.5		181.9	44.8	3.5	5.4	26.0	0.3	168.3	8.1	0.1
Delay (s)	52.3	71.5		221.3	77.8	30.7	38.3	60.3	27.9	198.0	39.4	24.5
Level of Service	D	E		F	E	C	D	E	C	F	D	C
Approach Delay (s)		68.8			85.8			52.2			80.5	
Approach LOS		E			F			D			F	

Intersection Summary			
HCM Average Control Delay	73.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	92.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	106.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

F. Turn Lane Storage Calculations

Signalized Intersection - Storage Worksheet

Posted speed	35	mph
Design year	2040	
Cycle length, C	90	seconds
Average vehicle length, L	20	ft/veh

LEFT-TURN STORAGE

	Euclid Ave. & Broadway Blvd. [AM]				Euclid Ave. & Broadway Blvd. [PM]			
	EB	WB	NB	SB	EB	WB	NB	SB
V, vph	423	293	94	283	342	365	184	283
Prot green, g, s (zero for permissive)	12.0	12.0	6.0	6.0	7.0	7.0	6.0	6.0
Storage length factor, f	1.75	2.00	2.00	2.00	1.75	1.75	2.00	2.00
Estimated queue, Lqueue, ft	320.8	253.9	87.7	264.1	276.0	294.5	171.7	264.1
Number of lanes	2	2	2	2				
Recommended Storage, ft	**170**	**150**	**90**	**140**				

RIGHT-TURN STORAGE

	Euclid Ave. & Broadway Blvd. [AM]				Euclid Ave. & Broadway Blvd. [PM]			
	EB	WB	NB	SB	EB	WB	NB	SB
V, vph	81	384	354	325	83	355	253	482
Prot green, g, s (zero for permissive)	26.0	26.0	30.0	30.0	31.0	31.0	30.0	30.0
Storage length factor, f	2.00	1.75	1.75	1.75	2.00	1.75	2.00	1.75
Estimated queue, Lqueue, ft	57.6	238.9	206.5	189.6	54.4	203.6	168.7	281.2
Number of lanes	1	1	1	1				
Recommended Storage, ft	**60**	**240**	**210**	**290**				

Signalized Intersection - Storage Worksheet

Posted speed	35	mph
Design year	2040	
Cycle length, C	90	seconds
Average vehicle length, L	20	ft/veh

LEFT-TURN STORAGE

	Highland Ave. & Broadway Blvd. [AM]				Highland Ave. & Broadway Blvd. [PM]			
	EB	WB	NB	SB	EB	WB	NB	SB
V, vph	51	44	139	80	45	35	78	118
Prot green, g, s (zero for permissive)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage length factor, f	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Estimated queue, Lqueue, ft	51.0	44.0	139.0	80.0	45.0	35.0	78.0	118.0
Number of lanes	1	1	1	1				
Recommended Storage, ft	**60**	**50**	**140**	**120**				

RIGHT-TURN STORAGE

	Highland Ave. & Broadway Blvd. [AM]				Highland Ave. & Broadway Blvd. [PM]			
	EB	WB	NB	SB	EB	WB	NB	SB
V, vph	59	104	86	42	20	44	38	40
Prot green, g, s (zero for permissive)	55.0	55.0	27.0	27.0	60.0	60.0	22.0	22.0
Storage length factor, f	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Estimated queue, Lqueue, ft	22.9	40.4	60.2	29.4	6.7	14.7	28.7	30.2
Number of lanes	1	1	1	1				
Recommended Storage, ft	**30**	**50**	**70**	**40**				

Signalized Intersection - Storage Worksheet

Posted speed	35	mph
Design year	2040	
Cycle length, C	90	seconds
Average vehicle length, L	20	ft/veh

LEFT-TURN STORAGE

	Campbell Ave. & Broadway Blvd. [AM]				Campbell Ave. & Broadway Blvd. [PM]			
	EB	WB	NB	SB	EB	WB	NB	SB
V, vph	190	248	229	391	370	313	262	505
Prot green, g, s (zero for permissive)	4.0	4.0	6.0	6.0	5.0	5.0	7.0	7.0
Storage length factor, f	2.00	2.00	2.00	1.75	1.75	1.75	2.00	1.50
Estimated queue, Lqueue, ft	181.6	237.0	213.7	319.3	305.8	258.7	241.6	349.3
Number of lanes	2	2	2	2				
Recommended Storage, ft	**160.0**	**130**	**130**	**180**				

RIGHT-TURN STORAGE

	Campbell Ave. & Broadway Blvd. [AM]				Campbell Ave. & Broadway Blvd. [PM]			
	EB	WB	NB	SB	EB	WB	NB	SB
V, vph	114	285	192	338	160	350	284	266
Prot green, g, s (zero for permissive)	31.0	31.0	33.0	33.0	34.0	34.0	27.0	27.0
Storage length factor, f	2.00	2.00	2.00	1.75	2.00	1.75	2.00	2.00
Estimated queue, Lqueue, ft	74.7	186.8	121.6	187.3	99.6	190.6	198.8	186.2
Number of lanes	1	1	1	1				
Recommended Storage, ft	**100.0**	**200**	**200**	**190**				

Signalized Intersection - Storage Worksheet

Posted speed	35	mph
Design year	2040	
Cycle length, C	90	seconds
Average vehicle length, L	20	ft/veh

LEFT-TURN STORAGE

	Tucson Blvd. & Broadway Blvd. [AM]				Tucson Blvd. & Broadway Blvd. [PM]			
	EB	WB	NB	SB	EB	WB	NB	SB
V, vph	63	60	182	106	75	56	165	174
Prot green, g, s (zero for permissive)	4.0	4.0	7.0	7.0	4.0	4.0	7.0	7.0
Storage length factor, f	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Estimated queue, Lqueue, ft	60.2	57.3	167.8	97.8	71.7	53.5	152.2	160.5
Number of lanes	1	1	1	1				
Recommended Storage, ft	**80.0**	**60**	**170**	**170**				

RIGHT-TURN STORAGE

	Tucson Blvd. & Broadway Blvd. [AM]				Tucson Blvd. & Broadway Blvd. [PM]			
	EB	WB	NB	SB	EB	WB	NB	SB
V, vph	142	108	113	173	117	151	125	174
Prot green, g, s (zero for permissive)	41.0	41.0	23.0	23.0	38.0	38.0	26.0	26.0
Storage length factor, f	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Estimated queue, Lqueue, ft	77.3	58.8	84.1	128.8	67.6	87.2	88.9	123.7
Number of lanes	1	1	1	1				
Recommended Storage, ft	**80.0**	**90**	**90**	**130**				

Signalized Intersection - Storage Worksheet

Posted speed	35	mph
Design year	2040	
Cycle length, C	90	seconds
Average vehicle length, L	20	ft/veh

LEFT-TURN STORAGE

	Country Club Rd. & Broadway Blvd. [AM]				Country Club Rd. & Broadway Blvd. [PM]			
	EB	WB	NB	SB	EB	WB	NB	SB
V, vph	175	132	194	254	323	262	159	387
Prot green, g, s (zero for permissive)	4.0	4.0	6.0	6.0	5.0	5.0	6.0	6.0
Storage length factor, f	2.00	2.00	2.00	2.00	1.75	2.00	2.00	1.75
Estimated queue, Lqueue, ft	167.2	126.1	181.1	237.1	266.9	247.4	148.4	316.1
Number of lanes	2	2	2	2				
Recommended Storage, ft	**140**	**130**	**100**	**160**				

RIGHT-TURN STORAGE

	Country Club Rd. & Broadway Blvd. [AM]				Country Club Rd. & Broadway Blvd. [PM]			
	EB	WB	NB	SB	EB	WB	NB	SB
V, vph	75	331	107	176	122	420	196	171
Prot green, g, s (zero for permissive)	38.0	38.0	26.0	26.0	38.0	38.0	25.0	25.0
Storage length factor, f	2.00	1.75	2.00	2.00	2.00	1.75	2.00	2.00
Estimated queue, Lqueue, ft	43.3	167.3	76.1	125.2	70.5	212.3	141.6	123.5
Number of lanes	1	1	1	1				
Recommended Storage, ft	**80**	**220**	**150**	**130**				

G. Multi-Modal LOS Worksheets

Multimodal Level of Service for Urban Streets

Diagram of Uban Street

Street: E Broadway Blvd ,6 Lane w/5'bike lanes, 2040

Date: 9/20/2011

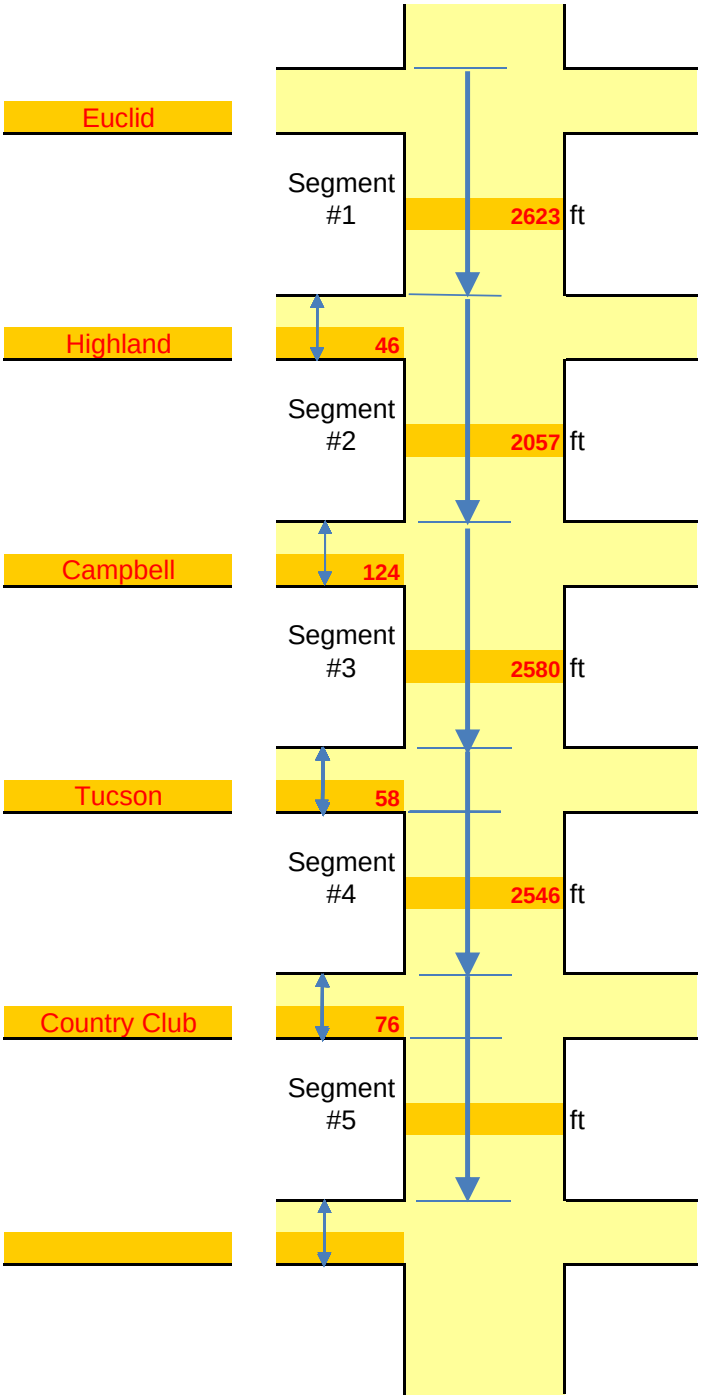
Limits: Cherry to Tucson

Observer: ABB

Analysis Direction:	EB

(Down Direction on this Sheet)

Data Entry Fields in Red



Intersect. Control	X-Street Lanes	X-Street Speed	X-St.App Vph/Ln	Right Turn Isl.
	3	35	165	0

Intersect. Control	X-Street Lanes	X-Street Speed	X-St.App Vph/Ln	Right Turn Isl.
	9	35	353	0

Intersect. Control	X-Street Lanes	X-Street Speed	X-St.App Vph/Ln	Right Turn Isl.
	4	30	220	0

Intersect. Control	X-Street Lanes	X-Street Speed	X-St.App Vph/Ln	Right Turn Isl.
	6	35	243	0

Intersect. Control	X-Street Lanes	X-Street Speed	X-St.App Vph/Ln	Right Turn Isl.

Multimodal Level of Service for Urban Streets

Street Cross-Section Data

Street: E Broadway Blvd ,6 Lane w/5'bike lanes, 2040

Limits: Cherry to Tucson

Observer: ABB

Date: 40806

Cross-Section #1

From: Euclid To: Highland

1

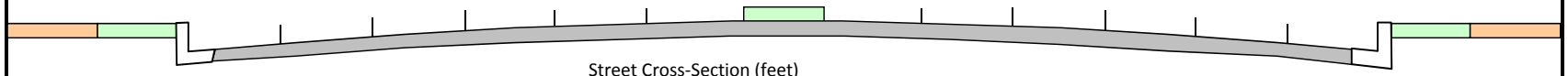
Trees	% Occ.
1	0%

EB

Pavement Cond:	3.5
Jay-Walking Calc:	no

(see xsec4-5)

WB



Street Cross-Section (feet)

Sidewalk	Buffer	Shoulder Parking	Bike Ln	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Median	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Bike Ln	Shoulder Parking	Buffer	Sidewalk
6	1		5		11	11	11	20	11	11	11		5		1	6

Ped Vol: 20

Cross-Section #2

From: Highland To: Campbell

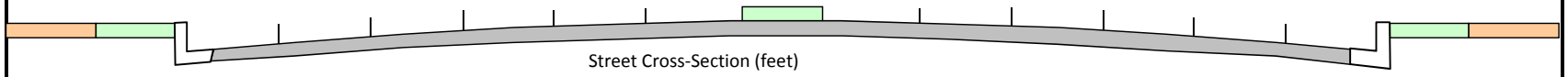
2

Trees	% Occ.
1	0%

EB

Pavement Cond:	3.5
Jay-Walking Calc:	no

WB



Street Cross-Section (feet)

Sidewalk	Buffer	Shoulder Parking	Bike Ln	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Median	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Bike Ln	Shoulder Parking	Buffer	Sidewalk
6	1		5		11	11	11	20	11	11	11		5		1	6

Ped Vol: 20

Cross-Section #3

From: Campbell To: Tucson

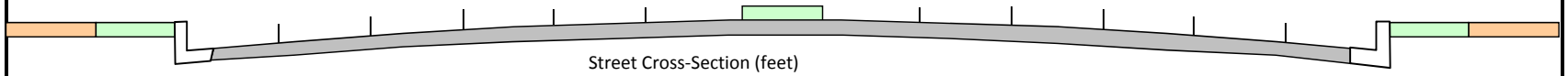
3

Trees	% Occ.
1	0%

EB

Pavement Cond:	3.5
Jay-Walking Calc:	no

WB



Street Cross-Section (feet)

Sidewalk	Buffer	Shoulder Parking	Bike Ln	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Median	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Bike Ln	Shoulder Parking	Buffer	Sidewalk
6	1		5		11	11	11	20	11	11	11		5		1	6

Ped Vol: 20

Multimodal Level of Service for Urban Streets

Street Cross-Section Data

Street: E Broadway Blvd ,6 Lane w/5'bike lanes, 2040

Limits: Cherry to Tucson

Observer: ABB

Date: 40806

Cross-Section #4

From: Tucson To: Country Club

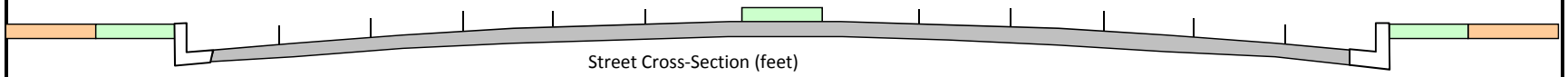
4

Trees	% Occ.
1	0%

EB

Pavement Cond:	3.5
Jay-Walking Calc:	no

WB



Street Cross-Section (feet)

Sidewalk	Buffer	Shoulder Parking	Bike Ln	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Median	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Bike Ln	Shoulder Parking	Buffer	Sidewalk
6	1		5		11	1	11	20	11	11	11		5		1	6

Ped Vol: 20

Cross-Section #5

From: Country Club To: 0

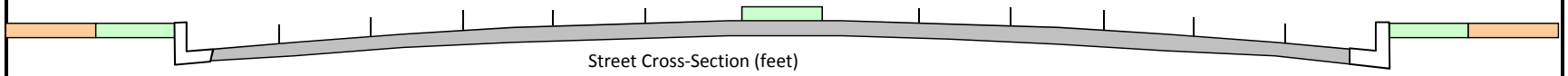
5

Trees	% Occ.

EB

Pavement Cond:	
Jay-Walking Calc:	

WB



Street Cross-Section (feet)

Sidewalk	Buffer	Shoulder Parking	Bike Ln	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Median	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Bike Ln	Shoulder Parking	Buffer	Sidewalk

Ped Vol:

Urban Street Multimodal Level of Service
Data Collection Sheet - Vehicle Traffic

Direction: **EB**

Street: E Broadway Blvd ,6 Lane w/5'bike lanes, 2040 Date: 20-Sep-11

Limits: Cherry to Tucson Observer: ABB

Field Survey

	Segment And Downstream Signal		Speed Limit	Median Type	Left Turn Pocket	Drivewys Rightside	Unsig. Intersects
	From	To	(mph)	(0-3)	(y/n)	(#)	(#)
1	Euclid	Highland	35	3	y	11	4
2	Highland	Campbell	35	3	y	5	4
3	Campbell	Tucson	35	3	y	11	3
4	Tucson	Country Club	35	3	y	10	3
5	Country Club	0					

Traffic Counts K: 100 D: 100 (enter 100 for 10(

	Segment And Downstream Signal		Traffic Volume	Heavy Vehicle	RTOR+ PermLeft	Left/Right Turns	Thru Adj. Sat.	PHF
	From	To		(%)	vph	%	(vphgl)	
1	Euclid	Highland	1740	2%	23	4%	1700	0.94
2	Highland	Campbell	1885	2%	58.5	33%	1700	0.92
3	Campbell	Tucson	1700	2%	34.5	11%	1700	0.94
4	Tucson	Country Club	1590	2%	47.5	26%	1700	0.93
5	Country Club	0						

Arterial Traffic Performance & Signal Timing

	Segment And Downstream Signal		Field Survey		Signal Timing Data			
			Mean Speed	Average Stops	Cycle Length	Grn/Cycle for Thru	Ped Walk	Xing Ped Walk
	From	To	(mph)	(#/veh)	(secs)	(%)	(sec/cyc)	(sec/cyc)
1	Euclid	Highland	20.0	1.5	90	40%	5	18
2	Highland	Campbell	20.0	1.5	90	36%	5	18
3	Campbell	Tucson	20.0	1.5	90	36%	5	18
4	Tucson	Country Club	20.0	1.5	90	40%	5	18
5	Country Club	0						

Notes: Set K and D to 100.00 if H25:H29 entries (ADT) are hourly and one-way volumes.
Median = 0 if None, 1 if one-way st., 2 if Painted or TWLTL, 3 if Raised
Heavy Vehicles = Buses plus trucks plus recreational vehicles
Thru Adusted Saturation Flow rates computed per Signalized Intersections Chapter, H(
Signal data is at the downstream signal

Urban Street Multimodal Level of Service
Data Collection Sheet - Transit

Direction: **EB**

Street: E Broadway Blvd ,6 Lane w/5'bike lanes, 2040

Date: 20-Sep-11

Limits: Cherry to Tucson

Observer: ABB

Field Survey

Segment			Bus Stop (#)	Shelters (% stops)	Benches (% stops)	CBD (yes/no)
	From	To				
1	Euclid	Highland	2	50%	100%	no
2	Highland	Campbell	2	50%	100%	no
3	Campbell	Tucson	2	50%	100%	no
4	Tucson	Country Club	2	50%	100%	no
5	Country Club	0				

Transit Performance Data

Segment			Route #'s	Frequency (bus/hr)	Load Factor (pas/seat)	On-Time Perform. (%)	Schedule Speed (mph)
	From	To					
1	Euclid	Highland	Local	6	80%	75%	15
			Express	4	80%	75%	20
2	Highland	Campbell	Local	6	80%	75%	15
			Express	4	80%	75%	20
3	Campbell	Tucson	Local	6	80%	75%	15
			Express	4	80%	75%	20
4	Tucson	Country Club	Local	6	80%	75%	15
			Express	4	80%	75%	20
5	Country Club	0					

Bus is On-Time if arrives within: 5 minutes of scheduled time.
Average Passenger Trip Length: 5 miles

Notes:
Count all bus service that stops within 1/4 mile of street segment

Multimodal Level of Service for Urban Streets

Results

Street: E Broadway Blvd ,6 Lane w/5'bike lanes, 2040

Date: 40806

Limits: Cherry to Tucson

Observer: ABB

Analysis Direction:	EB
(Down Direction on this Sheet)	
Auto LOS Model:	NCHRP 3-79 Model

Euclid

2623 ft
35 mph
1782 vph
3 lanes

Seg. #1

Seg 1	Score	Seg LOS	Int LOS
Auto	2.62	C	N/A
Transit	1.26	A	N/A
Bike	4.45	B	B
Ped	3.10	C	B

Highland

2057 ft
35 mph
1373 vph
3 lanes

Seg. #2

Seg 2	Score	Seg LOS	Int LOS
Auto	2.76	C	N/A
Transit	1.31	A	N/A
Bike	4.57	B	D
Ped	3.41	C	C

Campbell

2580 ft
35 mph
1604 vph
3 lanes

Seg. #3

Seg 3	Score	Seg LOS	Int LOS
Auto	2.62	C	N/A
Transit	1.26	A	N/A
Bike	4.42	B	B
Ped	3.14	C	B

Tucson

2546 ft
35 mph
1266 vph
3 lanes

Seg. #4

Seg 4	Score	Seg LOS	Int LOS
Auto	2.63	C	N/A
Transit	1.27	A	N/A
Bike	4.39	B	C
Ped	3.20	C	C

Country Club

0 ft
0 mph
0 vph
0 lanes

Seg. #5

Seg 5	Score	Seg LOS	Int LOS
Auto	N/A	#DIV/0!	N/A
Transit	#DIV/0!	N/A	N/A
Bike	#DIV/0!	#DIV/0!	D
Ped	#DIV/0!	A	#DIV/0!

0

Street	Score	LOS
Auto	2.65	C
Transit	1.27	A
Bike	4.45	E
Ped	3.20	C

Multimodal Level of Service for Urban Streets

Diagram of Uban Street

Street: E Broadway Blvd ,6 Lane w/6'bike lanes, 2040

Date: 3/1/2012

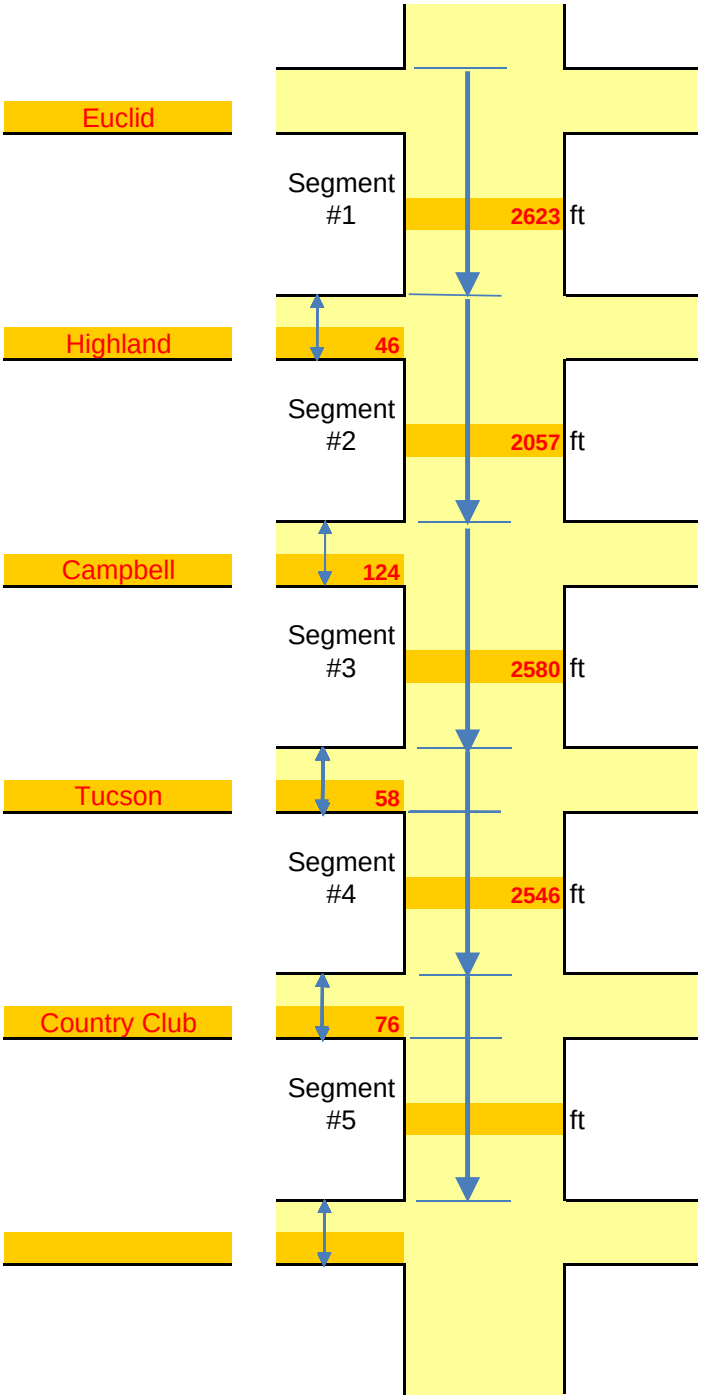
Limits: Euclid to Country Club

Observer: JMS

Analysis Direction:	EB

(Down Direction on this Sheet)

Data Entry Fields in Red



Intersect. Control	X-Street Lanes	X-Street Speed	X-St.App Vph/Ln	Right Turn Isl.
	3	35	165	0

Intersect. Control	X-Street Lanes	X-Street Speed	X-St.App Vph/Ln	Right Turn Isl.
	9	35	353	0

Intersect. Control	X-Street Lanes	X-Street Speed	X-St.App Vph/Ln	Right Turn Isl.
	4	30	220	0

Intersect. Control	X-Street Lanes	X-Street Speed	X-St.App Vph/Ln	Right Turn Isl.
	6	35	243	0

Intersect. Control	X-Street Lanes	X-Street Speed	X-St.App Vph/Ln	Right Turn Isl.

Multimodal Level of Service for Urban Streets

Street Cross-Section Data

Street: E Broadway Blvd ,6 Lane w/6'bike lanes, 2040

Limits: Euclid to Country Club

Observer: JMS

Date: 3/1/2012

Cross-Section #1

From: Euclid To: Highland

1

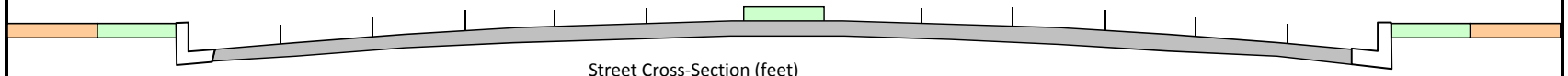
Trees	% Occ.
1	0%

EB

Pavement Cond:	3.5
Jay-Walking Calc:	no

(see xsec4-5)

WB



Street Cross-Section (feet)

Sidewalk	Buffer	Shoulder Parking	Bike Ln	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Median	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Bike Ln	Shoulder Parking	Buffer	Sidewalk
6	1		6		11	11	11	20	11	11	11		6		1	6

Ped Vol: 20

Cross-Section #2

From: Highland To: Campbell

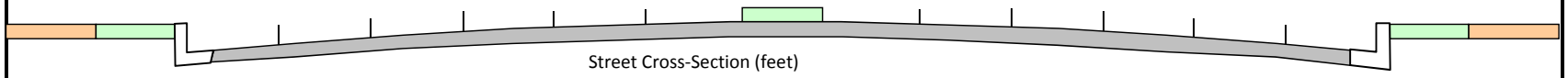
2

Trees	% Occ.
1	0%

EB

Pavement Cond:	3.5
Jay-Walking Calc:	no

WB



Street Cross-Section (feet)

Sidewalk	Buffer	Shoulder Parking	Bike Ln	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Median	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Bike Ln	Shoulder Parking	Buffer	Sidewalk
6	1		6		11	11	11	20	11	11	11		6		1	6

Ped Vol: 20

Cross-Section #3

From: Campbell To: Tucson

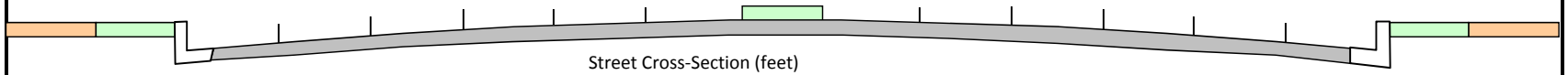
3

Trees	% Occ.
1	0%

EB

Pavement Cond:	3.5
Jay-Walking Calc:	no

WB



Street Cross-Section (feet)

Sidewalk	Buffer	Shoulder Parking	Bike Ln	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Median	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Bike Ln	Shoulder Parking	Buffer	Sidewalk
6	1		6		11	11	11	20	11	11	11		6		1	6

Ped Vol: 20

Multimodal Level of Service for Urban Streets

Street Cross-Section Data

Street: E Broadway Blvd ,6 Lane w/6'bike lanes, 2040

Limits: Euclid to Country Club

Observer: JMS

Date: 3/1/2012

Cross-Section #4

From: Tucson To: Country Club

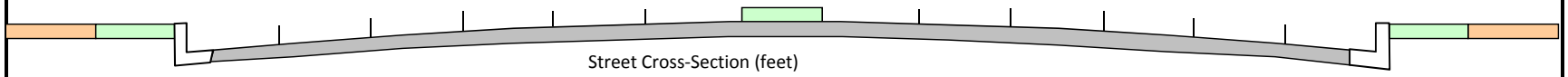
4

Trees	% Occ.
1	0%

EB

Pavement Cond:	3.5
Jay-Walking Calc:	no

WB



Sidewalk	Buffer	Shoulder Parking	Bike Ln	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Median	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Bike Ln	Shoulder Parking	Buffer	Sidewalk
6	1		6		11	11	11	20	11	11	11		6		1	6

Ped Vol: 20

Cross-Section #5

From: Country Club To: 0

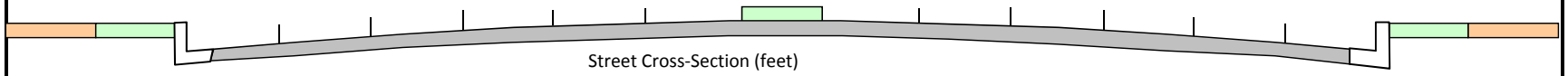
5

Trees	% Occ.

EB

Pavement Cond:	
Jay-Walking Calc:	

WB



Sidewalk	Buffer	Shoulder Parking	Bike Ln	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Median	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Bike Ln	Shoulder Parking	Buffer	Sidewalk

Ped Vol:

Urban Street Multimodal Level of Service
Data Collection Sheet - Vehicle Traffic

Direction: **EB**

Street: E Broadway Blvd ,6 Lane w/6'bike lanes, 2040 Date: 3/1/2012

Limits: Euclid to Country Club Observer: JMS

Field Survey

	Segment And Downstream Signal		Speed Limit	Median Type	Left Turn Pocket	Drivewys Rightside	Unsig. Intersects
	From	To	(mph)	(0-3)	(y/n)	(#)	(#)
1	Euclid	Highland	35	3	y	11	4
2	Highland	Campbell	35	3	y	5	4
3	Campbell	Tucson	35	3	y	11	3
4	Tucson	Country Club	35	3	y	10	3
5	Country Club	0					

Traffic Counts K: 100 D: 100 (enter 100 for 10(

	Segment And Downstream Signal		Traffic Volume	Heavy Vehicle	RTOR+ PermLeft	Left/Right Turns	Thru Adj. Sat.	PHF
	From	To		(%)	vph	%	(vphgl)	
1	Euclid	Highland	1740	2%	23	4%	1700	0.94
2	Highland	Campbell	1885	2%	58.5	33%	1700	0.92
3	Campbell	Tucson	1700	2%	34.5	11%	1700	0.94
4	Tucson	Country Club	1590	2%	47.5	26%	1700	0.93
5	Country Club	0						

Arterial Traffic Performance & Signal Timing

	Segment And Downstream Signal		Field Survey		Signal Timing Data			
			Mean Speed	Average Stops	Cycle Length	Grn/Cycle for Thru	Ped Walk	Xing Ped Walk
	From	To	(mph)	(#/veh)	(secs)	(%)	(sec/cyc)	(sec/cyc)
1	Euclid	Highland	20.0	1.5	90	40%	5	18
2	Highland	Campbell	20.0	1.5	90	36%	5	18
3	Campbell	Tucson	20.0	1.5	90	36%	5	18
4	Tucson	Country Club	20.0	1.5	90	40%	5	18
5	Country Club	0						

Notes: Set K and D to 100.00 if H25:H29 entries (ADT) are hourly and one-way volumes.
Median = 0 if None, 1 if one-way st., 2 if Painted or TWLTL, 3 if Raised
Heavy Vehicles = Buses plus trucks plus recreational vehicles
Thru Adusted Saturation Flow rates computed per Signalized Intersections Chapter, H(
Signal data is at the downstream signal

Urban Street Multimodal Level of Service
Data Collection Sheet - Transit

Direction: **EB**

Street: E Broadway Blvd ,6 Lane w/6'bike lanes, 2040

Date: 3/1/2012

Limits: Euclid to Country Club

Observer: JMS

Field Survey

Segment			Bus Stop (#)	Shelters (% stops)	Benches (% stops)	CBD (yes/no)
	From	To				
1	Euclid	Highland	2	50%	100%	no
2	Highland	Campbell	2	50%	100%	no
3	Campbell	Tucson	2	50%	100%	no
4	Tucson	Country Club	2	50%	100%	no
5	Country Club	0				

Transit Performance Data

Segment			Route #'s	Frequency (bus/hr)	Load Factor (pas/seat)	On-Time Perform. (%)	Schedule Speed (mph)
	From	To					
1	Euclid	Highland	Local	6	80%	75%	15
			Express	4	80%	75%	20
2	Highland	Campbell	Local	6	80%	75%	15
			Express	4	80%	75%	20
3	Campbell	Tucson	Local	6	80%	75%	15
			Express	4	80%	75%	20
4	Tucson	Country Club	Local	6	80%	75%	15
			Express	4	80%	75%	20
5	Country Club	0					

Bus is On-Time if arrives within: 5 minutes of scheduled time.
Average Passenger Trip Length: 5 miles

Notes:
Count all bus service that stops within 1/4 mile of street segment

Multimodal Level of Service for Urban Streets

Results

Street: E Broadway Blvd ,6 Lane w/6'bike lanes, 2040

Date: 3/1/2012

Limits: Euclid to Country Club

Observer: JMS

Analysis Direction:	EB
(Down Direction on this Sheet)	

Auto LOS Model: NCHRP 3-79 Model

Euclid

2623 ft
35 mph
1782 vph
3 lanes

Seg. #1

Seg 1	Score	Seg LOS	Int LOS
Auto	2.62	C	N/A
Transit	1.26	A	N/A
Bike	4.36	B	B
Ped	3.08	C	B

Highland

2057 ft
35 mph
1373 vph
3 lanes

Seg. #2

Seg 2	Score	Seg LOS	Int LOS
Auto	2.76	C	N/A
Transit	1.30	A	N/A
Bike	4.40	B	D
Ped	3.40	C	C

Campbell

2580 ft
35 mph
1604 vph
3 lanes

Seg. #3

Seg 3	Score	Seg LOS	Int LOS
Auto	2.62	C	N/A
Transit	1.26	A	N/A
Bike	4.32	B	B
Ped	3.13	C	B

Tucson

2546 ft
35 mph
1266 vph
3 lanes

Seg. #4

Seg 4	Score	Seg LOS	Int LOS
Auto	2.63	C	N/A
Transit	1.27	A	N/A
Bike	4.29	B	B
Ped	3.19	C	C

Country Club

0 ft
0 mph
0 vph
0 lanes

Seg. #5

Seg 5	Score	Seg LOS	Int LOS
Auto	N/A	#DIV/0!	N/A
Transit	#DIV/0!	N/A	N/A
Bike	#DIV/0!	#DIV/0!	D
Ped	#DIV/0!	A	#DIV/0!

0

Street	Score	LOS
Auto	2.65	C
Transit	1.27	A
Bike	4.34	E
Ped	3.19	C

Multimodal Level of Service for Urban Streets

Diagram of Uban Street

Street: E Broadway Blvd, 6 ln w/MU lns, 2040

Date: 3/1/2012

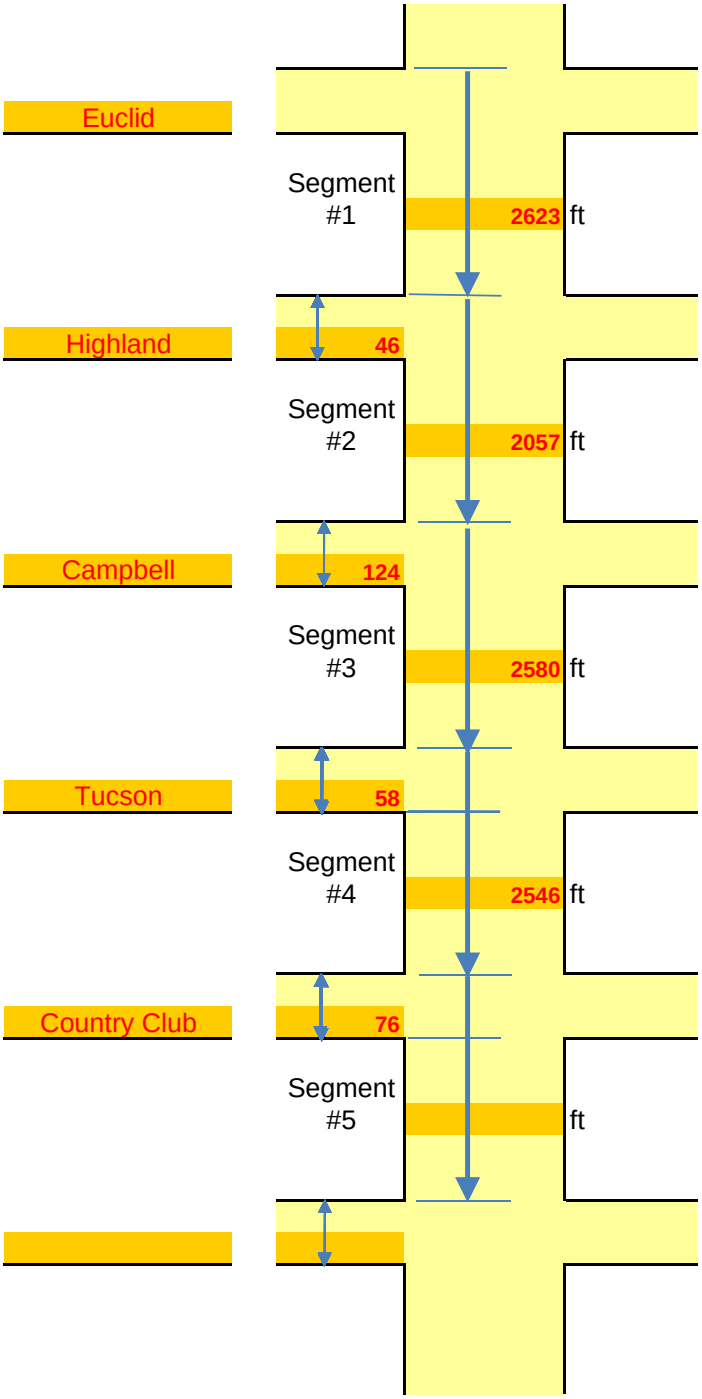
Limits: Euclid to Country Club

Observer: JMS

Analysis Direction:	EB

(Down Direction on this Sheet)

Data Entry Fields in Red



Intersect. Control	X-Street Lanes	X-Street Speed	X-St.App Vph/Ln	Right Turn Isl.
	3	35	165	0

Intersect. Control	X-Street Lanes	X-Street Speed	X-St.App Vph/Ln	Right Turn Isl.
	9	35	353	0

Intersect. Control	X-Street Lanes	X-Street Speed	X-St.App Vph/Ln	Right Turn Isl.
	4	30	220	0

Intersect. Control	X-Street Lanes	X-Street Speed	X-St.App Vph/Ln	Right Turn Isl.
	6	35	243	0

Intersect. Control	X-Street Lanes	X-Street Speed	X-St.App Vph/Ln	Right Turn Isl.

Multimodal Level of Service for Urban Streets

Street Cross-Section Data

Street: E Broadway Blvd, 6 ln w/MU lns, 2040

Limits: Euclid to Country Club

Observer: JMS

Date: 3/1/2012

Cross-Section #1

From: Euclid To: Highland

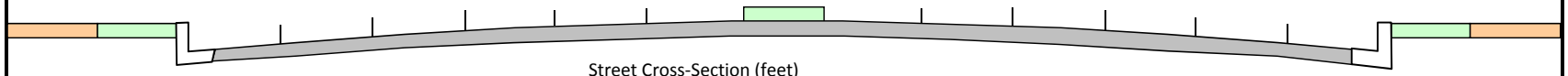
1

Trees	% Occ.
1	0%

EB

Pavement Cond:	3.5	(see xsec4-5)
Jay-Walking Calc:	no	

WB



Street Cross-Section (feet)

Sidewalk	Buffer	Shoulder Parking	Bike Ln	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Median	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Bike Ln	Shoulder Parking	Buffer	Sidewalk
6	1		12		11	11	11	20	11	11	11		12		1	6

Ped Vol: 20

Cross-Section #2

From: Highland To: Campbell

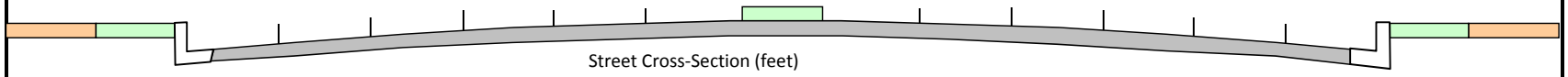
2

Trees	% Occ.
1	0%

EB

Pavement Cond:	3.5
Jay-Walking Calc:	no

WB



Street Cross-Section (feet)

Sidewalk	Buffer	Shoulder Parking	Bike Ln	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Median	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Bike Ln	Shoulder Parking	Buffer	Sidewalk
6	1		12		11	11	11	20	11	11	11		12		1	6

Ped Vol: 20

Cross-Section #3

From: Campbell To: Tucson

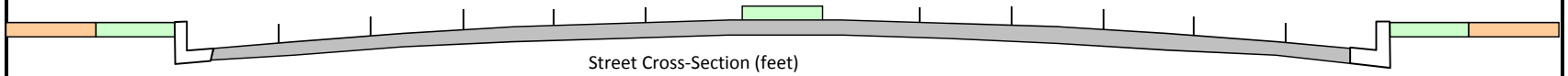
3

Trees	% Occ.
1	0%

EB

Pavement Cond:	3.5
Jay-Walking Calc:	no

WB



Street Cross-Section (feet)

Sidewalk	Buffer	Shoulder Parking	Bike Ln	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Median	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Bike Ln	Shoulder Parking	Buffer	Sidewalk
6	1		11		11	11	11	20	11	11	11		12		1	6

Ped Vol: 20

Multimodal Level of Service for Urban Streets

Street Cross-Section Data

Street: E Broadway Blvd, 6 ln w/MU lns, 2040

Limits: Euclid to Country Club

Observer: JMS

Date: 3/1/2012

Cross-Section #4

From: Tucson To: Country Club

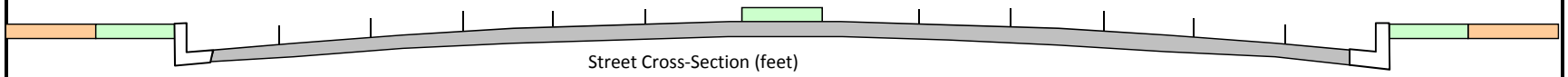
4

Trees	% Occ.
1	0%

EB

Pavement Cond:	3.5
Jay-Walking Calc:	no

WB



Sidewalk	Buffer	Shoulder Parking	Bike Ln	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Median	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Bike Ln	Shoulder Parking	Buffer	Sidewalk
6	1		12		11	11	11	20	11	11	11		12		1	6

Ped Vol: 20

Cross-Section #5

From: Country Club To: 0

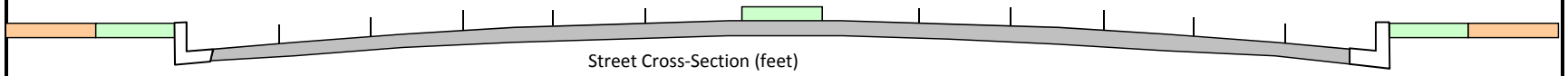
5

Trees	% Occ.
1	0%

EB

Pavement Cond:	3.5
Jay-Walking Calc:	no

WB



Sidewalk	Buffer	Shoulder Parking	Bike Ln	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Median	Trav. Lane	Trav. Lane	Trav. Lane	Trav. Lane	Bike Ln	Shoulder Parking	Buffer	Sidewalk
	1														1	

Ped Vol:

Urban Street Multimodal Level of Service
Data Collection Sheet - Vehicle Traffic

Direction: **EB**

Street: Broadway Blvd, 6 ln w/MU lns, 20

Date: 3/1/2012

Limits: Euclid to Country Club

Observer: JMS

Field Survey

	Segment And Downstream Signal		Speed Limit (mph)	Median Type (0-3)	Left Turn Pocket (y/n)	Drivewys Rightside (#)	Unsig. Intersects (#)
	From	To					
1	Euclid	Highland	35	3	y	11	4
2	Highland	Campbell	35	3	y	5	4
3	Campbell	Tucson	35	3	y	11	3
4	Tucson	Country Club	35	3	y	10	3
5	Country Club	0					

Traffic Counts

K: 100

D: 100

(enter 100 for 10

	Segment And Downstream Signal		Traffic Volume	Heavy Vehicle (%)	RTOR+ PermLeft vph	Left/Right Turns %	Thru Adj. Sat. (vphgl)	PHF
	From	To						
1	Euclid	Highland	1740	2%	23	4%	1700	0.94
2	Highland	Campbell	1885	2%	58.5	33%	1700	0.92
3	Campbell	Tucson	1700	2%	34.5	11%	1700	0.94
4	Tucson	Country Club	1590	2%	47.5	26%	1700	0.93
5	Country Club	0						

Arterial Traffic Performance & Signal Timing

	Segment And Downstream Signal		Field Survey		Signal Timing Data			
			Mean Speed (mph)	Average Stops (#/veh)	Cycle Length (secs)	Grn/Cycle for Thru (%)	Ped Walk (sec/cyc)	Xing Ped Walk (sec/cyc)
	From	To						
1	Euclid	Highland	20.8	1.3	90	75%	5	15
2	Highland	Campbell	20.8	1.3	90	36%	5	18
3	Campbell	Tucson	20.8	1.3	90	75%	5	15
4	Tucson	Country Club	20.8	1.3	90	75%	5	15
5	Country Club	0						

Notes: Set K and D to 100.00 if H25:H29 entries (ADT) are hourly and one-way volumes.
Median = 0 if None, 1 if one-way st., 2 if Painted or TWLTL, 3 if Raised
Heavy Vehicles = Buses plus trucks plus recreational vehicles
Thru Adusted Saturation Flow rates computed per Signalized Intersections Chapter, H
Signal data is at the downstream signal

Multimodal Level of Service for Urban Streets

Results

Street: E Broadway Blvd, 6 ln w/MU lns, 2040

Date: 3/1/2012

Limits: Euclid to Country Club

Observer: JMS

Analysis Direction:	EB
(Down Direction on this Sheet)	

Auto LOS Model: NCHRP 3-79 Model

Euclid

2623 ft
35 mph
1782 vph
3 lanes

Seg. #1

Seg 1	Score	Seg LOS	Int LOS
Auto	2.55	C	N/A
Transit	0.39	A	N/A
Bike	3.73	A	A
Ped	3.02	C	B

Highland

2057 ft
35 mph
1373 vph
3 lanes

Seg. #2

Seg 2	Score	Seg LOS	Int LOS
Auto	2.67	C	N/A
Transit	0.18	A	N/A
Bike	3.57	A	B
Ped	3.33	C	C

Campbell

2580 ft
35 mph
1604 vph
3 lanes

Seg. #3

Seg 3	Score	Seg LOS	Int LOS
Auto	2.55	C	N/A
Transit	#DIV/0!	N/A	N/A
Bike	3.79	A	A
Ped	3.07	C	B

Tucson

2546 ft
35 mph
1266 vph
3 lanes

Seg. #4

Seg 4	Score	Seg LOS	Int LOS
Auto	2.56	C	N/A
Transit	0.40	A	N/A
Bike	3.62	A	A
Ped	3.12	C	C

Country Club

0 ft
0 mph
0 vph
0 lanes

Seg. #5

Seg 5	Score	Seg LOS	Int LOS
Auto	N/A	#DIV/0!	N/A
Transit	#DIV/0!	N/A	N/A
Bike	#DIV/0!	A	D
Ped	#DIV/0!	A	#DIV/0!

0

Street	Score	LOS
Auto	2.58	C
Transit	0.25	A
Bike	3.68	D
Ped	3.12	C

Urban Street Multimodal Level of Service
Data Collection Sheet - Transit

Direction: **EB**

Street: E Broadway Blvd, 6 ln w/MU lns, 2040

Date: 3/1/2012

Limits: Euclid to Country Club

Observer: JMS

Field Survey

Segment	From	To	Bus Stop (#)	Shelters (% stops)	Benches (% stops)	CBD (yes/no)
1	Euclid	Highland	1	100%	100%	no
2	Highland	Campbell	1	100%	100%	no
3	Campbell	Tucson	0	0%	0%	no
4	Tucson	Country Club	1	100%	100%	no
5	Country Club	0	1	0%	100%	no

Transit Performance Data

Segment	From	To	Route #'s	Frequency (bus/hr)	Load Factor (pas/seat)	On-Time Perform. (%)	Schedule Speed (mph)
1	Euclid	Highland	5	2	80%	75%	28
			4	6	80%	75%	28
2	Highland	Campbell	5	2	80%	75%	28
			4	6	80%	75%	28
			105	1	80%	75%	30
			109	1	80%	75%	30
3	Campbell	Tucson					
4	Tucson	Country Club	5	2	80%	75%	28
			4	6	80%	75%	28
5	Country Club	0	5	2	80%	75%	28
			4	6	80%	75%	28
			105	1	80%	75%	30
			109	1	80%	75%	30

Bus is On-Time if arrives within: 5 minutes of scheduled time.
Average Passenger Trip Length: 5 miles

Notes:
Count all bus service that stops within 1/4 mile of street segment