



October 8, 2024

City of Aurora
Planning & Development Services
15151 E. Alameda Parkway, Suite 5200
Aurora, Colorado 80012
Ph: 303.739.7186

Re: Port Colorado – Sub-Area 2 – Master Plan (DA-1793-05) Submittal #6 Comment Response Letter to Submission Review #5 dated September 11, 2024

Staff's comments for Port Colorado Sub-Area 2 Master Plan have been addressed and responses are attached.

OWNER OF EACH RESPONSE

Red: LAI Design Group **Blue:** Westwood/Civil **Green:** FHI/Traffic

SUMMARY OF KEY COMMENTS FROM ALL DEPARTMENTS

- Traffic Impact Analysis: Not Ready for Technical Referral Civil Plan Intake – TIS not approved previous comments not addressed. (Item 5) **RE: Traffic Engineer has provided detailed responses.**
- See the comments from CDOT. (Item 6) **RE: Traffic Engineer has provided detailed responses.**

PLANNING DEPARTMENT COMMENTS

Reviewed by: Rachid Rabbaa rrabbaa@auroragov.org / 303-739-7541 / PDF comment color is teal.

1. Community Comments

- 1A. Please see the CDOT comments. PDF. Respond to each CDOT comment. "Acknowledge" as a response is NOT acceptable. **RE: Traffic Engineer has responded to each CDOT comment specifically.**

2. Completeness and Clarity of the Application

- 2A. No additional comments.

3. Zoning, Land Use Comments, and Transportation Issues

- 3A. No additional comments.

REFERRAL COMMENTS FROM OTHER DEPARTMENTS AND AGENCIES

4. Civil Engineering Reviewed by: Julie Bingham / jbingham@auroragov.org / 303-739-7403 / Comments in green.

- 4A. No additional comments.

5. Traffic Engineering Reviewed by: Steven Gomez / segomez@auroragov.org / 303-739- 7336 / **Comments in gold.**

Traffic Impact Analysis

- 5A. Previous comment not addressed. update ALL intersection HCM (LOS, delay) and queues to be consistent with worksheets, graphics, etc2. review and update ALL text to be consistent with latest traffic volumes, access configuration, intersection laneage, etc3. see comments throughout report.

RE: All intersections, queues and text have been updated and coordinated.

- 5B. Previous comments not addressed results are not consistent with worksheets.



RE: Previous comments have been addressed and consistent with worksheets.

- 5C. Not ready for Technical Referral Civil Plan Intake – TIS not approved previous comments not addressed.

RE: Previous comments have been addressed.

- 5D. Please respond to each TIS comment. “acknowledged” as a response is NOT acceptable.

RE: Traffic Engineer has responded to each comment specifically.

6. Department of Transportation: Reviewed by Steve Loeffler / steven.loeffler@state.co.us

- 6A. Comments are attached. **Respond to each major item specifically in your comment response letter and make revisions as necessary.** **RE: Traffic Engineer has responded to each comment specifically.**

- 6B. **A comment response letter is REQUIRED.** respond to each CDOT “acknowledged” as a response is NOT acceptable.

RE: Traffic Engineer has responded to each comment specifically.

6C. Environmental Comments:

Once File Search results are received Environmental review will continue. For ANY ground disturbance/work within CDOT ROW---

Required: Arch/History/Paleo:

Since this is a permit, a file search for Arch, Paleo, and History is required. If the file search identifies anything, a more extensive report will be required. If nothing is identified, then the file search should be sufficient. For the file search contact:

Cultural/History File Search: <https://www.historycolorado.org/file-access>

Email: hc_filesearch@state.co.us

RE: An online request was made and awaiting response from History Colorado

Paleo File Search: Colorado University Museum of Natural History - <https://www.colorado.edu/cumuseum/research-collections/paleontology/policies-procedure>

Email: jacob.vanveldhuizen@colorado.edu and from the Denver Museum of Nature and Science – Email: kristen.mackenzie@dmns.org

<https://www.dmns.org/science/earth-sciences/earth-sciences-collections/>

RE: An email request was made and awaiting response from Jacob and Kirsten

If there is NO ground disturbance within CDOT ROW, the applicant shall submit an email/memo to the R1 Environmental Permit Review Specialist stating this. **RE: Please provide contact information for the R1 Environmental Permit Review Specialist**

8/21/2024: Once file searches are received Environmental review will continue.

RE: Acknowledged – please note below that RLW on July 8, 2024, stated that “...at this time as it appears no work will be done in the CDOT ROW.” The applicant has still proceeded to get documentation from the above-mentioned agencies.

Permits Comments:

7.1.24 The Traffic Impact Analysis needs to be stamped by the Engineer from Felsburg Holt & Ullevig. -- Aaron

Eyl 7.1.24 **RE: Final Report will be stamped upon approval from the City of Aurora**

I have no comments at this time as it appears no work will be done in the CDOT ROW. Any work in the CDOT ROW requires CDOT permits. RLW July 8 2024 **RE: Acknowledging “No Comment” dated July 8 2024**

I have no comments at this time. RLW Aug 23 2024 **RE: Acknowledging “No Comment” dated Aug 23 2024**

8.28.24 - No comment. -- Aaron Eyl 8.28.24 **RE: Acknowledging “No Comment” dated 8.28.24**

Traffic Comments:

CLB on 8/27/24:

Regarding the FHU prepared Comment Response letter and updated Traffic Impact Analysis, since both of these documents appear to have addressed previous comments, there are no further comments at this time. 7-9-2024 - Chris Bland **RE:**

Acknowledging "No Comment" dated 7-9-2024 and 8/27/24

7-9-2024 - Chris Bland

(1) Under II.B. Roadway System, regarding I-70, believe consideration should be given to mentioning the existing Watkins Road interchange since this interchange, like Manila Road, is also near the project site.

RE: Watkins Road and Manila Road interchanges have been added to the text.

(2) Under II.B. Roadway System, regarding US 36, believe consideration should be given to mentioning some of the more major intersecting roadways, including, Imboden Road and Manila Road.

RE: Intersections of US 36 with Imboden Road and Manila Road have been added to the text.

(3) Under VI Summary and Recommendations, regarding the mentioning of accessing I-70 via a planned interchange at Imboden Road / Quail Run Road, believe consideration should be given to also mentioning the existing interchanges near the project site, namely Watkins Road and Manila Road. In addition, consideration should be given to mentioning how these interchanges will be developed in conjunction with the proposed developments and projected traffic volumes and in harmony with the CDOT 1601 process and related ongoing corridor-wide TDM planning documents such as the I-70 East Corridor Multimodal TDM Plan.

RE: CDOT 1601 process and related ongoing corridor-wide TDM planning documents have been noted. Watkins Road improvements identified in the 2021 Arapahoe County study have also been noted. Improvements at Manila Road have also been mentioned but noted that while they were identified in the master TIS they are not anticipated to be necessary for Subarea 2 given the construction of the Quail Run interchange.

(4) Under VI Summary and Recommendations, believe consideration should be given to mentioning that Port Colorado will also have access to US 36 via planned improvements at several intersections.

RE: US 36 improvements were identified in the Port Colorado Master TIS (2022). City of Aurora did not identify those intersections for study in this Subarea study.

7-9-2024



Traffic & Safety

Region 1
2829 W Howard Place, 2nd Floor
Denver, Colorado 80204



COLORADO
Department of Transportation
Region 1

Project Name: Port Subarea 2 - Transport Colorado

Print Date: 9/4/2024

Highway: 36

Mile Marker: 80.813

A comment response letter is REQUIRED along with the next submittal.

Review POC: loefflers

Environmental Comments: **RE: Repeated responses from above.**

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For ANY ground disturbance/work within CDOT ROW--- Required:

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Since this is a permit, a file search for Arch, Paleo, and History is required. If the file search identifies anything, a more extensive report will be required. If nothing is identified, then the file search should be sufficient. For the file search contact:

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Email: jacob.vanveldhuizen@colorado.edu and from the Denver Museum of Nature and Science – Email:

kristen.mackenzie@dmns.org

<https://www.dmns.org/science/earth-sciences/earth-sciences-collections/>

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RE: Watkins Road and Manila Road interchanges have been added to the text.

- (2) Under II.B. Roadway System, regarding US 36, believe consideration should be given to mentioning some of the more major intersecting roadways, including, Imboden Road and Manila Road.

RE: Intersections of US 36 with Imboden Road and Manila Road have been added to the text.

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RE: CDOT 1601 process and related ongoing corridor-wide TDM planning documents have been noted. Watkins Road improvements identified in the 2021 Arapahoe County study have also been noted. Improvements at Manila Road have also been mentioned but noted that while they were identified in the master TIS they are not anticipated to be necessary for Subarea 2 given the construction of the Quail Run interchange.

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RE: US 36 improvements were identified in the Port Colorado Master TIS (2022). City of Aurora did not identify those intersections for study in this Subarea study.

7-9-2024

If you require additional information or have any or have any questions about our submittal items, please do not hesitate to call or e-mail me (303) 734-1777 or jcarpenter@laidesigngroup.com. We look forward to working with the City in completing this process in order to contribute to the City of Aurora.

Sincerely,

Jennifer Carpenter
Principal



Comments provided on 09/04/24 seg

1. previous comment not addressed. update ALL intersection HCM (LOS, delay) and queues to be consistent with worksheets, graphics, etc
2. review and update ALL text to be consistent with latest traffic volumes, access configuration, intersection laneage, etc
3. see comments throughout report

EA 2

Traffic Impact Analysis

Prepared for:

Western Transport, LLC
1331 17th Street, Suite 1000
Denver, CO 80202

Prepared by:

Felsburg Holt & Ullevig
6400 S Fiddlers Green Circle, Suite 1500
Greenwood Village, CO 80111
303.721.1440

Project Manager: Philip Dunham, PE, PTOE



FHU Reference No. 122260-01

August 2024

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I. INTRODUCTION

Port Colorado, formerly TransPort Colorado, is planning to develop Subarea 2 of their master-planned business and industrial park in the City of Aurora, Colorado. Subarea 2 is an 1,860-acre parcel that is approximately bounded north-south by 56th Avenue and 32nd Avenue, and east-west by Imboden Road/Quail Run Road and Manila Road. The project will be developed with light industrial uses.

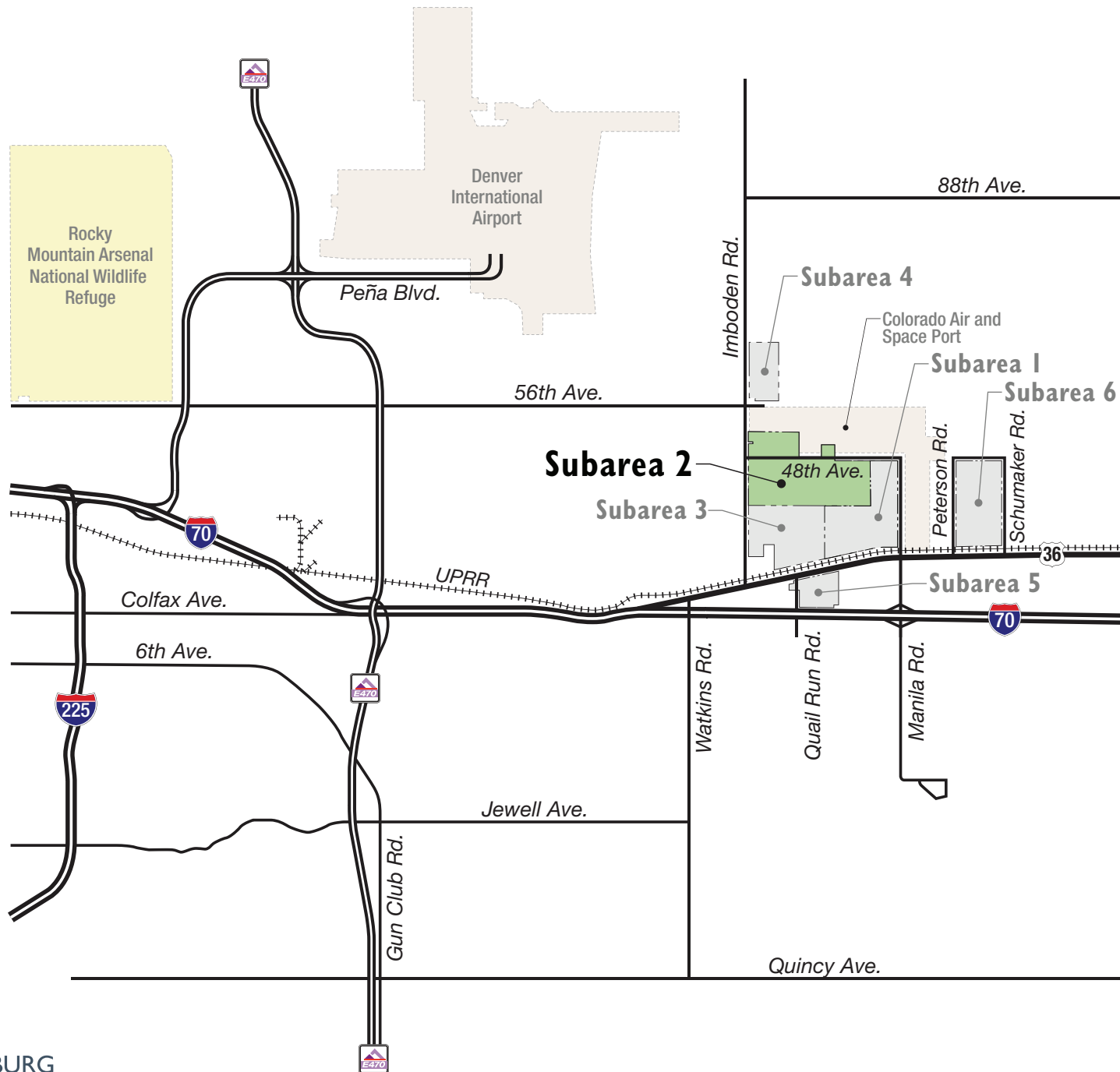
Figure 1 provides a vicinity map of the project location, and **Figure 2** illustrates the proposed site plan.

This Traffic Impact Analysis (TIA) assesses the traffic impacts related to the development of Port Colorado Subarea 2. Specific elements of this report are based on pre-application notes provided by the City of Aurora in September 2021. Short- and Long-Term future scenarios were explored for this site. These scenarios examine the traffic impacts within the context of the year 2040 and the future regional planning horizon beyond the year 2040.

The following summarizes what is included in this report:

- Evaluation of existing operational conditions
- Trip generation estimates for the proposed land uses
- Analysis of project impacts
- Consistency with the *Northeast Aurora Transportation Study Refresh (NEATS Refresh)*
- Discussion on pedestrian trail construction adjacent Bear Gulch
- Recommendations for public improvements

This study builds from analyses provided in the *TransPort Colorado Traffic Impact Study Analysis*, July 2022, prepared by Felsburg Holt & Ullevig, which addressed transportation needs of the 5,378-acre Port Colorado Framework Development Plan (FDP).





II. EXISTING CONDITIONS

II.A. Land Use

The area that immediately surrounds the site is largely undeveloped with the exception of the Colorado Air and Space Port (Space Port) to the north. Residential and commercial uses exist in the Towns of Watkins and Bennett, while the Prosper residential and commercial site is developing approximately one mile to the west along the south side of I-70. The Rocky Mountain Rail Park, a rail-served property, is an approved Adams County project that abuts Subarea 6 on the west side of Peterson Road. The site itself is currently vacant.

II.B. Roadway System

The Port Colorado Subarea 2 site will occupy nearly 3 square miles of land. Several existing roadways are spaced along one-mile land sections, although most of these roads currently have very little traffic and are somewhat discontinuous. More detailed descriptions of the primary roadways adjacent to and near the project site follow.

Interstate 70 (I-70)

I-70 is a major interstate route that bisects the state of Colorado at its approximate north/south midpoint. Not only is this route the primary east/west corridor for interstate travel in Colorado, but this route provides access to many states outside Colorado, from Utah to Maryland. I-70 has four travel lanes for vehicle movements and is posted with a speed limit of 75 miles per hour (MPH) in the study area.

Interchanges with I-70 near the project site include the Manila Road Interchange, approximately 2 miles southeast and the Watkins Road interchange approximately 5 miles south west of Port Colorado Subarea 2. However, a new interchange at the Imboden Road/Quail Run Road alignment is being proposed as the primary interstate access route for the Port Colorado Subarea 2 land uses, and it is currently proceeding through the Colorado Department of Transportation (CDOT) 1601 process for interchange approval.

United States 36 (US 36)

The southern boundary of the Port Colorado Subarea 2 project lies along approximately one-half mile north of Union Pacific Railroad (UPRR) trackage that is directly adjacent to the north side of US 36. The UPRR and US 36 parallel each other along the entire length of Port Colorado's southern boundary. The centerline-to-centerline distance between these two facilities is approximately 200 feet. US 36 is two lanes wide and has a posted speed limit of 55 MPH. Several section line roadways intersect US 36, and each intersecting roadway is controlled by stop signs at US 36, notably at Imboden Road and Manila Road adjacent to the Port Colorado site. CDOT classifies US 36 as a Rural Highway (R-B) in this area.

Manila Rd, Cavanaugh Rd, Quail Run Rd, Quail Run Dr, & Imboden Road/Quail Run Road Dr

Each of these roadways exists at one-mile intervals in or near Port Colorado Subarea 2, with each having a north/south orientation.

Manila Road provides access to the main entryway for the Space Port via 48th Avenue, and it has a posted speed of 45 MPH. Manila Road provides an interchange with I-70 and continues south into Arapahoe County.

Cavanaugh Road will provide the main entryway for the three PA-8 parcels, as well as PA-9, in Port Colorado Subarea 2. Cavanaugh Road currently does not exist in the study area but is planned to extend from 32nd Avenue to 48th Avenue just south of the Air and Space Port.

Imboden Road/Quail Run Road currently does not exist but is planned to provide access from Imboden Road/Quail Run Road to 32nd Avenue, then to the new interchange at I-70.

Quail Run Drive, similar to Cavanaugh Road, does not currently exist but will provide access to parcels 6, 7, 8A, & 9 within Port Colorado Subarea 2. It will extend from 32nd Avenue to 48th Avenue, south of the Air and Space Port.

Imboden Road/Quail Run Road is a two-lane paved roadway extending from US 36 on the south to 144th Avenue on the north. This roadway will be the main access to parcels 5 and 2 in the Subarea 2 development.

32nd, 42nd, 48th, & 56th Avenues

These roadways have an east/west orientation and are separated by a one-mile distance. 32nd Avenue is a planned roadway from Manila Road to Imboden Road/Quail Run Road and will provide connectivity between Manila Road, Cavanaugh Road, Quail Run Drive, and Imboden Road/Quail Run Road.

42nd Avenue is planned to be a local roadway providing access to parcels 8A, 8B, 8C, and 9 within Subarea 2.

48th Avenue is an unmarked paved roadway with a width of 20 feet in the study area. It provides connectivity from Manila Road to Imboden Road/Quail Run Road Drive and, with the development of Subarea 2, will provide access to parcels 2, 3, 4, 5, 6, 8A, and 8B.

56th Avenue is currently an unpaved roadway from Imboden Road/Quail Run Road Drive to Imboden Road/Quail Run Road. However, in the future, this roadway is planned to be a regional connector and will provide access to E-470 to the west.

II.C. Rail Facility

The UPRR parallels the southern boundary of Port Colorado. The UPRR trackage extends from the Denver metropolitan area to the east into Kansas and points beyond. There is only one track within the railroad right-of-way; approximately three trains use this track each day.

II.D. Traffic Volumes

Existing traffic volumes were recorded at Imboden Road/Quail Run Road with 56th Avenue in February 2020 and traffic counts were recorded in September of 2018 and grown at a rate of two percent per year to reflect 2023 conditions. These movements were recorded during the AM and PM peak hours, the typical time periods when vehicle activity is greatest. As shown on **Figure 3**, vehicle volumes are quite low when compared to traffic volume levels in other parts of the Denver metropolitan area. The majority of movements are less than 100 vehicles per hour (vph). **Appendix A** includes the recorded traffic volume data.

II.E. Traffic Control

Control of vehicle movements at intersections surrounding Port Colorado Subarea 2 is carried out via stop signs. All stop signs are used on the “minor” street intersection approaches where vehicle right-of-way assignment is necessary.

II.F. Traffic Operations

Traffic operations within the study area were evaluated according to techniques documented in the *Highway Capacity Manual*, 6th Edition (Transportation Research Board, 2016) using the existing traffic volumes, intersection geometry, and traffic control. Level of Service (LOS) is a qualitative measure of traffic operational conditions based on roadway capacity and vehicle delay. LOS is described by a letter designation ranging from A to F, with LOS A representing almost free-flow travel, while LOS F represents congested conditions. Synchro II software was used to evaluate how well the existing intersection is operating.

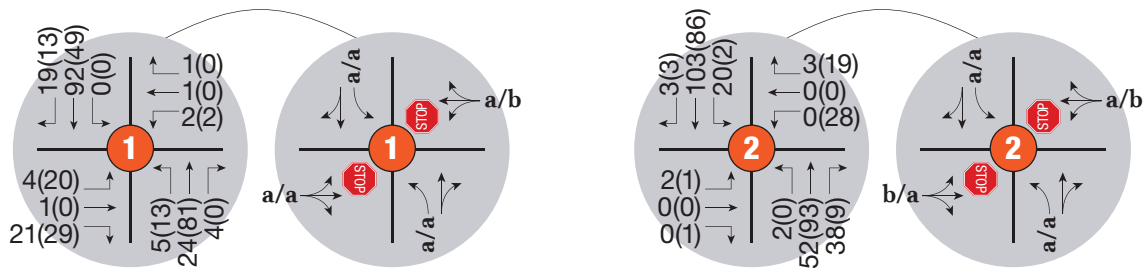
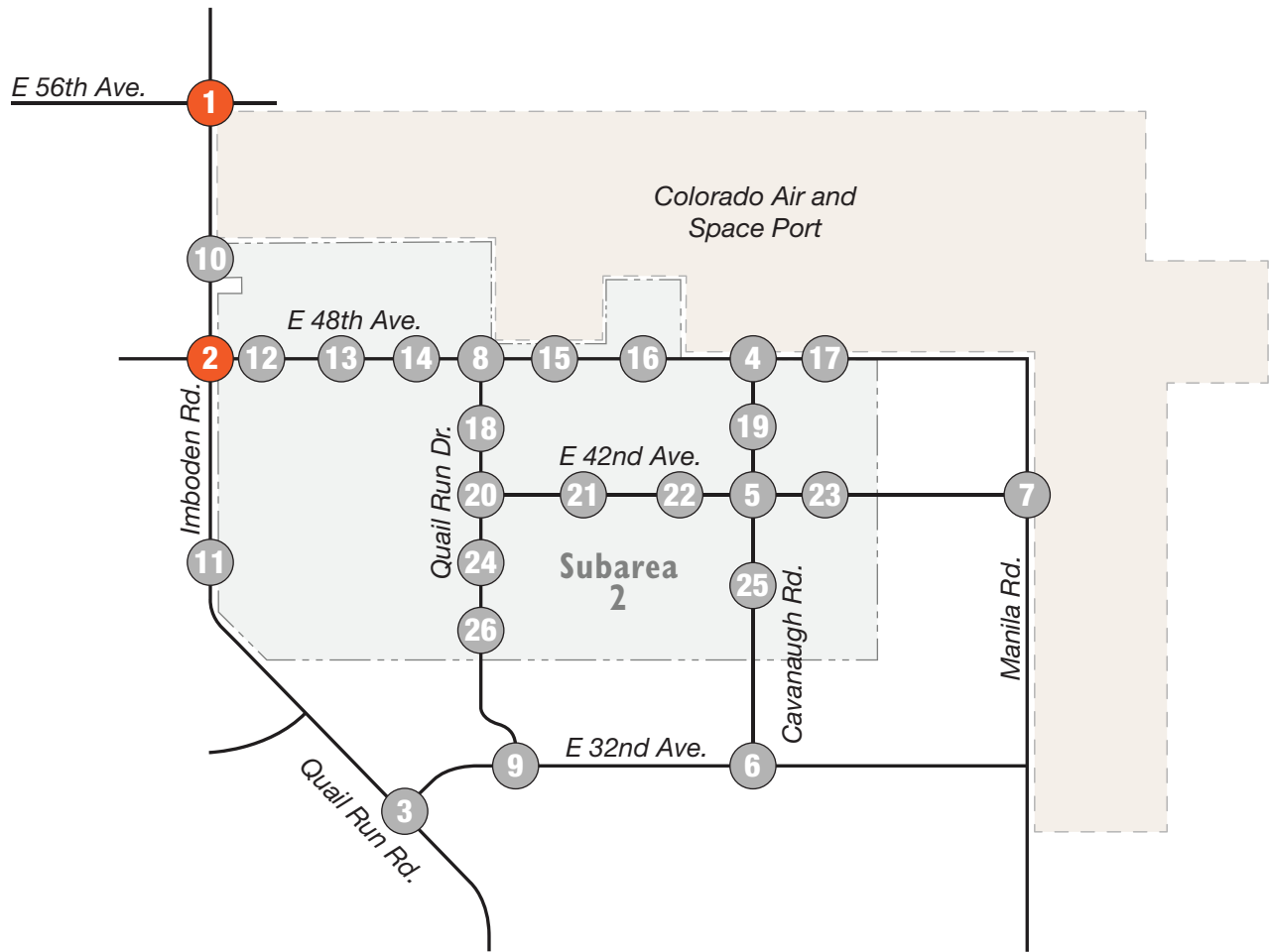
For stop-controlled intersections, LOS is calculated for each vehicle movement that must yield the right-of-way to an oncoming or crossing vehicle. In urbanized areas, LOS D is typically considered to be acceptable for peak hour traffic operations and is the standard set in the City of Aurora Traffic Impact Study guidelines.

Figure 3 shows the existing traffic control, intersection geometry, and results of the LOS analyses. **Appendix B** includes the LOS criteria, and **Appendix C** includes the analysis worksheets. All movements currently operate within acceptable parameters, at LOS B or better during peak hours, with most movements operating at LOS A. **Table I** outlines the LOS and delay by movement for the study intersection for existing conditions.

Table I. Existing Conditions LOS and Delay Summary

Intersection		Movement	Existing Conditions	
			AM LOS (delay [sec])	PM LOS (delay [sec])
1	Imboden Road/Quail Run Road & 56 th Avenue	EBLTR	a (9.3)	a (9.5)
		WBLTR	a (9.6)	b (10.2)
		NBL	a (7.6)	a (7.5)
		SBL	a (0.0)	a (0.0)
2	Imboden Road/Quail Run Road & 48 th Avenue	EBLTR	b (10.5)	a (9.6)
		WBLTR	a (8.8)	b (10.0)
		NBL	a (7.6)	a (0.0)
		SBL	a (7.6)	a (7.6)

KEY MAP



LEGEND

XXX(XXX) = AM(PM) Peak Hour Traffic Volumes

XXXX = Daily Traffic Volumes

x/x = AM/PM Peak Hour Unsignalized Intersection Level of Service

= Stop Sign

= Intersection Numbers

= Future Intersection

III. PORT COLORADO SUBAREA 2 SITE TRAFFIC

III.A. Site Trip Generation

Trip generation estimates for Port Colorado Subarea 2 are based on information contained in *Trip Generation*, 10th Edition, by the Institute of Transportation Engineers (ITE), 2017, and custom rates based on user provided data from other nearby developments within Aurora. Through correspondence with the City of Aurora, the Data Center and Warehouse land use categories were used for the trip generation estimates for all industrial sites. The user defined data for Data Center indicates a 1.47 million square foot facility would have 432 employees and expect 180 truck deliveries per day. It was determined that this results in a daily trip generation of 1,310 trips and equates to a rate of 0.89 trips per 1,000 SF. This is approximately a 10 percent reduction as compared to data provided by ITE for Data Center Land Use Code #160. The Warehousing uses utilize ITE provided data for High-Cube Transload and Short-Term Storage Warehouse Land Use Code #154. **Table 2** details the results of these estimates.

Table 2. Colorado Subarea 2 Trip Generation Estimates

Planning Area	Land Use	Developable Acreage	Potential Building Square Footage (KSF) ¹	Land Use % of Acreage	Land Use Size (KSF)	Daily Vehicle -Trips	AM			PM		
							In	Out	Total	In	Out	Total
PA-2a	Data Center	79.5	623.3	75%	467.5	416	23	19	42	11	26	37
	Warehouse			25%	155.8	266	20	6	26	8	20	28
	Sub Total			100%	623	683	43	25	68	19	46	65
PA-3	Data Center	149.6	1173.0	75%	879.7	783	43	36	79	21	49	70
	Warehouse			25%	293.2	501	38	12	50	15	38	53
	Sub Total			100%	1,173	1,284	81	48	129	36	87	123
PA-4	Data Center	36.8	288.5	75%	216.4	193	10	9	19	5	12	17
	Warehouse			25%	72.1	123	9	3	12	4	9	13
	Sub Total			100%	289	316	19	12	31	9	21	30
PA-5	Data Center	132.4	1038.1	75%	778.6	693	39	31	70	19	43	62
	Warehouse			25%	259.5	444	34	10	44	13	34	47
	Sub Total			100%	1,038	1,137	73	41	114	32	77	109

Planning Area	Land Use	Developable Acreage	Potential Building Square Footage (KSF) ¹	Land Use % of Acreage	Land Use Size (KSF)	Daily Vehicle -Trips	AM			PM		
							In	Out	Total	In	Out	Total
PA-6	Data Center	345.4	2708.2	75%	2031.2	1,808	101	82	183	49	113	162
	Warehouse			25%	677.1	1,158	89	26	115	34	88	122
	Sub Total			100%	2,708	2,965	190	108	298	83	201	284
PA-7	Data Center	72.16	565.8	75%	424.3	378	21	17	38	10	24	34
	Warehouse			25%	141.4	242	18	6	24	7	18	25
	Sub Total			100%	566	620	39	23	62	17	42	59
PA-8a	Data Center	316.1	2478.5	75%	1858.9	1,654	92	75	167	45	104	149
	Warehouse			25%	619.6	1,060	81	24	105	31	81	112
	Sub Total			100%	2,478	2,714	173	99	272	76	185	261
PA-8b	Data Center	159.1	1247.5	75%	935.6	833	46	38	84	23	52	75
	Warehouse			25%	311.9	533	41	12	53	16	40	56
	Sub Total			100%	1,247	1,366	87	50	137	39	92	131
PA-8c	Data Center	160.5	1258.4	75%	943.8	840	47	38	85	23	53	76
	Warehouse			25%	314.6	538	41	12	53	16	41	57
	Sub Total			100%	1,258	1,378	88	50	138	39	94	133
PA-9	Data Center	317.7	2491.0	75%	1868.3	1,663	92	76	168	45	105	150
	Warehouse			25%	622.8	1,065	82	24	106	31	81	112
	Sub Total			100%	2,491	2,728	174	100	274	76	186	262
Totals		1,769	13,872	100%	13,872	15,190	967	556	1,523	426	1,031	1,457

The equations and directional splits that follow were extracted from the *Trip Generation Manual*, 11th Edition, ITE, 2021 to formulate the trip generation shown on **Table 2**. Note that the Data Center rates below takes a 10 percent reduction to the rates from the manual based on the user defined data presented earlier in this section. It should be noted that the *TransPort Colorado Traffic Impact Study Analysis*, July 2022 used the 10th edition of the *Trip Generation Manual*, as that was current at the time, and rates used in this study may differ.

Data Center

	Average Rate	Split
Daily:	$T=0.89 \times x$	In: 50% Out: 50%
AM Peak:	$T=0.09 \times x$	In: 55% Out: 45%
PM Peak:	$T=0.08 \times x$	In: 30% Out: 70%

High-Cube Transload and Short-Term Storage Warehouse

	Average Rate	Split
Daily:	$T=1.71 \times x$	In: 50% Out: 50%
AM Peak:	$T=0.17 \times x$	In: 77% Out: 23%
PM Peak:	$T=0.18 \times x$	In: 28% Out: 72%

Due to both the large size and relative isolation of the Port Colorado development, it is estimated that there will be additional interactions that take place between the industrial land uses and the mixed-use parcels that would result in trips to the adjacent roadway network but not to the regional transportation network. An additional 9 percent of traffic to/from Subarea 5 is projected to interact with the industrial planning areas. This percentage is consistent with the interactions seen between the TAZ in the *NEATS Refresh* model that represents Subarea 5 and the other two TAZs that encompass Port Colorado. Therefore, along with the above shown trip generation estimates, an internal trip capture estimate related to movements to/from Subarea 5 of Port Colorado is included in background traffic, which will generate trips to and from parcels within Subarea 2. Subarea 5 is anticipated to be mixed use with retail, restaurants, and hotels that will have a sub-regional draw from the rest of Port Colorado beyond the internal capture within Subarea 5 itself. Although this internal capture will make trip generation from the year 2040 to the Long-Term horizon slightly different, the Long-Term trip generation is shown on **Figure 4** as a conservative representation. It was assumed that approximately 9 percent of trips generated by Subarea 5 would be to and from other parcels within Port Colorado including Subarea 2.

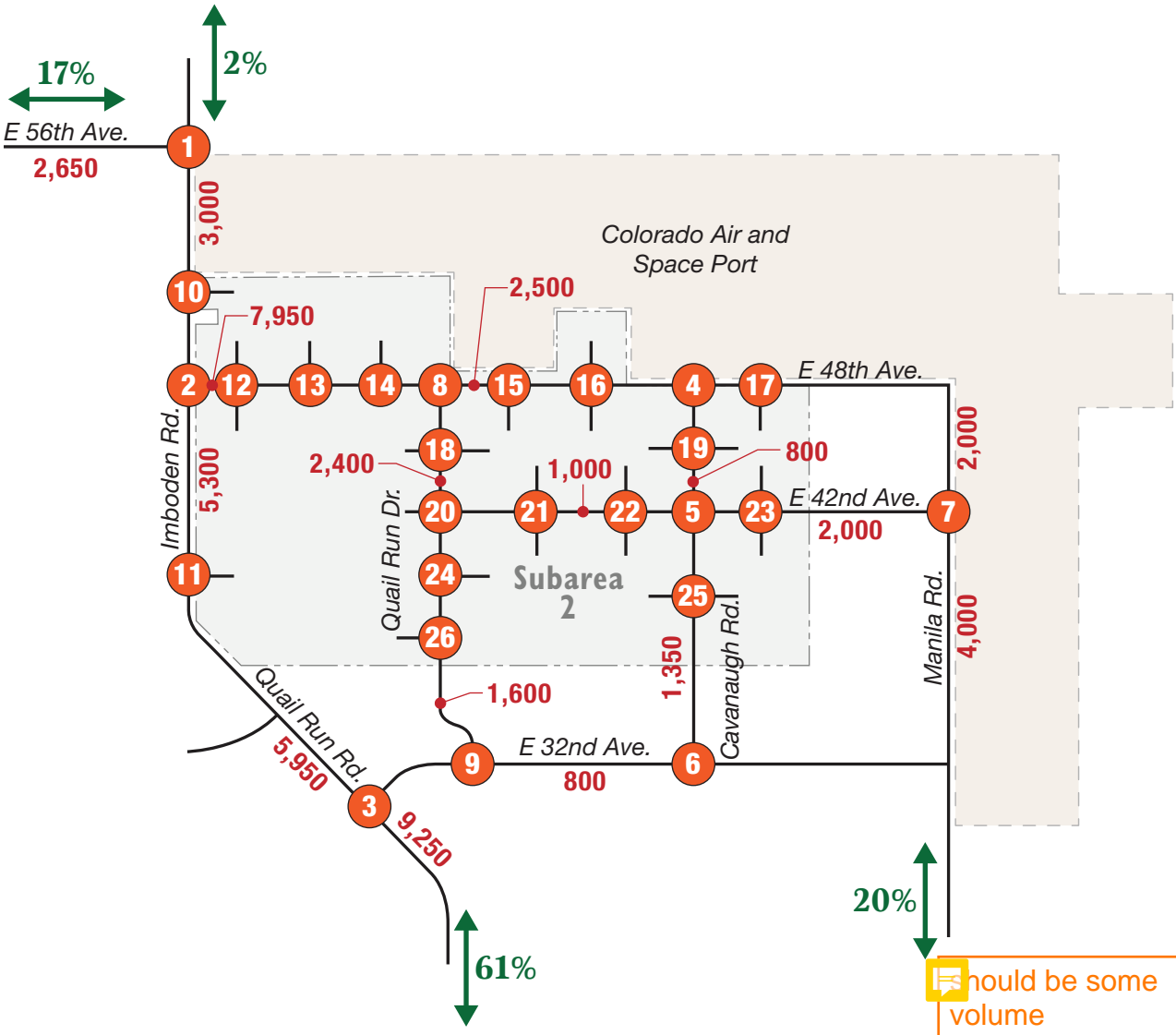
Of note, the current proposal for Subarea 2 represents a significant decrease in projected traffic when compared to the *TransPort Colorado Traffic Impact Study Analysis*, July 2022. Previous estimates of daily traffic were 18,242 trips. The current proposal represents a 17 percent daily reduction in traffic for the parcels within Subarea 2. This is largely a result of a shift to a land use mix that is 75 percent Data Center and 25 percent Warehousing as compared to the previous assumption of a 50/50 split. This change has been made at the request of the Port Colorado as market data suggests that there is a higher demand for Data Center than previously assumed.

III.B. Trip Distribution and Traffic Assignment

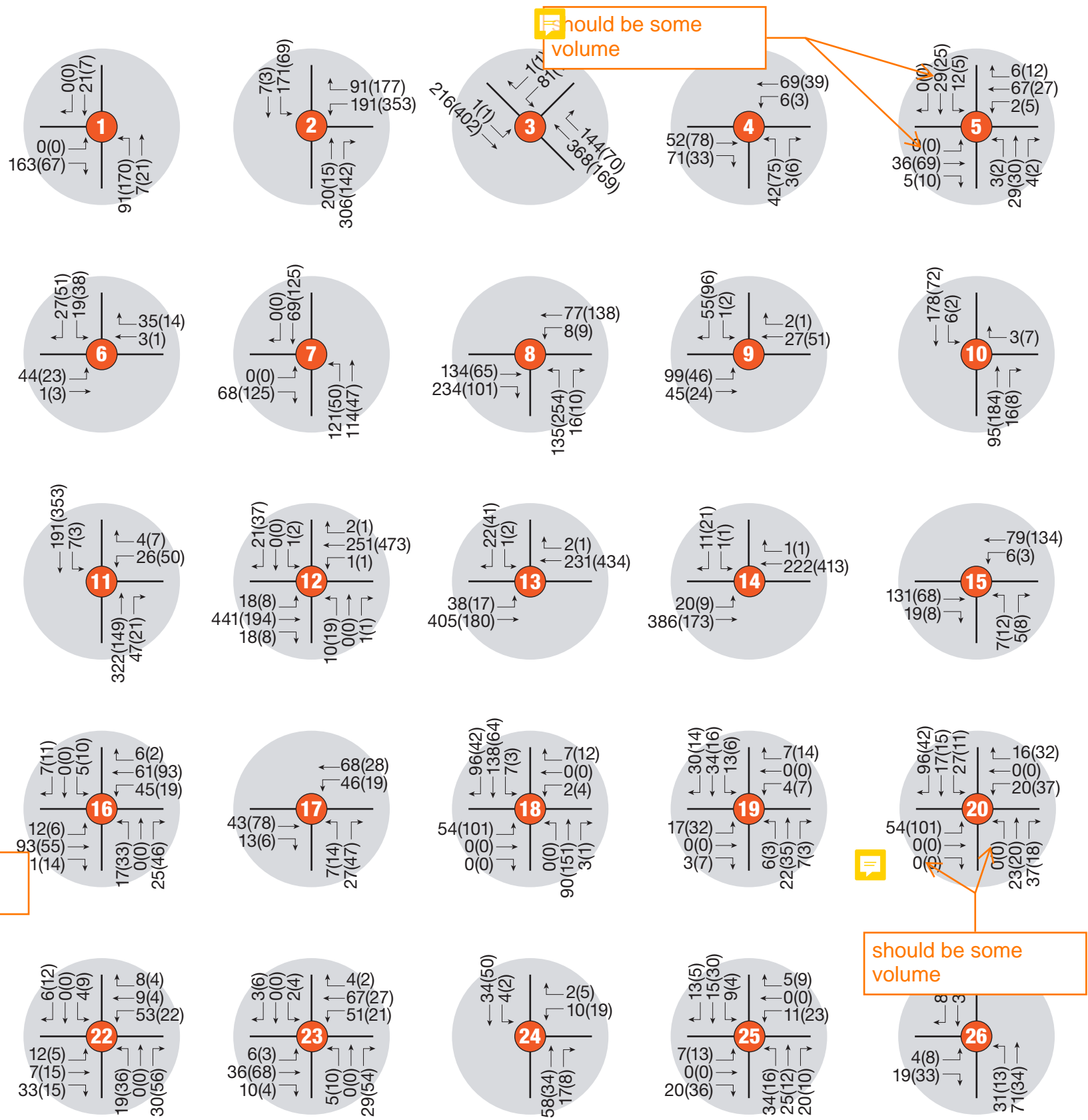
Trip distribution estimates for this site were based on those used in the master traffic study. The greatest component of site traffic will be toward Imboden Road/Quail Run Road, which will afford regional connectivity via the new interchange with I-70.

Figure 4 shows the site-trip distribution percentages for the Short- and Long-Term scenarios and the volumes resulting from applying those percentages to the site generated traffic. Imboden Road/Quail Run Road is the primary access route to/from Subarea 2, and it sees the highest levels of site traffic at about 9,250 daily trips south of 32nd Avenue. Other notable roadways that carry large volumes of site traffic include 48th Avenue immediately east of Imboden Road/Quail Run Road at 7,950 daily trips and 32nd Avenue at 800 daily trips immediately east of Imboden Road/Quail Run Road.

KEY MAP



- LEGEND**
- xxx(xxx) = AM(PM) Peak Hour Traffic Volumes
 - XXXX = Daily Traffic Volumes
 - xx% = Site Trip Distribution
 - X = Intersection Numbers



NOTE: Drawing Not to Scale

IV. BACKGROUND CONDITIONS

IV.A. Roadway Network Plan

The City of Aurora updated the *Northeast Area Transportation Study Refresh (NEATS Refresh)* in October 2018. This publication summarizes the buildout transportation recommendations for the *NEATS Refresh* planning area for the roadway, transit, and trail systems. The boundary for this study effort was approximately between Picadilly Road on the west, Schumaker Road on the east, Jewell Avenue and I-70 on the south, and 72nd Avenue on the north.

Besides an assessment of roadway improvement needs, future transit hubs were identified at two locations and a trail element was identified within the Port Colorado Subarea 2 study area. Relative to the Subarea 2 area, the following improvements were identified and are defined in *NEATS Refresh*:

Freeway Access

- New interchange constructed at the Imboden Road/Quail Run Road alignment along I-70

Minor Arterials

- US 36 – 2 Lanes
- Quail Run Drive – 2 lanes

Major Arterials

- Manila Road – 4 Lanes
- 56th Avenue – 4 Lanes
- 48th Avenue – 4 lanes
- Imboden Road/Quail Run Road – 4 lanes
- Imboden Road/Quail Run Road – 4 lanes

Potential UPRR Grade-Separated Crossings

- Manila Road – at US 36
- Imboden Road/Quail Run Road – at US 36

It should be noted that the above improvements are based on 2040 forecasts for the *NEATS Refresh* area; however, some of the identified improvements were made based on future planning considerations and not solely traffic volume based. Additionally, current development plans for Port Colorado were not entirely known when *NEATS Refresh* was prepared nor the neighboring site to Port Colorado Subarea 6, the Rocky Mountain Rail Park. **Appendix D** includes an illustration of these suggested improvements from *NEATS Refresh*.

IV.B. Background Traffic Volumes

Background traffic volume projections began with information contained in *NEATS Refresh*. Anticipated regional background traffic was added to the expected volumes generated by the remainder of the Port Colorado developments to arrive at a final background scenario for both Short and Long-Term. As such, the traffic volumes represented on **Figure 5** (2040) and **Figure 6** (Long-Term) contain projected Background traffic volumes.

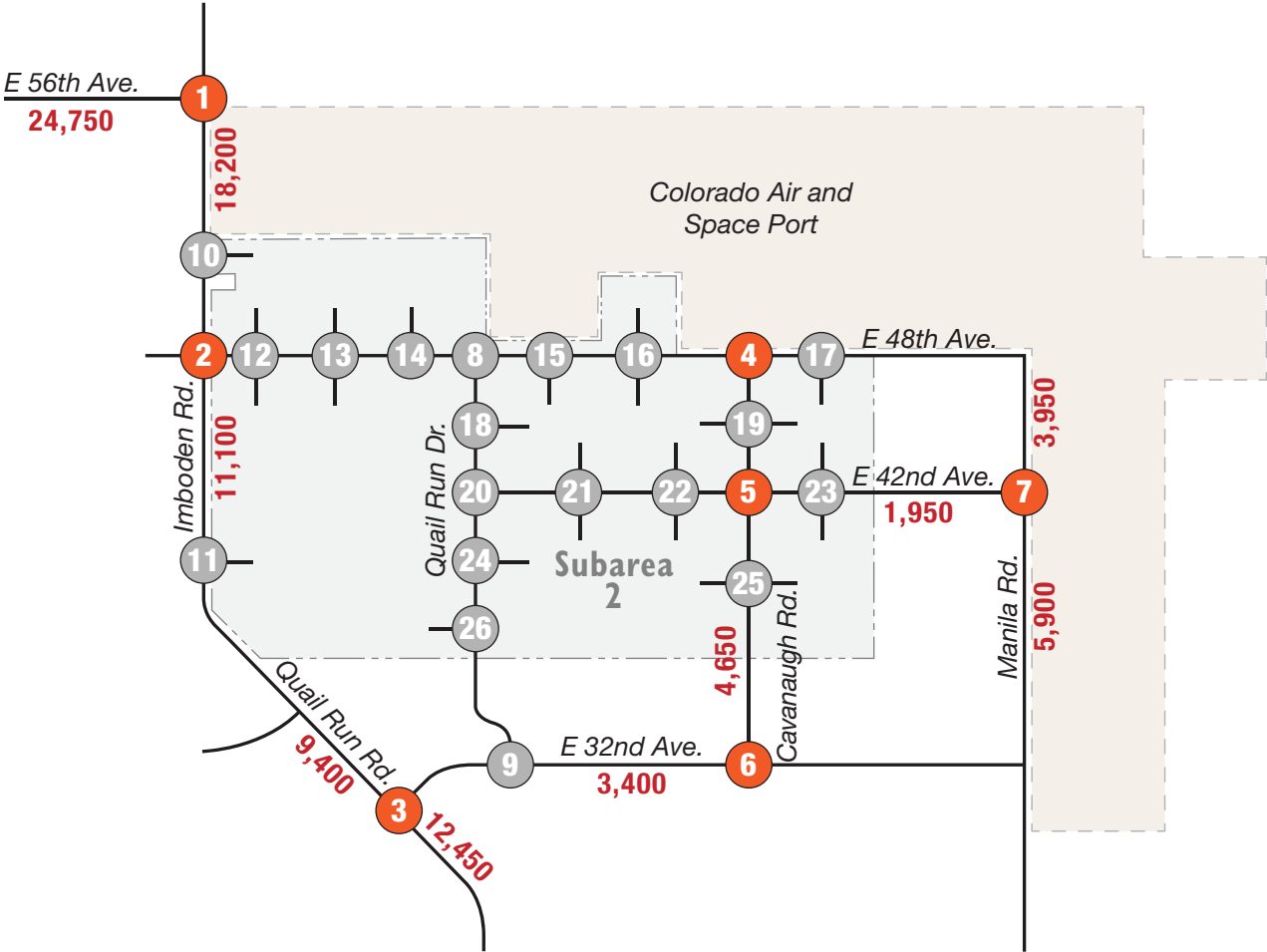
The *NEATS Refresh* travel demand model is considered a more accurate model for this area of Aurora since it has been modified with additional land use information given current and planned development proposals. The Denver Regional Council of Governments (DRCOG) model is not considered as accurate for these reasons.

The *NEATS Refresh* traffic volumes have also been supplemented with projections contained within both the *TransPort Colorado Traffic Impact Study Analysis*, July 2022, prepared by Felsburg Holt & Ullevig, and the *Rocky Mountain Rail Park TIS*, July 2018, prepared by Kimley-Horn and Associates.

IV.C. Pedestrian Trail Connection

North of the Subarea 2 development and to the west of the Colorado Air and Space Port, a future pedestrian trail is planned adjacent to Bear Gulch. All roadways will be built to *NEATS Refresh* standards, which include bike and pedestrian amenities in the standard cross-sections.

KEY MAP



LEGEND

xxx(xxx) = AM(PM) Peak Hour Traffic Volumes

XXXX = Daily Traffic Volumes

X/X = AM/PM Peak Hour Signalized Intersection Level of Service

x/x = AM/PM Peak Hour Unsignalized Intersection Level of Service

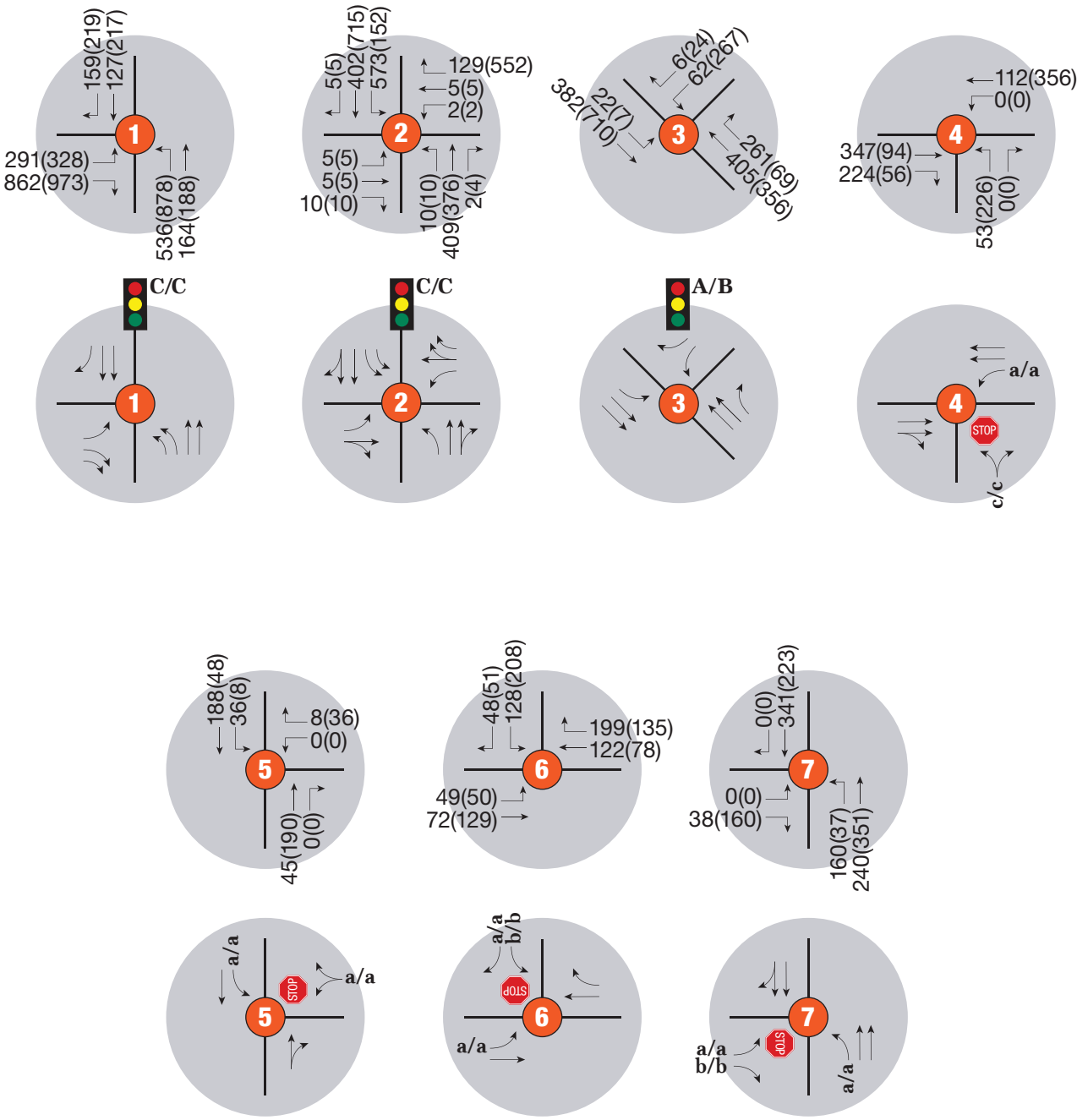
STOP = Stop Sign

Traffic Signal = Traffic Signal

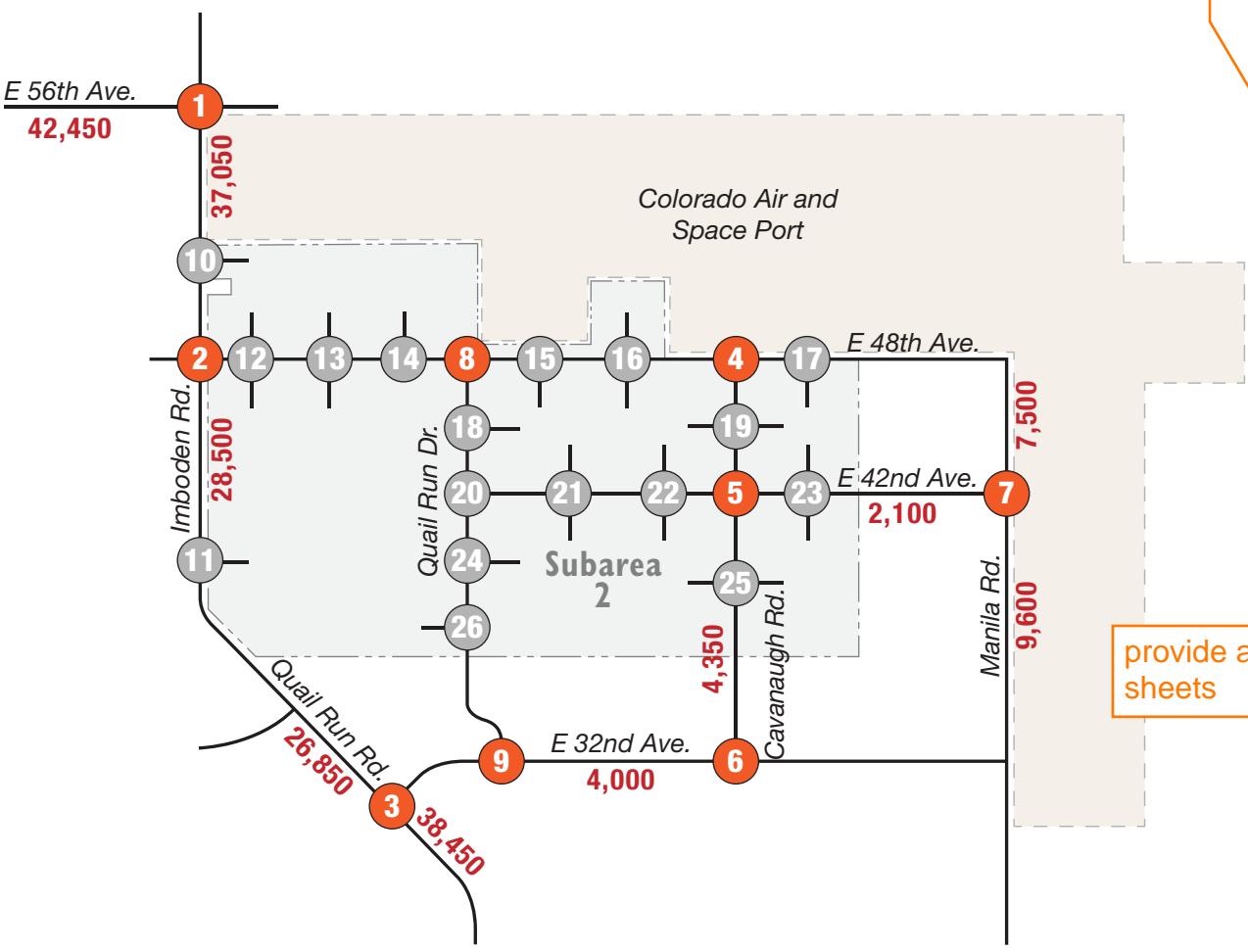
X = Intersection Numbers

X = Future Intersection

NOTE: Drawing Not to Scale



KEY MAP



LEGEND

xxx(xxx) = AM(PM) Peak Hour Traffic Volumes

XXXX = Daily Traffic Volumes

X/X = AM/PM Peak Hour Signalized Intersection Level of Service

x/x = AM/PM Peak Hour Unsignalized Intersection Level of Service

= Stop Sign

= Traffic Signal

= Intersection Numbers

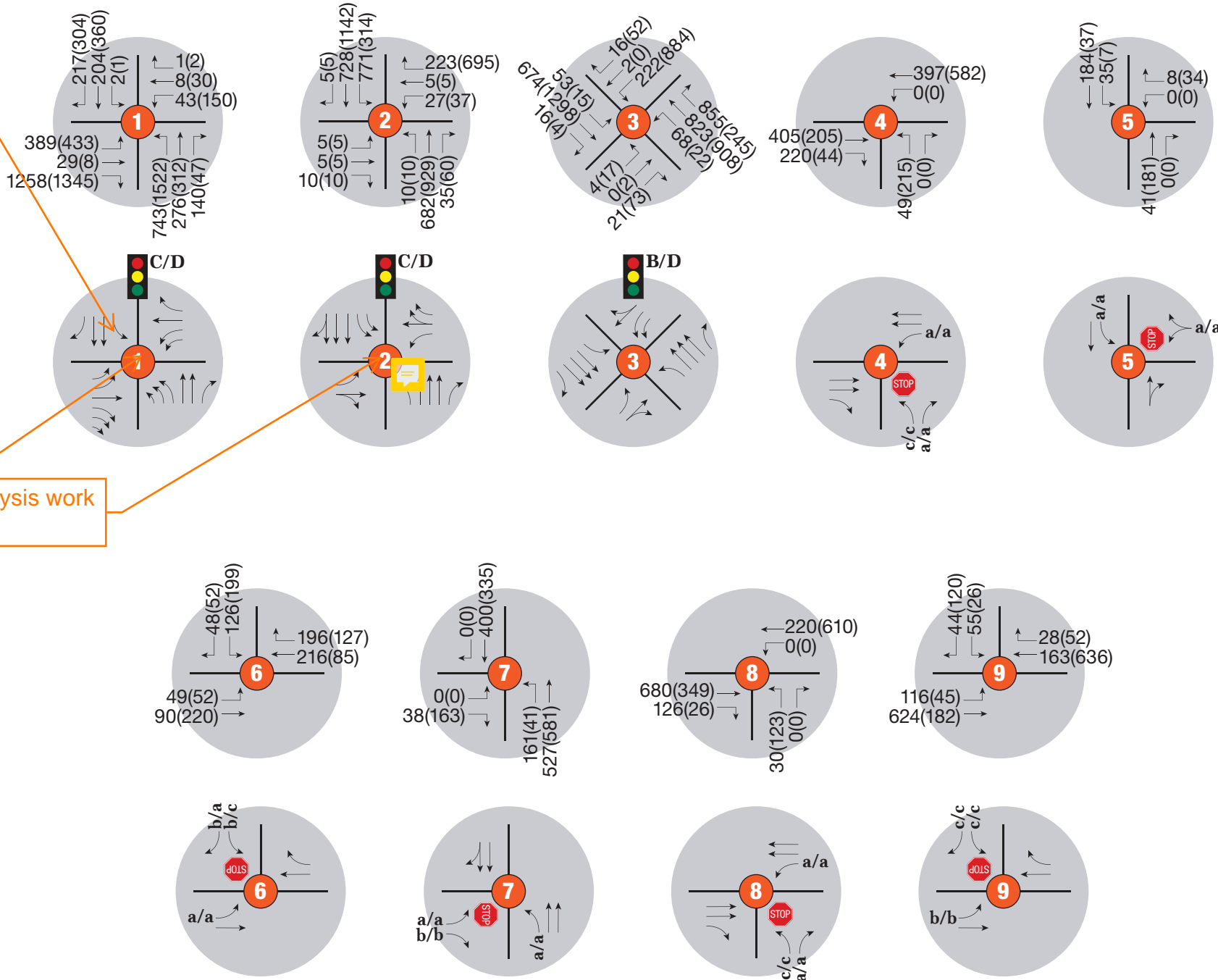
= Future Intersection

NOTE: Drawing Not to Scale

add CFI



provide analysis work sheets



IV.D. Background Traffic Operations

An evaluation of intersection operations was conducted for the AM and PM peak hours using the methodologies of the *Highway Capacity Manual* for unsignalized intersections and Synchro for signalized intersections. The results of these analyses find that certain improvements will be necessary to provide acceptable vehicle operations during the AM and PM peak hours. LOS D or better can be achieved with the traffic control recommendations of **Figure 5** for Short-Term operations in the year 2040 when Subarea 2 is assumed to be fully constructed and **Figure 6** for Long-Term conditions. **Table 3** and **Table 4** outline the LOS and delay by movement for each study intersection, as well as the overall LOS for signalized intersections for the Short-Term and Long-Term Background conditions.

Table 3. Short-Term Background LOS and Delay Summary

Intersection #	Intersection	Results are not consistent with worksheets, HCM results	M LOS (Delay [sec])
1 – Signalized	56th Avenue & Imboden Road/Quail Run Road	EBL	e (56.7)
		EBR	a (7)
		NBL	d (40.7)
		NBT	a (9.3)
		SBT	d (45.9)
		SBR	b (14.4)
2 – Signalized	48th Avenue & Imboden Road/Quail Run Road	Overall	C (27.1)
		WBL	b (17)
		WBR	c (21.4)
		NBTR	c (32)
		SBL	e (60.8)
		SBT	b (19.4)
3 – Signalized	32nd Avenue & Imboden Road/Quail Run Road	Overall	C (26.1)
		WBL	e (64.1)
		WBR	c (27)
		NBT	a (8.8)
		NBR	a (0.1)
		SBL	a (9.3)
4 – TWSC	48th Avenue & Cavanaugh Road	SBT	b (10.6)
		Overall	B (18.3)
5 – TWSC	42nd Avenue & Cavanaugh Road	WBL	A (5.4)
		NBLR	c (15.6)
6 – TWSC	32nd Avenue & Cavanaugh Road	WBL	a (8.8)
		SBL	a (9.9)
7 – TWSC	Manila Road & 42nd Avenue	SBL	a (7.6)
		EBL	a (8.1)
		SBL	b (14.8)
7 – TWSC	Manila Road & 42nd Avenue	SBR	a (9.2)
		EBL	a (0)
		EBR	b (10.4)
7 – TWSC	Manila Road & 42nd Avenue	NBL	a (8.2)
		NBL	a (9.2)

Table 4. Long-Term Background LOS and Delay Summary

Intersection #	Intersection	Movement	AM LOS (Delay [sec])	PM LOS (Delay [sec])
1 – Signalized	56th Avenue & Imboden Road/Quail Run Road	EBL	d (39.2)	d (51.5)
		EBT	c (29.7)	d (38)
		EBR	a (9.1)	b (15.7)
		WBL	e (58.7)	e (75.3)
		WBT	d (44.5)	d (52.6)
		WBR	a (0)	a (0)
		NBL	d (41.8)	e (64.2)
		NBT	a (9)	a (8.3)
		NBR	a (0.7)	a (0.4)
		SBL	d (40)	d (43)
		SBT	d (42.3)	e (71.2)
		SBR	a (3.5)	b (15.5)
		Overall	C (22.3)	D (41.5)
I – CFI	56th Avenue & Imboden Road/Quail Run Road	EBL	b (17.8)	c (27.9)
		EBT	d (52)	e (60.4)
		EBR	a (1)	a (0.9)
		WBL	b (13.9)	c (23.7)
		WBT	d (51.9)	d (54.8)
		NBL	b (17.4)	b (19.7)
		NBT	b (15.2)	b (11)
		NBR	a (0)	a (0)
		SBL	c (29)	c (25)
		SBT	b (17)	b (11.1)
		SBR	a (0)	a (0)
		Overall	B (17.8)	B (18.5)
2 – Signalized	48th Avenue & Imboden Road/Quail Run Road	WBL	e (63)	b (16.4)
		WBR	a (8.7)	c (32.3)
		NBT	c (30.4)	d (51.6)
		NBR	b (12.9)	b (18.8)
		SBL	d (43.7)	e (64.6)
		SBT	a (6.4)	c (30.2)
		Overall	C (25.6)	D (40.3)
3 – Signalized	32nd Avenue & Imboden Road/Quail Run Road	EBL	d (55)	d (51.4)
		EBTR	a (0.4)	e (57.8)
		WBL	d (44.6)	e (66.7)
		WBTR	b (10.8)	a (0.2)
		NBL	c (21.8)	d (43.8)
		NBT	b (17.1)	c (30.2)
		NBR	a (4.9)	a (1.3)
		SBL	b (12.2)	c (21.7)

provide analysis work sheets

Intersection #	Intersection	Movement	AM LOS (Delay [sec])	PM LOS (Delay [sec])
		SBT	b (10.3)	c (30.4)
		SBR	a (0.1)	a (0)
		Overall	B (13.7)	D (37.7)
4 – TWSC	48th Avenue & Cavanaugh Road	WBL	a (0)	a (0)
		NBL	c (17.1)	c (23.8)
		NBR	a (0)	a (0)
5 – TWSC	42nd Avenue & Cavanaugh Road	WBL	a (8.8)	a (9.8)
		SBL	a (7.6)	a (7.9)
6 – TWSC	32nd Avenue & Cavanaugh Road	EBL	a (8.8)	a (8.1)
		SBL	b (14.7)	c (17.4)
		SBR	b (10.2)	a (9.2)
7 – TWSC	Manila Road & 42nd Avenue	EBL	a (0)	a (0)
		EBR	b (10.3)	b (11.2)
		NBL	a (9.5)	a (8.6)
8 – TWSC	48th Avenue & Quail Run Drive	WBL	a (0)	a (0)
		NBL	c (21.2)	c (24)
		NBR	a (0)	a (0)
9 – TWSC	32nd Avenue & Quail Run Drive	EBL	a (8.2)	b (10)
		SBL	d (32.6)	c (22.6)
		SBR	a (9.7)	c (17.9)

The following improvements are assumed as Short-Term Background improvements in support of traffic growth, including buildout of the Rocky Mountain Rail Park and further development within Port Colorado, that would influence traffic at study area intersections:

Short-Term (2040) Improvements

- Build 56th Avenue, 48th Avenue, Manila Road, Imboden Road/Quail Run Road, and Imboden Road/Quail Run Road with a 4-lane cross-section
- Build 32nd Avenue, 42nd Avenue, and Cavanaugh Road with a 3-lane cross-section
- Signalize the 56th Avenue/Imboden Road/Quail Run Road intersection, providing an exclusive left turn lane and dual right turn lanes on the eastbound approach, dual left turn lanes on the northbound approach, and an exclusive right turn lane on the southbound approach
- Signalize the 48th Avenue/Imboden Road/Quail Run Road intersection, providing left and right exclusive lanes on the westbound approach as well as dual southbound left turn lanes.
- Signalize the 32nd Avenue/Imboden Road/Quail Run Road intersection, providing left and right exclusive turn lanes on the south-westbound approach, as well as an exclusive right turn lane and left turn lane on the north-westbound and south-eastbound approaches, respectively
- Implement stop control on Cavanaugh Road at its intersection with 32nd Avenue, providing exclusive left and right turn lanes on the southbound approach
- Implement stop control on Cavanaugh Road at its intersection with 48th Avenue
- Implement stop control on 42nd Avenue at its intersection with Cavanaugh Road, providing an exclusive left turn lane on the westbound approach

- Implement stop control on 42nd Avenue at its intersection with Manila Road, providing left and right turn lanes at the T-intersection, as well as a northbound left turn lane

Signalization of all above intersections is projected to be needed based on review of Warrant 1 Condition A, Minimum Eight-Hour Vehicular Volume; Warrant 1 Condition B, Interruption of Continuous Traffic; Warrant 1 Condition C, Minimum Eight-Hour Vehicular Volume and Interruption of Continuous Traffic; Warrant 2, Four-Hour Vehicular Volume; and Warrant 3, Peak Hour Volume, contained in the *Manual on Uniform Traffic Control Devices* (MUTCD). Estimates have been made for hours 3–8 for the multi-hour warrants based on typical daily distributions and represent an approximation of whether warrants could be met in the future. The warrant graphs are included in **Appendix G**.

The following additional improvements are anticipated for Long-Term conditions in addition to those presented previously.

Long-Term Improvements

- Widen Imboden Road/Quail Run Road and Imboden Road/Quail Run Road to three lanes per direction between the I-70 ramp terminal intersections and 56th Avenue
- Widen Imboden Road/Quail Run Road to a 4-lane cross-section north of 56th Avenue
- Build Quail Run Drive with a three-lane cross-section
- Provide triple rights and an exclusive left turn lane on the eastbound approach, triple lefts and an exclusive right on the northbound approach, dual lefts and an exclusive right on the westbound approach, and one exclusive left and right lane on the southbound approach of the 56th Avenue/Imboden Road/Quail Run Road intersection
- Provide dual lefts on the southbound approach and an exclusive right turn lane on the northbound approach at the intersection of Imboden Road/Quail Run Road with 48th Avenue
- Add a southwest leg to the 32nd Avenue/Imboden Road/Quail Run Road intersection and provide exclusive left and right turn lanes on the northwest and southeast approaches, a single left turn lane on the north-eastbound approach, and dual lefts on the south-westbound approach

Operational analysis worksheets for Subarea 2 background conditions are included in **Appendix E**. Heavy vehicle percentages of 25 percent were used in the AM and PM peak hours for the operational analyses. This is consistent with percentages for sites with similar land use mixes.

The noted improvements for Short-Term and Long-Term have been included in the operational analyses for the respective timeframes.

All future intersection laneage will be determined at the time of parcel platting but are expected to have one inbound and one outbound lane at each access point.

V. TOTAL CONDITIONS

V.A. Roadway Network Plan

Buildout roadway improvements are consistent with the *NEATS Refresh* improvements presented in **Section IV** with the exception of expansion of Quail Run Road/Imboden Road from a four-lane to a six-lane cross-section in support of development traffic. As previously stated, some of these improvements are in the context of complete construction of the *NEATS Refresh* study area, which is an undefined year beyond 2040.

Additional roadway network improvements within Port Colorado Subarea 2 include the following:

- Construction of all site accesses
- Implementation of stop signs on all site accesses approaches

V.B. Buildout Volumes

The Short-Term and Long-Term total traffic has been estimated using the site generated traffic found on **Figure 4**, combined with background traffic for short-term on **Figure 5** and long-term on **Figure 6**. The resulting volumes can be found on **Figure 7** for short-term and **Figure 8** for long-term conditions. Imboden Road/Quail Run Road is anticipated to be the heaviest traveled roadway, with a projected daily volume of 27,450 in 2040 and 45,150 in the Long-Term just south of 32nd Avenue. The heaviest traveled roadway within Subarea 2 is anticipated to be 48th Avenue, with a projected volume of 13,150 in the Short-Term and 15,300 in the Long-Term just east of Imboden Road/Quail Run Road.

V.C. Buildout Traffic Operations

An evaluation of buildout volumes was conducted for the volumes presented on **Figure 7** for short-term and on **Figure 8** for long-term. The results of these operational analyses are presented on **Figure 9** for short-term and on **Figure 10** for long-term.

Most site access locations are anticipated to operate acceptably at LOS D or better as side-street stop-controlled intersections with one lane approaches from the driveway and a three-lane cross-section for the roadway network internal to the site with this

Intersection 9

- Southbound left turn anticipated to operate at LOS F during

Intersection 10

- Westbound movement with $\frac{3}{4}$ access anticipated to operate at LOS F during the PM peak hour

Intersection 13

- Northbound movement anticipated to operate at LOS F in the AM and PM peak hours

Intersection 14

- Northbound movement anticipated to operate at LOS F in the AM and PM peak hours

It is not uncommon for side street movements to experience excessive delay during peak hours, and these intersections are not anticipated to meet signal warrants; therefore, no improvements are recommended.

It should be noted that the current site plan assumes two accesses per parcel and may be a conservative estimate. However, given current plans the northbound approach at intersection 11 and the eastbound approach as well as the removal of the NB leg at intersection 13 should consider implementation of an exclusive right turn lane into the site due to vehicular demand.

All signalized intersections in the study area are anticipated to operate acceptably at LOS D or better during peak hours given the improvements shown on **Figure 9** and **Figure 10**. Operational analysis worksheets for Subarea 2 total conditions are included in **Appendix F. Table 5** and **Table 6** outline the LOS and delay by movement for each study intersection, as well as the overall LOS for signalized intersections for the short-term and long-term buildout conditions.

V.D. Port Colorado Master Network Differences

The Port Colorado Master Study, *TransPort Colorado Traffic Impact Study Analysis*, July 2022, outlines the following roadway network geometry by 2040 for the Subarea 2 roadways:

3-Lane Arterial

- 56th Avenue
- 48th Avenue
- 32nd Avenue
- Quail Run Drive
- Cavanaugh Road
- 42nd Avenue

4-Lane Minor Arterial

- Imboden Road/Quail Run Road
- Manila Road

The following recommendations have emerged from this study:

3-Lane Arterial

- 32nd Avenue
- Quail Run Drive
- Cavanaugh Road
- 42nd Avenue

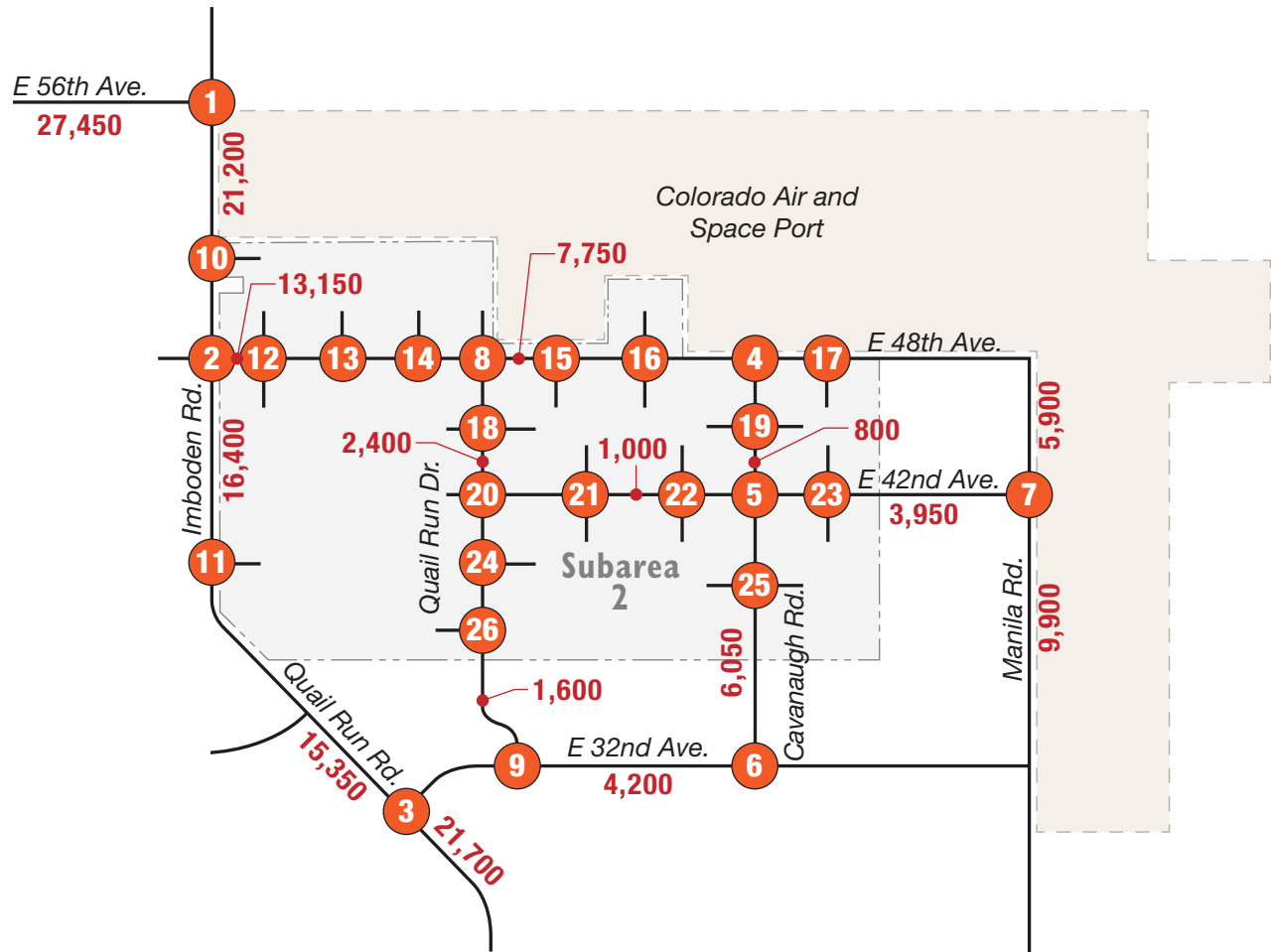
4-Lane Minor Arterial

- 56th Avenue
- Imboden Road/Quail Run Road
- 48th Avenue
- Manila Road

As can be seen from the above, 56th Avenue and 48th Avenue will need to be increased from a 3-lane roadway to a 4-lane roadway in light of new anticipated surrounding development. All other roadways are anticipated to operate acceptably given the cross-sections provided in the master study. The expanded roadway cross-sections reported in this study do however remain consistent with the ultimate buildout reported in *TransPort Colorado Traffic Impact Study Analysis*, July 2022. The reason for the increases by 2040 is the result of a faster anticipated development of Subarea 2 as compared to that previous analysis.

See volume comments on Figure 4

KEY MAP

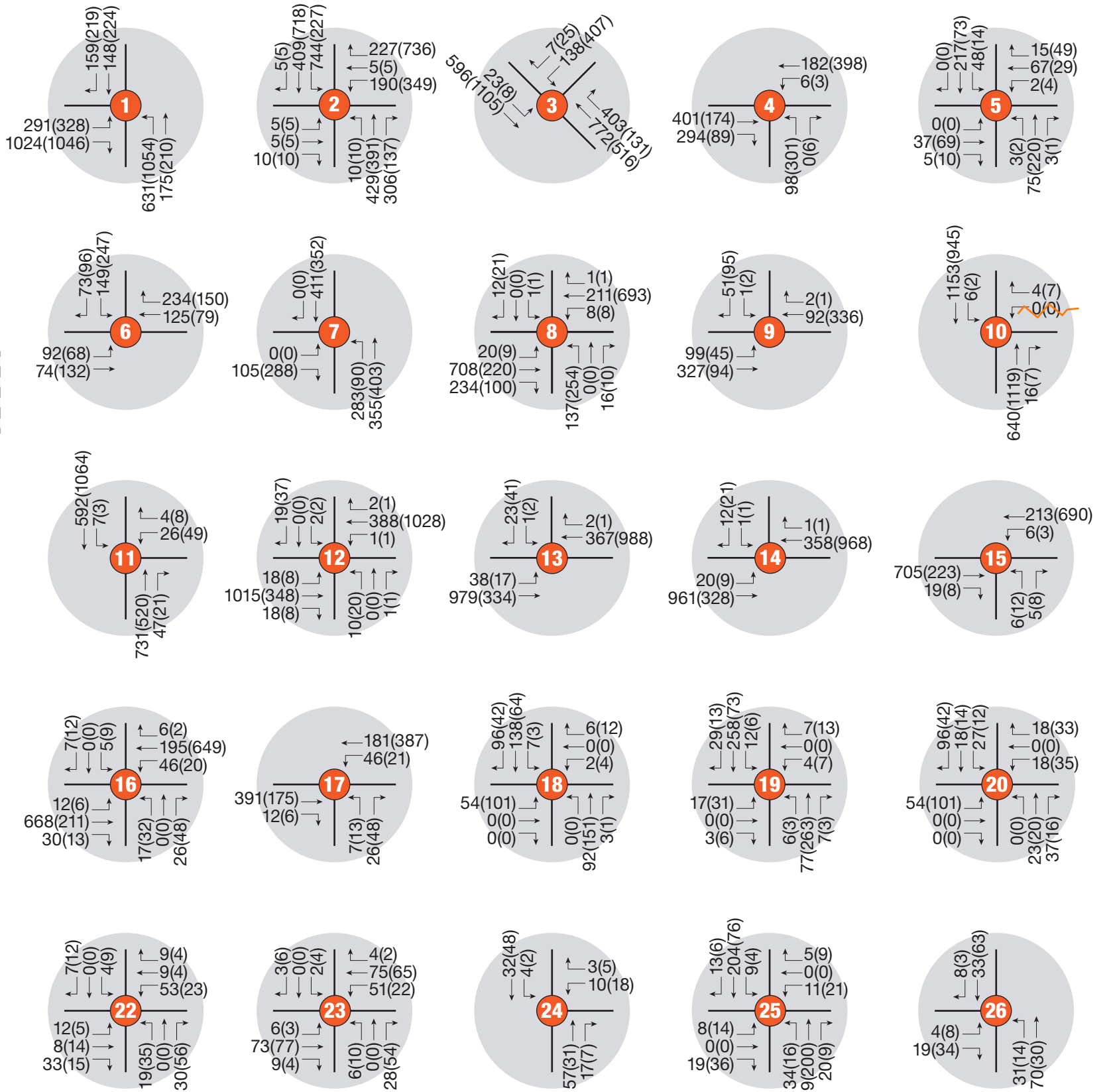


LEGEND

xxx(xxx) = AM(PM) Peak Hour Traffic Volumes

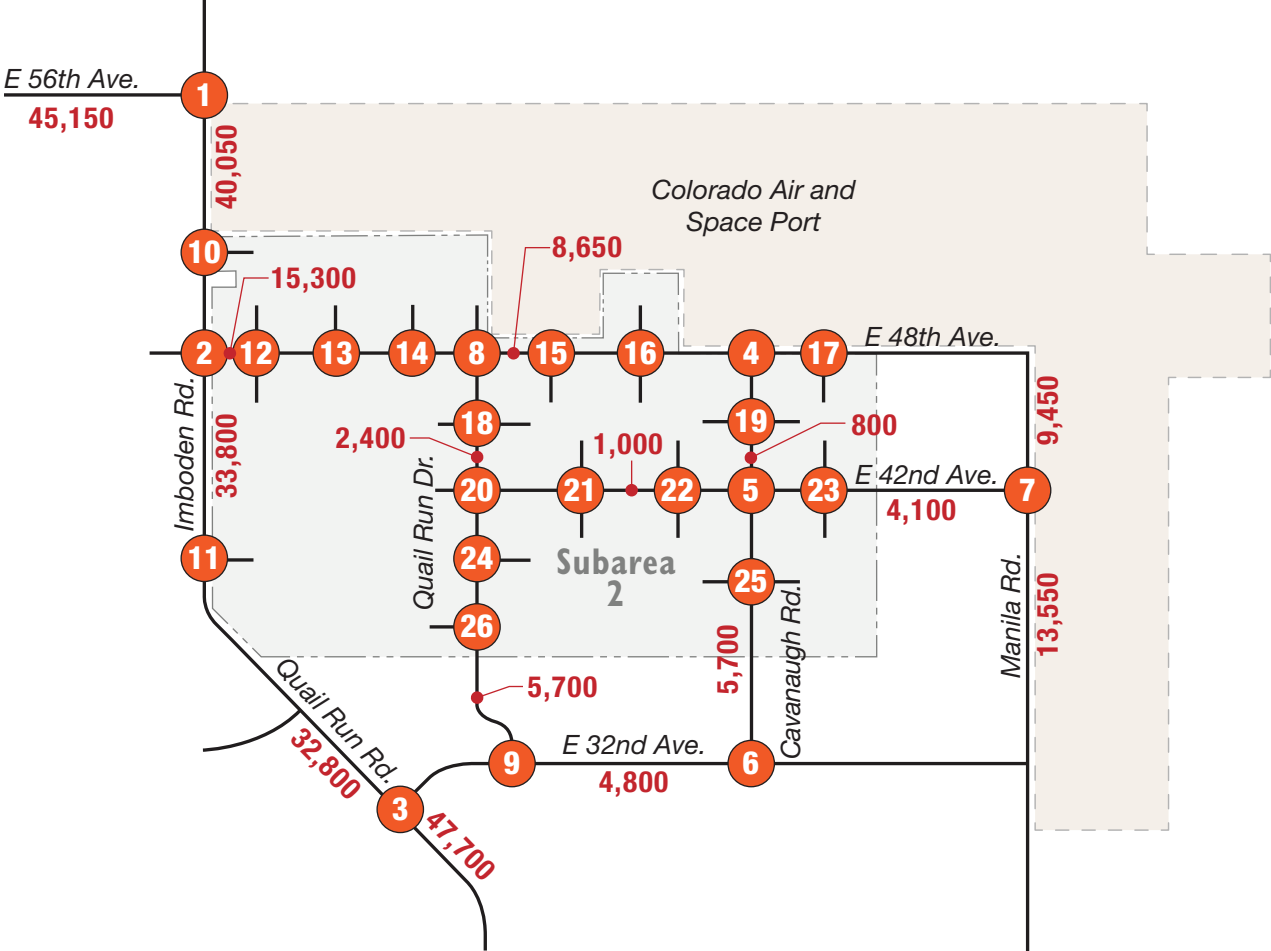
XXXX = Daily Traffic Volumes

X = Intersection Numbers



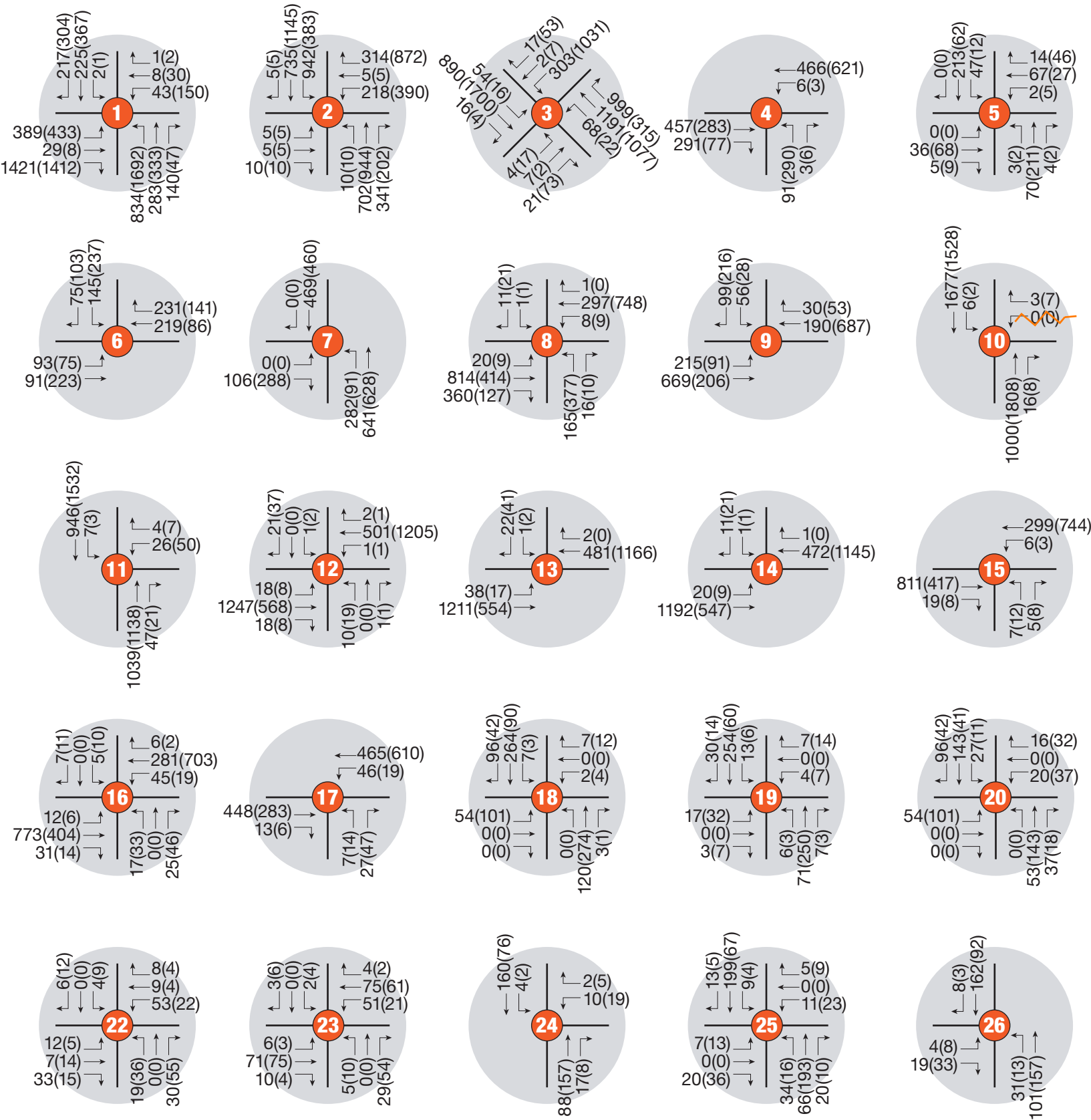
See volume comments on Figure 4

KEY MAP

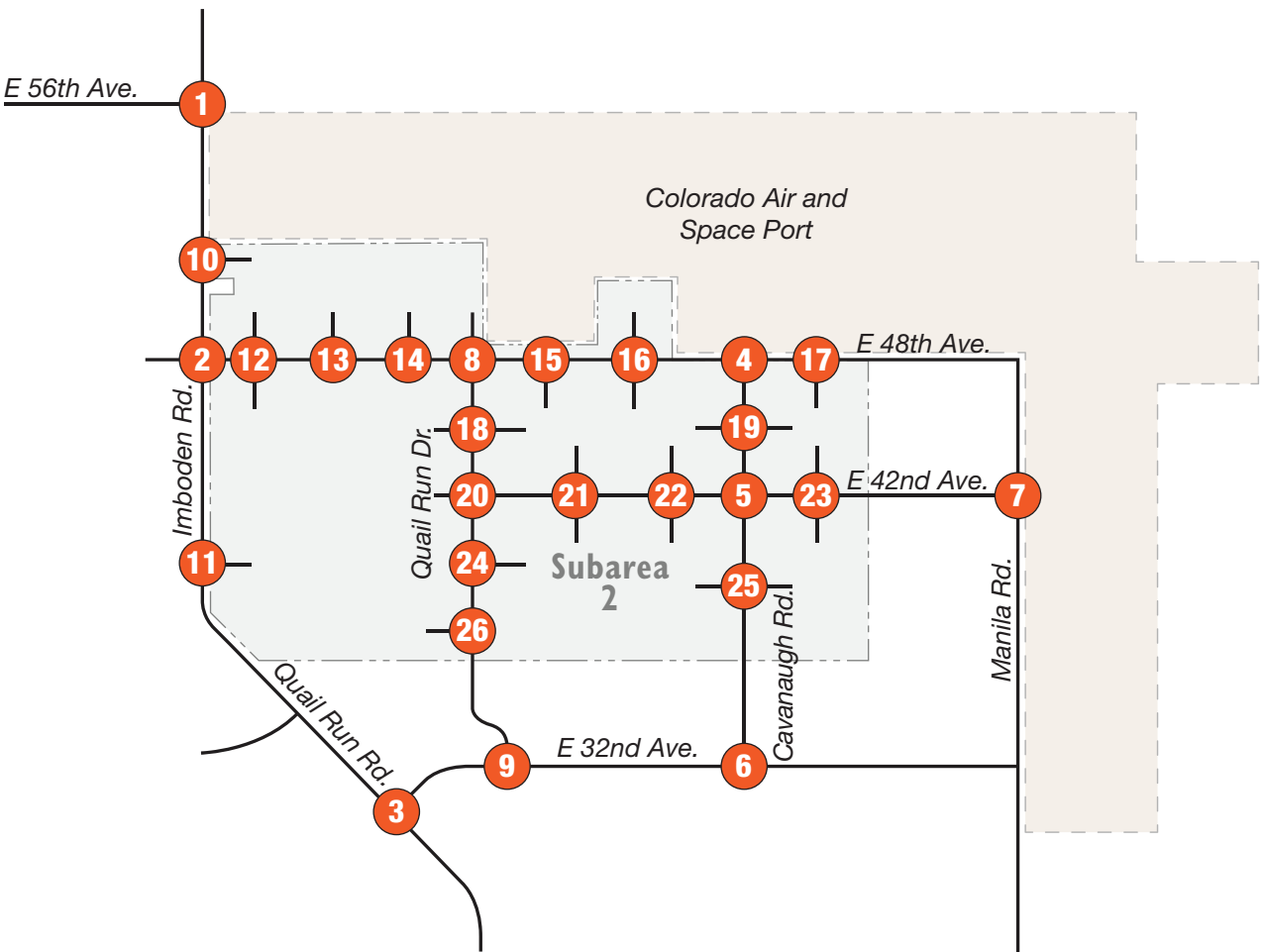


LEGEND

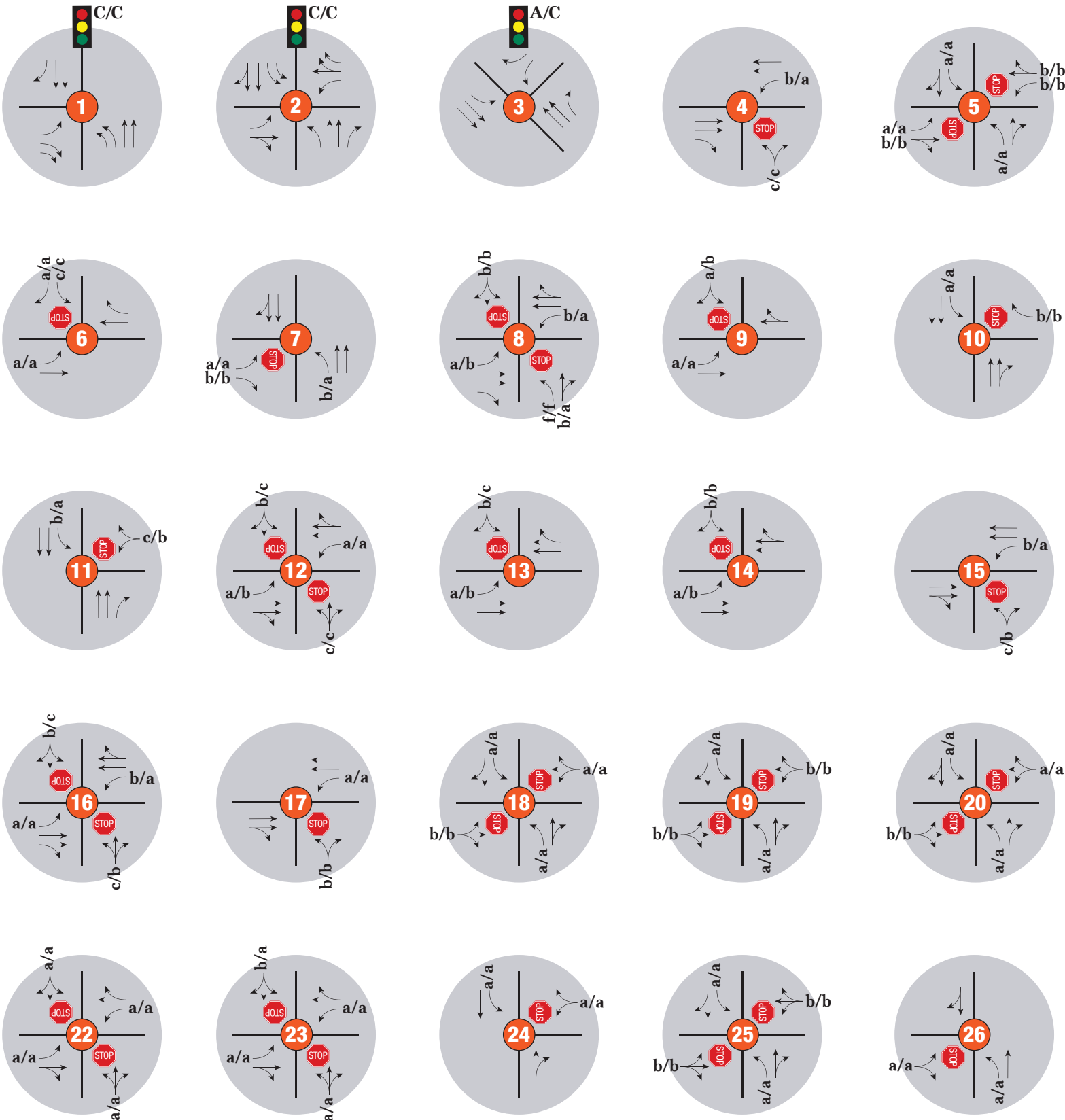
- xxx(xxx) = AM(PM) Peak Hour Traffic Volumes
XXXX = Daily Traffic Volumes
X = Intersection Numbers



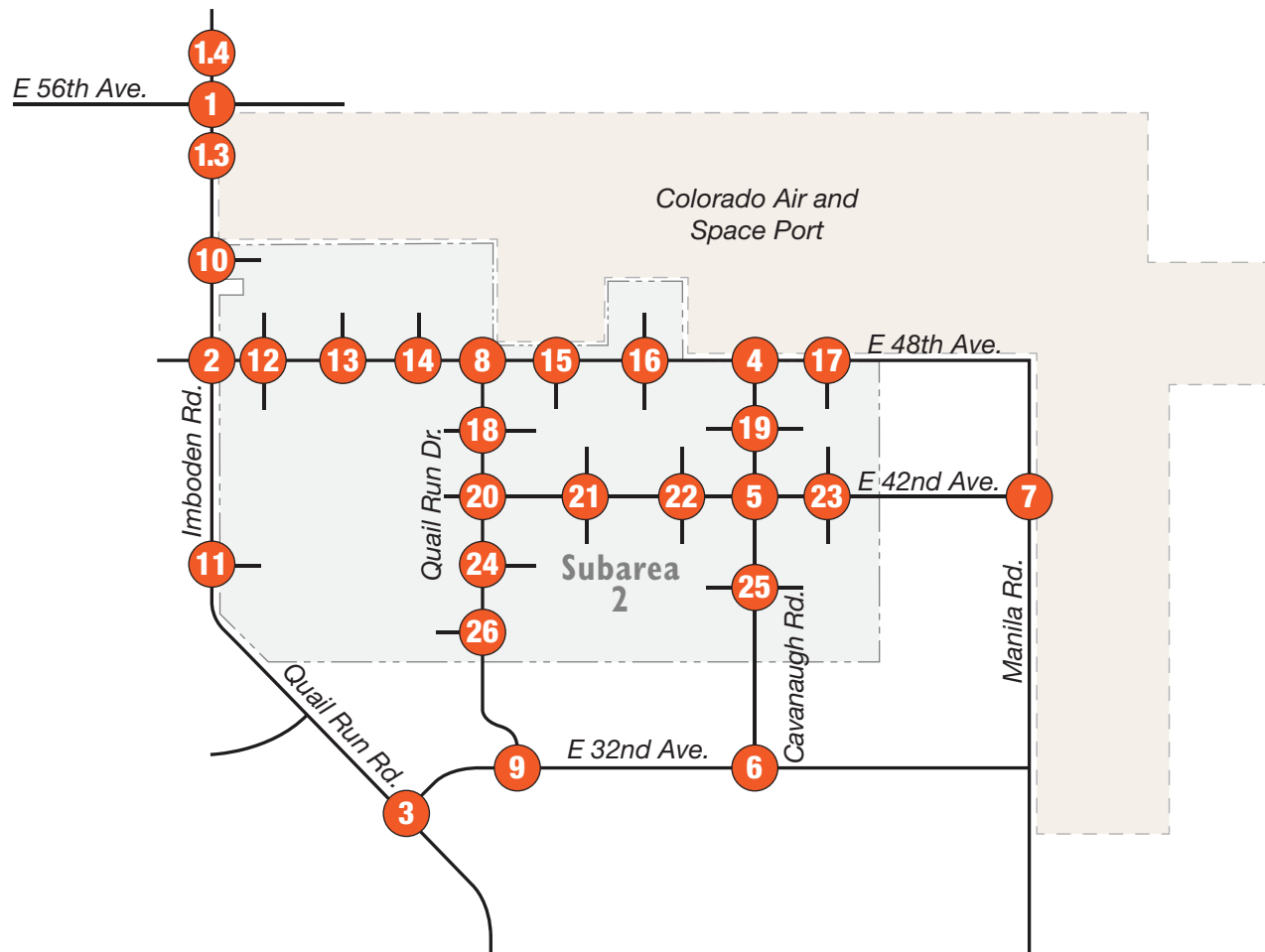
KEY MAP



- LEGEND**
- X/X = AM/PM Peak Hour Signalized Intersection Level of Service
 - x/x = AM/PM Peak Hour Unsignalized Intersection Level of Service
 - STOP = Stop Sign
 - Traffic Signal
 - X = Intersection Numbers



KEY MAP

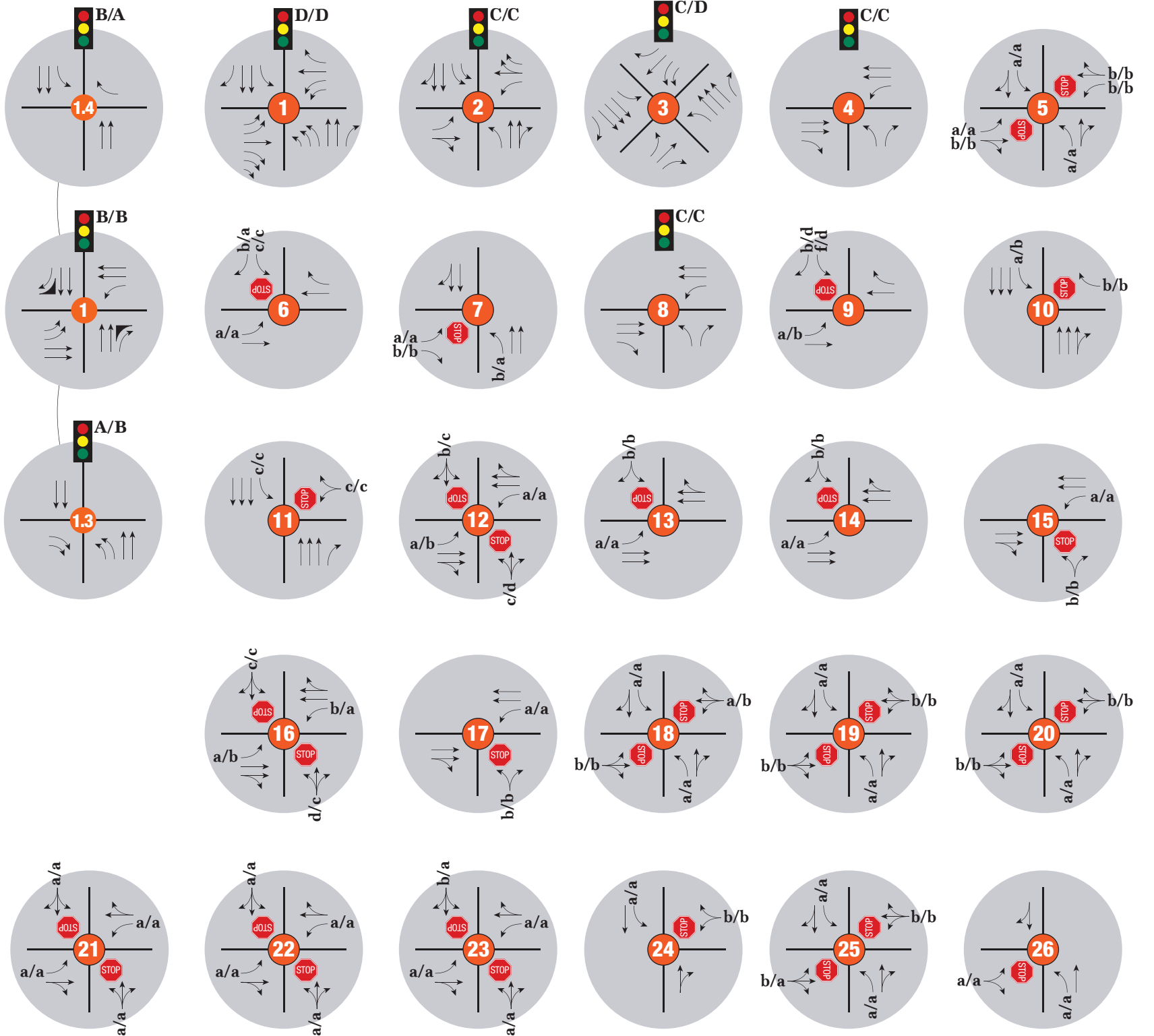


LEGEND

- X/X = AM/PM Peak Hour Signalized Intersection Level of Service
- x/x = AM/PM Peak Hour Unsignalized Intersection Level of Service
- STOP = Stop Sign
- Traffic Signal Icon = Traffic Signal
- X = Intersection Numbers

NOTE: Drawing Not to Scale

CFI (Continuous Flow Intersection)



results are not consistent with worksheets,
HCM results

Table 5. Short-Term Total

Short Term Total LOS Summary				
Intersection #	Intersection	Movement	AM LOS (Delay [sec])	PM LOS (Delay [sec])
1 - Signalized	56th Avenue & Imboden Road	EBL	d (50.1)	e (74.5)
		EBR	a (7.5)	b (7.5)
		NBL	d (38)	d (47.5)
		NBT	a (5.3)	a (9.6)
		SBT	d (39.6)	d (49.8)
		SBR	a (7.5)	b (19.3)
		Overall	C (22.3)	C (32.4)
2 - Signalized	48th Avenue & Imboden Road	EBL	d (54.6)	d (54.4)
		EBTR	d (37.1)	d (36.8)
		WBL	f (114.9)	f (81.2)
		WBTR	b (11.8)	c (21.5)
		NBL	c (33.3)	c (26.9)
		NBT	c (33.8)	c (25.8)
		NBR	a (4.3)	a (1.8)
		SBL	d (46.5)	e (56)
		SBT	a (8.2)	b (18.1)
		Overall	C (33.7)	C (29.4)
3 - Signalized	32nd Avenue & Quail Run Road	WBL	e (64)	d (46.4)
		WBR	c (21.1)	a (6.8)
		NBT	a (6.1)	b (15)
		NBR	a (0.7)	a (0.5)
		SBL	a (5.4)	b (10.2)
		SBT	a (5.5)	b (21.9)
		Overall	A (9)	C (23.3)
4 - TWSC	48th Avenue & Cavanaugh Road	WBL	a (10.1)	a (8.2)
		NBLR	c (16.8)	c (23.9)
5 - TWSC	42nd Avenue & Cavanaugh Road	EBL	a (0)	a (0)
		EBTR	b (13.2)	b (12.6)
		WBL	b (13.4)	b (13)
		WBTR	b (13.5)	b (11.4)
		NBL	a (8)	a (7.6)
		SBL	a (7.7)	a (8)
6 - TWSC	32nd Avenue & Cavanaugh Road	EBL	a (8.8)	a (8.2)
		SBL	c (15.6)	c (17.8)
		SBR	a (9.6)	a (9.5)
7 - TWSC	Manila Road & 42nd Avenue	EBL	a (0)	a (0)
		EBR	b (11)	b (13.2)
		NBL	b (10.5)	a (8.9)
8 - TWSC	48th Avenue & Quail Run Drive	WBL	b (11.6)	a (8.4)
		NBLR	f (90.2)	f (89.8)

previous comment not addressed

WBR

results are not consistent with worksheets, HCM results

Short Term Total				
Intersection #	Intersection	Movement	AM LOS (Delay [sec])	PM LOS (Delay [sec])
9 - TWSC	32nd Avenue & Quail Run Drive	EBL	a (7.9)	a (8.5)
		SBLR	a (9.4)	b (11.9)
10 - TWSC	PA-2 Access & Imboden	WBLR	a (9.5)	b (12.9)
		SBL	a (9.3)	b (12.6)
11 - TWSC	PA-5 Access & Imboden	WBLR	d (29.6)	e (34.5)
		SBL	b (10.6)	a (9.3)
12 - TWSC	PA-2 Access & 48th Avenue	EBL	a (8.7)	b (12.3)
		WBL	b (12.2)	a (8.5)
		NBLTR	f (54.1)	c (32.4)
		SBLTR	b (11.8)	c (16.4)
13 - TWSC	PA-3 Western Access & 48th Avenue	EBL	a (8.7)	b (12.1)
		WBL	a (0)	a (0)
		SBLTR	b (10.6)	c (15.5)
14 - TWSC	PA-3 Eastern Access & 48th Avenue	EBL	b (11.8)	b (11.8)
		WBL	a (0)	a (0)
		SBLTR	b (14.5)	b (14.5)
15 - TWSC	PA-8A Access & 48th Avenue	WBL	b (10.2)	a (8.1)
		NBLR	c (17.2)	b (13)
16 - TWSC	PA-4 Access & 48th Avenue	EBL	a (8)	a (9.8)
		WBL	b (10.4)	a (8.1)
		NBLTR	c (20.1)	b (14.2)
		SBLTR	b (13.6)	c (18.6)
17 - TWSC	PA-8B Access & 48th Avenue	WBL	a (8.9)	a (8)
		NBLR	b (11.6)	b (10.4)
18 - TWSC	PA-8A Access & Quail Run Drive	EBLTR	b (11.9)	b (12)
		WBLTR	a (9.4)	a (9.7)
		NBL	a (0)	a (0)
		SBL	a (7.7)	a (7.8)
19 - TWSC	PA-8B Access & Cavanaugh Road	EBLTR	b (12.4)	b (12.1)
		WBLTR	b (10.1)	b (11)
		NBL	a (8.2)	a (7.6)
		SBL	a (7.7)	a (8.1)
20 - TWSC	42nd Avenue & Quail Run Drive	EBLTR	b (10.5)	a (10.5)
		WBLTR	a (9.4)	a (9.3)
		NBL	a (0)	a (0)
		SBL	a (7.6)	a (7.5)
21 - TWSC	PA-9 Western Access & 42nd Avenue	EBL	a (7.5)	a (7.5)
		WBL	a (7.6)	a (7.5)
		NBLTR	a (9.1)	a (9.1)
		SBLTR	a (8.7)	a (8.8)
22 - TWSC		EBL	a (7.5)	a (7.5)



Previous comment not addressed

results are not consistent with worksheets, HCM results

Short Term Total LOS Summary				
Intersection #	Intersection	Movement	AM LOS (Delay [sec])	PM LOS (Delay [sec])
	PA-9 Eastern Access & 42nd Avenue	WBL	a (7.6)	a (7.5)
		NBLTR	a (9.5)	a (9.4)
		SBLTR	a (9.3)	a (9.3)
23 - TWSC	PA-8C Access & 42nd Avenue	EBL	a (7.6)	a (7.6)
		WBL	a (7.7)	a (7.7)
		NBLTR	a (9.5)	a (9.5)
		SBLTR	b (10)	a (9.8)
24 - TWSC	PA-9 Access & Quail Run Drive	WBLR	a (9.3)	a (9.2)
		SBL	a (7.6)	a (7.5)
25 - TWSC	PA-9 Access & Cavanaugh Road	EBLTR	b (10.7)	b (10.0)
		WBLTR	b (11.7)	b (11.8)
		NBL	a (8.1)	a (7.7)
		SBL	a (7.7)	a (8)
26 - TWSC	PA-7 Access & Quail Run Drive	EBLR	a (9)	a (9.2)
		NBL	a (7.6)	a (7.6)



previous comment
not addressed



previous comment not addressed

results are not consistent with worksheets,
HCM results

Table 6. Total LOS and Delay Summary

Long Term Total LOS Summary				
Intersection #	Intersection	Movement	AM LOS (Delay [sec])	PM LOS (Delay [sec])
1 - Signalized	56th Avenue & Imboden Road	EBL	d (36.8)	e (79.2)
		EBT	c (28.9)	d (48.4)
		EBR	b (12.3)	b (15.5)
		WBL	e (60.7)	f (86.5)
		WBT	d (44.8)	e (62.5)
		WBR	a (0)	a (0)
		NBL	d (45.3)	f (89.9)
		NBT	b (18.1)	b (13.6)
		NBR	a (2.2)	a (1.2)
		SBL	d (43.5)	e (55)
		SBT	d (51.3)	f (83.3)
		SBR	a (3.9)	d (15.8)
		Overall	C (25.4)	E (55.2)
2 - Signalized	48th Avenue & Imboden Road	EBL	e (55.7)	d (54.2)
		EBTR	e (58.4)	d (36.6)
		WBL	e (57.7)	e (76.3)
		WBTR	a (0)	a (7.4)
		WBR	a (9.9)	c (20.4)
		NBL	d (35.9)	c (39.5)
		NBT	d (47.9)	d (41.4)
		NBR	d (43.1)	a (3.3)
		SBL	d (40.3)	e (52)
		SBT	a (7.8)	b (17)
		SBTR	a (8.1)	b (17)
		Overall	C (33.1)	D (40.4)
3 - Signalized	32nd Avenue & Quail Run Road	EBL	d (49.2)	f (82.6)
		EBT	d (49.4)	e (72)
		EBR	a (0.6)	a (6.7)
		WBL	d (36)	f (84.5)
		WBT	b (15.5)	c (22)
		WBR	a (0.1)	a (1.2)
		NBL	c (34.9)	d (39.6)
		NBT	d (47)	d (43.5)
		NBR	b (19.3)	a (1.1)
		SBL	d (45.4)	d (35.8)
		SBT	d (39.1)	f (92.5)
		SBR	a (0.1)	a (0)
		Overall	D (35.4)	E (68.4)
4 - Signalized	48th Avenue & Cavanaugh Road	EBT	d (48.5)	c (31.8)
		EBR	a (0.5)	a (0.1)
		WBL	c (33.7)	c (24.3)
		WBT	d (49.2)	d (42)
		NBL	a (8.4)	b (15.5)
		NBR	a (5.7)	a (7.7)
		Overall	D (35.2)	C (31)

results are not consistent with worksheets,
HCM results

Long Term Total LOS Summary				
Intersection #	Intersection	Movement	AM LOS (Delay [sec])	PM LOS (Delay [sec])
5 - TWSC	42nd Avenue & Cavanaugh Road	EBL	a (0)	a (0)
		EBTR	b (13)	b (12.3)
		WBL	b (13.2)	b (12.6)
		WBTR	b (13.4)	b (11.2)
		NBL	a (8)	a (7.6)
		SBL	a (7.7)	a (8)
6 - TWSC	32nd Avenue & Cavanaugh Road	EBL	a (9.2)	a (8.2)
		SBL	c (18.8)	c (22.5)
		SBR	b (10.4)	a (9.5)
7 - TWSC	Manila Road & 42nd Avenue	EBL	a (0)	a (0)
		EBR	b (11.4)	b (14.6)
		NBL	b (11)	a (9.4)
8 - Signalized	48th Avenue & Quail Run Drive	EBT	a (9.2)	c (24.9)
		EBR	b (16.7)	d (36.6)
		EBL	a (1)	a (1.7)
		WBL	c (24.2)	c (24.3)
		WBT	c (32.5)	d (52.1)
		NBL	c (20.2)	c (23.1)
		SBT	a (0.1)	a (0.2)
		Overall	C (16.2)	D (37)
9 - TWSC	32nd Avenue & Quail Run Drive	EBL	a (8.7)	b (10.7)
		SBL	f (71.7)	d (31.4)
		SBR	b (10.4)	d (29)
10 - TWSC	PA-2 Access & Imboden	WBLR	a (9)	a (9.4)
		SBL	a (10.2)	c (16.6)
11 - TWSC	PA-5 Access & Imboden	WBL	f (56)	f (222.9)
		SBL	b (12.7)	b (13.3)
12 - TWSC	PA-2 Access & 48th Avenue	EBL	a (9.2)	b (13.8)
		WBL	b (14.2)	a (9.4)
		NBLTR	f (104.4)	f (63.4)
		SBLTR	b (12)	c (20.2)
13 - TWSC	PA-3 Western Access & 48th Avenue	EBL	a (9.1)	b (13.6)
		WBL	a (0)	a (0)
		SBLTR	b (11.7)	c (18.4)
14 - TWSC	PA-3 Eastern Access & 48th Avenue	EBL	a (8.9)	b (11.4)
		WBL	b (13)	a (0)
		SBLTR	b (11.3)	b (10.9)
15 - TWSC	PA-8A Access & 48th Avenue	WBL	b (10.9)	a (8.8)
		NBLR	c (21)	c (16.3)
16 - TWSC	PA-4 Access & 48th Avenue	EBL	a (8.3)	b (10.1)
		WBL	b (11.1)	a (8.8)
		NBLTR	d (25.4)	c (19.5)
		SBLTR	c (15.7)	c (23.7)
17 - TWSC		WBL	a (9.2)	a (8.4)

results are not consistent with worksheets,
HCM results

Intersection #	Intersection	Movement	AM LOS (Delay [sec])	PM LOS (Delay [sec])
	PA-8B Access & 48th Avenue	NBLR	b (12.9)	b (11.7)
18 - TWSC	PA-8A Access & Quail Run Drive	EBLTR	b (14.3)	b (14.7)
		WBLTR	a (9.9)	b (10.8)
		NBL	a (0)	a (0)
		SBL	a (7.7)	a (8.2)
19 - TWSC	PA-8B Access & Cavanaugh Road	EBLTR	b (12.3)	b (11.8)
		WBLTR	b (10)	b (10.8)
		NBL	a (8.2)	a (8.1)
		SBL	a (7.6)	a (7.6)
20 - TWSC	42nd Avenue & Quail Run Drive	EBLTR	b (12.3)	b (12.4)
		WBLTR	b (10.3)	b (10.5)
		NBL	a (0)	a (0)
		SBL	a (7.7)	a (7.9)
21 - TWSC	PA-9 Western Access & 42nd Avenue	EBL	a (7.5)	a (7.5)
		WBL	a (7.6)	a (7.5)
		NBLTR	a (9.2)	a (9.1)
		SBLTR	a (8.7)	a (8.8)
22 - TWSC	PA-9 Eastern Access & 42nd Avenue	EBL	a (7.5)	a (7.5)
		WBL	a (7.6)	a (7.5)
		NBLTR	a (9.5)	a (9.4)
		SBLTR	a (9.3)	a (9.3)
23 - TWSC	PA-8C Access & 42nd Avenue	EBL	a (7.6)	a (7.6)
		WBL	a (7.7)	a (7.7)
		NBLTR	a (9.4)	a (9.5)
		SBLTR	b (10)	a (9.7)
24 - TWSC	PA-9 Access & Quail Run Drive	WBLR	b (10.4)	b (10.3)
		SBL	a (7.7)	a (7.8)
25 - TWSC	PA-9 Access & Cavanaugh Road	EBLTR	b (10.6)	a (9.9)
		WBLTR	b (11.5)	b (11.7)
		NBL	a (8.1)	a (7.6)
		SBL	a (7.6)	a (8)
26 - TWSC	PA-7 Access & Quail Run Drive	EBLR	a (9.9)	a (9.6)
		NBL	a (7.9)	a (7.7)

V.E. Queueing Analysis

Appendix H shows the 95th percentile projected queue length for the AM and PM peak hours for all study scenarios. Output from the traffic analysis effort was used to recommend these storage lengths, using the following methodology:

- **Left turn lane storage lengths.** At signalized intersections, the greater of the HCM 6th Edition or Synchro methodology queue calculations was reported. For unsignalized intersections, the HCM 6th Edition calculation was reported.
- **Through movements.** For signalized intersections, Synchro calculation results were reported. No through movement queues are reported for unsignalized intersections as the through movements are not required to stop.
- **Right turn movements.** The Synchro queue length was used. HCM 6th Edition information was not used because HCM's signalized intersection methodology does not account for right turns on red.

Deceleration lane and taper lengths should be added to these dimensions per City of Aurora standards to identify the total length of each auxiliary lane. Upon the development of site plans, more detailed traffic impact studies should be prepared to confirm/refine the above queue lengths as well as all of the study area intersection operations.

VI. SUMMARY AND RECOMMENDATIONS

Port Colorado, formerly TransPort Colorado, is planning to develop Subarea 2 of their master-planned business and industrial park in the City of Aurora, Colorado. Subarea 2 is an 1,890-acre parcel, bounded north-south by 56th Avenue and 32nd Avenue, and east-west by Manila Road and Imboden Road/Quail Run Road. The project will be developed with light industrial land uses.

The project is located adjacent to the Colorado Air and Space Port (Space Port), formerly known as the Front Range Airport, and it is also within close proximity of Denver International Airport. The development of the Rocky Mountain Rail Park, an industrial rail-served project, is also anticipated to the west of Peterson Road.

Port Colorado will have access to I-70, a major east-west interstate highway system via a planned interchange at Imboden Road/Quail Run Road as well as the existing interchanges at Watkins Road and Manila Road. Watkins Road has been identified for future improvements by Arapahoe County in recent planning studies in support of significant development plans south of I-70 most notably the master planned Prosper development. Improvements at the interchange of Manila Road and I-70 have also been identified as part of the Port Colorado Master TIS but are not anticipated to be necessary with the development of Subarea 2 under the assumption of Quail Run interchange serving that area of development. All interchange work along I-70 will need to follow the CDOT I601 process to gain approval from CDOT and FHWA.

The existing roadway network surrounding Port Colorado Subarea 2 is somewhat limited, and numerous improvements will need to be made to support background traffic in the area even without development of Port Colorado Subarea 2. Those improvements include the following.

Short-Term Background Improvements

- Build 56th Avenue, 48th Avenue, Manila Road, Imboden Road/Quail Run Road, and Imboden Road/Quail Run Road with a 4-lane cross-section
- Build 32nd Avenue, 42nd Avenue, and Cavanaugh Road with a 3-lane cross-section
- Signalize the 56th Avenue/Imboden Road/Quail Run Road intersection, providing an exclusive left turn lane and dual right turn lanes on the eastbound approach, dual left turn lanes on the northbound approach, and an exclusive right turn lane on the southbound approach
- Signalize the 48th Avenue/Imboden Road/Quail Run Road intersection, providing left and right exclusive lanes on the westbound approach, as well as a dual southbound left turn lanes.
- Signalize the 32nd Avenue/Imboden Road/Quail Run Road intersection, providing left and right exclusive turn lanes on the south-westbound approach, as well as an exclusive right turn lane and left turn lane on the north-westbound and south-eastbound approaches respectively
- Implement stop control on Cavanaugh Road at its intersection with 32nd Avenue, providing exclusive left and right turn lanes on the southbound approach
- Implement stop control on Cavanaugh Road at its intersection with 48th Avenue
- Implement stop control on 42nd Avenue at its intersection with Cavanaugh Road, providing and exclusive left turn lane on the westbound approach
- Implement stop control on 42nd Avenue at its intersection with Manila Road, providing left and right turn lanes at the T-intersection.

Long-Term Background Improvements

- Widen Imboden Road/Quail Run Road and Imboden Road/Quail Run Road to three lanes per direction between I-70 ramp terminal intersections and 56th Avenue

- Widen Imboden Road/Quail Run Road to a 4-lane cross-section north of 56th Avenue
- Build Quail Run Drive with a three-lane cross-section
- Provide triple rights and an exclusive left turn lane on the eastbound approach, triple lefts and an exclusive right on the northbound approach, dual lefts, and an exclusive right on the westbound approach, and one exclusive left and right lane on the southbound approach of the 56th Avenue/Imboden Road/Quail Run Road intersection
- An alternative for 56th Avenue/Imboden Road/Quail Run Road would be to create a CFI, instead of providing triple rights and triple lefts which could potentially be a very large intersection to sustain a high volume of traffic
- Provide dual lefts on the southbound approach and an exclusive right turn lane on the northbound approach at the intersection of Imboden Road/Quail Run Road with 48th Avenue
- Add a southwest leg to the 32nd Avenue/Imboden Road/Quail Run Road intersection and provide exclusive left and right turn lanes on the northwest and southeast approaches, a single left turn lane on the north-eastbound approach, and dual lefts on the south-westbound approach

The majority of roadways within the Port Colorado Subarea 2 network do not exist or are minor unpaved roadways. Port Colorado will construct new roadways that will serve the proposed land use types, and certain improvements replicate information contained in *NEATS Refresh*. The following roadway improvements will be necessary to support the Subarea 2 development.

Short-Term Total Improvements

- Add a northbound right turn lane to the intersection of 48th Avenue with Imboden Road/Quail Run Road
- Build Quail Run Drive and 42nd Avenue to a 3-lane cross-section
- Build all site access roadways and implement stop control on minor streets
- Consider adding right turn lanes at the following site access locations:
 - Northbound at intersection 11
 - Eastbound at intersection 13

Long-Term Total Improvements

- Add a second westbound right turn lane at the intersection of 48th Avenue with Imboden Road/Quail Run Road
- Add exclusive east and westbound right turn lanes at the intersection of Imboden Road/Quail Run Road with 32nd Avenue
- Signalize the intersection of 48th Avenue with Quail Run Drive when warranted
- Signalize the intersection of 48th Avenue with Cavanaugh Road when warranted
- Build Quail Run Drive and 42nd Avenue to a 3-lane cross-section
- Build all site access roadways and implement stop control on minor streets
- Consider adding right turn lanes at the following site access locations:
 - Northbound at intersection 11
 - Eastbound at intersection 13

It should be noted that 56th Avenue and 48th Avenue are anticipated to require a 4-lane cross-section by the 2040 year, as compared to the 3-lane cross-section shown in the *TransPort Colorado Traffic Impact Study Analysis*, July 2022 due to new development anticipated in the surrounding area.

The development of Port Colorado Subarea 2 will be gradual over the next decade, and traffic operational analyses will continue as parcels develop to support the confirmation and construction timeframes for infrastructure improvements. Analyses of individual parcels will confirm intersection laneage, traffic control recommendations, along with identifying the appropriate timing of such improvements.

APPENDIX A. TRAFFIC COUNTS



(303) 216-2439
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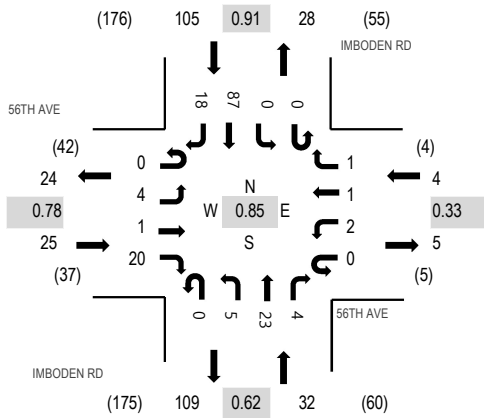
Location: 1 IMBODEN RD & 56TH AVE AM

Date: Thursday, February 6, 2020

Peak Hour: 06:30 AM - 07:30 AM

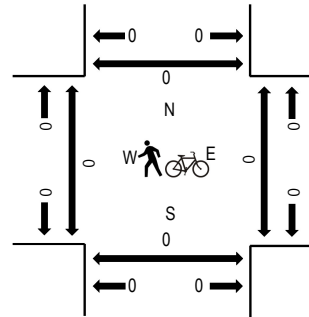
Peak 15-Minutes: 06:45 AM - 07:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	56TH AVE Eastbound				56TH AVE Westbound				IMBODEN RD Northbound				IMBODEN RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
6:30 AM	0	1	0	5	0	0	0	1	0	2	4	3	0	0	25	4	45	166	0	0	0	0
6:45 AM	0	1	1	6	0	0	0	0	0	2	10	1	0	0	23	5	49	140	0	0	0	0
7:00 AM	0	1	0	6	0	2	1	0	0	1	5	0	0	0	23	5	44	118	0	0	0	0
7:15 AM	0	1	0	3	0	0	0	0	0	0	4	0	0	0	16	4	28	111	0	0	0	0
7:30 AM	0	0	0	2	0	0	0	0	0	0	4	0	0	0	10	3	19	111	0	0	0	0
7:45 AM	0	0	0	1	0	0	0	0	0	2	10	0	0	0	11	3	27		0	0	0	0
8:00 AM	0	3	0	4	0	0	0	0	0	0	4	0	0	0	20	6	37		0	0	0	0
8:15 AM	0	0	0	2	0	0	0	0	0	2	6	0	0	0	16	2	28		0	0	0	0
Count Total	0	7	1	29	0	2	1	1	0	9	47	4	0	0	144	32	277		0	0	0	0
Peak Hour	0	4	1	20	0	2	1	1	0	5	23	4	0	0	87	18	166		0	0	0	0



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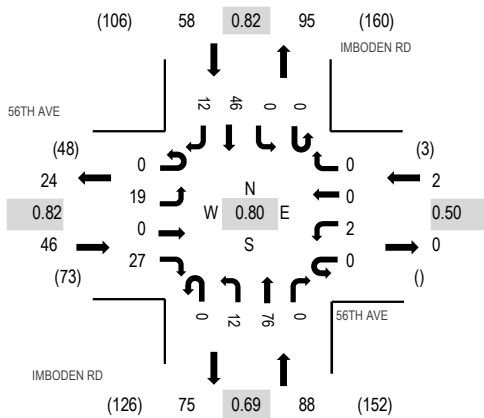
Location: 1 IMBODEN RD & 56TH AVE PM

Date: Thursday, February 6, 2020

Peak Hour: 04:15 PM - 05:15 PM

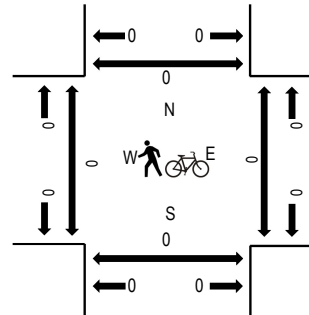
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	56TH AVE Eastbound				56TH AVE Westbound				IMBODEN RD Northbound				IMBODEN RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	2	0	5	0	0	0	0	0	2	10	0	0	0	9	2	30	163	0	0	0	0
4:15 PM	0	3	0	5	0	1	0	0	0	3	14	0	0	0	12	4	42	194	0	0	0	0
4:30 PM	0	5	0	9	0	0	0	0	0	4	16	0	0	0	7	1	42	193	0	0	0	0
4:45 PM	0	6	0	8	0	0	0	0	0	2	17	0	0	0	12	4	49	183	0	0	0	0
5:00 PM	0	5	0	5	0	1	0	0	0	3	29	0	0	0	15	3	61	171	0	0	0	0
5:15 PM	0	3	0	5	0	0	0	1	0	2	14	0	0	0	10	6	41		0	0	0	0
5:30 PM	0	2	0	2	0	0	0	0	0	5	14	0	0	0	7	2	32		0	0	0	0
5:45 PM	0	4	0	4	0	0	0	0	0	2	15	0	0	0	9	3	37		0	0	0	0
Count Total	0	30	0	43	0	2	0	1	0	23	129	0	0	0	81	25	334		0	0	0	0
Peak Hour	0	19	0	27	0	2	0	0	0	12	76	0	0	0	46	12	194		0	0	0	0



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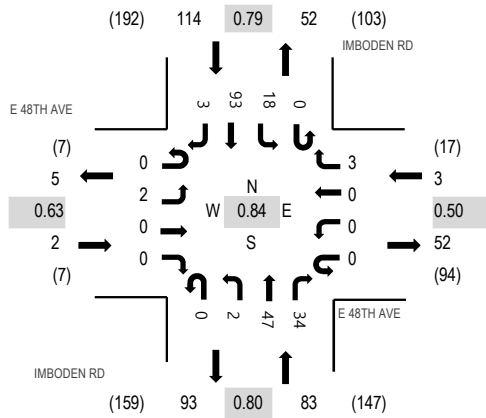
Location: 2 IMBODEN RD & E 48TH AVE AM

Date: Thursday, September 6, 2018

Peak Hour: 06:30 AM - 07:30 AM

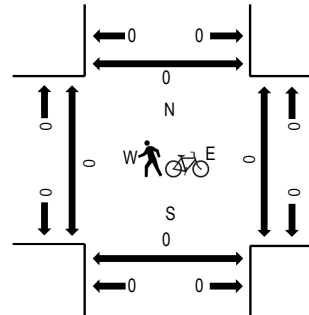
Peak 15-Minutes: 06:45 AM - 07:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	E 48TH AVE Eastbound				E 48TH AVE Westbound				IMBODEN RD Northbound				IMBODEN RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
6:30 AM	0	0	0	0	0	0	0	2	0	0	9	12	0	5	30	1	59	202	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	2	13	9	0	5	29	2	60	178	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	17	9	0	5	14	0	45	160	0	0	0	0
7:15 AM	0	2	0	0	0	0	0	1	0	0	8	4	0	3	20	0	38	150	0	0	0	0
7:30 AM	0	2	0	0	0	1	0	1	0	0	12	3	0	4	12	0	35	161	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	3	0	0	10	8	0	6	14	1	42		0	0	0	0
8:00 AM	0	0	0	1	0	2	0	0	0	1	5	5	0	5	16	0	35		0	0	0	0
8:15 AM	0	2	0	0	0	6	0	1	0	0	15	5	0	6	14	0	49		0	0	0	0
Count Total	0	6	0	1	0	9	0	8	0	3	89	55	0	39	149	4	363		0	0	0	0
Peak Hour	0	2	0	0	0	0	0	3	0	2	47	34	0	18	93	3	202		0	0	0	0



(303) 216-2439
www.alltrafficdata.net

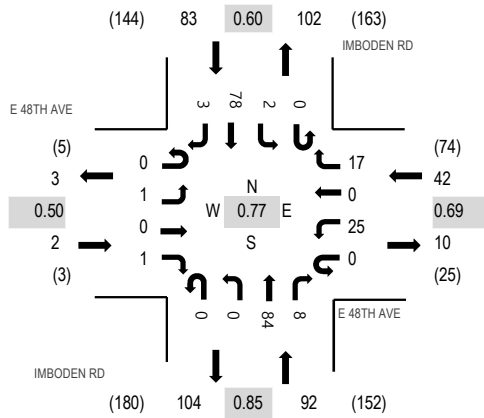
Location: 2 IMBODEN RD & E 48TH AVE PM

Date: Thursday, September 6, 2018

Peak Hour: 04:30 PM - 05:30 PM

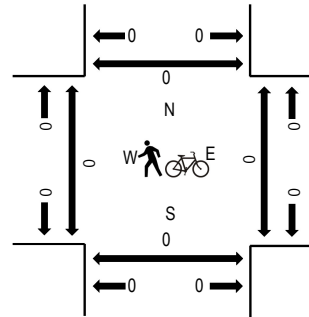
Peak 15-Minutes: 04:45 PM - 05:00 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	E 48TH AVE Eastbound				E 48TH AVE Westbound				IMBODEN RD Northbound				IMBODEN RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	0	0	0	4	0	1	0	0	11	4	0	4	12	1	37	196	0	0	0	0
4:15 PM	0	0	0	0	0	11	0	2	0	0	7	2	0	0	17	0	39	215	0	0	0	0
4:30 PM	0	0	0	0	0	7	0	3	0	0	23	0	0	1	14	1	49	219	0	0	0	0
4:45 PM	0	0	0	1	0	5	0	2	0	0	23	4	0	1	34	1	71	212	0	0	0	0
5:00 PM	0	0	0	0	0	8	0	9	0	0	25	2	0	0	11	1	56	177	0	0	0	0
5:15 PM	0	1	0	0	0	5	0	3	0	0	13	2	0	0	19	0	43		0	0	0	0
5:30 PM	0	0	0	0	0	2	0	3	0	0	19	3	0	2	13	0	42		0	0	0	0
5:45 PM	0	1	0	0	0	5	0	4	0	1	13	0	0	0	12	0	36		0	0	0	0
Count Total	0	2	0	1	0	47	0	27	0	1	134	17	0	8	132	4	373		0	0	0	0
Peak Hour	0	1	0	1	0	25	0	17	0	0	84	8	0	2	78	3	219		0	0	0	0

APPENDIX B. LEVEL OF SERVICE CRITERIA

TABLE B1
LEVEL OF SERVICE CRITERIA FOR
TWO-WAY STOP CONTROLLED (TWSC) INTERSECTIONS AND ROUNDABOUTS

Level of Service	Delay Range (sec/veh)
A	0.0 – 10.0
B	>10.0 – 15.0
C	>15.0 – 25.0
D	>25.0 – 35.0
E	>35.0 – 50.0
F	> 50.0

Adapted from *Highway Capacity Manual*, Transportation Research Board, 2010.

TABLE B2
LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

Level of Service	Control Delay (sec/veh)	Qualitative Description
A	≤ 10.0	Good progression, short cycles, very few vehicle-stops.
B	>10.0 – 20.0	Good progression, and/or short cycle lengths, more vehicle-stops.
C	>20.0 – 35.0	Fair progression and/or longer cycle lengths, some individual cycle failures, many vehicle-stops
D	>35.0 – 55.0	Noticeable congestion and cycle failures, unfavorable progression, high v/c ratios, several stops.
E	>55.0 – 80.0	Limit of acceptable delay, poor progression, long cycles, high v/c ratios, frequent cycle failures.
F	> 80.0	Delay is unacceptable to most drivers, volume exceeds capacity, breakdown of traffic flow.

Adapted from *Highway Capacity Manual*, Transportation Research Board, 2010.

APPENDIX C. ANALYSIS WORKSHEETS – EXISTING CONDITIONS

HCM 6th TWSC
1: Imboden Rd & 56th Avenue

Existing Conditions
AM Peak

Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	4	1	21	2	1	1	5	24	4	0	92	19
Future Vol, veh/h	4	1	21	2	1	1	5	24	4	0	92	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	11	11	11	11	11	11	11	11	11	11	11	11
Mvmt Flow	5	1	25	2	1	1	6	29	5	0	110	23

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	167	168	122	179	177	32	133	0	0	34	0	0
Stage 1	122	122	-	44	44	-	-	-	-	-	-	-
Stage 2	45	46	-	135	133	-	-	-	-	-	-	-
Critical Hdwy	7.21	6.61	6.31	7.21	6.61	6.31	4.21	-	-	4.21	-	-
Critical Hdwy Stg 1	6.21	5.61	-	6.21	5.61	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.21	5.61	-	6.21	5.61	-	-	-	-	-	-	-
Follow-up Hdwy	3.599	4.099	3.399	3.599	4.099	3.399	2.299	-	-	2.299	-	-
Pot Cap-1 Maneuver	777	709	905	763	701	1017	1398	-	-	1521	-	-
Stage 1	861	778	-	948	841	-	-	-	-	-	-	-
Stage 2	947	839	-	847	769	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	772	706	905	739	698	1017	1398	-	-	1521	-	-
Mov Cap-2 Maneuver	772	706	-	739	698	-	-	-	-	-	-	-
Stage 1	858	778	-	944	838	-	-	-	-	-	-	-
Stage 2	940	836	-	822	769	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	9.3		9.6		1.1		0	
HCM LOS	A		A					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1398	-	-	872 781	1521	-	-
HCM Lane V/C Ratio	0.004	-	-	0.035 0.006	-	-	-
HCM Control Delay (s)	7.6	-	-	9.3 9.6	0	-	-
HCM Lane LOS	A	-	-	A A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1 0	0	-	-

HCM 6th TWSC
2: Imboden Rd & 48th Avenue

Existing Conditions
AM Peak

Intersection												
Int Delay, s/veh	1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	2	0	0	0	0	3	2	52	38	20	103	3
Future Vol, veh/h	2	0	0	0	0	3	2	52	38	20	103	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	11	11	11	11	11	11	11	11	11	11	11	11
Mvmt Flow	2	0	0	0	0	4	2	62	45	24	123	4

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	264	284	125	262	264	85	127	0	0	107	0	0
Stage 1	173	173	-	89	89	-	-	-	-	-	-	-
Stage 2	91	111	-	173	175	-	-	-	-	-	-	-
Critical Hdwy	7.21	6.61	6.31	7.21	6.61	6.31	4.21	-	-	4.21	-	-
Critical Hdwy Stg 1	6.21	5.61	-	6.21	5.61	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.21	5.61	-	6.21	5.61	-	-	-	-	-	-	-
Follow-up Hdwy	3.599	4.099	3.399	3.599	4.099	3.399	2.299	-	-	2.299	-	-
Pot Cap-1 Maneuver	671	610	902	673	626	950	1405	-	-	1429	-	-
Stage 1	808	739	-	897	804	-	-	-	-	-	-	-
Stage 2	894	786	-	808	737	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	659	599	902	664	615	950	1405	-	-	1429	-	-
Mov Cap-2 Maneuver	659	599	-	664	615	-	-	-	-	-	-	-
Stage 1	807	726	-	896	803	-	-	-	-	-	-	-
Stage 2	889	785	-	794	724	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	10.5		8.8		0.2		1.2	
HCM LOS	B		A					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1405	-	-	659 950	1429	-	-
HCM Lane V/C Ratio	0.002	-	-	0.004 0.004	0.017	-	-
HCM Control Delay (s)	7.6	-	-	10.5 8.8	7.6	-	-
HCM Lane LOS	A	-	-	B A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0 0	0.1	-	-

HCM 6th TWSC
1: Imboden Rd & 56th Avenue

Existing Conditions
PM Peak

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Traffic Vol, veh/h	20	0	29	2	0	0	13	81	0	0	49	13
Future Vol, veh/h	20	0	29	2	0	0	13	81	0	0	49	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	11	11	11	11	11	11	11	11	11	11	11	11
Mvmt Flow	24	0	35	2	0	0	15	96	0	0	58	15

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	192	192	66	209	199	96	73	0	0	96	0	0
Stage 1	66	66	-	126	126	-	-	-	-	-	-	-
Stage 2	126	126	-	83	73	-	-	-	-	-	-	-
Critical Hdwy	7.21	6.61	6.31	7.21	6.61	6.31	4.21	-	-	4.21	-	-
Critical Hdwy Stg 1	6.21	5.61	-	6.21	5.61	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.21	5.61	-	6.21	5.61	-	-	-	-	-	-	-
Follow-up Hdwy	3.599	4.099	3.399	3.599	4.099	3.399	2.299	-	-	2.299	-	-
Pot Cap-1 Maneuver	748	687	973	729	681	936	1472	-	-	1443	-	-
Stage 1	922	823	-	857	775	-	-	-	-	-	-	-
Stage 2	857	775	-	903	817	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	742	680	973	698	674	936	1472	-	-	1443	-	-
Mov Cap-2 Maneuver	742	680	-	698	674	-	-	-	-	-	-	-
Stage 1	913	823	-	848	767	-	-	-	-	-	-	-
Stage 2	848	767	-	871	817	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.5	10.2	1	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1472	-	-	863 698	1443	-	-
HCM Lane V/C Ratio	0.011	-	-	0.068 0.003	-	-	-
HCM Control Delay (s)	7.5	-	-	9.5 10.2	0	-	-
HCM Lane LOS	A	-	-	A B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2 0	0	-	-

HCM 6th TWSC
2: Imboden Rd & 48th Avenue

Existing Conditions
PM Peak

Intersection												
Int Delay, s/veh	2.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	1	0	1	28	0	19	0	93	9	2	86	3
Future Vol, veh/h	1	0	1	28	0	19	0	93	9	2	86	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	11	11	11	11	11	11	11	11	11	11	11	11
Mvmt Flow	1	0	1	33	0	23	0	111	11	2	102	4

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	236	230	104	226	227	117	106	0	0	122	0	0
Stage 1	108	108	-	117	117	-	-	-	-	-	-	-
Stage 2	128	122	-	109	110	-	-	-	-	-	-	-
Critical Hdwy	7.21	6.61	6.31	7.21	6.61	6.31	4.21	-	-	4.21	-	-
Critical Hdwy Stg 1	6.21	5.61	-	6.21	5.61	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.21	5.61	-	6.21	5.61	-	-	-	-	-	-	-
Follow-up Hdwy	3.599	4.099	3.399	3.599	4.099	3.399	2.299	-	-	2.299	-	-
Pot Cap-1 Maneuver	700	654	927	711	657	911	1431	-	-	1411	-	-
Stage 1	876	789	-	866	782	-	-	-	-	-	-	-
Stage 2	855	778	-	875	787	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	682	653	927	710	656	911	1431	-	-	1411	-	-
Mov Cap-2 Maneuver	682	653	-	710	656	-	-	-	-	-	-	-
Stage 1	876	788	-	866	782	-	-	-	-	-	-	-
Stage 2	834	778	-	873	786	-	-	-	-	-	-	-

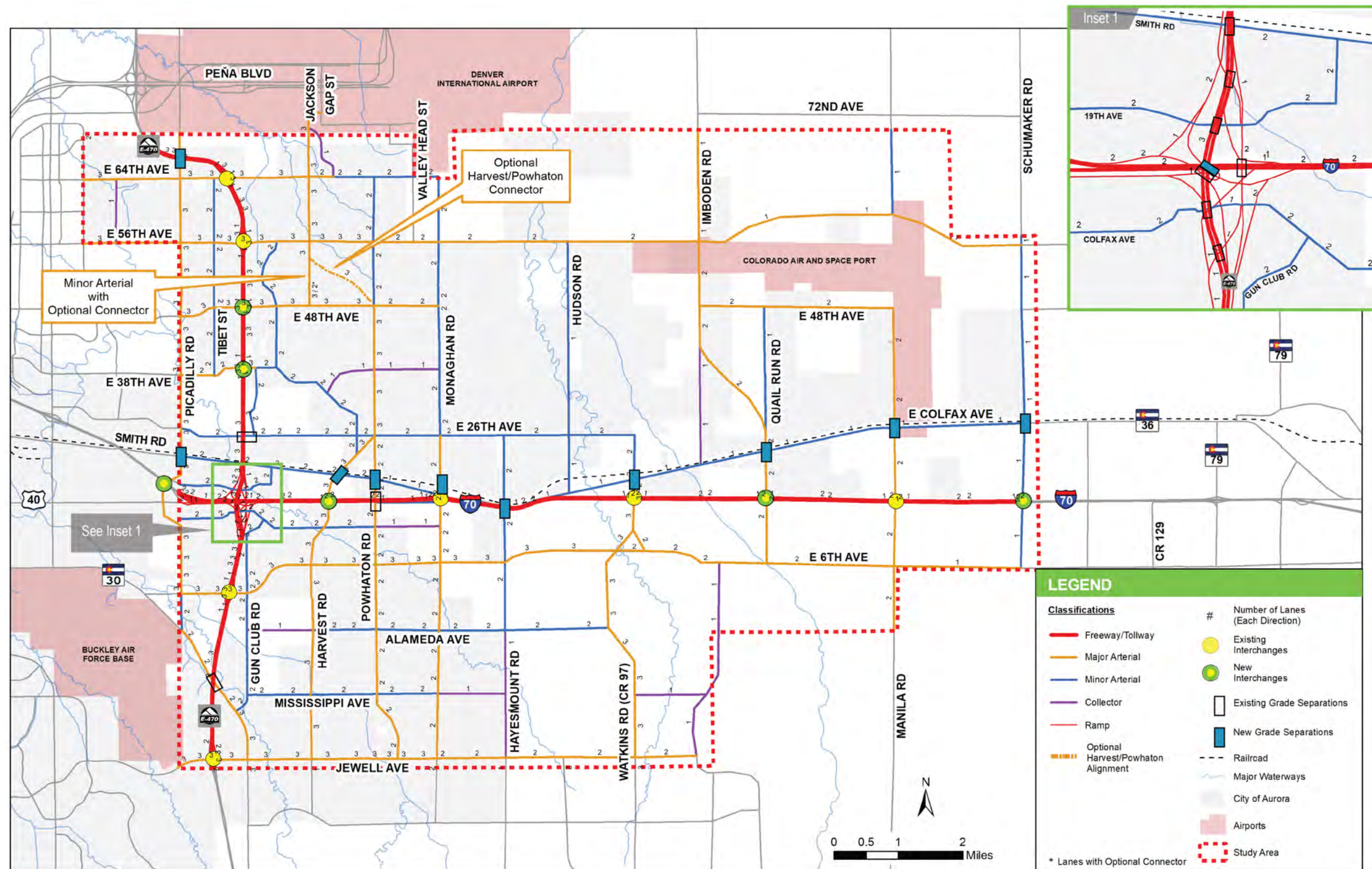
Approach	EB	WB	NB	SB
HCM Control Delay, s	9.6	10	0	0.2
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1431	-	-	786 780	1411	-	-
HCM Lane V/C Ratio	-	-	-	0.003 0.072	0.002	-	-
HCM Control Delay (s)	0	-	-	9.6 10	7.6	-	-
HCM Lane LOS	A	-	-	A B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0 0.2	0	-	-

APPENDIX D. NEATS REFRESH RECOMMENDED ROADWAY NETWORK















Figure ES-3.
Recommended Roadway Network



APPENDIX E. ANALYSIS WORKSHEETS – BACKGROUND CONDITIONS

Timings 1: Imboden Rd & 56th Avenue

2040 Background
AM Peak

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	291	862	536	164	127	159
Future Volume (vph)	291	862	536	164	127	159
Turn Type	Prot	pt+ov	Prot	NA	NA	pm+ov
Protected Phases	4	4 5	5	2	6	4
Permitted Phases						6
Detector Phase	4	4 5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	23.5		10.5	23.5	23.5	23.5
Total Split (s)	50.0		44.0	70.0	26.0	50.0
Total Split (%)	41.7%		36.7%	58.3%	21.7%	41.7%
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5		5.5	5.5	5.5	5.5
Lead/Lag			Lead	Lag		
Lead-Lag Optimize?			Yes	Yes		
Recall Mode	None		None	C-Max	C-Max	None
Act Effct Green (s)	34.5	72.6	32.6	74.5	36.4	76.4
Actuated g/C Ratio	0.29	0.60	0.27	0.62	0.30	0.64
v/c Ratio	0.76	0.57	0.77	0.10	0.16	0.20
Control Delay	50.4	3.9	38.7	6.9	35.7	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.4	3.9	38.7	6.9	35.7	5.3
LOS	D	A	D	A	D	A
Approach Delay	15.6			31.2	18.7	
Approach LOS	B			C	B	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 20.5 (17%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 21.2

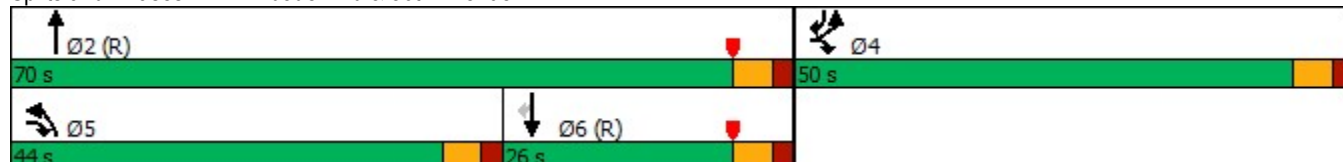
Intersection LOS: C

Intersection Capacity Utilization 49.3%

ICU Level of Service A

Analysis Period (min) 15













Splits and Phases: 1: Imboden Rd & 56th Avenue



HCM 6th Signalized Intersection Summary



















1: Imboden Rd & 56th Avenue

2040 Background
AM Peak

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	291	862	536	164	127	159
Future Volume (veh/h)	291	862	536	164	127	159
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530
Adj Flow Rate, veh/h	316	937	583	178	138	173
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	25	25	25	25	25	25
Cap, veh/h	497	1307	656	1649	841	817
Arrive On Green	0.34	0.34	0.23	0.57	0.29	0.29
Sat Flow, veh/h	1457	2281	2826	2983	2983	1296
Grp Volume(v), veh/h	316	937	583	178	138	173
Grp Sat Flow(s),veh/h/ln	1457	1141	1413	1453	1453	1296
Q Serve(g_s), s	21.9	35.7	23.9	3.4	4.3	6.8
Cycle Q Clear(g_c), s	21.9	35.7	23.9	3.4	4.3	6.8
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	497	1307	656	1649	841	817
V/C Ratio(X)	0.64	0.72	0.89	0.11	0.16	0.21
Avail Cap(c_a), veh/h	540	1376	907	1649	841	817
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.97	0.97	1.00	1.00
Uniform Delay (d), s/veh	33.3	18.6	44.6	12.0	31.8	9.5
Incr Delay (d2), s/veh	2.2	1.7	8.0	0.1	0.4	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	12.6	30.4	13.9	2.0	2.8	7.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	35.5	20.3	52.6	12.1	32.2	10.1
LnGrp LOS	D	C	D	B	C	B
Approach Vol, veh/h	1253			761	311	
Approach Delay, s/veh	24.1			43.1	19.9	
Approach LOS	C			D	B	
Timer - Assigned Phs	2		4		5	6
Phs Duration (G+Y+Rc), s	73.6		46.4		33.4	40.2
Change Period (Y+Rc), s	5.5		5.5		5.5	5.5
Max Green Setting (Gmax), s	64.5		44.5		38.5	20.5
Max Q Clear Time (g_c+l1), s	5.4		37.7		25.9	8.8
Green Ext Time (p_c), s	1.3		3.2		1.9	1.1
Intersection Summary						
HCM 6th Ctrl Delay			29.8			
HCM 6th LOS			C			

Timings 2: Imboden Rd & 48th Avenue

2040 Background
AM Peak

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	5	5	2	5	129	10	409	573	402
Future Volume (vph)	5	5	2	5	129	10	409	573	402
Turn Type	Perm	NA	Perm	NA	pm+ov	Perm	NA	Prot	NA
Protected Phases		4		8	1		2	1	6
Permitted Phases	4		8		8	2			
Detector Phase	4	4	8	8	1	2	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.5	23.5	23.5	23.5	10.5	23.5	23.5	10.5	23.5
Total Split (s)	25.0	25.0	25.0	25.0	52.0	43.0	43.0	52.0	95.0
Total Split (%)	20.8%	20.8%	20.8%	20.8%	43.3%	35.8%	35.8%	43.3%	79.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag					Lead	Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effect Green (s)	7.5	7.5	7.5	7.5	43.6	65.4	65.4	32.9	104.8
Actuated g/C Ratio	0.06	0.06	0.06	0.06	0.36	0.54	0.54	0.27	0.87
v/c Ratio	0.08	0.17	0.03	0.52	0.15	0.03	0.28	0.81	0.18
Control Delay	53.2	34.4	51.5	27.3	4.8	18.0	17.5	52.0	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.2	34.4	51.5	27.3	4.8	18.0	17.5	52.0	1.5
LOS	D	C	D	C	A	B	B	D	A
Approach Delay		38.9		16.5			17.5		31.1
Approach LOS		D		B			B		C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 37.5 (31%), Referenced to phase 2:NBTL and 6:SBT, Start of Yellow

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 26.2

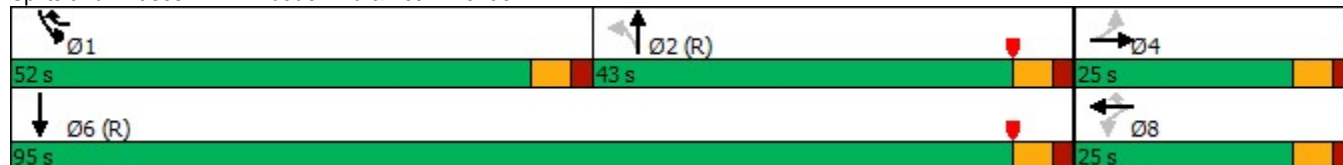
Intersection LOS: C

Intersection Capacity Utilization 45.6%

ICU Level of Service A

Analysis Period (min) 15























Splits and Phases: 2: Imboden Rd & 48th Avenue



HCM 6th Signalized Intersection Summary













2: Imboden Rd & 48th Avenue

2040 Background
AM Peak

																						
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR										
Lane Configurations																						
Traffic Volume (veh/h)	5	5	10	2	5	129	10	409	2	573	402	5										
Future Volume (veh/h)	5	5	10	2	5	129	10	409	2	573	402	5										
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0										
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00										
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00										
Work Zone On Approach	No			No			No			No												
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530										
Adj Flow Rate, veh/h	5	5	11	2	0	143	11	445	2	623	437	5										
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92										
Percent Heavy Veh, %	25	25	25	25	25	25	25	25	25	25	25	25										
Cap, veh/h	121	26	56	116	0	801	489	1643	7	703	2496	29										
Arrive On Green	0.06	0.06	0.06	0.06	0.00	0.06	0.55	0.55	0.55	0.25	0.85	0.85										
Sat Flow, veh/h	1018	425	936	1143	0	2592	775	2967	13	2826	2943	34										
Grp Volume(v), veh/h	5	0	16	2	0	143	11	218	229	623	216	226										
Grp Sat Flow(s),veh/h/ln	1018	0	1361	1143	0	1296	775	1453	1527	1413	1453	1523										
Q Serve(g_s), s	0.6	0.0	1.3	0.2	0.0	4.8	0.8	9.4	9.5	25.5	3.2	3.2										
Cycle Q Clear(g_c), s	0.6	0.0	1.3	1.5	0.0	4.8	0.8	9.4	9.5	25.5	3.2	3.2										
Prop In Lane	1.00		0.69	1.00		1.00	1.00		0.01	1.00		0.02										
Lane Grp Cap(c), veh/h	121	0	82	116	0	801	489	804	845	703	1233	1292										
V/C Ratio(X)	0.04	0.00	0.20	0.02	0.00	0.18	0.02	0.27	0.27	0.89	0.17	0.18										
Avail Cap(c_a), veh/h	225	0	221	233	0	1066	489	804	845	1095	1233	1292										
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00										
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.84	0.84	0.84										
Uniform Delay (d), s/veh	53.3	0.0	53.6	54.4	0.0	30.3	12.1	14.1	14.1	43.4	1.6	1.6										
Incr Delay (d2), s/veh	0.1	0.0	1.2	0.1	0.0	0.1	0.1	0.8	0.8	4.9	0.3	0.2										
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0										
%ile BackOfQ(95%),veh/ln	0.3	0.0	0.9	0.1	0.0	2.8	0.3	5.9	6.2	13.9	1.2	1.2										
Unsig. Movement Delay, s/veh																						
LnGrp Delay(d),s/veh	53.4	0.0	54.8	54.4	0.0	30.4	12.2	14.9	14.9	48.4	1.9	1.9										
LnGrp LOS	D	A	D	D	A	C	B	B	B	D	A	A										
Approach Vol, veh/h	21			145			458			1065												
Approach Delay, s/veh	54.5			30.8			14.8			29.1												
Approach LOS	D			C			B			C												
Timer - Assigned Phs	1	2	4		6		8															
Phs Duration (G+Y+Rc), s	35.4	71.9	12.7		107.3		12.7															
Change Period (Y+Rc), s	5.5	5.5	5.5		5.5		5.5															
Max Green Setting (Gmax), s	46.5	37.5	19.5		89.5		19.5															
Max Q Clear Time (g_c+I1), s	27.5	11.5	3.3		5.2		6.8															
Green Ext Time (p_c), s	2.4	2.9	0.0		3.0		0.4															
Intersection Summary																						
HCM 6th Ctrl Delay													25.7									
HCM 6th LOS													C									
Notes																						
User approved volume balancing among the lanes for turning movement.																						

Timings 3: Quail Run Rd & 32nd Avenue

2040 Background
AM Peak

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	62	6	405	261	22	382
Future Volume (vph)	62	6	405	261	22	382
Turn Type	Prot	Prot	NA	pm+ov	Perm	NA
Protected Phases	3	3	2	3		6
Permitted Phases				2	6	
Detector Phase	3	3	2	3	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.5	10.5	23.5	10.5	23.5	23.5
Total Split (s)	53.0	53.0	67.0	53.0	67.0	67.0
Total Split (%)	44.2%	44.2%	55.8%	44.2%	55.8%	55.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	None	C-Max	C-Max
Act Effect Green (s)	11.0	11.0	98.0	120.0	98.0	98.0
Actuated g/C Ratio	0.09	0.09	0.82	1.00	0.82	0.82
v/c Ratio	0.51	0.06	0.19	0.22	0.04	0.18
Control Delay	64.1	27.0	2.8	0.4	2.8	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.1	27.0	2.8	0.4	2.8	2.8
LOS	E	C	A	A	A	A
Approach Delay	60.6		1.9			2.8
Approach LOS	E		A			A

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 61.5 (51%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.51

Intersection Signal Delay: 5.7

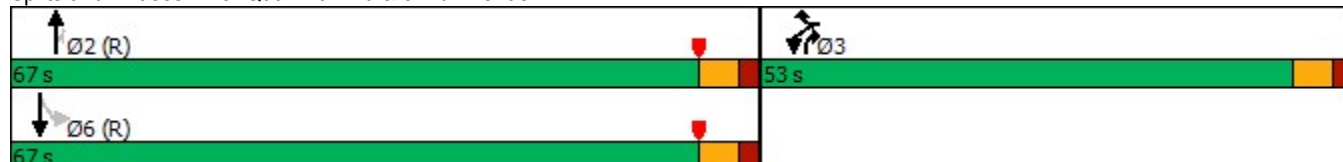
Intersection LOS: A

Intersection Capacity Utilization 31.6%

ICU Level of Service A

Analysis Period (min) 15













Splits and Phases: 3: Quail Run Rd & 32nd Avenue



HCM 6th Signalized Intersection Summary

3: Quail Run Rd & 32nd Avenue

2040 Background
AM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	62	6	405	261	22	382
Future Volume (veh/h)	62	6	405	261	22	382
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530
Adj Flow Rate, veh/h	67	7	440	284	24	415
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	25	25	25	25	25	25
Cap, veh/h	85	76	2470	1177	551	2470
Arrive On Green	0.06	0.06	0.85	0.85	0.85	0.85
Sat Flow, veh/h	1457	1296	2983	1296	597	2983
Grp Volume(v), veh/h	67	7	440	284	24	415
Grp Sat Flow(s),veh/h/ln	1457	1296	1453	1296	597	1453
Q Serve(g_s), s	5.4	0.6	3.2	3.1	0.9	3.0
Cycle Q Clear(g_c), s	5.4	0.6	3.2	3.1	4.1	3.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	85	76	2470	1177	551	2470
V/C Ratio(X)	0.79	0.09	0.18	0.24	0.04	0.17
Avail Cap(c_a), veh/h	577	513	2470	1177	551	2470
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.8	53.5	1.6	0.6	2.0	1.6
Incr Delay (d2), s/veh	14.7	0.5	0.2	0.5	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.2	0.4	1.1	0.4	0.2	1.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	70.5	54.0	1.7	1.1	2.1	1.7
LnGrp LOS	E	D	A	A	A	A
Approach Vol, veh/h	74		724			439
Approach Delay, s/veh	68.9		1.5			1.7
Approach LOS	E		A			A
Timer - Assigned Phs	2		6		8	
Phs Duration (G+Y+Rc), s	107.5		107.5		12.5	
Change Period (Y+Rc), s	5.5		5.5		5.5	
Max Green Setting (Gmax), s	61.5		61.5		47.5	
Max Q Clear Time (g_c+l1), s	5.2		6.1		7.4	
Green Ext Time (p_c), s	4.6		3.5		0.2	
Intersection Summary						
HCM 6th Ctrl Delay			5.6			
HCM 6th LOS			A			





HCM 6th TWSC
4: Cavanaugh Road & 48th Avenue

2040 Background
AM Peak

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↖	↑↑	↖	
Traffic Vol, veh/h	347	224	0	112	53	0
Future Vol, veh/h	347	224	0	112	53	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	377	243	0	122	58	0
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	620	0	560	310
Stage 1	-	-	-	-	499	-
Stage 2	-	-	-	-	61	-
Critical Hdwy	-	-	4.6	-	7.3	7.4
Critical Hdwy Stg 1	-	-	-	-	6.3	-
Critical Hdwy Stg 2	-	-	-	-	6.3	-
Follow-up Hdwy	-	-	2.45	-	3.75	3.55
Pot Cap-1 Maneuver	-	-	816	-	407	622
Stage 1	-	-	-	-	514	-
Stage 2	-	-	-	-	891	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	816	-	407	622
Mov Cap-2 Maneuver	-	-	-	-	407	-
Stage 1	-	-	-	-	514	-
Stage 2	-	-	-	-	891	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		15.3	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	407	-	-	816	-	
HCM Lane V/C Ratio	0.142	-	-	-	-	
HCM Control Delay (s)	15.3	-	-	0	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	0.5	-	-	0	-	

HCM 6th TWSC
5: Cavanaugh Road & 42nd Avenue







2040 Background
AM Peak







Intersection						
Int Delay, s/veh	1.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	8	45	0	36	188
Future Vol, veh/h	0	8	45	0	36	188
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	0	9	49	0	39	204

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	331	49	0
Stage 1	49	-	-
Stage 2	282	-	-
Critical Hdwy	6.65	6.45	-
Critical Hdwy Stg 1	5.65	-	-
Critical Hdwy Stg 2	5.65	-	-
Follow-up Hdwy	3.725	3.525	-
Pot Cap-1 Maneuver	619	958	-
Stage 1	918	-	-
Stage 2	716	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	602	958	-
Mov Cap-2 Maneuver	602	-	-
Stage 1	918	-	-
Stage 2	697	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.8	0	1.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	958	1422
HCM Lane V/C Ratio	-	-	0.009	0.028
HCM Control Delay (s)	-	-	8.8	7.6
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0.1













Intersection						
Int Delay, s/veh	4.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	49	72	122	199	128	48
Future Vol, veh/h	49	72	122	199	128	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	53	78	133	216	139	52
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	349	0	-	0	317	133
Stage 1	-	-	-	-	133	-
Stage 2	-	-	-	-	184	-
Critical Hdwy	4.35	-	-	-	6.65	6.45
Critical Hdwy Stg 1	-	-	-	-	5.65	-
Critical Hdwy Stg 2	-	-	-	-	5.65	-
Follow-up Hdwy	2.425	-	-	-	3.725	3.525
Pot Cap-1 Maneuver	1093	-	-	-	631	858
Stage 1	-	-	-	-	840	-
Stage 2	-	-	-	-	795	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1093	-	-	-	601	858
Mov Cap-2 Maneuver	-	-	-	-	601	-
Stage 1	-	-	-	-	800	-
Stage 2	-	-	-	-	795	-
Approach	EB	WB		SB		
HCM Control Delay, s	3.4	0		11.9		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1093	-	-	-	601	858
HCM Lane V/C Ratio	0.049	-	-	-	0.231	0.061
HCM Control Delay (s)	8.5	-	-	-	12.8	9.5
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.9	0.2

Intersection						
Int Delay, s/veh	2.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	38	160	240	341	0
Future Vol, veh/h	0	38	160	240	341	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	0	41	174	261	371	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	850	186	371	0	-	0
Stage 1	371	-	-	-	-	-
Stage 2	479	-	-	-	-	-
Critical Hdwy	7.3	7.4	4.6	-	-	-
Critical Hdwy Stg 1	6.3	-	-	-	-	-
Critical Hdwy Stg 2	6.3	-	-	-	-	-
Follow-up Hdwy	3.75	3.55	2.45	-	-	-
Pot Cap-1 Maneuver	258	757	1035	-	-	-
Stage 1	605	-	-	-	-	-
Stage 2	527	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	215	757	1035	-	-	-
Mov Cap-2 Maneuver	215	-	-	-	-	-
Stage 1	503	-	-	-	-	-
Stage 2	527	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	10	3.7		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1035	-	-	757	-	-
HCM Lane V/C Ratio	0.168	-	-	0.055	-	-
HCM Control Delay (s)	9.2	-	0	10	-	-
HCM Lane LOS	A	-	A	B	-	-
HCM 95th %tile Q(veh)	0.6	-	-	0.2	-	-

Timings

1: Imboden Rd & 56th Avenue

2040 Background
PM Peak

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	328	973	878	188	217	219
Future Volume (vph)	328	973	878	188	217	219
Turn Type	Prot	pt+ov	Prot	NA	NA	pm+ov
Protected Phases	4	4 5	5	2	6	4
Permitted Phases	6					
Detector Phase	4	4 5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	23.5		10.5	23.5	23.5	23.5
Total Split (s)	43.0		53.0	77.0	24.0	43.0
Total Split (%)	35.8%		44.2%	64.2%	20.0%	35.8%
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5		5.5	5.5	5.5	5.5
Lead/Lag			Lead	Lag		
Lead-Lag Optimize?			Yes	Yes		
Recall Mode	None		None	C-Max	C-Max	None
Act Effct Green (s)	35.1	86.6	46.0	73.9	22.4	63.0
Actuated g/C Ratio	0.29	0.72	0.38	0.62	0.19	0.52
v/c Ratio	0.85	0.62	0.89	0.11	0.44	0.34
Control Delay	58.7	7.4	44.2	10.4	47.8	15.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.7	7.4	44.2	10.4	47.8	15.3
LOS	E	A	D	B	D	B
Approach Delay	20.3			38.3	31.5	
Approach LOS	C			D	C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 18.5 (15%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 28.9

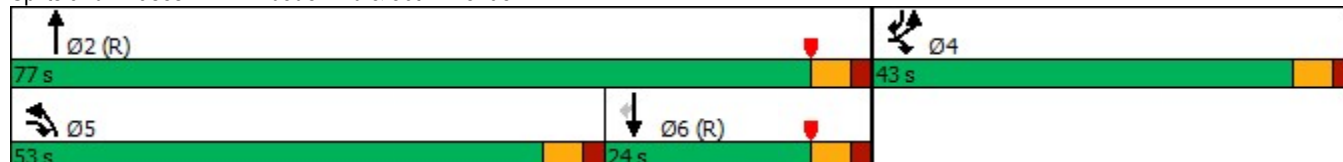
Intersection LOS: C

Intersection Capacity Utilization 63.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: Imboden Rd & 56th Avenue









HCM 6th Signalized Intersection Summary

1: Imboden Rd & 56th Avenue

2040 Background
PM Peak





















Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	328	973	878	188	217	219
Future Volume (veh/h)	328	973	878	188	217	219
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530
Adj Flow Rate, veh/h	357	1058	954	204	236	238
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	25	25	25	25	25	25
Cap, veh/h	450	1529	1022	1742	558	649
Arrive On Green	0.31	0.31	0.36	0.60	0.19	0.19
Sat Flow, veh/h	1457	2281	2826	2983	2983	1296
Grp Volume(v), veh/h	357	1058	954	204	236	238
Grp Sat Flow(s),veh/h/ln	1457	1141	1413	1453	1453	1296
Q Serve(g_s), s	26.9	34.2	39.0	3.6	8.6	13.5
Cycle Q Clear(g_c), s	26.9	34.2	39.0	3.6	8.6	13.5
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	450	1529	1022	1742	558	649
V/C Ratio(X)	0.79	0.69	0.93	0.12	0.42	0.37
Avail Cap(c_a), veh/h	455	1538	1119	1742	558	649
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.91	0.91	1.00	1.00
Uniform Delay (d), s/veh	38.0	12.2	36.9	10.4	42.6	18.3
Incr Delay (d2), s/veh	9.2	1.3	12.3	0.1	2.3	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	16.0	31.7	21.1	2.1	5.9	11.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	47.2	13.5	49.2	10.5	45.0	19.9
LnGrp LOS	D	B	D	B	D	B
Approach Vol, veh/h	1415			1158	474	
Approach Delay, s/veh	22.0			42.4	32.4	
Approach LOS	C			D	C	
Timer - Assigned Phs	2		4		5	6
Phs Duration (G+Y+Rc), s	77.4		42.6		48.9	28.5
Change Period (Y+Rc), s	5.5		5.5		5.5	5.5
Max Green Setting (Gmax), s	71.5		37.5		47.5	18.5
Max Q Clear Time (g_c+l1), s	5.6		36.2		41.0	15.5
Green Ext Time (p_c), s	1.5		0.9		2.3	0.7
Intersection Summary						
HCM 6th Ctrl Delay			31.4			
HCM 6th LOS			C			

Notes

User approved pedestrian interval to be less than phase max green.

Timings 2: Imboden Rd & 48th Avenue

2040 Background
PM Peak

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	5	5	2	5	552	10	376	152	715
Future Volume (vph)	5	5	2	5	552	10	376	152	715
Turn Type	Perm	NA	Perm	NA	pm+ov	Perm	NA	Prot	NA
Protected Phases		4		8	1		2	1	6
Permitted Phases	4		8		8	2			
Detector Phase	4	4	8	8	1	2	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.5	23.5	23.5	23.5	10.5	23.5	23.5	10.5	23.5
Total Split (s)	47.0	47.0	47.0	47.0	33.0	40.0	40.0	33.0	73.0
Total Split (%)	39.2%	39.2%	39.2%	39.2%	27.5%	33.3%	33.3%	27.5%	60.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag					Lead	Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effect Green (s)	10.4	10.4	10.4	10.4	28.6	80.4	80.4	12.7	98.6
Actuated g/C Ratio	0.09	0.09	0.09	0.09	0.24	0.67	0.67	0.11	0.82
v/c Ratio	0.10	0.13	0.02	0.80	0.71	0.03	0.21	0.56	0.33
Control Delay	49.4	28.6	44.5	22.2	26.4	10.4	9.3	55.3	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.4	28.6	44.5	22.2	26.4	10.4	9.3	55.3	3.5
LOS	D	C	D	C	C	B	A	E	A
Approach Delay		33.6		24.4			9.3		12.5
Approach LOS		C		C			A		B

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 34.5 (29%), Referenced to phase 2:NBTL and 6:SBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 15.6

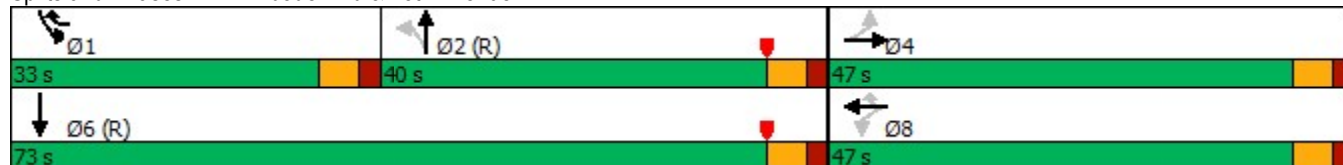
Intersection LOS: B

Intersection Capacity Utilization 51.2%

ICU Level of Service A

Analysis Period (min) 15























Splits and Phases: 2: Imboden Rd & 48th Avenue



HCM 6th Signalized Intersection Summary













2: Imboden Rd & 48th Avenue

2040 Background
PM Peak

																						
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR										
Lane Configurations																						
Traffic Volume (veh/h)	5	5	10	2	5	552	10	376	4	152	715	5										
Future Volume (veh/h)	5	5	10	2	5	552	10	376	4	152	715	5										
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0										
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00										
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00										
Work Zone On Approach	No			No			No			No												
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530										
Adj Flow Rate, veh/h	5	5	11	2	0	603	11	409	4	165	777	5										
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92										
Percent Heavy Veh, %	25	25	25	25	25	25	25	25	25	25	25	25										
Cap, veh/h	341	103	227	327	0	830	367	1599	16	220	1971	13										
Arrive On Green	0.24	0.24	0.24	0.24	0.00	0.24	0.54	0.54	0.54	0.08	0.67	0.67										
Sat Flow, veh/h	1159	425	936	1143	0	2592	565	2949	29	2826	2960	19										
Grp Volume(v), veh/h	5	0	16	2	0	603	11	201	212	165	381	401										
Grp Sat Flow(s),veh/h/ln	1159	0	1361	1143	0	1296	565	1453	1524	1413	1453	1526										
Q Serve(g_s), s	0.4	0.0	1.1	0.2	0.0	24.7	1.1	8.8	8.9	6.9	14.3	14.3										
Cycle Q Clear(g_c), s	0.4	0.0	1.1	1.2	0.0	24.7	1.1	8.8	8.9	6.9	14.3	14.3										
Prop In Lane	1.00		0.69	1.00		1.00	1.00		0.02	1.00		0.01										
Lane Grp Cap(c), veh/h	341	0	330	327	0	830	367	788	827	220	967	1016										
V/C Ratio(X)	0.01	0.00	0.05	0.01	0.00	0.73	0.03	0.26	0.26	0.75	0.39	0.39										
Avail Cap(c_a), veh/h	461	0	471	445	0	1098	367	788	827	648	967	1016										
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00										
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.78	0.78	0.78										
Uniform Delay (d), s/veh	34.6	0.0	34.8	35.3	0.0	36.1	12.8	14.6	14.6	54.2	9.1	9.1										
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.0	0.0	1.7	0.2	0.8	0.7	4.0	0.9	0.9										
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0										
%ile BackOfQ(95%),veh/ln	0.2	0.0	0.7	0.1	0.0	12.6	0.3	5.5	5.8	4.6	7.6	7.9										
Unsig. Movement Delay, s/veh																						
LnGrp Delay(d),s/veh	34.6	0.0	34.9	35.3	0.0	37.8	13.0	15.4	15.3	58.2	10.0	10.0										
LnGrp LOS	C	A	C	D	A	D	B	B	B	E	B	A										
Approach Vol, veh/h	21				605				424													
Approach Delay, s/veh	34.8				37.8				15.3													
Approach LOS	C				D				B													
Timer - Assigned Phs	1	2	4		6		8															
Phs Duration (G+Y+Rc), s	14.8	70.6	34.6		85.4		34.6															
Change Period (Y+Rc), s	5.5	5.5	5.5		5.5		5.5															
Max Green Setting (Gmax), s	27.5	34.5	41.5		67.5		41.5															
Max Q Clear Time (g_c+I1), s	8.9	10.9	3.1		16.3		26.7															
Green Ext Time (p_c), s	0.5	2.7	0.1		6.1		2.4															
Intersection Summary																						
HCM 6th Ctrl Delay 23.8																						
HCM 6th LOS C																						
Notes																						
User approved volume balancing among the lanes for turning movement.																						

Timings 3: Quail Run Rd & 32nd Avenue

2040 Background
PM Peak

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	267	24	356	69	7	710
Future Volume (vph)	267	24	356	69	7	710
Turn Type	Prot	Prot	NA	pm+ov	Perm	NA
Protected Phases	3	3	2	3		6
Permitted Phases				2	6	
Detector Phase	3	3	2	3	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.5	10.5	23.5	10.5	23.5	23.5
Total Split (s)	56.0	56.0	64.0	56.0	64.0	64.0
Total Split (%)	46.7%	46.7%	53.3%	46.7%	53.3%	53.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	None	C-Max	C-Max
Act Effect Green (s)	30.2	30.2	78.8	120.0	78.8	78.8
Actuated g/C Ratio	0.25	0.25	0.66	1.00	0.66	0.66
v/c Ratio	0.80	0.08	0.20	0.06	0.02	0.41
Control Delay	57.5	10.7	9.5	0.1	10.0	11.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.5	10.7	9.5	0.1	10.0	11.5
LOS	E	B	A	A	A	B
Approach Delay	53.7		8.0			11.5
Approach LOS	D		A			B

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 58.5 (49%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow

Natural Cycle: 45

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 19.0

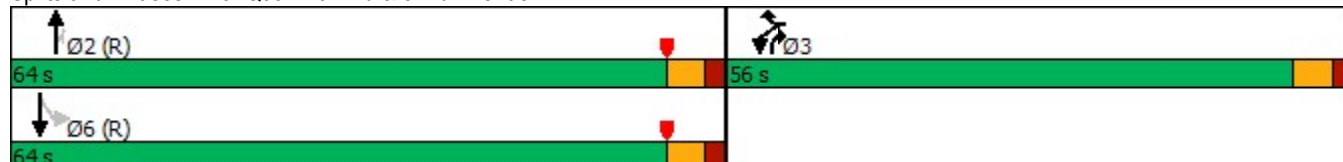
Intersection LOS: B

Intersection Capacity Utilization 43.6%

ICU Level of Service A

Analysis Period (min) 15













Splits and Phases: 3: Quail Run Rd & 32nd Avenue



HCM 6th Signalized Intersection Summary

3: Quail Run Rd & 32nd Avenue

2040 Background
PM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	267	24	356	69	7	710
Future Volume (veh/h)	267	24	356	69	7	710
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530
Adj Flow Rate, veh/h	290	26	387	75	8	772
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	25	25	25	25	25	25
Cap, veh/h	319	284	2003	1177	583	2003
Arrive On Green	0.22	0.22	0.69	0.69	0.69	0.69
Sat Flow, veh/h	1457	1296	2983	1296	815	2983
Grp Volume(v), veh/h	290	26	387	75	8	772
Grp Sat Flow(s),veh/h/ln	1457	1296	1453	1296	815	1453
Q Serve(g_s), s	23.3	1.9	5.7	0.7	0.4	13.5
Cycle Q Clear(g_c), s	23.3	1.9	5.7	0.7	6.2	13.5
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	319	284	2003	1177	583	2003
V/C Ratio(X)	0.91	0.09	0.19	0.06	0.01	0.39
Avail Cap(c_a), veh/h	613	545	2003	1177	583	2003
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.7	37.3	6.7	0.5	7.8	7.9
Incr Delay (d2), s/veh	9.8	0.1	0.2	0.1	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	14.2	1.1	3.1	0.1	0.1	7.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	55.5	37.5	6.9	0.6	7.8	8.5
LnGrp LOS	E	D	A	A	A	A
Approach Vol, veh/h	316		462			780
Approach Delay, s/veh	54.0		5.9			8.4
Approach LOS	D		A			A
Timer - Assigned Phs	2		6		8	
Phs Duration (G+Y+Rc), s	88.2		88.2		31.8	
Change Period (Y+Rc), s	5.5		5.5		5.5	
Max Green Setting (Gmax), s	58.5		58.5		50.5	
Max Q Clear Time (g_c+l1), s	7.7		15.5		25.3	
Green Ext Time (p_c), s	3.2		6.8		1.0	
Intersection Summary						
HCM 6th Ctrl Delay			16.9			
HCM 6th LOS			B			





HCM 6th TWSC
4: Cavanaugh Road & 48th Avenue







2040 Background
PM Peak







Intersection						
Int Delay, s/veh	4.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↱	↑↑	↱	
Traffic Vol, veh/h	94	56	0	356	226	0
Future Vol, veh/h	94	56	0	356	226	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	102	61	0	387	246	0
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	163	0	327	82
Stage 1	-	-	-	-	133	-
Stage 2	-	-	-	-	194	-
Critical Hdwy	-	-	4.6	-	7.3	7.4
Critical Hdwy Stg 1	-	-	-	-	6.3	-
Critical Hdwy Stg 2	-	-	-	-	6.3	-
Follow-up Hdwy	-	-	2.45	-	3.75	3.55
Pot Cap-1 Maneuver	-	-	1261	-	584	892
Stage 1	-	-	-	-	815	-
Stage 2	-	-	-	-	755	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1261	-	584	892
Mov Cap-2 Maneuver	-	-	-	-	584	-
Stage 1	-	-	-	-	815	-
Stage 2	-	-	-	-	755	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		15.6	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	584	-	-	1261	-	
HCM Lane V/C Ratio	0.421	-	-	-	-	
HCM Control Delay (s)	15.6	-	-	0	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	2.1	-	-	0	-	

HCM 6th TWSC
5: Cavanaugh Road & 42nd Avenue

2040 Background
PM Peak

Intersection						
Int Delay, s/veh	1.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	36	190	0	8	48
Future Vol, veh/h	0	36	190	0	8	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	0	39	207	0	9	52
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	277	207	0	0	207	0
Stage 1	207	-	-	-	-	-
Stage 2	70	-	-	-	-	-
Critical Hdwy	6.65	6.45	-	-	4.35	-
Critical Hdwy Stg 1	5.65	-	-	-	-	-
Critical Hdwy Stg 2	5.65	-	-	-	-	-
Follow-up Hdwy	3.725	3.525	-	-	2.425	-
Pot Cap-1 Maneuver	666	779	-	-	1238	-
Stage 1	776	-	-	-	-	-
Stage 2	898	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	661	779	-	-	1238	-
Mov Cap-2 Maneuver	661	-	-	-	-	-
Stage 1	776	-	-	-	-	-
Stage 2	892	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	9.9	0	1.1			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	779	1238	-	
HCM Lane V/C Ratio	-	-	0.05	0.007	-	
HCM Control Delay (s)	-	-	9.9	7.9	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	0.2	0	-	


























Intersection						
Int Delay, s/veh	6.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	50	129	78	135	208	51
Future Vol, veh/h	50	129	78	135	208	51
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	54	140	85	147	226	55
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	232	0	-	0	333	85
Stage 1	-	-	-	-	85	-
Stage 2	-	-	-	-	248	-
Critical Hdwy	4.35	-	-	-	6.65	6.45
Critical Hdwy Stg 1	-	-	-	-	5.65	-
Critical Hdwy Stg 2	-	-	-	-	5.65	-
Follow-up Hdwy	2.425	-	-	-	3.725	3.525
Pot Cap-1 Maneuver	1212	-	-	-	618	914
Stage 1	-	-	-	-	883	-
Stage 2	-	-	-	-	742	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1212	-	-	-	590	914
Mov Cap-2 Maneuver	-	-	-	-	590	-
Stage 1	-	-	-	-	843	-
Stage 2	-	-	-	-	742	-
Approach	EB		WB		SB	
HCM Control Delay, s	2.3		0		13.7	
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1212	-	-	-	590	914
HCM Lane V/C Ratio	0.045	-	-	-	0.383	0.061
HCM Control Delay (s)	8.1	-	-	-	14.8	9.2
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	1.8	0.2

Intersection						
Int Delay, s/veh	2.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	160	37	351	223	0
Future Vol, veh/h	0	160	37	351	223	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	0	174	40	382	242	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	513	121	242	0	-	0
Stage 1	242	-	-	-	-	-
Stage 2	271	-	-	-	-	-
Critical Hdwy	7.3	7.4	4.6	-	-	-
Critical Hdwy Stg 1	6.3	-	-	-	-	-
Critical Hdwy Stg 2	6.3	-	-	-	-	-
Follow-up Hdwy	3.75	3.55	2.45	-	-	-
Pot Cap-1 Maneuver	438	839	1170	-	-	-
Stage 1	711	-	-	-	-	-
Stage 2	686	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	423	839	1170	-	-	-
Mov Cap-2 Maneuver	423	-	-	-	-	-
Stage 1	687	-	-	-	-	-
Stage 2	686	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	10.4	0.8		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1170	-	-	839	-	-
HCM Lane V/C Ratio	0.034	-	-	0.207	-	-
HCM Control Delay (s)	8.2	-	0	10.4	-	-
HCM Lane LOS	A	-	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.8	-	-

Timings 3: Quail Run Rd & 32nd Avenue

Used long term
background for
intersections 1 & 2

Long Term Background
AM Peak

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			 			  			  	
Traffic Volume (vph)	4	0	222	2	68	823	855	53	674	16
Future Volume (vph)	4	0	222	2	68	823	855	53	674	16
Turn Type	Perm	NA	Prot	NA	pm+pt	NA	pm+ov	pm+pt	NA	Perm
Protected Phases		4	3	8	5	2	3	1	6	
Permitted Phases	4				2		2	6		6
Detector Phase	4	4	3	8	5	2	3	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.5	23.5	10.5	23.5	10.5	23.5	10.5	10.5	23.5	23.5
Total Split (s)	23.5	23.5	50.0	72.0	10.5	36.0	50.0	12.0	48.0	48.0
Total Split (%)	17.8%	17.8%	37.9%	54.5%	8.0%	27.3%	37.9%	9.1%	36.4%	36.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lag	Lag	Lead		Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	None	C-Max	C-Max
Act Effect Green (s)	6.2	6.2	22.8	30.1	87.1	80.1	109.5	86.0	79.5	79.5
Actuated g/C Ratio	0.05	0.05	0.17	0.23	0.66	0.61	0.83	0.65	0.60	0.60
v/c Ratio	0.06	0.07	0.50	0.06	0.19	0.36	0.76	0.17	0.29	0.02
Control Delay	61.2	0.4	51.2	12.5	12.1	17.6	4.9	12.4	17.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.2	0.4	51.2	12.5	12.1	17.6	4.9	12.4	17.2	0.1
LOS	E	A	D	B	B	B	A	B	B	A
Approach Delay		9.4		48.4		11.2			16.5	
Approach LOS		A		D		B			B	

Intersection Summary

Cycle Length: 132

Actuated Cycle Length: 132

Offset: 30.5 (23%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 15.8

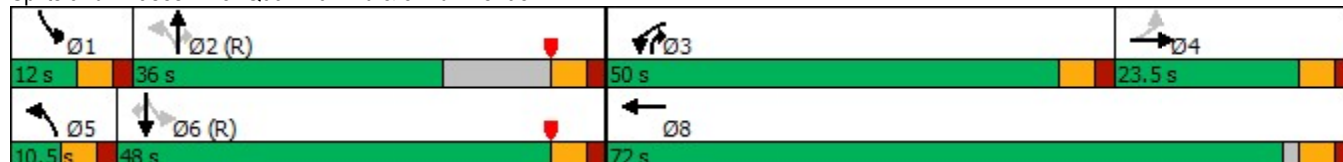
Intersection LOS: B

Intersection Capacity Utilization 75.0%

ICU Level of Service D

Analysis Period (min) 15























Splits and Phases: 3: Quail Run Rd & 32nd Avenue



HCM 6th Signalized Intersection Summary

3: Quail Run Rd & 32nd Avenue


























Long Term Background
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	0	21	222	2	16	68	823	855	53	674	16
Future Volume (veh/h)	4	0	21	222	2	16	68	823	855	53	674	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530
Adj Flow Rate, veh/h	4	0	23	241	2	17	74	895	929	58	733	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	25	25	25	25	25	25	25	25	25	25	25	25
Cap, veh/h	90	0	40	297	25	210	450	2772	997	223	2764	858
Arrive On Green	0.03	0.00	0.03	0.11	0.18	0.18	0.04	0.66	0.66	0.03	0.66	0.66
Sat Flow, veh/h	1139	0	1296	2826	139	1179	1457	4176	1296	1457	4176	1296
Grp Volume(v), veh/h	4	0	23	241	0	19	74	895	929	58	733	17
Grp Sat Flow(s),veh/h/ln	1139	0	1296	1413	0	1317	1457	1392	1296	1457	1392	1296
Q Serve(g_s), s	0.5	0.0	2.3	11.0	0.0	1.6	2.1	12.1	77.1	1.7	9.5	0.6
Cycle Q Clear(g_c), s	0.5	0.0	2.3	11.0	0.0	1.6	2.1	12.1	77.1	1.7	9.5	0.6
Prop In Lane	1.00		1.00	1.00		0.89	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	90	0	40	297	0	234	450	2772	997	223	2764	858
V/C Ratio(X)	0.04	0.00	0.57	0.81	0.00	0.08	0.16	0.32	0.93	0.26	0.27	0.02
Avail Cap(c_a), veh/h	210	0	177	953	0	664	453	2772	997	246	2764	858
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.2	0.0	63.1	57.8	0.0	45.3	6.8	9.5	12.4	7.1	9.2	7.6
Incr Delay (d2), s/veh	0.2	0.0	12.3	5.3	0.0	0.1	0.2	0.3	16.2	0.6	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.2	0.0	1.6	7.5	0.0	1.0	1.2	6.6	30.6	1.0	5.2	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.4	0.0	75.5	63.0	0.0	45.4	6.9	9.8	28.6	7.7	9.4	7.7
LnGrp LOS	E	A	E	E	A	D	A	A	C	A	A	A
Approach Vol, veh/h	27			260			1898			808		
Approach Delay, s/veh	73.5			61.7			18.9			9.2		
Approach LOS	E			E			B			A		
Timer - Assigned Phs	1	2	3	4	5	6	8					
Phs Duration (G+Y+Rc), s	9.9	93.1	19.4	9.6	10.2	92.9	29.0					
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5					
Max Green Setting (Gmax), s	6.5	30.5	44.5	18.0	5.0	42.5	66.5					
Max Q Clear Time (g_c+I1), s	3.7	79.1	13.0	4.3	4.1	11.5	3.6					
Green Ext Time (p_c), s	0.0	0.0	0.9	0.1	0.0	6.0	0.1					
Intersection Summary												
HCM 6th Ctrl Delay	20.5											
HCM 6th LOS	C											

Timings 3: Quail Run Rd & 32nd Avenue

Long term
background for
intersections 1 & 2

Long Term Background
PM Peak

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			 			  			  	
Traffic Volume (vph)	17	2	884	0	22	908	245	15	1298	4
Future Volume (vph)	17	2	884	0	22	908	245	15	1298	4
Turn Type	Perm	NA	Prot	NA	pm+pt	NA	pm+ov	pm+pt	NA	Perm
Protected Phases		4	3	8	5	2	3	1	6	
Permitted Phases	4				2		2	6		6
Detector Phase	4	4	3	8	5	2	3	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.5	23.5	10.5	23.5	10.5	23.5	10.5	10.5	23.5	23.5
Total Split (s)	24.0	24.0	52.0	76.0	11.0	53.0	52.0	11.0	53.0	53.0
Total Split (%)	17.1%	17.1%	37.1%	54.3%	7.9%	37.9%	37.1%	7.9%	37.9%	37.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lag	Lag	Lead		Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	None	C-Max	C-Max
Act Effect Green (s)	8.3	8.3	50.9	64.7	64.3	59.9	114.1	63.2	57.7	57.7
Actuated g/C Ratio	0.06	0.06	0.36	0.46	0.46	0.43	0.82	0.45	0.41	0.41
v/c Ratio	0.28	0.56	0.94	0.09	0.21	0.56	0.24	0.09	0.83	0.01
Control Delay	72.1	31.5	61.1	0.2	33.4	32.1	0.9	22.7	42.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.1	31.5	61.1	0.2	33.4	32.1	0.9	22.7	42.1	0.0
LOS	E	C	E	A	C	C	A	C	D	A
Approach Delay		38.9		57.7		25.6			41.8	
Approach LOS		D		E		C			D	

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 140

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 40.5

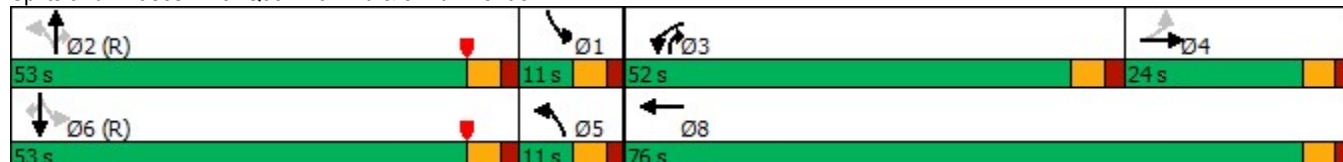
Intersection LOS: D

Intersection Capacity Utilization 66.1%

ICU Level of Service C

Analysis Period (min) 15




























Splits and Phases: 3: Quail Run Rd & 32nd Avenue



HCM 6th Signalized Intersection Summary

3: Quail Run Rd & 32nd Avenue

Long Term Background
PM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations				 				  			  		
Traffic Volume (veh/h)	17	2	73	884	0	52	22	908	245	15	1298	4	
Future Volume (veh/h)	17	2	73	884	0	52	22	908	245	15	1298	4	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach	No			No			No			No			
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	
Adj Flow Rate, veh/h	18	2	79	961	0	57	24	987	266	16	1411	4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Percent Heavy Veh, %	25	25	25	25	25	25	25	25	25	25	25	25	
Cap, veh/h	136	2	98	939	0	581	189	1417	870	252	1417	440	
Arrive On Green	0.08	0.08	0.08	0.33	0.00	0.45	0.09	0.34	0.34	0.09	0.34	0.34	
Sat Flow, veh/h	1101	32	1269	2826	0	1296	1457	4176	1296	1457	4176	1296	
Grp Volume(v), veh/h	18	0	81	961	0	57	24	987	266	16	1411	4	
Grp Sat Flow(s),veh/h/ln	1101	0	1301	1413	0	1296	1457	1392	1296	1457	1392	1296	
Q Serve(g_s), s	2.1	0.0	8.6	46.5	0.0	3.6	0.0	28.6	4.2	0.0	47.2	0.3	
Cycle Q Clear(g_c), s	2.1	0.0	8.6	46.5	0.0	3.6	0.0	28.6	4.2	0.0	47.2	0.3	
Prop In Lane	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00	
Lane Grp Cap(c), veh/h	136	0	100	939	0	581	189	1417	870	252	1417	440	
V/C Ratio(X)	0.13	0.00	0.81	1.02	0.00	0.10	0.13	0.70	0.31	0.06	1.00	0.01	
Avail Cap(c_a), veh/h	197	0	172	939	0	653	189	1417	870	252	1417	440	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	60.6	0.0	63.6	46.8	0.0	22.3	57.4	40.0	2.8	43.1	46.2	30.7	
Incr Delay (d2), s/veh	0.4	0.0	14.0	35.6	0.0	0.1	0.3	2.9	0.9	0.1	23.0	0.0	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(95%),veh/ln	1.1	0.0	5.8	28.8	0.0	2.0	1.4	15.4	2.8	0.8	26.4	0.2	
Unsig. Movement Delay, s/veh													
LnGrp Delay(d),s/veh	61.0	0.0	77.6	82.3	0.0	22.3	57.7	42.9	3.7	43.2	69.1	30.7	
LnGrp LOS	E	A	E	F	A	C	E	D	A	D	E	C	
Approach Vol, veh/h	99			1018				1277				1431	
Approach Delay, s/veh	74.6			79.0				35.0				68.7	
Approach LOS	E			E				C				E	
Timer - Assigned Phs	1	2	3	4	5	6	8						
Phs Duration (G+Y+Rc), s	18.7	53.0	52.0	16.3	18.7	53.0	68.3						
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5						
Max Green Setting (Gmax), s	5.5	47.5	46.5	18.5	5.5	47.5	70.5						
Max Q Clear Time (g_c+I1), s	2.0	30.6	48.5	10.6	2.0	49.2	5.6						
Green Ext Time (p_c), s	0.0	7.6	0.0	0.2	0.0	0.0	0.4						
Intersection Summary													
HCM 6th Ctrl Delay			60.3										
HCM 6th LOS			E										
Notes													

APPENDIX F. ANALYSIS WORKSHEETS – TOTAL CONDITIONS

Timings 1: Imboden Rd & 56th Avenue

2040 Total
AM Peak



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	291	1024	631	175	148	159
Future Volume (vph)	291	1024	631	175	148	159
Lane Group Flow (vph)	316	1113	686	190	161	173
Turn Type	Prot	pt+ov	Prot	NA	NA	pm+ov
Protected Phases	4	4 5	5	2	6	4
Permitted Phases						6
Detector Phase	4	4 5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	23.5		10.5	23.5	23.5	23.5
Total Split (s)	48.0		47.0	72.0	25.0	48.0
Total Split (%)	40.0%		39.2%	60.0%	20.8%	40.0%
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5		5.5	5.5	5.5	5.5
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		None	C-Max	C-Max	None
v/c Ratio	0.76	0.67	0.78	0.11	0.21	0.22
Control Delay	50.1	7.5	38.0	5.3	39.6	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.1	7.5	38.0	5.3	39.6	7.5
Queue Length 50th (ft)	220	128	143	14	53	31
Queue Length 95th (ft)	302	134	243	26	93	71
Internal Link Dist (ft)	22583			3921	12432	
Turn Bay Length (ft)		100	100			100
Base Capacity (vph)	511	1712	974	1787	749	878
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.65	0.70	0.11	0.21	0.20

Intersection Summary

Cycle Length: 120

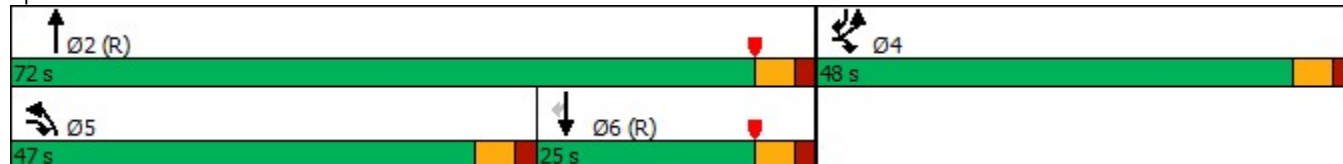
Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 80

Control Type: Actuated-Coordinated

Splits and Phases: 1: Imboden Rd & 56th Avenue









HCM 6th Signalized Intersection Summary

1: Imboden Rd & 56th Avenue

2040 Total
AM Peak























Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	291	1024	631	175	148	159
Future Volume (veh/h)	291	1024	631	175	148	159
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530
Adj Flow Rate, veh/h	316	1113	686	190	161	173
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	25	25	25	25	25	25
Cap, veh/h	516	1422	761	1610	694	769
Arrive On Green	0.35	0.35	0.27	0.55	0.24	0.24
Sat Flow, veh/h	1457	2281	2826	2983	2983	1296
Grp Volume(v), veh/h	316	1113	686	190	161	173
Grp Sat Flow(s),veh/h/ln	1457	1141	1413	1453	1453	1296
Q Serve(g_s), s	21.5	42.5	28.1	3.7	5.4	7.5
Cycle Q Clear(g_c), s	21.5	42.5	28.1	3.7	5.4	7.5
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	516	1422	761	1610	694	769
V/C Ratio(X)	0.61	0.78	0.90	0.12	0.23	0.23
Avail Cap(c_a), veh/h	516	1422	977	1610	694	769
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.0	16.6	42.3	12.8	36.8	11.5
Incr Delay (d2), s/veh	2.1	2.9	9.5	0.1	0.8	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	12.4	34.5	16.1	2.2	3.6	8.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	34.1	19.5	51.8	12.9	37.6	12.1
LnGrp LOS	C	B	D	B	D	B
Approach Vol, veh/h	1429			876	334	
Approach Delay, s/veh	22.7			43.3	24.4	
Approach LOS	C			D	C	
Timer - Assigned Phs	2		4		5	6
Phs Duration (G+Y+Rc), s	72.0		48.0		37.8	34.2
Change Period (Y+Rc), s	5.5		5.5		5.5	5.5
Max Green Setting (Gmax), s	66.5		42.5		41.5	19.5
Max Q Clear Time (g_c+l1), s	5.7		44.5		30.1	9.5
Green Ext Time (p_c), s	1.4		0.0		2.2	1.1
Intersection Summary						
HCM 6th Ctrl Delay			29.8			
HCM 6th LOS			C			

Notes

User approved pedestrian interval to be less than phase max green.

Timings 2: Imboden Rd & 48th Avenue

2040 Total
AM Peak

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	5	5	190	5	227	10	429	306	744	409
Future Volume (vph)	5	5	190	5	227	10	429	306	744	409
Lane Group Flow (vph)	5	16	207	126	126	11	466	333	809	450
Turn Type	Perm	NA	pm+pt	NA	pm+ov	Perm	NA	pm+ov	Prot	NA
Protected Phases		4	3	8	1		2	3	1	6
Permitted Phases	4		8		8	2		2		
Detector Phase	4	4	3	8	1	2	2	3	1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.5	23.5	10.5	23.5	10.5	23.5	23.5	10.5	10.5	23.5
Total Split (s)	24.0	24.0	20.0	44.0	46.0	30.0	30.0	20.0	46.0	76.0
Total Split (%)	20.0%	20.0%	16.7%	36.7%	38.3%	25.0%	25.0%	16.7%	38.3%	63.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lag	Lag	Lead		Lead	Lag	Lag	Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	None	C-Max
v/c Ratio	0.06	0.19	1.01	0.42	0.18	0.04	0.45	0.40	0.86	0.21
Control Delay	54.6	37.1	114.9	11.8	6.8	33.3	33.8	4.3	46.5	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.6	37.1	114.9	11.8	6.8	33.3	33.8	4.3	46.5	8.2
Queue Length 50th (ft)	4	4	~193	4	31	5	133	3	307	58
Queue Length 95th (ft)	17	27	#274	55	41	23	236	67	363	108
Internal Link Dist (ft)		1288		382			2909			761
Turn Bay Length (ft)	100		100			100		100	100	
Base Capacity (vph)	234	219	205	478	715	270	1044	835	995	2146
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.07	1.01	0.26	0.18	0.04	0.45	0.40	0.81	0.21

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

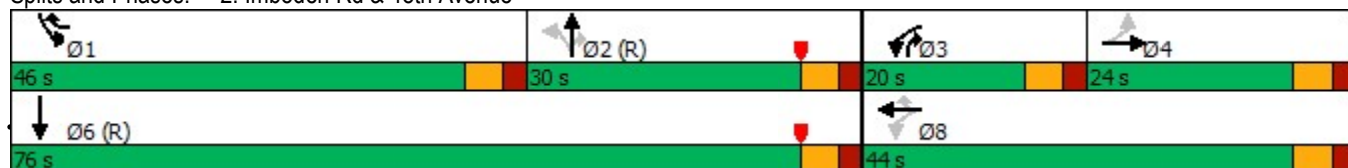
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Imboden Rd & 48th Avenue


























FHU

HCM 6th Signalized Intersection Summary












2: Imboden Rd & 48th Avenue

2040 Total
AM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	5	5	10	190	5	227	10	429	306	744	409	5	
Future Volume (veh/h)	5	5	10	190	5	227	10	429	306	744	409	5	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach	No			No			No			No			
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	
Adj Flow Rate, veh/h	5	5	11	207	0	250	11	466	333	809	445	5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Percent Heavy Veh, %	25	25	25	25	25	25	25	25	25	25	25	25	
Cap, veh/h	108	18	39	271	0	1339	326	1005	605	871	2060	23	
Arrive On Green	0.04	0.04	0.04	0.12	0.00	0.21	0.35	0.35	0.35	0.31	0.70	0.70	
Sat Flow, veh/h	1159	425	936	1457	0	2592	769	2906	1296	2826	2944	33	
Grp Volume(v), veh/h	5	0	16	207	0	250	11	466	333	809	220	230	
Grp Sat Flow(s),veh/h/ln	1159	0	1361	1457	0	1296	769	1453	1296	1413	1453	1524	
Q Serve(g_s), s	0.5	0.0	1.4	14.5	0.0	6.2	1.1	15.0	22.1	33.3	6.4	6.4	
Cycle Q Clear(g_c), s	0.5	0.0	1.4	14.5	0.0	6.2	1.1	15.0	22.1	33.3	6.4	6.4	
Prop In Lane	1.00		0.69	1.00		1.00	1.00		1.00	1.00		0.02	
Lane Grp Cap(c), veh/h	108	0	57	271	0	1339	326	1005	605	871	1017	1066	
V/C Ratio(X)	0.05	0.00	0.28	0.76	0.00	0.19	0.03	0.46	0.55	0.93	0.22	0.22	
Avail Cap(c_a), veh/h	239	0	210	271	0	1631	326	1005	605	954	1017	1066	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	55.3	0.0	55.8	47.6	0.0	15.5	26.0	30.6	23.0	40.2	6.4	6.4	
Incr Delay (d2), s/veh	0.2	0.0	2.7	12.3	0.0	0.1	0.2	1.5	3.6	14.2	0.5	0.5	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(95%),veh/ln	0.3	0.0	0.9	11.4	0.0	3.3	0.4	9.3	11.7	19.1	3.6	3.7	
Unsig. Movement Delay, s/veh													
LnGrp Delay(d),s/veh	55.5	0.0	58.4	59.8	0.0	15.6	26.2	32.1	26.5	54.5	6.8	6.8	
LnGrp LOS	E	A	E	E	A	B	C	C	C	D	A	A	
Approach Vol, veh/h	21			457				810				1259	
Approach Delay, s/veh	57.7			35.6				29.7				37.5	
Approach LOS	E			D				C				D	
Timer - Assigned Phs	1	2	3	4	6			8					
Phs Duration (G+Y+Rc), s	42.5	47.0	20.0	10.5	89.5			30.5					
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5			5.5					
Max Green Setting (Gmax), s	40.5	24.5	14.5	18.5	70.5			38.5					
Max Q Clear Time (g_c+I1), s	35.3	24.1	16.5	3.4	8.4			8.2					
Green Ext Time (p_c), s	1.7	0.2	0.0	0.0	3.1			1.0					
Intersection Summary													
HCM 6th Ctrl Delay				34.8									
HCM 6th LOS				C									
Notes													
User approved pedestrian interval to be less than phase max green.													
User approved volume balancing among the lanes for turning movement.													

Timings 3: Quail Run Rd & 32nd Avenue

2040 Total
AM Peak

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	138	7	772	403	23	596
Future Volume (vph)	138	7	772	403	23	596
Lane Group Flow (vph)	150	8	839	438	25	648
Turn Type	Prot	Prot	NA	pm+ov	pm+pt	NA
Protected Phases	3	3	2	3	1	6
Permitted Phases				2	6	
Detector Phase	3	3	2	3	1	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.5	10.5	23.5	10.5	10.5	23.5
Total Split (s)	42.0	42.0	76.5	42.0	12.0	88.5
Total Split (%)	32.2%	32.2%	58.6%	32.2%	9.2%	67.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	C-Max	None	None	C-Max
v/c Ratio	0.71	0.04	0.41	0.36	0.06	0.29
Control Delay	70.5	23.0	9.8	0.9	5.0	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.5	23.0	9.8	0.9	5.0	5.4
Queue Length 50th (ft)	123	0	153	0	4	73
Queue Length 95th (ft)	185	14	242	11	14	125
Internal Link Dist (ft)	1393		912			5621
Turn Bay Length (ft)	100			100	100	
Base Capacity (vph)	403	367	2062	1277	390	2222
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.02	0.41	0.34	0.06	0.29

Intersection Summary

Cycle Length: 130.5

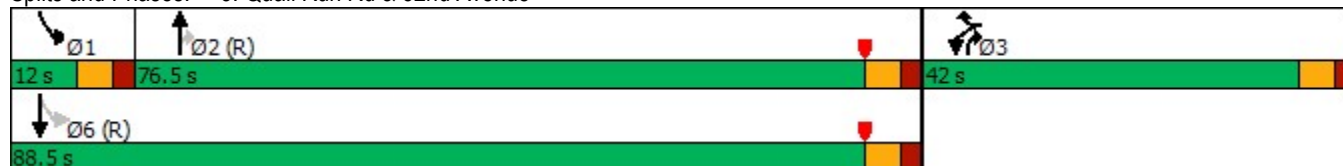
Actuated Cycle Length: 130.5

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated








Splits and Phases: 3: Quail Run Rd & 32nd Avenue



HCM 6th Signalized Intersection Summary

3: Quail Run Rd & 32nd Avenue

2040 Total
AM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	138	7	772	403	23	596
Future Volume (veh/h)	138	7	772	403	23	596
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530
Adj Flow Rate, veh/h	150	8	839	438	25	648
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	25	25	25	25	25	25
Cap, veh/h	174	155	2124	1102	309	2313
Arrive On Green	0.12	0.12	0.73	0.73	0.02	0.80
Sat Flow, veh/h	1457	1296	2983	1296	1457	2983
Grp Volume(v), veh/h	150	8	839	438	25	648
Grp Sat Flow(s),veh/h/ln	1457	1296	1453	1296	1457	1453
Q Serve(g_s), s	13.1	0.7	14.2	9.9	0.5	7.6
Cycle Q Clear(g_c), s	13.1	0.7	14.2	9.9	0.5	7.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	174	155	2124	1102	309	2313
V/C Ratio(X)	0.86	0.05	0.40	0.40	0.08	0.28
Avail Cap(c_a), veh/h	409	364	2124	1102	348	2313
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.2	50.7	6.6	2.2	4.6	3.5
Incr Delay (d2), s/veh	11.8	0.1	0.6	1.1	0.1	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.2	0.4	7.5	3.6	0.3	3.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	68.0	50.9	7.2	3.3	4.7	3.8
LnGrp LOS	E	D	A	A	A	A
Approach Vol, veh/h	158		1277			673
Approach Delay, s/veh	67.2		5.8			3.8
Approach LOS	E		A			A
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	8.5	100.5			109.0	21.0
Change Period (Y+Rc), s	5.5	5.5			5.5	5.5
Max Green Setting (Gmax), s	6.5	71.0			83.0	36.5
Max Q Clear Time (g_c+l1), s	2.5	16.2			9.6	15.1
Green Ext Time (p_c), s	0.0	10.4			5.5	0.4
Intersection Summary						
HCM 6th Ctrl Delay			9.8			
HCM 6th LOS			A			









HCM 6th TWSC
4: Cavanaugh Road & 48t Avenue/48th Avenue

2040 Total
AM Peak

Intersection						
Int Delay, s/veh	1.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↖	↑↑	↘	
Traffic Vol, veh/h	401	294	6	182	98	3
Future Vol, veh/h	401	294	6	182	98	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	436	320	7	198	107	3
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	756	0	549	218
Stage 1	-	-	-	-	436	-
Stage 2	-	-	-	-	113	-
Critical Hdwy	-	-	4.6	-	7.3	7.4
Critical Hdwy Stg 1	-	-	-	-	6.3	-
Critical Hdwy Stg 2	-	-	-	-	6.3	-
Follow-up Hdwy	-	-	2.45	-	3.75	3.55
Pot Cap-1 Maneuver	-	-	715	-	414	720
Stage 1	-	-	-	-	557	-
Stage 2	-	-	-	-	835	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	715	-	410	720
Mov Cap-2 Maneuver	-	-	-	-	410	-
Stage 1	-	-	-	-	557	-
Stage 2	-	-	-	-	827	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.3		16.8	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	415	-	-	715	-	
HCM Lane V/C Ratio	0.265	-	-	0.009	-	
HCM Control Delay (s)	16.8	-	-	10.1	-	
HCM Lane LOS	C	-	-	B	-	
HCM 95th %tile Q(veh)	1.1	-	-	0	-	

HCM 6th TWSC
5: Cavanaugh Road & 42nd Avenue

2040 Total
AM Peak

Intersection												
Int Delay, s/veh	4.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	37	5	2	67	15	3	75	3	48	217	0
Future Vol, veh/h	0	37	5	2	67	15	3	75	3	48	217	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	0	40	5	2	73	16	3	82	3	52	236	0







Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	474	431	236	453	430	84	236	0	0	85	0	0
Stage 1	340	340	-	90	90	-	-	-	-	-	-	-
Stage 2	134	91	-	363	340	-	-	-	-	-	-	-
Critical Hdwy	7.35	6.75	6.45	7.35	6.75	6.45	4.35	-	-	4.35	-	-
Critical Hdwy Stg 1	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.725	4.225	3.525	3.725	4.225	3.525	2.425	-	-	2.425	-	-
Pot Cap-1 Maneuver	465	484	749	480	485	915	1207	-	-	1378	-	-
Stage 1	629	600	-	864	778	-	-	-	-	-	-	-
Stage 2	817	777	-	611	600	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	390	465	749	432	466	915	1207	-	-	1378	-	-
Mov Cap-2 Maneuver	390	465	-	432	466	-	-	-	-	-	-	-
Stage 1	628	577	-	862	776	-	-	-	-	-	-	-
Stage 2	725	775	-	543	577	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	13.2		13.5		0.3		1.4	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1207	-	-	-	487	432	512	1378	-	-
HCM Lane V/C Ratio	0.003	-	-	-	0.094	0.005	0.174	0.038	-	-
HCM Control Delay (s)	8	-	-	0	13.2	13.4	13.5	7.7	-	-
HCM Lane LOS	A	-	-	A	B	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0.3	0	0.6	0.1	-	-







HCM 6th TWSC
6: 32nd Avenue & Cavanaugh Road

2040 Total
AM Peak

Intersection						
Int Delay, s/veh	5.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	92	74	125	234	149	73
Future Vol, veh/h	92	74	125	234	149	73
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	100	80	136	254	162	79
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	390	0	-	0	416	136
Stage 1	-	-	-	-	136	-
Stage 2	-	-	-	-	280	-
Critical Hdwy	4.35	-	-	-	6.65	6.45
Critical Hdwy Stg 1	-	-	-	-	5.65	-
Critical Hdwy Stg 2	-	-	-	-	5.65	-
Follow-up Hdwy	2.425	-	-	-	3.725	3.525
Pot Cap-1 Maneuver	1054	-	-	-	552	855
Stage 1	-	-	-	-	837	-
Stage 2	-	-	-	-	717	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1054	-	-	-	500	855
Mov Cap-2 Maneuver	-	-	-	-	500	-
Stage 1	-	-	-	-	757	-
Stage 2	-	-	-	-	717	-
Approach	EB	WB		SB		
HCM Control Delay, s	4.9	0		13.6		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1054	-	-	-	500	855
HCM Lane V/C Ratio	0.095	-	-	-	0.324	0.093
HCM Control Delay (s)	8.8	-	-	-	15.6	9.6
HCM Lane LOS	A	-	-	-	C	A
HCM 95th %tile Q(veh)	0.3	-	-	-	1.4	0.3













HCM 6th TWSC
7: Manila Road & 42nd Avenue

2040 Total
AM Peak

Intersection						
Int Delay, s/veh	3.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	105	283	355	411	0
Future Vol, veh/h	0	105	283	355	411	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	0	114	308	386	447	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1256	224	447	0	-	0
Stage 1	447	-	-	-	-	-
Stage 2	809	-	-	-	-	-
Critical Hdwy	7.3	7.4	4.6	-	-	-
Critical Hdwy Stg 1	6.3	-	-	-	-	-
Critical Hdwy Stg 2	6.3	-	-	-	-	-
Follow-up Hdwy	3.75	3.55	2.45	-	-	-
Pot Cap-1 Maneuver	135	713	963	-	-	-
Stage 1	549	-	-	-	-	-
Stage 2	345	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	92	713	963	-	-	-
Mov Cap-2 Maneuver	92	-	-	-	-	-
Stage 1	373	-	-	-	-	-
Stage 2	345	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	11	4.6		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	963	-	-	713	-	-
HCM Lane V/C Ratio	0.319	-	-	0.16	-	-
HCM Control Delay (s)	10.5	-	0	11	-	-
HCM Lane LOS	B	-	A	B	-	-
HCM 95th %tile Q(veh)	1.4	-	-	0.6	-	-

HCM 6th TWSC
8: Quail Run Drive & 48th Avenue

2040 Total
AM Peak

Intersection												
Int Delay, s/veh	9.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	708	234	8	211	1	137	0	16	1	0	12
Future Vol, veh/h	20	708	234	8	211	1	137	0	16	1	0	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	100	100	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	22	770	254	9	229	1	149	0	17	1	0	13





Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	230	0	0	1024	0	0	947	1062	385	677	1316	115
Stage 1	-	-	-	-	-	-	814	814	-	248	248	-
Stage 2	-	-	-	-	-	-	133	248	-	429	1068	-
Critical Hdwy	4.6	-	-	4.6	-	-	8	7	7.4	8	7	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-	7	6	-	7	6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7	6	-	7	6	-
Follow-up Hdwy	2.45	-	-	2.45	-	-	3.75	4.25	3.55	3.75	4.25	3.55
Pot Cap-1 Maneuver	1183	-	-	551	-	-	184	188	552	297	129	847
Stage 1	-	-	-	-	-	-	292	339	-	673	646	-
Stage 2	-	-	-	-	-	-	794	646	-	517	251	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1183	-	-	551	-	-	176	181	552	280	124	847
Mov Cap-2 Maneuver	-	-	-	-	-	-	176	181	-	280	124	-
Stage 1	-	-	-	-	-	-	286	333	-	660	636	-
Stage 2	-	-	-	-	-	-	769	636	-	491	246	-





Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2	-	-	0.4	-	-	77.9	-	-	10	-	-
HCM LOS	-	-	-	-	-	-	F	-	-	B	-	-

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	176	552	1183	-	-	551	-	-	733
HCM Lane V/C Ratio	0.846	0.032	0.018	-	-	0.016	-	-	0.019
HCM Control Delay (s)	85.6	11.7	8.1	-	-	11.6	-	-	10
HCM Lane LOS	F	B	A	-	-	B	-	-	B
HCM 95th %tile Q(veh)	6	0.1	0.1	-	-	0	-	-	0.1

HCM 6th TWSC
9: 32nd Avenue & Quail Run Drive






2040 Total
AM Peak

Intersection						
Int Delay, s/veh	2.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	99	327	92	2	1	51
Future Vol, veh/h	99	327	92	2	1	51
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	108	355	100	2	1	55
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	102	0	-	0	672	101
Stage 1	-	-	-	-	101	-
Stage 2	-	-	-	-	571	-
Critical Hdwy	4.35	-	-	-	6.65	6.45
Critical Hdwy Stg 1	-	-	-	-	5.65	-
Critical Hdwy Stg 2	-	-	-	-	5.65	-
Follow-up Hdwy	2.425	-	-	-	3.725	3.525
Pot Cap-1 Maneuver	1358	-	-	-	388	895
Stage 1	-	-	-	-	869	-
Stage 2	-	-	-	-	522	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1358	-	-	-	357	895
Mov Cap-2 Maneuver	-	-	-	-	357	-
Stage 1	-	-	-	-	799	-
Stage 2	-	-	-	-	522	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.8	0		9.4		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1358	-	-	-	870	
HCM Lane V/C Ratio	0.079	-	-	-	0.065	
HCM Control Delay (s)	7.9	-	-	-	9.4	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0.3	-	-	-	0.2	

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	4	640	16	6	1153
Future Vol, veh/h	0	4	640	16	6	1153
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	0	4	696	17	7	1253
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	357	0	0	713	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.4	-	-	4.6	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.55	-	-	2.45	-
Pot Cap-1 Maneuver	0	578	-	-	746	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	578	-	-	746	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	11.3	0		0.1		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	- 578		746	-	
HCM Lane V/C Ratio	-	- 0.008		0.009	-	
HCM Control Delay (s)	-	- 11.3		9.9	-	
HCM Lane LOS	-	- B		A	-	
HCM 95th %tile Q(veh)	-	- 0		0	-	







HCM 6th TWSC
11: Imboden Rd & PA-5 Access

2040 Total
AM Peak

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	26	4	731	47	7	592
Future Vol, veh/h	26	4	731	47	7	592
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	100	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	28	4	795	51	8	643
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1133	398	0	0	846	0
Stage 1	795	-	-	-	-	-
Stage 2	338	-	-	-	-	-
Critical Hdwy	7.3	7.4	-	-	4.6	-
Critical Hdwy Stg 1	6.3	-	-	-	-	-
Critical Hdwy Stg 2	6.3	-	-	-	-	-
Follow-up Hdwy	3.75	3.55	-	-	2.45	-
Pot Cap-1 Maneuver	*299	541	-	-	656	-
Stage 1	*351	-	-	-	-	-
Stage 2	*745	-	-	-	-	-
Platoon blocked, %	1	-	-	-	-	-
Mov Cap-1 Maneuver	*295	541	-	-	656	-
Mov Cap-2 Maneuver	*295	-	-	-	-	-
Stage 1	*351	-	-	-	-	-
Stage 2	*736	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	17.8	0		0.1		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	-	314	656	-	
HCM Lane V/C Ratio	-	-	0.104	0.012	-	
HCM Control Delay (s)	-	-	17.8	10.6	-	
HCM Lane LOS	-	-	C	B	-	
HCM 95th %tile Q(veh)	-	-	0.3	0	-	
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

HCM 6th TWSC
12: PA-5 Access/PA-2 Access & 48th Avenue

2040 Total
AM Peak

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	1015	18	1	388	2	10	0	1	2	0	19
Future Vol, veh/h	18	1015	18	1	388	2	10	0	1	2	0	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	20	1103	20	1	422	2	11	0	1	2	0	21

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	424	0	0	1123	0	0	1366	1579	562	1017	1588	212
Stage 1	-	-	-	-	-	-	1153	1153	-	425	425	-
Stage 2	-	-	-	-	-	-	213	426	-	592	1163	-
Critical Hdwy	4.6	-	-	4.6	-	-	8	7	7.4	8	7	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-	7	6	-	7	6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7	6	-	7	6	-
Follow-up Hdwy	2.45	-	-	2.45	-	-	3.75	4.25	3.55	3.75	4.25	3.55
Pot Cap-1 Maneuver	984	-	-	*893	-	-	*341	*204	*616	*583	*200	727
Stage 1	-	-	-	-	-	-	*583	*515	-	*520	*531	-
Stage 2	-	-	-	-	-	-	*707	*530	-	*583	*515	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	984	-	-	*893	-	-	*326	*200	*616	*572	*196	727
Mov Cap-2 Maneuver	-	-	-	-	-	-	*326	*200	-	*572	*196	-
Stage 1	-	-	-	-	-	-	*572	*504	-	*510	*530	-
Stage 2	-	-	-	-	-	-	*686	*529	-	*570	*504	-





Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	15.9	10.2
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	341	984	-	-	* 893	-	-	709
HCM Lane V/C Ratio	0.035	0.02	-	-	0.001	-	-	0.032
HCM Control Delay (s)	15.9	8.7	-	-	9	-	-	10.2
HCM Lane LOS	C	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.1

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





HCM 6th TWSC
13: 48th Avenue & PA-3 Western Access

2040 Total
AM Peak

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	38	979	367	2	1	23
Future Vol, veh/h	38	979	367	2	1	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	41	1064	399	2	1	25
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	401	0	-	0	1014	201
Stage 1	-	-	-	-	400	-
Stage 2	-	-	-	-	614	-
Critical Hdwy	4.6	-	-	-	7.3	7.4
Critical Hdwy Stg 1	-	-	-	-	6.3	-
Critical Hdwy Stg 2	-	-	-	-	6.3	-
Follow-up Hdwy	2.45	-	-	-	3.75	3.55
Pot Cap-1 Maneuver	1006	-	-	-	199	740
Stage 1	-	-	-	-	583	-
Stage 2	-	-	-	-	444	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1006	-	-	-	191	740
Mov Cap-2 Maneuver	-	-	-	-	191	-
Stage 1	-	-	-	-	559	-
Stage 2	-	-	-	-	444	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.3	0		10.7		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1006	-	-	-	661	
HCM Lane V/C Ratio	0.041	-	-	-	0.039	
HCM Control Delay (s)	8.7	-	-	-	10.7	
HCM Lane LOS	A	-	-	-	B	
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1	

HCM 6th TWSC
14: 48th Avenue & PA-3 Eastern Access

2040 Total
AM Peak

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	961	358	1	1	12
Future Vol, veh/h	20	961	358	1	1	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	22	1045	389	1	1	13

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	390	0	-	0	957 195
Stage 1	-	-	-	-	390 -
Stage 2	-	-	-	-	567 -
Critical Hdwy	4.6	-	-	-	7.3 7.4
Critical Hdwy Stg 1	-	-	-	-	6.3 -
Critical Hdwy Stg 2	-	-	-	-	6.3 -
Follow-up Hdwy	2.45	-	-	-	3.75 3.55
Pot Cap-1 Maneuver	1016	-	-	-	218 747
Stage 1	-	-	-	-	590 -
Stage 2	-	-	-	-	471 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1016	-	-	-	213 747
Mov Cap-2 Maneuver	-	-	-	-	213 -
Stage 1	-	-	-	-	577 -
Stage 2	-	-	-	-	471 -

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1016	-	-	-	626
HCM Lane V/C Ratio	0.021	-	-	-	0.023
HCM Control Delay (s)	8.6	-	-	-	10.9
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

HCM 6th TWSC
15: PA-8A Access & 48th Avenue

2040 Total
AM Peak

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↑	↑↑	↑	
Traffic Vol, veh/h	705	19	6	213	6	5
Future Vol, veh/h	705	19	6	213	6	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	766	21	7	232	7	5







Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	787	0	907
Stage 1	-	-	-	-	777
Stage 2	-	-	-	-	130
Critical Hdwy	-	-	4.6	-	7.3
Critical Hdwy Stg 1	-	-	-	-	6.3
Critical Hdwy Stg 2	-	-	-	-	6.3
Follow-up Hdwy	-	-	2.45	-	3.75
Pot Cap-1 Maneuver	-	-	694	-	236
Stage 1	-	-	-	-	360
Stage 2	-	-	-	-	818
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	694	-	234
Mov Cap-2 Maneuver	-	-	-	-	234
Stage 1	-	-	-	-	360
Stage 2	-	-	-	-	810

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	16.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	316	-	-	694	-
HCM Lane V/C Ratio	0.038	-	-	0.009	-
HCM Control Delay (s)	16.8	-	-	10.2	-
HCM Lane LOS	C	-	-	B	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

HCM 6th TWSC
16: PA-8A Access/PA-4 Access & 48th Avenue

2040 Total
AM Peak

Intersection												
Int Delay, s/veh	1.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	668	30	46	195	6	17	0	26	5	0	7
Future Vol, veh/h	12	668	30	46	195	6	17	0	26	5	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	13	726	33	50	212	7	18	0	28	5	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	219	0	0	759	0	0	975	1088	380	705	1101	110
Stage 1	-	-	-	-	-	-	769	769	-	316	316	-
Stage 2	-	-	-	-	-	-	206	319	-	389	785	-
Critical Hdwy	4.6	-	-	4.6	-	-	8	7	7.4	8	7	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-	7	6	-	7	6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7	6	-	7	6	-
Follow-up Hdwy	2.45	-	-	2.45	-	-	3.75	4.25	3.55	3.75	4.25	3.55
Pot Cap-1 Maneuver	1196	-	-	713	-	-	175	181	557	283	178	854
Stage 1	-	-	-	-	-	-	313	358	-	609	599	-
Stage 2	-	-	-	-	-	-	715	597	-	548	351	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1196	-	-	713	-	-	163	167	557	252	164	854
Mov Cap-2 Maneuver	-	-	-	-	-	-	163	167	-	252	164	-
Stage 1	-	-	-	-	-	-	310	354	-	602	557	-
Stage 2	-	-	-	-	-	-	659	555	-	515	347	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.9			20.1			13.7		
HCM LOS							C			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	285	1196	-	-	713	-	-	428
HCM Lane V/C Ratio	0.164	0.011	-	-	0.07	-	-	0.03
HCM Control Delay (s)	20.1	8	-	-	10.4	-	-	13.7
HCM Lane LOS	C	A	-	-	B	-	-	B
HCM 95th %tile Q(veh)	0.6	0	-	-	0.2	-	-	0.1







HCM 6th TWSC
17: PA-8B Access & 48th Avenue

2040 Total
AM Peak

Intersection						
Int Delay, s/veh	1.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↖	↑↑	↘	
Traffic Vol, veh/h	391	12	46	181	7	26
Future Vol, veh/h	391	12	46	181	7	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	425	13	50	197	8	28
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	438	0	631	219
Stage 1	-	-	-	-	432	-
Stage 2	-	-	-	-	199	-
Critical Hdwy	-	-	4.6	-	7.3	7.4
Critical Hdwy Stg 1	-	-	-	-	6.3	-
Critical Hdwy Stg 2	-	-	-	-	6.3	-
Follow-up Hdwy	-	-	2.45	-	3.75	3.55
Pot Cap-1 Maneuver	-	-	971	-	364	719
Stage 1	-	-	-	-	560	-
Stage 2	-	-	-	-	750	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	971	-	345	719
Mov Cap-2 Maneuver	-	-	-	-	345	-
Stage 1	-	-	-	-	560	-
Stage 2	-	-	-	-	712	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		1.8		11.6	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	585	-	-	971	-	
HCM Lane V/C Ratio	0.061	-	-	0.051	-	
HCM Control Delay (s)	11.6	-	-	8.9	-	
HCM Lane LOS	B	-	-	A	-	
HCM 95th %tile Q(veh)	0.2	-	-	0.2	-	

HCM 6th TWSC
18: Quail Run Drive & PA-8A Access

2040 Total
AM Peak

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	54	0	0	2	0	6	0	92	3	7	138	96
Future Vol, veh/h	54	0	0	2	0	6	0	92	3	7	138	96
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	59	0	0	2	0	7	0	100	3	8	150	104
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	323	321	202	320	372	102	254	0	0	103	0	0
Stage 1	218	218	-	102	102	-	-	-	-	-	-	-
Stage 2	105	103	-	218	270	-	-	-	-	-	-	-
Critical Hdwy	7.35	6.75	6.45	7.35	6.75	6.45	4.35	-	-	4.35	-	-
Critical Hdwy Stg 1	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.725	4.225	3.525	3.725	4.225	3.525	2.425	-	-	2.425	-	-
Pot Cap-1 Maneuver	588	560	784	591	523	894	1188	-	-	1357	-	-
Stage 1	735	682	-	851	768	-	-	-	-	-	-	-
Stage 2	847	767	-	735	646	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	581	557	784	589	520	894	1188	-	-	1357	-	-
Mov Cap-2 Maneuver	581	557	-	589	520	-	-	-	-	-	-	-
Stage 1	735	678	-	851	768	-	-	-	-	-	-	-
Stage 2	841	767	-	731	642	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	11.9		9.6			0			0.2			
HCM LOS	B		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1188	-	-	581	792	1357	-	-				
HCM Lane V/C Ratio	-	-	-	0.101	0.011	0.006	-	-				
HCM Control Delay (s)	0	-	-	11.9	9.6	7.7	-	-				
HCM Lane LOS	A	-	-	B	A	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.3	0	0	-	-				

HCM 6th TWSC
19: Cavanaugh Road & PA-8A Access/PA-8B Access

2040 Total
AM Peak

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	17	0	3	4	0	7	6	77	7	12	258	29
Future Vol, veh/h	17	0	3	4	0	7	6	77	7	12	258	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	18	0	3	4	0	8	7	84	8	13	280	32

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	428	428	296	426	440	88	312	0	0	92	0	0
Stage 1	322	322	-	102	102	-	-	-	-	-	-	-
Stage 2	106	106	-	324	338	-	-	-	-	-	-	-
Critical Hdwy	7.35	6.75	6.45	7.35	6.75	6.45	4.35	-	-	4.35	-	-
Critical Hdwy Stg 1	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.725	4.225	3.525	3.725	4.225	3.525	2.425	-	-	2.425	-	-
Pot Cap-1 Maneuver	499	486	692	501	478	910	1129	-	-	1370	-	-
Stage 1	644	612	-	851	768	-	-	-	-	-	-	-
Stage 2	846	765	-	642	602	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	489	479	692	492	471	910	1129	-	-	1370	-	-
Mov Cap-2 Maneuver	489	479	-	492	471	-	-	-	-	-	-	-
Stage 1	640	606	-	846	763	-	-	-	-	-	-	-
Stage 2	834	760	-	633	597	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	12.3		10.3		0.5		0.3	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1129	-	-	512 695	1370	-	-
HCM Lane V/C Ratio	0.006	-	-	0.042 0.017	0.01	-	-
HCM Control Delay (s)	8.2	-	-	12.3 10.3	7.7	-	-
HCM Lane LOS	A	-	-	B B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1 0.1	0	-	-

HCM 6th TWSC
20: Quail Run Drive & 42nd Avenue

2040 Total
AM Peak

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	54	0	0	18	0	18	0	23	37	27	18	96
Future Vol, veh/h	54	0	0	18	0	18	0	23	37	27	18	96
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	59	0	0	20	0	20	0	25	40	29	20	104







Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	185	195	72	175	227	45	124	0	0	65	0	0
Stage 1	130	130	-	45	45	-	-	-	-	-	-	-
Stage 2	55	65	-	130	182	-	-	-	-	-	-	-
Critical Hdwy	7.35	6.75	6.45	7.35	6.75	6.45	4.35	-	-	4.35	-	-
Critical Hdwy Stg 1	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.725	4.225	3.525	3.725	4.225	3.525	2.425	-	-	2.425	-	-
Pot Cap-1 Maneuver	728	661	930	739	634	963	1332	-	-	1403	-	-
Stage 1	821	746	-	914	814	-	-	-	-	-	-	-
Stage 2	902	798	-	821	708	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	702	647	930	727	621	963	1332	-	-	1403	-	-
Mov Cap-2 Maneuver	702	647	-	727	621	-	-	-	-	-	-	-
Stage 1	821	730	-	914	814	-	-	-	-	-	-	-
Stage 2	884	798	-	804	693	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	10.6		9.6		0		1.5	
HCM LOS	B		A					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1332	-	-	702 829	1403	-	-
HCM Lane V/C Ratio	-	-	-	0.084 0.047	0.021	-	-
HCM Control Delay (s)	0	-	-	10.6 9.6	7.6	-	-
HCM Lane LOS	A	-	-	B A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3 0.1	0.1	-	-







HCM 6th TWSC
21: PA-9 Access/PA-8A Access & 42nd Avenue

2040 Total
AM Peak

Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	44	13	9	26	0	5	0	8	0	0	5
Future Vol, veh/h	6	44	13	9	26	0	5	0	8	0	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	7	48	14	10	28	0	5	0	9	0	0	5
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	28	0	0	62	0	0	120	117	55	122	124	28
Stage 1	-	-	-	-	-	-	69	69	-	48	48	-
Stage 2	-	-	-	-	-	-	51	48	-	74	76	-
Critical Hdwy	4.35	-	-	4.35	-	-	7.35	6.75	6.45	7.35	6.75	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Follow-up Hdwy	2.425	-	-	2.425	-	-	3.725	4.225	3.525	3.725	4.225	3.525
Pot Cap-1 Maneuver	1449	-	-	1406	-	-	804	732	951	802	726	985
Stage 1	-	-	-	-	-	-	887	794	-	910	812	-
Stage 2	-	-	-	-	-	-	907	812	-	881	789	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1449	-	-	1406	-	-	792	723	951	788	717	985
Mov Cap-2 Maneuver	-	-	-	-	-	-	792	723	-	788	717	-
Stage 1	-	-	-	-	-	-	883	790	-	905	806	-
Stage 2	-	-	-	-	-	-	896	806	-	869	785	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			1.9			9.1			8.7		
HCM LOS							A			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	883	1449	-	-	1406	-	-	985				
HCM Lane V/C Ratio	0.016	0.005	-	-	0.007	-	-	0.006				
HCM Control Delay (s)	9.1	7.5	-	-	7.6	-	-	8.7				
HCM Lane LOS	A	A	-	-	A	-	-	A				
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0				

HCM 6th TWSC
22: PA-9 Access/PA-8A Access & 42nd Avenue

2040 Total
AM Peak

Intersection												
Int Delay, s/veh	5.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	8	33	53	9	9	19	0	30	4	0	7
Future Vol, veh/h	12	8	33	53	9	9	19	0	30	4	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	13	9	36	58	10	10	21	0	33	4	0	8







Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	20	0	0	45	0	0	188	189	27	201	202	15
Stage 1	-	-	-	-	-	-	53	53	-	131	131	-
Stage 2	-	-	-	-	-	-	135	136	-	70	71	-
Critical Hdwy	4.35	-	-	4.35	-	-	7.35	6.75	6.45	7.35	6.75	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Follow-up Hdwy	2.425	-	-	2.425	-	-	3.725	4.225	3.525	3.725	4.225	3.525
Pot Cap-1 Maneuver	1459	-	-	1427	-	-	724	667	986	710	655	1002
Stage 1	-	-	-	-	-	-	905	808	-	820	746	-
Stage 2	-	-	-	-	-	-	816	742	-	885	793	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1459	-	-	1427	-	-	691	634	986	661	622	1002
Mov Cap-2 Maneuver	-	-	-	-	-	-	691	634	-	661	622	-
Stage 1	-	-	-	-	-	-	897	801	-	813	715	-
Stage 2	-	-	-	-	-	-	777	712	-	848	786	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.7			5.7			9.5			9.3		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	846	1459	-	-	1427	-	-	844
HCM Lane V/C Ratio	0.063	0.009	-	-	0.04	-	-	0.014
HCM Control Delay (s)	9.5	7.5	-	-	7.6	-	-	9.3
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0

HCM 6th TWSC
23: PA-8C Access/PA-8B Access & 42nd Avenue

2040 Total
AM Peak

Intersection												
Int Delay, s/veh	3.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	73	9	51	75	4	6	0	28	2	0	3
Future Vol, veh/h	6	73	9	51	75	4	6	0	28	2	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	7	79	10	55	82	4	7	0	30	2	0	3





Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	86	0	0	89	0	0	294	294	84	307	297	84
Stage 1	-	-	-	-	-	-	98	98	-	194	194	-
Stage 2	-	-	-	-	-	-	196	196	-	113	103	-
Critical Hdwy	4.35	-	-	4.35	-	-	7.35	6.75	6.45	7.35	6.75	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Follow-up Hdwy	2.425	-	-	2.425	-	-	3.725	4.225	3.525	3.725	4.225	3.525
Pot Cap-1 Maneuver	1377	-	-	1374	-	-	615	581	915	603	578	915
Stage 1	-	-	-	-	-	-	855	771	-	758	699	-
Stage 2	-	-	-	-	-	-	756	697	-	839	767	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1377	-	-	1374	-	-	592	555	915	563	552	915
Mov Cap-2 Maneuver	-	-	-	-	-	-	592	555	-	563	552	-
Stage 1	-	-	-	-	-	-	851	767	-	754	671	-
Stage 2	-	-	-	-	-	-	723	669	-	807	763	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	3	9.5	10
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	835	1377	-	-	1374	-	-	732
HCM Lane V/C Ratio	0.044	0.005	-	-	0.04	-	-	0.007
HCM Control Delay (s)	9.5	7.6	-	-	7.7	-	-	10
HCM Lane LOS	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0

HCM 6th TWSC
24: Quail Run Drive & PA-9 Access

2040 Total
AM Peak

Intersection						
Int Delay, s/veh	1.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	3	57	17	4	32
Future Vol, veh/h	10	3	57	17	4	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	11	3	62	18	4	35
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	114	71	0	0	80	0
Stage 1	71	-	-	-	-	-
Stage 2	43	-	-	-	-	-
Critical Hdwy	6.65	6.45	-	-	4.35	-
Critical Hdwy Stg 1	5.65	-	-	-	-	-
Critical Hdwy Stg 2	5.65	-	-	-	-	-
Follow-up Hdwy	3.725	3.525	-	-	2.425	-
Pot Cap-1 Maneuver	830	931	-	-	1384	-
Stage 1	897	-	-	-	-	-
Stage 2	924	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	828	931	-	-	1384	-
Mov Cap-2 Maneuver	828	-	-	-	-	-
Stage 1	897	-	-	-	-	-
Stage 2	921	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.3	0		0.8		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	850	1384	-	
HCM Lane V/C Ratio	-	-	0.017	0.003	-	
HCM Control Delay (s)	-	-	9.3	7.6	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

HCM 6th TWSC
25: Cavanaugh Road & PA-9 Access/PA-8C Access

2040 Total
AM Peak

Intersection												
Int Delay, s/veh	2.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Traffic Vol, veh/h	8	0	19	11	0	5	34	69	20	9	204	13
Future Vol, veh/h	8	0	19	11	0	5	34	69	20	9	204	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	9	0	21	12	0	5	37	75	22	10	222	14






Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	412	420	229	420	416	86	236	0	0	97	0	0
Stage 1	249	249	-	160	160	-	-	-	-	-	-	-
Stage 2	163	171	-	260	256	-	-	-	-	-	-	-
Critical Hdwy	7.35	6.75	6.45	7.35	6.75	6.45	4.35	-	-	4.35	-	-
Critical Hdwy Stg 1	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.725	4.225	3.525	3.725	4.225	3.525	2.425	-	-	2.425	-	-
Pot Cap-1 Maneuver	512	491	756	506	494	913	1207	-	-	1364	-	-
Stage 1	707	660	-	791	724	-	-	-	-	-	-	-
Stage 2	788	716	-	697	655	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	494	472	756	478	475	913	1207	-	-	1364	-	-
Mov Cap-2 Maneuver	494	472	-	478	475	-	-	-	-	-	-	-
Stage 1	685	655	-	766	702	-	-	-	-	-	-	-
Stage 2	759	694	-	673	650	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	10.8		11.6		2.2		0.3	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1207	-	-	653	562	1364	-
HCM Lane V/C Ratio	0.031	-	-	0.045	0.031	0.007	-
HCM Control Delay (s)	8.1	-	-	10.8	11.6	7.7	-
HCM Lane LOS	A	-	-	B	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.1	0	-













HCM 6th TWSC
26: Quail Run Drive & PA-7 Access

2040 Total
AM Peak

Intersection						
Int Delay, s/veh	2.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	19	31	70	33	8
Future Vol, veh/h	4	19	31	70	33	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	4	21	34	76	36	9
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	185	41	45	0	-	0
Stage 1	41	-	-	-	-	-
Stage 2	144	-	-	-	-	-
Critical Hdwy	6.65	6.45	4.35	-	-	-
Critical Hdwy Stg 1	5.65	-	-	-	-	-
Critical Hdwy Stg 2	5.65	-	-	-	-	-
Follow-up Hdwy	3.725	3.525	2.425	-	-	-
Pot Cap-1 Maneuver	755	968	1427	-	-	-
Stage 1	926	-	-	-	-	-
Stage 2	830	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	737	968	1427	-	-	-
Mov Cap-2 Maneuver	737	-	-	-	-	-
Stage 1	904	-	-	-	-	-
Stage 2	830	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	9	2.3		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1427	-	918	-	-	
HCM Lane V/C Ratio	0.024	-	0.027	-	-	
HCM Control Delay (s)	7.6	-	9	-	-	
HCM Lane LOS	A	-	A	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-	

Timings 1: Imboden Rd & 56th Avenue

2040 Total
PM Peak

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	328	1046	1054	210	224	219
Future Volume (vph)	328	1046	1054	210	224	219
Lane Group Flow (vph)	357	1137	1146	228	243	238
Turn Type	Prot	pt+ov	Prot	NA	NA	pm+ov
Protected Phases	4	4 5	5	2	6	4
Permitted Phases						6
Detector Phase	4	4 5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	23.5		10.5	23.5	23.5	23.5
Total Split (s)	38.0		57.0	82.0	25.0	38.0
Total Split (%)	31.7%		47.5%	68.3%	20.8%	31.7%
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5		5.5	5.5	5.5	5.5
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		None	C-Max	C-Max	None
v/c Ratio	0.93	0.65	0.95	0.12	0.50	0.37
Control Delay	74.5	7.5	47.5	9.6	49.8	19.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.5	7.5	47.5	9.6	49.8	19.3
Queue Length 50th (ft)	269	155	454	34	91	99
Queue Length 95th (ft)	#449	217	#585	52	135	163
Internal Link Dist (ft)	22583			3921	12432	
Turn Bay Length (ft)		100	100			100
Base Capacity (vph)	391	1746	1202	1854	484	640
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.91	0.65	0.95	0.12	0.50	0.37

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

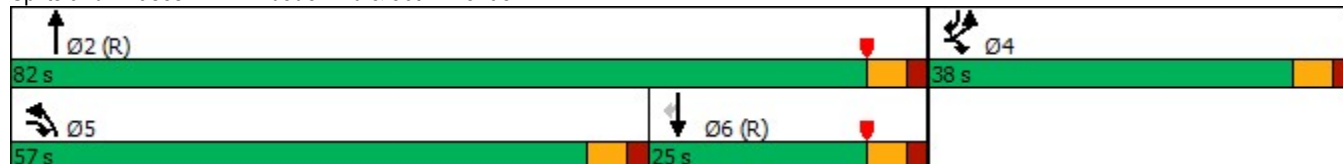
Natural Cycle: 100

Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.













Splits and Phases: 1: Imboden Rd & 56th Avenue



HCM 6th Signalized Intersection Summary





















1: Imboden Rd & 56th Avenue

2040 Total
PM Peak

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	328	1046	1054	210	224	219
Future Volume (veh/h)	328	1046	1054	210	224	219
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530
Adj Flow Rate, veh/h	357	1137	1146	228	243	238
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	25	25	25	25	25	25
Cap, veh/h	395	1579	1190	1853	496	572
Arrive On Green	0.27	0.27	0.42	0.64	0.17	0.17
Sat Flow, veh/h	1457	2281	2826	2983	2983	1296
Grp Volume(v), veh/h	357	1137	1146	228	243	238
Grp Sat Flow(s),veh/h/ln	1457	1141	1413	1453	1453	1296
Q Serve(g_s), s	28.4	32.5	47.4	3.7	9.1	15.1
Cycle Q Clear(g_c), s	28.4	32.5	47.4	3.7	9.1	15.1
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	395	1579	1190	1853	496	572
V/C Ratio(X)	0.90	0.72	0.96	0.12	0.49	0.42
Avail Cap(c_a), veh/h	395	1579	1213	1853	496	572
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.3	11.4	33.8	8.6	45.0	22.9
Incr Delay (d2), s/veh	23.8	1.6	17.5	0.1	3.4	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	18.6	33.3	25.8	2.1	6.3	12.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	66.0	13.0	51.3	8.7	48.5	25.2
LnGrp LOS	E	B	D	A	D	C
Approach Vol, veh/h	1494			1374	481	
Approach Delay, s/veh	25.7			44.3	36.9	
Approach LOS	C			D	D	
Timer - Assigned Phs	2		4		5	6
Phs Duration (G+Y+Rc), s	82.0		38.0		56.0	26.0
Change Period (Y+Rc), s	5.5		5.5		5.5	5.5
Max Green Setting (Gmax), s	76.5		32.5		51.5	19.5
Max Q Clear Time (g_c+l1), s	5.7		34.5		49.4	17.1
Green Ext Time (p_c), s	1.7		0.0		1.1	0.6
Intersection Summary						
HCM 6th Ctrl Delay			34.9			
HCM 6th LOS			C			

Timings 2: Imboden Rd & 48th Avenue

2040 Total
PM Peak

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	5	5	349	5	736	10	391	137	227	718
Future Volume (vph)	5	5	349	5	736	10	391	137	227	718
Lane Group Flow (vph)	5	16	379	405	400	11	425	149	247	785
Turn Type	Perm	NA	pm+pt	NA	pm+ov	Perm	NA	pm+ov	Prot	NA
Protected Phases		4	3	8	1		2	3	1	6
Permitted Phases	4		8		8	2		2		
Detector Phase	4	4	3	8	1	2	2	3	1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.5	23.5	10.5	23.5	10.5	23.5	23.5	10.5	10.5	23.5
Total Split (s)	24.0	24.0	36.0	60.0	27.0	33.0	33.0	36.0	27.0	60.0
Total Split (%)	20.0%	20.0%	30.0%	50.0%	22.5%	27.5%	27.5%	30.0%	22.5%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lag	Lag	Lead		Lead	Lag	Lag	Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	None	C-Max
v/c Ratio	0.06	0.19	0.98	0.63	0.64	0.05	0.34	0.15	0.66	0.44
Control Delay	54.4	36.8	81.2	7.7	21.5	26.9	25.8	1.8	56.0	18.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.4	36.8	81.2	7.7	21.5	26.9	25.8	1.8	56.0	18.1
Queue Length 50th (ft)	4	4	~315	3	201	4	103	0	97	165
Queue Length 95th (ft)	17	27	#373	82	226	21	189	25	136	272
Internal Link Dist (ft)		1288		382			2909			761
Turn Bay Length (ft)	100		100			100		100	100	
Base Capacity (vph)	234	219	398	776	678	235	1262	991	501	1781
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.07	0.95	0.52	0.59	0.05	0.34	0.15	0.49	0.44

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Yellow

Natural Cycle: 80

Control Type: Actuated-Coordinated

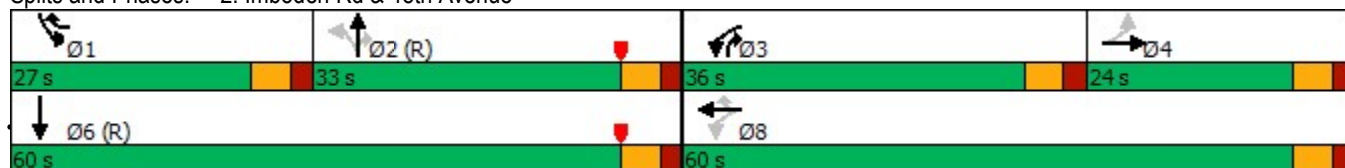
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.
























Splits and Phases: 2: Imboden Rd & 48th Avenue



HCM 6th Signalized Intersection Summary

2: Imboden Rd & 48th Avenue

2040 Total
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	10	349	5	736	10	391	137	227	718	5
Future Volume (veh/h)	5	5	10	349	5	736	10	391	137	227	718	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530
Adj Flow Rate, veh/h	5	5	11	379	0	803	11	425	149	247	780	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	25	25	25	25	25	25	25	25	25	25	25	25
Cap, veh/h	83	18	39	465	0	1163	292	1203	866	302	1677	11
Arrive On Green	0.04	0.04	0.04	0.25	0.00	0.34	0.41	0.41	0.41	0.11	0.57	0.57
Sat Flow, veh/h	554	425	936	1457	0	2592	564	2906	1296	2826	2960	19
Grp Volume(v), veh/h	5	0	16	379	0	803	11	425	149	247	383	402
Grp Sat Flow(s),veh/h/ln	554	0	1361	1457	0	1296	564	1453	1296	1413	1453	1526
Q Serve(g_s), s	1.0	0.0	1.4	29.0	0.0	29.7	1.4	12.0	5.2	10.3	18.6	18.6
Cycle Q Clear(g_c), s	1.0	0.0	1.4	29.0	0.0	29.7	1.7	12.0	5.2	10.3	18.6	18.6
Prop In Lane	1.00		0.69	1.00		1.00	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	83	0	57	465	0	1163	292	1203	866	302	823	865
V/C Ratio(X)	0.06	0.00	0.28	0.82	0.00	0.69	0.04	0.35	0.17	0.82	0.46	0.47
Avail Cap(c_a), veh/h	145	0	210	465	0	1455	292	1203	866	506	823	865
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.6	0.0	55.8	38.4	0.0	26.4	21.2	24.1	7.5	52.4	15.3	15.3
Incr Delay (d2), s/veh	0.3	0.0	2.7	10.8	0.0	1.0	0.2	0.8	0.4	5.4	1.9	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.3	0.0	0.9	17.2	0.0	14.1	0.4	7.7	2.7	7.0	10.6	11.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.9	0.0	58.4	49.2	0.0	27.4	21.4	25.0	7.9	57.8	17.2	17.1
LnGrp LOS	E	A	E	D	A	C	C	C	A	E	B	B
Approach Vol, veh/h					1182				585			
Approach Delay, s/veh	57.8				34.4				20.6			
Approach LOS	E				C				C			
Timer - Assigned Phs	1	2	3	4	6				8			
Phs Duration (G+Y+Rc), s	18.3	55.2	36.0	10.5	73.5				46.5			
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5				5.5			
Max Green Setting (Gmax), s	21.5	27.5	30.5	18.5	54.5				54.5			
Max Q Clear Time (g_c+I1), s	12.3	14.0	31.0	3.4	20.6				31.7			
Green Ext Time (p_c), s	0.6	3.0	0.0	0.0	5.8				3.8			

Intersection Summary













HCM 6th Ctrl Delay	28.9
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.

Timings 3: Quail Run Rd & 32nd Avenue

2040 Total
PM Peak

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	407	25	516	131	8	1105
Future Volume (vph)	407	25	516	131	8	1105
Lane Group Flow (vph)	442	27	561	142	9	1201
Turn Type	Prot	Prot	NA	pm+ov	pm+pt	NA
Protected Phases	3	3	2	3	1	6
Permitted Phases				2	6	
Detector Phase	3	3	2	3	1	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.5	10.5	23.5	10.5	10.5	23.5
Total Split (s)	33.0	33.0	31.5	33.0	10.5	42.0
Total Split (%)	44.0%	44.0%	42.0%	44.0%	14.0%	56.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	C-Max	None	None	C-Max
v/c Ratio	0.90	0.06	0.40	0.11	0.03	0.81
Control Delay	46.4	6.8	15.0	0.5	10.2	21.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.4	6.8	15.0	0.5	10.2	21.9
Queue Length 50th (ft)	184	0	82	0	2	244
Queue Length 95th (ft)	#345	15	158	8	9	#354
Internal Link Dist (ft)	1393		912			5621
Turn Bay Length (ft)	100			100	100	
Base Capacity (vph)	529	490	1397	1232	330	1477
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.06	0.40	0.12	0.03	0.81

Intersection Summary

Cycle Length: 75

Actuated Cycle Length: 75

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow

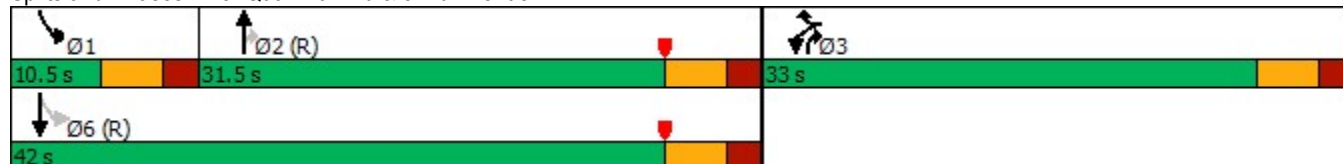
Natural Cycle: 75

Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.













Splits and Phases: 3: Quail Run Rd & 32nd Avenue



HCM 6th Signalized Intersection Summary

3: Quail Run Rd & 32nd Avenue

2040 Total
PM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	407	25	516	131	8	1105
Future Volume (veh/h)	407	25	516	131	8	1105
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530
Adj Flow Rate, veh/h	442	27	561	142	9	1201
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	25	25	25	25	25	25
Cap, veh/h	477	425	1281	996	326	1528
Arrive On Green	0.33	0.33	0.44	0.44	0.01	0.53
Sat Flow, veh/h	1457	1296	2983	1296	1457	2983
Grp Volume(v), veh/h	442	27	561	142	9	1201
Grp Sat Flow(s),veh/h/ln	1457	1296	1453	1296	1457	1453
Q Serve(g_s), s	22.0	1.1	10.0	2.1	0.2	25.1
Cycle Q Clear(g_c), s	22.0	1.1	10.0	2.1	0.2	25.1
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	477	425	1281	996	326	1528
V/C Ratio(X)	0.93	0.06	0.44	0.14	0.03	0.79
Avail Cap(c_a), veh/h	534	475	1281	996	406	1528
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.3	17.3	14.5	2.3	11.2	14.4
Incr Delay (d2), s/veh	21.1	0.1	1.1	0.3	0.0	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	15.0	0.6	5.8	0.7	0.1	12.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	45.4	17.4	15.6	2.6	11.3	18.5
LnGrp LOS	D	B	B	A	B	B
Approach Vol, veh/h	469		703			1210
Approach Delay, s/veh	43.8		13.0			18.5
Approach LOS	D		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	6.4	38.6			44.9	30.1
Change Period (Y+Rc), s	5.5	5.5			5.5	5.5
Max Green Setting (Gmax), s	5.0	26.0			36.5	27.5
Max Q Clear Time (g_c+l1), s	2.2	12.0			27.1	24.0
Green Ext Time (p_c), s	0.0	3.8			5.7	0.6
Intersection Summary						
HCM 6th Ctrl Delay			21.8			
HCM 6th LOS			C			









HCM 6th TWSC
4: Cavanaugh Road & 48t Avenue/48th Avenue

2040 Total
PM Peak

Intersection						
Int Delay, s/veh	7.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	
Traffic Vol, veh/h	174	89	3	398	301	6
Future Vol, veh/h	174	89	3	398	301	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	189	97	3	433	327	7
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	286	0	412	95
Stage 1	-	-	-	-	189	-
Stage 2	-	-	-	-	223	-
Critical Hdwy	-	-	4.6	-	7.3	7.4
Critical Hdwy Stg 1	-	-	-	-	6.3	-
Critical Hdwy Stg 2	-	-	-	-	6.3	-
Follow-up Hdwy	-	-	2.45	-	3.75	3.55
Pot Cap-1 Maneuver	-	-	1122	-	512	874
Stage 1	-	-	-	-	760	-
Stage 2	-	-	-	-	728	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1122	-	510	874
Mov Cap-2 Maneuver	-	-	-	-	510	-
Stage 1	-	-	-	-	760	-
Stage 2	-	-	-	-	726	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.1		24	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	514	-	-	1122	-	
HCM Lane V/C Ratio	0.649	-	-	0.003	-	
HCM Control Delay (s)	24	-	-	8.2	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	4.6	-	-	0	-	

HCM 6th TWSC
5: Cavanaugh Road & 42nd Avenue

2040 Total
PM Peak

Intersection												
Int Delay, s/veh	4.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	69	10	4	29	49	2	220	1	14	73	0
Future Vol, veh/h	0	69	10	4	29	49	2	220	1	14	73	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	0	75	11	4	32	53	2	239	1	15	79	0







Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	395	353	79	396	353	240	79	0	0	240	0	0
Stage 1	109	109	-	244	244	-	-	-	-	-	-	-
Stage 2	286	244	-	152	109	-	-	-	-	-	-	-
Critical Hdwy	7.35	6.75	6.45	7.35	6.75	6.45	4.35	-	-	4.35	-	-
Critical Hdwy Stg 1	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.725	4.225	3.525	3.725	4.225	3.525	2.425	-	-	2.425	-	-
Pot Cap-1 Maneuver	526	537	921	525	537	745	1386	-	-	1203	-	-
Stage 1	843	763	-	711	664	-	-	-	-	-	-	-
Stage 2	674	664	-	799	763	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	461	530	921	458	530	745	1386	-	-	1203	-	-
Mov Cap-2 Maneuver	461	530	-	458	530	-	-	-	-	-	-	-
Stage 1	842	754	-	710	663	-	-	-	-	-	-	-
Stage 2	595	663	-	702	754	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	12.6		11.5		0.1		1.3	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1386	-	-	-	560	458	647	1203	-	-
HCM Lane V/C Ratio	0.002	-	-	-	0.153	0.009	0.131	0.013	-	-
HCM Control Delay (s)	7.6	-	-	0	12.6	12.9	11.4	8	-	-
HCM Lane LOS	A	-	-	A	B	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0.5	0	0.5	0	-	-







HCM 6th TWSC
6: 32nd Avenue & Cavanaugh Road

2040 Total
PM Peak

Intersection						
Int Delay, s/veh	7.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	68	132	79	150	247	96
Future Vol, veh/h	68	132	79	150	247	96
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	74	143	86	163	268	104
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	249	0	-	0	377	86
Stage 1	-	-	-	-	86	-
Stage 2	-	-	-	-	291	-
Critical Hdwy	4.35	-	-	-	6.65	6.45
Critical Hdwy Stg 1	-	-	-	-	5.65	-
Critical Hdwy Stg 2	-	-	-	-	5.65	-
Follow-up Hdwy	2.425	-	-	-	3.725	3.525
Pot Cap-1 Maneuver	1194	-	-	-	582	913
Stage 1	-	-	-	-	883	-
Stage 2	-	-	-	-	709	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1194	-	-	-	546	913
Mov Cap-2 Maneuver	-	-	-	-	546	-
Stage 1	-	-	-	-	828	-
Stage 2	-	-	-	-	709	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.8	0		15.5		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1194	-	-	-	546	913
HCM Lane V/C Ratio	0.062	-	-	-	0.492	0.114
HCM Control Delay (s)	8.2	-	-	-	17.8	9.5
HCM Lane LOS	A	-	-	-	C	A
HCM 95th %tile Q(veh)	0.2	-	-	-	2.7	0.4













HCM 6th TWSC
7: Manila Road & 42nd Avenue

2040 Total
PM Peak

Intersection						
Int Delay, s/veh	4.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	288	90	403	352	0
Future Vol, veh/h	0	288	90	403	352	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	0	313	98	438	383	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	798	192	383	0	-	0
Stage 1	383	-	-	-	-	-
Stage 2	415	-	-	-	-	-
Critical Hdwy	7.3	7.4	4.6	-	-	-
Critical Hdwy Stg 1	6.3	-	-	-	-	-
Critical Hdwy Stg 2	6.3	-	-	-	-	-
Follow-up Hdwy	3.75	3.55	2.45	-	-	-
Pot Cap-1 Maneuver	280	750	1023	-	-	-
Stage 1	596	-	-	-	-	-
Stage 2	572	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	253	750	1023	-	-	-
Mov Cap-2 Maneuver	253	-	-	-	-	-
Stage 1	539	-	-	-	-	-
Stage 2	572	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	13.2	1.6		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1023	-	-	750	-	-
HCM Lane V/C Ratio	0.096	-	-	0.417	-	-
HCM Control Delay (s)	8.9	-	0	13.2	-	-
HCM Lane LOS	A	-	A	B	-	-
HCM 95th %tile Q(veh)	0.3	-	-	2.1	-	-

HCM 6th TWSC
8: Quail Run Drive & 48th Avenue

2040 Total
PM Peak

Intersection												
Int Delay, s/veh	15.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	220	100	8	693	1	254	0	10	1	0	21
Future Vol, veh/h	9	220	100	8	693	1	254	0	10	1	0	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	100	100	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	10	239	109	9	753	1	276	0	11	1	0	23






Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	754	0	0	348	0	0	654	1031	120	912	1140	377
Stage 1	-	-	-	-	-	-	259	259	-	772	772	-
Stage 2	-	-	-	-	-	-	395	772	-	140	368	-
Critical Hdwy	4.6	-	-	4.6	-	-	8	7	7.4	8	7	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-	7	6	-	7	6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7	6	-	7	6	-
Follow-up Hdwy	2.45	-	-	2.45	-	-	3.75	4.25	3.55	3.75	4.25	3.55
Pot Cap-1 Maneuver	717	-	-	1058	-	-	310	197	840	196	168	559
Stage 1	-	-	-	-	-	-	662	638	-	311	357	-
Stage 2	-	-	-	-	-	-	543	357	-	786	566	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	717	-	-	1058	-	-	292	192	840	190	164	559
Mov Cap-2 Maneuver	-	-	-	-	-	-	292	192	-	190	164	-
Stage 1	-	-	-	-	-	-	653	629	-	307	354	-
Stage 2	-	-	-	-	-	-	516	354	-	765	558	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			0.1			75.9			12.3		
HCM LOS							F			B		

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	292	840	717	-	-	1058	-	-	514
HCM Lane V/C Ratio	0.946	0.013	0.014	-	-	0.008	-	-	0.047
HCM Control Delay (s)	78.5	9.3	10.1	-	-	8.4	-	-	12.3
HCM Lane LOS	F	A	B	-	-	A	-	-	B
HCM 95th %tile Q(veh)	9.2	0	0	-	-	0	-	-	0.1

HCM 6th TWSC
9: 32nd Avenue & Quail Run Drive

2040 Total
PM Peak

Intersection						
Int Delay, s/veh	2.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	45	94	336	1	2	95
Future Vol, veh/h	45	94	336	1	2	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	49	102	365	1	2	103





Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	366	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.35	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.425	-	-
Pot Cap-1 Maneuver	1076	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1076	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	2.8	0	11.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1076	-	-	-	625
HCM Lane V/C Ratio	0.045	-	-	-	0.169
HCM Control Delay (s)	8.5	-	-	-	11.9
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6






HCM 6th TWSC
10: Imboden Rd & PA-2 Access

2040 Total
PM Peak

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	7	1119	7	2	945
Future Vol, veh/h	0	7	1119	7	2	945
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	0	8	1216	8	2	1027
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	612	0	0	1224	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.4	-	-	4.6	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.55	-	-	2.45	-
Pot Cap-1 Maneuver	0	*567	-	-	*822	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %		1	-	-	1	-
Mov Cap-1 Maneuver	-	*567	-	-	*822	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	11.4	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	-	567	* 822	-	
HCM Lane V/C Ratio	-	-	0.013	0.003	-	
HCM Control Delay (s)	-	-	11.4	9.4	-	
HCM Lane LOS	-	-	B	A	-	
HCM 95th %tile Q(veh)	-	-	0	0	-	
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon







HCM 6th TWSC
11: Imboden Rd & PA-5 Access

2040 Total
PM Peak

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	49	8	520	21	3	1064
Future Vol, veh/h	49	8	520	21	3	1064
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	100	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	53	9	565	23	3	1157
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1150	283	0	0	588	0
Stage 1	565	-	-	-	-	-
Stage 2	585	-	-	-	-	-
Critical Hdwy	7.3	7.4	-	-	4.6	-
Critical Hdwy Stg 1	6.3	-	-	-	-	-
Critical Hdwy Stg 2	6.3	-	-	-	-	-
Follow-up Hdwy	3.75	3.55	-	-	2.45	-
Pot Cap-1 Maneuver	*560	650	-	-	841	-
Stage 1	*473	-	-	-	-	-
Stage 2	*560	-	-	-	-	-
Platoon blocked, %	1		-	-		-
Mov Cap-1 Maneuver	*558	650	-	-	841	-
Mov Cap-2 Maneuver	*558	-	-	-	-	-
Stage 1	*473	-	-	-	-	-
Stage 2	*558	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	12.1	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)		-	-	569	841	-
HCM Lane V/C Ratio		-	-	0.109	0.004	-
HCM Control Delay (s)		-	-	12.1	9.3	-
HCM Lane LOS		-	-	B	A	-
HCM 95th %tile Q(veh)		-	-	0.4	0	-
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

HCM 6th TWSC
12: PA-5 Access/PA-2 Access & 48th Avenue

2040 Total
PM Peak

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	348	8	1	1028	1	20	0	1	2	0	37
Future Vol, veh/h	8	348	8	1	1028	1	20	0	1	2	0	37
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	9	378	9	1	1117	1	22	0	1	2	0	40

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1118	0	0	387	0	0	962	1521	194	1327	1525	559
Stage 1	-	-	-	-	-	-	401	401	-	1120	1120	-
Stage 2	-	-	-	-	-	-	561	1120	-	207	405	-
Critical Hdwy	4.6	-	-	4.6	-	-	8	7	7.4	8	7	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-	7	6	-	7	6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7	6	-	7	6	-
Follow-up Hdwy	2.45	-	-	2.45	-	-	3.75	4.25	3.55	3.75	4.25	3.55
Pot Cap-1 Maneuver	503	-	-	1275	-	-	265	114	*884	*126	113	418
Stage 1	-	-	-	-	-	-	812	722	-	*184	236	-
Stage 2	-	-	-	-	-	-	426	236	-	*837	718	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	503	-	-	1275	-	-	236	112	*884	*124	111	418
Mov Cap-2 Maneuver	-	-	-	-	-	-	236	112	-	*124	111	-
Stage 1	-	-	-	-	-	-	797	709	-	*181	236	-
Stage 2	-	-	-	-	-	-	385	236	-	*821	705	-





Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	21.2	15.9
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	245	503	-	-	1275	-	-	373
HCM Lane V/C Ratio	0.093	0.017	-	-	0.001	-	-	0.114
HCM Control Delay (s)	21.2	12.3	-	-	7.8	-	-	15.9
HCM Lane LOS	C	B	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.4

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

HCM 6th TWSC
13: 48th Avenue & PA-3 Western Access

2040 Total
PM Peak

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	17	334	988	1	2	41
Future Vol, veh/h	17	334	988	1	2	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	18	363	1074	1	2	45





Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1075	0	0 1293 538
Stage 1	-	-	- 1075 -
Stage 2	-	-	- 218 -
Critical Hdwy	4.6	-	- 7.3 7.4
Critical Hdwy Stg 1	-	-	- 6.3 -
Critical Hdwy Stg 2	-	-	- 6.3 -
Follow-up Hdwy	2.45	-	- 3.75 3.55
Pot Cap-1 Maneuver	525	-	- 127 432
Stage 1	-	-	- 243 -
Stage 2	-	-	- 733 -
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	525	-	- 123 432
Mov Cap-2 Maneuver	-	-	- 123 -
Stage 1	-	-	- 235 -
Stage 2	-	-	- 733 -

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	15.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	525	-	-	-	387
HCM Lane V/C Ratio	0.035	-	-	-	0.121
HCM Control Delay (s)	12.1	-	-	-	15.6
HCM Lane LOS	B	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

HCM 6th TWSC
14: 48th Avenue & PA-3 Eastern Access

2040 Total
PM Peak

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	9	328	968	1	1	21
Future Vol, veh/h	9	328	968	1	1	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	10	357	1052	1	1	23

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1053	0	0 1252 527
Stage 1	-	-	- 1053 -
Stage 2	-	-	- 199 -
Critical Hdwy	4.6	-	- 7.3 7.4
Critical Hdwy Stg 1	-	-	- 6.3 -
Critical Hdwy Stg 2	-	-	- 6.3 -
Follow-up Hdwy	2.45	-	- 3.75 3.55
Pot Cap-1 Maneuver	536	-	- 136 440
Stage 1	-	-	- 250 -
Stage 2	-	-	- 750 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	536	-	- 133 440
Mov Cap-2 Maneuver	-	-	- 133 -
Stage 1	-	-	- 245 -
Stage 2	-	-	- 750 -

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	14.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	536	-	-	-	398
HCM Lane V/C Ratio	0.018	-	-	-	0.06
HCM Control Delay (s)	11.8	-	-	-	14.6
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

HCM 6th TWSC
15: PA-8A Access & 48th Avenue

2040 Total
PM Peak

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↖	↑↑	↘	
Traffic Vol, veh/h	223	8	3	690	12	8
Future Vol, veh/h	223	8	3	690	12	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	242	9	3	750	13	9







Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	251	0	628
Stage 1	-	-	-	-	247
Stage 2	-	-	-	-	381
Critical Hdwy	-	-	4.6	-	7.3
Critical Hdwy Stg 1	-	-	-	-	6.3
Critical Hdwy Stg 2	-	-	-	-	6.3
Follow-up Hdwy	-	-	2.45	-	3.75
Pot Cap-1 Maneuver	-	-	1160	-	366
Stage 1	-	-	-	-	707
Stage 2	-	-	-	-	597
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1160	-	365
Mov Cap-2 Maneuver	-	-	-	-	365
Stage 1	-	-	-	-	707
Stage 2	-	-	-	-	595

Approach	EB	WB	NB
HCM Control Delay, s	0	0	13
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	471	-	-	1160	-
HCM Lane V/C Ratio	0.046	-	-	0.003	-
HCM Control Delay (s)	13	-	-	8.1	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

HCM 6th TWSC
16: PA-8A Access/PA-4 Access & 48th Avenue

2040 Total
PM Peak

Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	211	13	20	649	2	32	0	48	9	0	12
Future Vol, veh/h	6	211	13	20	649	2	32	0	48	9	0	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	7	229	14	22	705	2	35	0	52	10	0	13

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	707	0	0	243	0	0	647	1001	122	879	1007	354
Stage 1	-	-	-	-	-	-	250	250	-	750	750	-
Stage 2	-	-	-	-	-	-	397	751	-	129	257	-
Critical Hdwy	4.6	-	-	4.6	-	-	8	7	7.4	8	7	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-	7	6	-	7	6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7	6	-	7	6	-
Follow-up Hdwy	2.45	-	-	2.45	-	-	3.75	4.25	3.55	3.75	4.25	3.55
Pot Cap-1 Maneuver	750	-	-	1169	-	-	313	206	838	208	204	580
Stage 1	-	-	-	-	-	-	671	645	-	322	366	-
Stage 2	-	-	-	-	-	-	542	365	-	798	640	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	750	-	-	1169	-	-	300	200	838	191	198	580
Mov Cap-2 Maneuver	-	-	-	-	-	-	300	200	-	191	198	-
Stage 1	-	-	-	-	-	-	665	639	-	319	359	-
Stage 2	-	-	-	-	-	-	520	358	-	741	634	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.2	14	17.5
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	488	750	-	-	1169	-	-	310
HCM Lane V/C Ratio	0.178	0.009	-	-	0.019	-	-	0.074
HCM Control Delay (s)	14	9.8	-	-	8.1	-	-	17.5
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.6	0	-	-	0.1	-	-	0.2







HCM 6th TWSC
17: PA-8B Access & 48th Avenue

2040 Total
PM Peak

Intersection						
Int Delay, s/veh	1.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↖	↑↑	↖	
Traffic Vol, veh/h	175	6	21	387	13	48
Future Vol, veh/h	175	6	21	387	13	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	190	7	23	421	14	52
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	197	0	451	99
Stage 1	-	-	-	-	194	-
Stage 2	-	-	-	-	257	-
Critical Hdwy	-	-	4.6	-	7.3	7.4
Critical Hdwy Stg 1	-	-	-	-	6.3	-
Critical Hdwy Stg 2	-	-	-	-	6.3	-
Follow-up Hdwy	-	-	2.45	-	3.75	3.55
Pot Cap-1 Maneuver	-	-	1221	-	482	868
Stage 1	-	-	-	-	755	-
Stage 2	-	-	-	-	698	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1221	-	473	868
Mov Cap-2 Maneuver	-	-	-	-	473	-
Stage 1	-	-	-	-	755	-
Stage 2	-	-	-	-	685	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.4		10.4	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	737	-	-	1221	-	
HCM Lane V/C Ratio	0.09	-	-	0.019	-	
HCM Control Delay (s)	10.4	-	-	8	-	
HCM Lane LOS	B	-	-	A	-	
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-	

HCM 6th TWSC
18: Quail Run Drive & PA-8A Access

2040 Total
PM Peak

Intersection												
Int Delay, s/veh	3.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	101	0	0	4	0	12	0	151	1	3	64	42
Future Vol, veh/h	101	0	0	4	0	12	0	151	1	3	64	42
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	110	0	0	4	0	13	0	164	1	3	70	46
Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	270	264	93	264	287	165	116	0	0	165	0	0
Stage 1	99	99	-	165	165	-	-	-	-	-	-	-
Stage 2	171	165	-	99	122	-	-	-	-	-	-	-
Critical Hdwy	7.35	6.75	6.45	7.35	6.75	6.45	4.35	-	-	4.35	-	-
Critical Hdwy Stg 1	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.725	4.225	3.525	3.725	4.225	3.525	2.425	-	-	2.425	-	-
Pot Cap-1 Maneuver	638	604	904	644	586	823	1341	-	-	1285	-	-
Stage 1	854	771	-	786	720	-	-	-	-	-	-	-
Stage 2	780	720	-	854	753	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	627	603	904	643	585	823	1341	-	-	1285	-	-
Mov Cap-2 Maneuver	627	603	-	643	585	-	-	-	-	-	-	-
Stage 1	854	769	-	786	720	-	-	-	-	-	-	-
Stage 2	768	720	-	852	751	-	-	-	-	-	-	-
Approach	EB		WB		NB			SB				
HCM Control Delay, s	12		9.8		0			0.2				
HCM LOS	B		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1341	-	-	627	769	1285	-	-				
HCM Lane V/C Ratio	-	-	-	0.175	0.023	0.003	-	-				
HCM Control Delay (s)	0	-	-	12	9.8	7.8	-	-				
HCM Lane LOS	A	-	-	B	A	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.6	0.1	0	-	-				

HCM 6th TWSC
19: Cavanaugh Road & PA-8A Access/PA-8B Access

2040 Total
PM Peak

Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↵	↵		↵	↵	
Traffic Vol, veh/h	31	0	6	7	0	13	3	263	3	6	73	13
Future Vol, veh/h	31	0	6	7	0	13	3	263	3	6	73	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	34	0	7	8	0	14	3	286	3	7	79	14
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	401	395	86	398	401	288	93	0	0	289	0	0
Stage 1	100	100	-	294	294	-	-	-	-	-	-	-
Stage 2	301	295	-	104	107	-	-	-	-	-	-	-
Critical Hdwy	7.35	6.75	6.45	7.35	6.75	6.45	4.35	-	-	4.35	-	-
Critical Hdwy Stg 1	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.725	4.225	3.525	3.725	4.225	3.525	2.425	-	-	2.425	-	-
Pot Cap-1 Maneuver	521	508	913	523	504	700	1369	-	-	1152	-	-
Stage 1	853	770	-	667	630	-	-	-	-	-	-	-
Stage 2	661	629	-	849	764	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	507	504	913	516	500	700	1369	-	-	1152	-	-
Mov Cap-2 Maneuver	507	504	-	516	500	-	-	-	-	-	-	-
Stage 1	851	765	-	666	629	-	-	-	-	-	-	-
Stage 2	646	628	-	838	759	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	12.1		11		0.1		0.5					
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1369	-	-	546	622	1152	-	-				
HCM Lane V/C Ratio	0.002	-	-	0.074	0.035	0.006	-	-				
HCM Control Delay (s)	7.6	-	-	12.1	11	8.1	-	-				
HCM Lane LOS	A	-	-	B	B	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-				

HCM 6th TWSC
20: Quail Run Drive & 42nd Avenue

2040 Total
PM Peak

Intersection												
Int Delay, s/veh	6.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Traffic Vol, veh/h	101	0	0	35	0	33	0	20	16	12	14	42
Future Vol, veh/h	101	0	0	35	0	33	0	20	16	12	14	42
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	110	0	0	38	0	36	0	22	17	13	15	46







Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	113	103	38	95	118	31	61	0	0	39	0	0
Stage 1	64	64	-	31	31	-	-	-	-	-	-	-
Stage 2	49	39	-	64	87	-	-	-	-	-	-	-
Critical Hdwy	7.35	6.75	6.45	7.35	6.75	6.45	4.35	-	-	4.35	-	-
Critical Hdwy Stg 1	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.725	4.225	3.525	3.725	4.225	3.525	2.425	-	-	2.425	-	-
Pot Cap-1 Maneuver	813	746	972	836	731	981	1408	-	-	1435	-	-
Stage 1	892	799	-	930	826	-	-	-	-	-	-	-
Stage 2	909	819	-	892	780	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	778	739	972	830	724	981	1408	-	-	1435	-	-
Mov Cap-2 Maneuver	778	739	-	830	724	-	-	-	-	-	-	-
Stage 1	892	792	-	930	826	-	-	-	-	-	-	-
Stage 2	876	819	-	884	773	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	10.4		9.4		0		1.3	
HCM LOS	B		A					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1408	-	-	778 897	1435	-	-
HCM Lane V/C Ratio	-	-	-	0.141 0.082	0.009	-	-
HCM Control Delay (s)	0	-	-	10.4 9.4	7.5	-	-
HCM Lane LOS	A	-	-	B A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.5 0.3	0	-	-

HCM 6th TWSC
21: PA-9 Access/PA-8A Access & 42nd Avenue

2040 Total
PM Peak

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	20	6	4	47	0	10	0	14	0	0	10
Future Vol, veh/h	3	20	6	4	47	0	10	0	14	0	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	3	22	7	4	51	0	11	0	15	0	0	11







Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	51	0	0	29	0	0	97	91	26	98	94	51
Stage 1	-	-	-	-	-	-	32	32	-	59	59	-
Stage 2	-	-	-	-	-	-	65	59	-	39	35	-
Critical Hdwy	4.35	-	-	4.35	-	-	7.35	6.75	6.45	7.35	6.75	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Follow-up Hdwy	2.425	-	-	2.425	-	-	3.725	4.225	3.525	3.725	4.225	3.525
Pot Cap-1 Maneuver	1420	-	-	1447	-	-	833	757	987	832	755	956
Stage 1	-	-	-	-	-	-	929	825	-	898	803	-
Stage 2	-	-	-	-	-	-	891	803	-	921	822	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1420	-	-	1447	-	-	821	753	987	816	751	956
Mov Cap-2 Maneuver	-	-	-	-	-	-	821	753	-	816	751	-
Stage 1	-	-	-	-	-	-	927	823	-	896	801	-
Stage 2	-	-	-	-	-	-	878	801	-	905	820	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.8			0.6			9.1			8.8		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	910	1420	-	-	1447	-	-	956
HCM Lane V/C Ratio	0.029	0.002	-	-	0.003	-	-	0.011
HCM Control Delay (s)	9.1	7.5	-	-	7.5	-	-	8.8
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0







HCM 6th TWSC
22: PA-9 Access/PA-8A Access & 42nd Avenue

2040 Total
PM Peak

Intersection												
Int Delay, s/veh	7.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	14	15	23	4	4	35	0	56	9	0	12
Future Vol, veh/h	5	14	15	23	4	4	35	0	56	9	0	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	5	15	16	25	4	4	38	0	61	10	0	13
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	8	0	0	31	0	0	96	91	23	120	97	6
Stage 1	-	-	-	-	-	-	33	33	-	56	56	-
Stage 2	-	-	-	-	-	-	63	58	-	64	41	-
Critical Hdwy	4.35	-	-	4.35	-	-	7.35	6.75	6.45	7.35	6.75	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Follow-up Hdwy	2.425	-	-	2.425	-	-	3.725	4.225	3.525	3.725	4.225	3.525
Pot Cap-1 Maneuver	1474	-	-	1445	-	-	835	757	991	804	752	1013
Stage 1	-	-	-	-	-	-	927	824	-	901	805	-
Stage 2	-	-	-	-	-	-	893	803	-	892	817	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1474	-	-	1445	-	-	812	742	991	743	737	1013
Mov Cap-2 Maneuver	-	-	-	-	-	-	812	742	-	743	737	-
Stage 1	-	-	-	-	-	-	924	822	-	898	791	-
Stage 2	-	-	-	-	-	-	866	789	-	834	815	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.1			5.6			9.4			9.2		
HCM LOS							A			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	914	1474	-	-	1445	-	-	876				
HCM Lane V/C Ratio	0.108	0.004	-	-	0.017	-	-	0.026				
HCM Control Delay (s)	9.4	7.5	-	-	7.5	-	-	9.2				
HCM Lane LOS	A	A	-	-	A	-	-	A				
HCM 95th %tile Q(veh)	0.4	0	-	-	0.1	-	-	0.1				

HCM 6th TWSC
23: PA-8C Access/PA-8B Access & 42nd Avenue

2040 Total
PM Peak

Intersection												
Int Delay, s/veh	3.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	77	4	22	65	2	10	0	54	4	0	6
Future Vol, veh/h	3	77	4	22	65	2	10	0	54	4	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	3	84	4	24	71	2	11	0	59	4	0	7





Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	73	0	0	88	0	0	216	213	86	242	214	72
Stage 1	-	-	-	-	-	-	92	92	-	120	120	-
Stage 2	-	-	-	-	-	-	124	121	-	122	94	-
Critical Hdwy	4.35	-	-	4.35	-	-	7.35	6.75	6.45	7.35	6.75	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Follow-up Hdwy	2.425	-	-	2.425	-	-	3.725	4.225	3.525	3.725	4.225	3.525
Pot Cap-1 Maneuver	1393	-	-	1375	-	-	694	646	913	667	645	930
Stage 1	-	-	-	-	-	-	861	776	-	832	754	-
Stage 2	-	-	-	-	-	-	827	753	-	830	774	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1393	-	-	1375	-	-	679	634	913	615	633	930
Mov Cap-2 Maneuver	-	-	-	-	-	-	679	634	-	615	633	-
Stage 1	-	-	-	-	-	-	859	774	-	830	741	-
Stage 2	-	-	-	-	-	-	807	740	-	775	772	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	1.9	9.5	9.7
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	866	1393	-	-	1375	-	-	772
HCM Lane V/C Ratio	0.08	0.002	-	-	0.017	-	-	0.014
HCM Control Delay (s)	9.5	7.6	-	-	7.7	-	-	9.7
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0

HCM 6th TWSC
24: Quail Run Drive & PA-9 Access

2040 Total
PM Peak

Intersection						
Int Delay, s/veh	2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	18	5	31	7	2	48
Future Vol, veh/h	18	5	31	7	2	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	20	5	34	8	2	52
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	94	38	0	0	42	0
Stage 1	38	-	-	-	-	-
Stage 2	56	-	-	-	-	-
Critical Hdwy	6.65	6.45	-	-	4.35	-
Critical Hdwy Stg 1	5.65	-	-	-	-	-
Critical Hdwy Stg 2	5.65	-	-	-	-	-
Follow-up Hdwy	3.725	3.525	-	-	2.425	-
Pot Cap-1 Maneuver	853	972	-	-	1431	-
Stage 1	929	-	-	-	-	-
Stage 2	911	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	852	972	-	-	1431	-
Mov Cap-2 Maneuver	852	-	-	-	-	-
Stage 1	929	-	-	-	-	-
Stage 2	910	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.2	0		0.3		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	875	1431	-	
HCM Lane V/C Ratio	-	-	0.029	0.002	-	
HCM Control Delay (s)	-	-	9.2	7.5	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

HCM 6th TWSC
25: Cavanaugh Road & PA-9 Access/PA-8C Access

2040 Total
PM Peak

Intersection												
Int Delay, s/veh	2.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↖	↗		↖	↗	
Traffic Vol, veh/h	14	0	36	21	0	9	16	200	9	4	76	6
Future Vol, veh/h	14	0	36	21	0	9	16	200	9	4	76	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	15	0	39	23	0	10	17	217	10	4	83	7






Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	356	356	87	370	354	222	90	0	0	227	0	0
Stage 1	95	95	-	256	256	-	-	-	-	-	-	-
Stage 2	261	261	-	114	98	-	-	-	-	-	-	-
Critical Hdwy	7.35	6.75	6.45	7.35	6.75	6.45	4.35	-	-	4.35	-	-
Critical Hdwy Stg 1	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.725	4.225	3.525	3.725	4.225	3.525	2.425	-	-	2.425	-	-
Pot Cap-1 Maneuver	559	535	912	546	536	763	1372	-	-	1217	-	-
Stage 1	858	774	-	700	655	-	-	-	-	-	-	-
Stage 2	696	652	-	838	771	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	545	527	912	517	528	763	1372	-	-	1217	-	-
Mov Cap-2 Maneuver	545	527	-	517	528	-	-	-	-	-	-	-
Stage 1	848	772	-	692	647	-	-	-	-	-	-	-
Stage 2	679	644	-	799	769	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	10.1		11.7		0.5		0.4	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1372	-	-	767	572	1217	-
HCM Lane V/C Ratio	0.013	-	-	0.071	0.057	0.004	-
HCM Control Delay (s)	7.7	-	-	10.1	11.7	8	-
HCM Lane LOS	A	-	-	B	B	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.2	0	-

























HCM 6th TWSC
26: Quail Run Drive & PA-7 Access

2040 Total
PM Peak

Intersection						
Int Delay, s/veh	3.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	34	14	30	63	3
Future Vol, veh/h	8	34	14	30	63	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	9	37	15	33	68	3
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	133	70	71	0	-	0
Stage 1	70	-	-	-	-	-
Stage 2	63	-	-	-	-	-
Critical Hdwy	6.65	6.45	4.35	-	-	-
Critical Hdwy Stg 1	5.65	-	-	-	-	-
Critical Hdwy Stg 2	5.65	-	-	-	-	-
Follow-up Hdwy	3.725	3.525	2.425	-	-	-
Pot Cap-1 Maneuver	809	932	1395	-	-	-
Stage 1	898	-	-	-	-	-
Stage 2	904	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	800	932	1395	-	-	-
Mov Cap-2 Maneuver	800	-	-	-	-	-
Stage 1	888	-	-	-	-	-
Stage 2	904	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	9.2	2.4		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1395	-	904	-	-	
HCM Lane V/C Ratio	0.011	-	0.051	-	-	
HCM Control Delay (s)	7.6	-	9.2	-	-	
HCM Lane LOS	A	-	A	-	-	
HCM 95th %tile Q(veh)	0	-	0.2	-	-	

Timings 1: Imboden Rd & 56th Avenue

Long Term Total
AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	389	29	1421	43	8	1	834	283	140	2	225	217
Future Volume (vph)	389	29	1421	43	8	1	834	283	140	2	225	217
Lane Group Flow (vph)	423	32	1545	47	9	1	907	308	152	2	245	236
Turn Type	Prot	NA	pt+ov	Prot	NA	Perm	Prot	NA	pm+ov	Perm	NA	pm+ov
Protected Phases	7	4	4 5	3	8		5	2	3		6	7
Permitted Phases						8			2	6		6
Detector Phase	7	4	4 5	3	8	8	5	2	3	6	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.5	23.5		10.5	23.5	23.5	10.5	23.5	10.5	23.5	23.5	10.5
Total Split (s)	32.0	44.0		12.0	24.0	24.0	40.0	64.0	12.0	24.0	24.0	32.0
Total Split (%)	26.7%	36.7%		10.0%	20.0%	20.0%	33.3%	53.3%	10.0%	20.0%	20.0%	26.7%
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5		5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead		Lead	Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max	None	C-Max	C-Max	None
v/c Ratio	0.46	0.07	0.75	0.32	0.06	0.00	0.79	0.22	0.18	0.01	0.53	0.29
Control Delay	36.8	28.9	12.3	60.7	44.8	0.0	45.3	18.1	2.2	43.5	51.3	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.8	28.9	12.3	60.7	44.8	0.0	45.3	18.1	2.2	43.5	51.3	3.9
Queue Length 50th (ft)	113	17	235	18	7	0	228	70	0	1	93	0
Queue Length 95th (ft)	212	41	309	39	22	0	280	99	28	9	137	48
Internal Link Dist (ft)		8849			6426			4305			2093	
Turn Bay Length (ft)	100		100	100		100	100		100	100		100
Base Capacity (vph)	947	487	2054	151	247	355	1170	1414	824	137	463	811
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	0.45	0.07	0.75	0.31	0.04	0.00	0.78	0.22	0.18	0.01	0.53	0.29

Intersection Summary

Cycle Length: 120

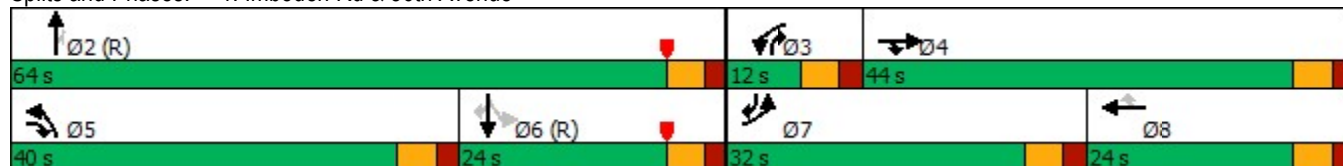
Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

























Splits and Phases: 1: Imboden Rd & 56th Avenue



HCM 6th Signalized Intersection Summary





















1: Imboden Rd & 56th Avenue

Long Term Total
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	389	29	1421	43	8	1	834	283	140	2	225	217
Future Volume (veh/h)	389	29	1421	43	8	1	834	283	140	2	225	217
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530
Adj Flow Rate, veh/h	423	32	1545	47	9	1	907	308	152	2	245	236
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	25	25	25	25	25	25	25	25	25	25	25	25
Cap, veh/h	482	491	1684	93	280	237	1023	1478	702	247	622	498
Arrive On Green	0.17	0.32	0.32	0.03	0.18	0.18	0.25	0.51	0.51	0.21	0.21	0.21
Sat Flow, veh/h	2826	1530	2955	2826	1530	1296	4108	2906	1296	876	2906	1296
Grp Volume(v), veh/h	423	32	1545	47	9	1	907	308	152	2	245	236
Grp Sat Flow(s),veh/h/ln	1413	1530	985	1413	1530	1296	1369	1453	1296	876	1453	1296
Q Serve(g_s), s	17.5	1.7	38.5	2.0	0.6	0.1	25.5	7.0	7.3	0.2	8.7	16.4
Cycle Q Clear(g_c), s	17.5	1.7	38.5	2.0	0.6	0.1	25.5	7.0	7.3	0.2	8.7	16.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	482	491	1684	93	280	237	1023	1478	702	247	622	498
V/C Ratio(X)	0.88	0.07	0.92	0.50	0.03	0.00	0.89	0.21	0.22	0.01	0.39	0.47
Avail Cap(c_a), veh/h	624	491	1684	153	280	237	1181	1478	702	247	622	498
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.5	28.3	23.3	57.1	40.3	40.1	43.4	16.2	14.3	37.2	40.5	27.8
Incr Delay (d2), s/veh	11.0	0.1	8.4	4.2	0.0	0.0	7.6	0.3	0.7	0.1	1.9	3.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	11.2	1.2	19.7	1.4	0.4	0.0	14.3	4.3	4.1	0.1	5.9	9.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.5	28.3	31.7	61.2	40.3	40.1	51.1	16.5	15.0	37.2	42.4	31.0
LnGrp LOS	E	C	C	E	D	D	D	B	B	D	D	C
Approach Vol, veh/h	2000			57			1367			483		
Approach Delay, s/veh	37.5			57.6			39.3			36.8		
Approach LOS	D			E			D			D		
Timer - Assigned Phs	2			3			4			5		
Phs Duration (G+Y+Rc), s	66.5			9.5			44.0			35.4		
Change Period (Y+Rc), s	5.5			5.5			5.5			5.5		
Max Green Setting (Gmax), s	58.5			6.5			38.5			34.5		
Max Q Clear Time (g_c+I1), s	9.3			4.0			40.5			27.5		
Green Ext Time (p_c), s	2.8			0.0			0.0			2.3		
Intersection Summary												
HCM 6th Ctrl Delay	38.3											
HCM 6th LOS	D											
Notes												

Timings 2: Imboden Rd & 48th Avenue

Long Term Total
AM Peak

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	5	5	218	5	314	10	702	341	942	735
Future Volume (vph)	5	5	218	5	314	10	702	341	942	735
Lane Group Flow (vph)	5	16	237	172	174	11	763	371	1024	804
Turn Type	Perm	NA	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA
Protected Phases		4	3	8	1	5	2	3	1	6
Permitted Phases	4		8		8	2		2		
Detector Phase	4	4	3	8	1	5	2	3	1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.5	23.5	10.5	23.5	10.5	10.5	23.5	10.5	10.5	23.5
Total Split (s)	23.5	23.5	18.0	41.5	55.0	11.0	34.0	18.0	55.0	78.0
Total Split (%)	18.0%	18.0%	13.8%	31.8%	42.1%	8.4%	26.1%	13.8%	42.1%	59.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lag	Lag	Lead		Lag	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	None	C-Max
v/c Ratio	0.07	0.21	1.33	0.51	0.24	0.05	0.54	0.51	0.97	0.27
Control Delay	60.2	40.1	219.2	19.2	6.3	15.3	37.7	8.3	61.7	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.2	40.1	219.2	19.2	6.3	15.3	37.7	8.3	61.7	7.6
Queue Length 50th (ft)	4	4	~252	61	20	3	200	43	433	73
Queue Length 95th (ft)	18	29	#353	83	62	11	253	113	#578	132
Internal Link Dist (ft)		885		382			2909			761
Turn Bay Length (ft)	100		100		100	100		100	100	
Base Capacity (vph)	195	197	178	461	708	222	1411	733	1062	3005
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.08	1.33	0.37	0.25	0.05	0.54	0.51	0.96	0.27

Intersection Summary

Cycle Length: 130.5

Actuated Cycle Length: 130.5

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Yellow

Natural Cycle: 110

Control Type: Actuated-Coordinated

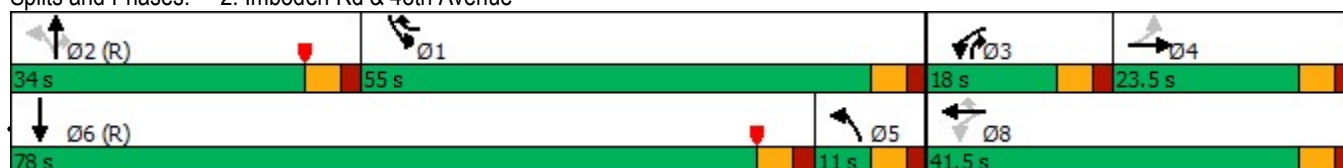
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.
























Splits and Phases: 2: Imboden Rd & 48th Avenue



HCM 6th Signalized Intersection Summary

























2: Imboden Rd & 48th Avenue

Long Term Total
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	10	218	5	314	10	702	341	942	735	5
Future Volume (veh/h)	5	5	10	218	5	314	10	702	341	942	735	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530
Adj Flow Rate, veh/h	5	5	11	237	0	344	11	763	371	1024	799	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	25	25	25	25	25	25	25	25	25	25	25	25
Cap, veh/h	88	16	36	226	0	1695	322	915	409	1348	2388	15
Arrive On Green	0.04	0.04	0.04	0.10	0.00	0.18	0.14	0.22	0.22	0.48	0.56	0.56
Sat Flow, veh/h	848	425	936	1457	0	2592	1457	4176	1296	2826	4282	27
Grp Volume(v), veh/h	5	0	16	237	0	344	11	763	371	1024	519	285
Grp Sat Flow(s),veh/h/ln	848	0	1361	1457	0	1296	1457	1392	1296	1413	1392	1525
Q Serve(g_s), s	0.7	0.0	1.5	12.5	0.0	0.0	0.0	22.7	18.8	38.6	13.2	13.2
Cycle Q Clear(g_c), s	0.7	0.0	1.5	12.5	0.0	0.0	0.0	22.7	18.8	38.6	13.2	13.2
Prop In Lane	1.00		0.69	1.00		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	88	0	52	226	0	1695	322	915	409	1348	1552	850
V/C Ratio(X)	0.06	0.00	0.31	1.05	0.00	0.20	0.03	0.83	0.91	0.76	0.33	0.33
Avail Cap(c_a), veh/h	173	0	188	226	0	1954	322	915	409	1348	1552	850
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.5	0.0	60.8	56.6	0.0	9.0	36.7	48.5	29.3	27.9	15.6	15.6
Incr Delay (d2), s/veh	0.3	0.0	3.2	72.7	0.0	0.1	0.0	8.8	26.4	2.6	0.6	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.3	0.0	1.0	11.6	0.0	3.4	0.5	13.4	13.0	19.3	7.7	8.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.7	0.0	64.0	129.3	0.0	9.0	36.7	57.3	55.7	30.5	16.2	16.7
LnGrp LOS	E	A	E	F	A	A	D	E	E	C	B	B
Approach Vol, veh/h	21			581			1145			1828		
Approach Delay, s/veh	63.3			58.1			56.6			24.3		
Approach LOS	E			E			E			C		
Timer - Assigned Phs	1	2	3	4	5	6	8					
Phs Duration (G+Y+Rc), s	67.5	34.0	18.0	10.5	23.5	78.0	28.5					
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5					
Max Green Setting (Gmax), s	49.5	28.5	12.5	18.0	5.5	72.5	36.0					
Max Q Clear Time (g_c+I1), s	40.6	24.7	14.5	3.5	2.0	15.2	2.0					
Green Ext Time (p_c), s	3.1	2.3	0.0	0.0	0.0	6.6	1.5					
Intersection Summary												
HCM 6th Ctrl Delay	40.3											
HCM 6th LOS	D											
Notes												
User approved pedestrian interval to be less than phase max green.												
User approved volume balancing among the lanes for turning movement.												
User approved changes to right turn type.												

Timings 3: Quail Run Rd & 32nd Avenue

Long Term Total
AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	7	21	303	2	17	68	1191	999	54	890	16
Future Volume (vph)	4	7	21	303	2	17	68	1191	999	54	890	16
Lane Group Flow (vph)	4	8	23	329	2	18	74	1295	1086	59	967	17
Turn Type	Perm	NA	Perm	Prot	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	Perm
Protected Phases		4		3	8		5	2	3	1	6	
Permitted Phases	4		4			8	2		2	6		6
Detector Phase	4	4	4	3	8	8	5	2	3	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.5	23.5	23.5	10.5	23.5	23.5	10.5	23.5	10.5	10.5	23.5	23.5
Total Split (s)	23.5	23.5	23.5	49.0	72.5	72.5	11.0	47.5	49.0	10.5	47.0	47.0
Total Split (%)	18.0%	18.0%	18.0%	37.5%	55.6%	55.6%	8.4%	36.4%	37.5%	8.0%	36.0%	36.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	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 Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lead	Lead	Lag			Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	None	None	None	C-Max	None	None	C-Max	C-Max
v/c Ratio	0.03	0.04	0.08	0.38	0.00	0.03	0.46	0.86	0.94	0.55	0.65	0.03
Control Delay	49.2	49.4	0.6	36.0	15.5	0.1	34.9	47.0	19.3	45.4	39.1	0.1
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	49.2	49.4	0.6	36.0	15.5	0.1	34.9	47.0	19.3	45.4	39.1	0.1
Queue Length 50th (ft)	3	6	0	108	1	0	39	395	41	31	266	0
Queue Length 95th (ft)	14	22	0	150	5	0	73	#500	#1066	#68	320	0
Internal Link Dist (ft)		387			1393			912			5621	
Turn Bay Length (ft)	100		100	100		100	100		100	100		100
Base Capacity (vph)	158	209	275	933	780	695	162	1505	1157	108	1492	536
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	0.03	0.04	0.08	0.35	0.00	0.03	0.46	0.86	0.94	0.55	0.65	0.03

Intersection Summary

Cycle Length: 130.5

Actuated Cycle Length: 130.5

Offset: 10 (8%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

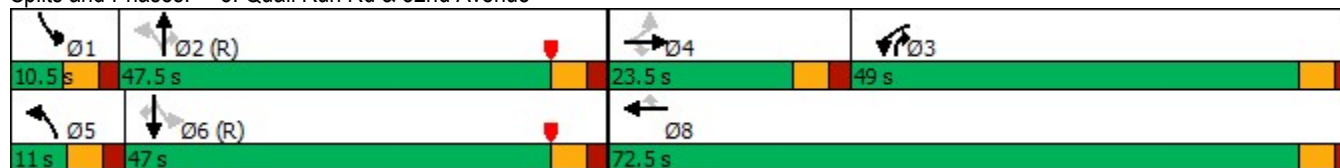
Natural Cycle: 110

Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

























Splits and Phases: 3: Quail Run Rd & 32nd Avenue



HCM 6th Signalized Intersection Summary

3: Quail Run Rd & 32nd Avenue

Long Term Total
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	7	21	303	2	17	68	1191	999	54	890	16
Future Volume (veh/h)	4	7	21	303	2	17	68	1191	999	54	890	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530
Adj Flow Rate, veh/h	4	8	23	329	2	18	74	1295	1086	59	967	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	25	25	25	25	25	25	25	25	25	25	25	25
Cap, veh/h	212	212	179	391	488	414	283	2172	853	142	2160	671
Arrive On Green	0.14	0.14	0.14	0.14	0.32	0.32	0.04	0.52	0.52	0.03	0.52	0.52
Sat Flow, veh/h	1138	1530	1296	2826	1530	1296	1457	4176	1296	1457	4176	1296
Grp Volume(v), veh/h	4	8	23	329	2	18	74	1295	1086	59	967	17
Grp Sat Flow(s),veh/h/ln	1138	1530	1296	1413	1530	1296	1457	1392	1296	1457	1392	1296
Q Serve(g_s), s	0.4	0.6	1.7	14.8	0.1	1.2	3.1	28.0	46.4	2.5	18.9	0.8
Cycle Q Clear(g_c), s	0.5	0.6	1.7	14.8	0.1	1.2	3.1	28.0	46.4	2.5	18.9	0.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	212	212	179	391	488	414	283	2172	853	142	2160	671
V/C Ratio(X)	0.02	0.04	0.13	0.84	0.00	0.04	0.26	0.60	1.27	0.42	0.45	0.03
Avail Cap(c_a), veh/h	212	212	179	946	788	668	291	2172	853	148	2160	671
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.5	48.5	36.3	54.6	30.2	30.6	15.3	21.7	10.5	19.4	19.7	15.3
Incr Delay (d2), s/veh	0.2	0.3	1.5	4.9	0.0	0.0	0.5	1.2	131.8	1.9	0.7	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.2	0.4	1.3	9.4	0.1	0.7	1.9	14.3	60.5	1.6	10.3	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.7	48.8	37.7	59.6	30.2	30.6	15.7	22.9	142.3	21.4	20.4	15.4
LnGrp LOS	D	D	D	E	C	C	B	C	F	C	C	B
Approach Vol, veh/h	35				349				2455			
Approach Delay, s/veh	41.5				57.9				75.5			
Approach LOS	D				E				E			
Timer - Assigned Phs	1	2	3	4	5	6	8					
Phs Duration (G+Y+Rc), s	9.9	73.1	23.5	23.5	10.3	72.8	47.0					
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5					
Max Green Setting (Gmax), s	5.0	42.0	43.5	18.0	5.5	41.5	67.0					
Max Q Clear Time (g_c+l1), s	4.5	48.4	16.8	3.7	5.1	20.9	3.2					
Green Ext Time (p_c), s	0.0	0.0	1.2	0.1	0.0	7.3	0.1					
Intersection Summary												
HCM 6th Ctrl Delay	58.8											
HCM 6th LOS	E											
Notes												

Timings

4: Cavanaugh Road & 48th Avenue

Long Term Total

AM Peak

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘	↗
Traffic Volume (vph)	457	291	6	466	91	3
Future Volume (vph)	457	291	6	466	91	3
Lane Group Flow (vph)	497	316	7	507	99	3
Turn Type	NA	pm+ov	Perm	NA	Prot	Prot
Protected Phases	4	5		8	5	5
Permitted Phases		4	8			
Detector Phase	4	5	8	8	5	5
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.5	10.5	23.5	23.5	10.5	10.5
Total Split (s)	67.0	53.0	67.0	67.0	53.0	53.0
Total Split (%)	55.8%	44.2%	55.8%	55.8%	44.2%	44.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	None	None
v/c Ratio	0.73	0.24	0.06	0.75	0.10	0.00
Control Delay	48.5	0.5	33.7	49.2	8.4	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.5	0.5	33.7	49.2	8.4	5.7
Queue Length 50th (ft)	187	0	4	192	25	0
Queue Length 95th (ft)	227	0	16	232	55	4
Internal Link Dist (ft)	580			1365	114	
Turn Bay Length (ft)		100	100		100	
Base Capacity (vph)	1480	1292	235	1480	971	870
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.24	0.03	0.34	0.10	0.00

Intersection Summary

Cycle Length: 120

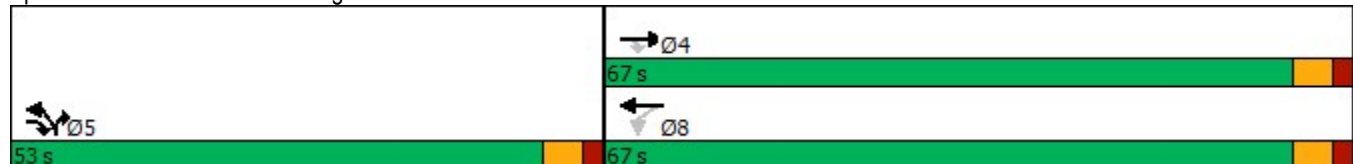
Actuated Cycle Length: 120

Offset: 49 (41%), Referenced to phase 2: and 6:, Start of Yellow

Natural Cycle: 40

Control Type: Actuated-Coordinated

Splits and Phases: 4: Cavanaugh Road & 48th Avenue











HCM 6th Signalized Intersection Summary 4: Cavanaugh Road & 48th Avenue

Long Term Total
AM Peak

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↙	↑↑	↙	↗
Traffic Volume (veh/h)	457	291	6	466	91	3
Future Volume (veh/h)	457	291	6	466	91	3
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530
Adj Flow Rate, veh/h	497	316	7	507	99	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	25	25	25	25	25	25
Cap, veh/h	648	1177	94	648	998	888
Arrive On Green	0.22	0.22	0.22	0.22	0.69	0.69
Sat Flow, veh/h	2983	1296	549	2983	1457	1296
Grp Volume(v), veh/h	497	316	7	507	99	3
Grp Sat Flow(s),veh/h/ln	1453	1296	549	1453	1457	1296
Q Serve(g_s), s	19.2	3.5	1.5	19.7	2.8	0.1
Cycle Q Clear(g_c), s	19.2	3.5	20.7	19.7	2.8	0.1
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	648	1177	94	648	998	888
V/C Ratio(X)	0.77	0.27	0.07	0.78	0.10	0.00
Avail Cap(c_a), veh/h	1489	1553	253	1489	998	888
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.7	0.7	53.4	43.9	6.4	6.0
Incr Delay (d2), s/veh	1.9	0.1	0.3	2.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	11.4	0.2	0.4	11.7	1.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	45.6	0.8	53.7	46.0	6.4	6.0
LnGrp LOS	D	A	D	D	A	A
Approach Vol, veh/h	813			514	102	
Approach Delay, s/veh	28.2			46.1	6.4	
Approach LOS	C			D	A	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	87.7		32.3		32.3	
Change Period (Y+Rc), s	5.5		5.5		5.5	
Max Green Setting (Gmax), s	47.5		61.5		61.5	
Max Q Clear Time (g_c+I1), s	4.8		21.2		22.7	
Green Ext Time (p_c), s	0.3		5.3		4.1	
Intersection Summary						
HCM 6th Ctrl Delay			33.1			
HCM 6th LOS			C			

HCM 6th TWSC
5: Cavanaugh Road & 42nd Avenue

Long Term Total
AM Peak

Intersection												
Int Delay, s/veh	4.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	36	5	2	67	14	3	70	4	47	213	0
Future Vol, veh/h	0	36	5	2	67	14	3	70	4	47	213	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	0	39	5	2	73	15	3	76	4	51	232	0







Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	462	420	232	440	418	78	232	0	0	80	0	0
Stage 1	334	334	-	84	84	-	-	-	-	-	-	-
Stage 2	128	86	-	356	334	-	-	-	-	-	-	-
Critical Hdwy	7.35	6.75	6.45	7.35	6.75	6.45	4.35	-	-	4.35	-	-
Critical Hdwy Stg 1	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.725	4.225	3.525	3.725	4.225	3.525	2.425	-	-	2.425	-	-
Pot Cap-1 Maneuver	473	491	753	490	492	922	1212	-	-	1384	-	-
Stage 1	634	604	-	870	782	-	-	-	-	-	-	-
Stage 2	823	781	-	617	604	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	398	472	753	442	473	922	1212	-	-	1384	-	-
Mov Cap-2 Maneuver	398	472	-	442	473	-	-	-	-	-	-	-
Stage 1	633	582	-	868	780	-	-	-	-	-	-	-
Stage 2	732	779	-	550	582	-	-	-	-	-	-	-







Approach	EB		WB		NB		SB	
HCM Control Delay, s	13		13.4		0.3		1.4	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1212	-	-	-	495	442	516	1384	-	-
HCM Lane V/C Ratio	0.003	-	-	-	0.09	0.005	0.171	0.037	-	-
HCM Control Delay (s)	8	-	-	0	13	13.2	13.4	7.7	-	-
HCM Lane LOS	A	-	-	A	B	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0.3	0	0.6	0.1	-	-

HCM 6th TWSC
6: 32nd Avenue & Cavanaugh Road



















Long Term Total
AM Peak

Intersection						
Int Delay, s/veh	5.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	93	91	219	231	145	75
Future Vol, veh/h	93	91	219	231	145	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	100	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	101	99	238	251	158	82
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	489	0	-	0	539	238
Stage 1	-	-	-	-	238	-
Stage 2	-	-	-	-	301	-
Critical Hdwy	4.35	-	-	-	6.65	6.45
Critical Hdwy Stg 1	-	-	-	-	5.65	-
Critical Hdwy Stg 2	-	-	-	-	5.65	-
Follow-up Hdwy	2.425	-	-	-	3.725	3.525
Pot Cap-1 Maneuver	965	-	-	-	466	747
Stage 1	-	-	-	-	750	-
Stage 2	-	-	-	-	701	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	965	-	-	-	417	747
Mov Cap-2 Maneuver	-	-	-	-	417	-
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	701	-
Approach	EB	WB		SB		
HCM Control Delay, s	4.6	0		15.9		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	965	-	-	-	417	747
HCM Lane V/C Ratio	0.105	-	-	-	0.378	0.109
HCM Control Delay (s)	9.2	-	-	-	18.8	10.4
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.3	-	-	-	1.7	0.4

Intersection						
Int Delay, s/veh	2.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	106	282	641	469	0
Future Vol, veh/h	0	106	282	641	469	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	0	115	307	697	510	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1473	255	510	0	-	0
Stage 1	510	-	-	-	-	-
Stage 2	963	-	-	-	-	-
Critical Hdwy	7.3	7.4	4.6	-	-	-
Critical Hdwy Stg 1	6.3	-	-	-	-	-
Critical Hdwy Stg 2	6.3	-	-	-	-	-
Follow-up Hdwy	3.75	3.55	2.45	-	-	-
Pot Cap-1 Maneuver	95	679	906	-	-	-
Stage 1	507	-	-	-	-	-
Stage 2	282	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	63	679	906	-	-	-
Mov Cap-2 Maneuver	63	-	-	-	-	-
Stage 1	335	-	-	-	-	-
Stage 2	282	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	11.4	3.4		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	906	-	-	679	-	-
HCM Lane V/C Ratio	0.338	-	-	0.17	-	-
HCM Control Delay (s)	11	-	0	11.4	-	-
HCM Lane LOS	B	-	A	B	-	-
HCM 95th %tile Q(veh)	1.5	-	-	0.6	-	-

Timings 8: Quail Run Drive & 48th Avenue

Long Term Total
AM Peak

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	20	814	360	8	297	165	0	1	0
Future Volume (vph)	20	814	360	8	297	165	0	1	0
Lane Group Flow (vph)	22	885	391	9	324	179	17	0	13
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	Perm	NA
Protected Phases	7	4	5	3	8	5	2		6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	5	3	8	5	2	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.5	23.5	10.5	10.5	23.5	10.5	23.5	23.5	23.5
Total Split (s)	11.0	64.0	29.0	11.0	64.0	29.0	55.5	26.5	26.5
Total Split (%)	8.4%	49.0%	22.2%	8.4%	49.0%	22.2%	42.5%	20.3%	20.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5		5.5
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max
v/c Ratio	0.08	0.82	0.48	0.05	0.33	0.29	0.02		0.02
Control Delay	9.2	16.7	1.0	24.2	32.5	20.2	0.1		0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	9.2	16.7	1.0	24.2	32.5	20.2	0.1		0.1
Queue Length 50th (ft)	4	136	1	5	115	76	0		0
Queue Length 95th (ft)	m5	m155	m0	15	124	m150	m0		0
Internal Link Dist (ft)		798			1247		1347		653
Turn Bay Length (ft)	100		100	100		100			
Base Capacity (vph)	286	1294	888	171	1294	633	761		586
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	0.08	0.68	0.44	0.05	0.25	0.28	0.02		0.02

Intersection Summary

Cycle Length: 130.5

Actuated Cycle Length: 130.5

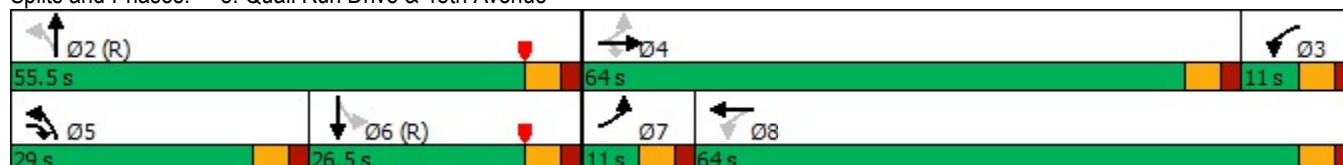
Offset: 1 (1%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

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
























Splits and Phases: 8: Quail Run Drive & 48th Avenue









HCM 6th Signalized Intersection Summary

8: Quail Run Drive & 48th Avenue

Long Term Total
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (veh/h)	20	814	360	8	297	1	165	0	16	1	0	11
Future Volume (veh/h)	20	814	360	8	297	1	165	0	16	1	0	11
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530
Adj Flow Rate, veh/h	22	885	391	9	323	1	179	0	17	1	0	12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	25	25	25	25	25	25	25	25	25	25	25	25
Cap, veh/h	273	1043	584	93	1036	3	637	0	653	51	16	442
Arrive On Green	0.02	0.36	0.36	0.01	0.35	0.35	0.09	0.00	0.50	0.37	0.00	0.37
Sat Flow, veh/h	1457	2906	1296	1457	2972	9	1457	0	1296	57	43	1195
Grp Volume(v), veh/h	22	885	391	9	158	166	179	0	17	13	0	0
Grp Sat Flow(s),veh/h/ln	1457	1453	1296	1457	1453	1528	1457	0	1296	1295	0	0
Q Serve(g_s), s	1.3	36.5	23.1	0.0	10.3	10.3	9.5	0.0	0.9	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.3	36.5	23.1	0.0	10.3	10.3	9.5	0.0	0.9	0.8	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.01	1.00		1.00	0.08		0.92
Lane Grp Cap(c), veh/h	273	1043	584	93	506	532	637	0	653	509	0	0
V/C Ratio(X)	0.08	0.85	0.67	0.10	0.31	0.31	0.28	0.00	0.03	0.03	0.00	0.00
Avail Cap(c_a), veh/h	304	1308	702	139	654	688	767	0	653	509	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	30.0	38.4	16.1	57.3	31.0	31.0	20.3	0.0	16.2	26.1	0.0	0.0
Incr Delay (d2), s/veh	0.1	4.5	1.9	0.4	0.3	0.3	0.2	0.0	0.1	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.9	19.6	11.4	0.5	6.7	7.0	5.9	0.0	0.5	0.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.2	42.9	17.9	57.7	31.3	31.3	20.5	0.0	16.3	26.2	0.0	0.0
LnGrp LOS	C	D	B	E	C	C	C	A	B	C	A	A
Approach Vol, veh/h		1298			333			196			13	
Approach Delay, s/veh		35.2			32.0			20.2			26.2	
Approach LOS		D			C			C			C	
Timer - Assigned Phs		2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s		71.0	6.9	52.2	17.4	53.6	8.2	50.8				
Change Period (Y+Rc), s		5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s		50.0	5.5	58.5	23.5	21.0	5.5	58.5				
Max Q Clear Time (g_c+I1), s		2.9	2.0	38.5	11.5	2.8	3.3	12.3				
Green Ext Time (p_c), s		0.1	0.0	8.2	0.4	0.0	0.0	2.1				
Intersection Summary												
HCM 6th Ctrl Delay			32.9									
HCM 6th LOS			C									

Intersection						
Int Delay, s/veh	5.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	215	669	190	30	56	99
Future Vol, veh/h	215	669	190	30	56	99
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	234	727	207	33	61	108
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	240	0	-	0	1402	207
Stage 1	-	-	-	-	207	-
Stage 2	-	-	-	-	1195	-
Critical Hdwy	4.35	-	-	-	6.65	6.45
Critical Hdwy Stg 1	-	-	-	-	5.65	-
Critical Hdwy Stg 2	-	-	-	-	5.65	-
Follow-up Hdwy	2.425	-	-	-	3.725	3.525
Pot Cap-1 Maneuver	1203	-	-	-	137	779
Stage 1	-	-	-	-	776	-
Stage 2	-	-	-	-	258	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1203	-	-	-	110	779
Mov Cap-2 Maneuver	-	-	-	-	110	-
Stage 1	-	-	-	-	625	-
Stage 2	-	-	-	-	258	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.1	0		32.8		
HCM LOS	D					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1203	-	-	-	110	779
HCM Lane V/C Ratio	0.194	-	-	-	0.553	0.138
HCM Control Delay (s)	8.7	-	-	-	72.3	10.4
HCM Lane LOS	A	-	-	-	F	B
HCM 95th %tile Q(veh)	0.7	-	-	-	2.6	0.5

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↗↗↗	↗	↘	↘↘↘
Traffic Vol, veh/h	0	3	1000	16	6	1677
Future Vol, veh/h	0	3	1000	16	6	1677
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	100	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	0	3	1087	17	7	1823

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	-	544	0 0 1104 0
Stage 1	-	-	- - -
Stage 2	-	-	- - -
Critical Hdwy	-	7.6	- - 5.8 -
Critical Hdwy Stg 1	-	-	- - -
Critical Hdwy Stg 2	-	-	- - -
Follow-up Hdwy	-	4.15	- - 3.35 -
Pot Cap-1 Maneuver	0	*650	- - *805 -
Stage 1	0	-	- - -
Stage 2	0	-	- - -
Platoon blocked, %		1	- - 1 -
Mov Cap-1 Maneuver	-	*650	- - *805 -
Mov Cap-2 Maneuver	-	-	- - -
Stage 1	-	-	- - -
Stage 2	-	-	- - -

Approach	WB	NB	SB
HCM Control Delay, s	10.6	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	- 650	* 805	-
HCM Lane V/C Ratio	-	- 0.005	0.008	-
HCM Control Delay (s)	-	- 10.6	9.5	-
HCM Lane LOS	-	- B	A	-
HCM 95th %tile Q(veh)	-	- 0	0	-

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

HCM 6th TWSC
11: Imboden Rd & PA-5 Access

Long Term Total
AM Peak

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		U	U	W	U
Traffic Vol, veh/h	26	4	1039	47	7	946
Future Vol, veh/h	26	4	1039	47	7	946
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	100	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	28	4	1129	51	8	1028

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1556	565	0	0	1180	0
Stage 1	1129	-	-	-	-	-
Stage 2	427	-	-	-	-	-
Critical Hdwy	6.2	7.6	-	-	5.8	-
Critical Hdwy Stg 1	7.1	-	-	-	-	-
Critical Hdwy Stg 2	6.5	-	-	-	-	-
Follow-up Hdwy	4.05	4.15	-	-	3.35	-
Pot Cap-1 Maneuver	*301	358	-	-	265	-
Stage 1	*169	-	-	-	-	-
Stage 2	*686	-	-	-	-	-
Platoon blocked, %	1	-	-	-	-	-
Mov Cap-1 Maneuver	*292	358	-	-	265	-
Mov Cap-2 Maneuver	*292	-	-	-	-	-
Stage 1	*169	-	-	-	-	-
Stage 2	*665	-	-	-	-	-







Approach	WB	NB	SB
HCM Control Delay, s	18.5	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	299	265
HCM Lane V/C Ratio	-	-	0.109	0.029
HCM Control Delay (s)	-	-	18.5	19
HCM Lane LOS	-	-	C	C
HCM 95th %tile Q(veh)	-	-	0.4	0.1

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

HCM 6th TWSC
12: PA-5 Access/PA-2 Access & 48th Avenue

Long Term Total
AM Peak

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	1247	18	1	501	2	10	0	1	1	0	21
Future Vol, veh/h	18	1247	18	1	501	2	10	0	1	1	0	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	20	1355	20	1	545	2	11	0	1	1	0	23

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	547	0	0	1375	0	0	1680	1954	688	1266	1963	274
Stage 1	-	-	-	-	-	-	1405	1405	-	548	548	-
Stage 2	-	-	-	-	-	-	275	549	-	718	1415	-
Critical Hdwy	4.6	-	-	4.6	-	-	8	7	7.4	8	7	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-	7	6	-	7	6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7	6	-	7	6	-
Follow-up Hdwy	2.45	-	-	2.45	-	-	3.75	4.25	3.55	3.75	4.25	3.55
Pot Cap-1 Maneuver	875	-	-	*777	-	-	*213	*106	*536	*507	103	659
Stage 1	-	-	-	-	-	-	*507	*448	-	*434	462	-
Stage 2	-	-	-	-	-	-	*647	*461	-	*507	446	-
Platoon blocked, %		-	-	1	-	-	1	1	1	1	1	
Mov Cap-1 Maneuver	875	-	-	*777	-	-	*202	*103	*536	*497	101	659
Mov Cap-2 Maneuver	-	-	-	-	-	-	*202	*103	-	*497	101	-
Stage 1	-	-	-	-	-	-	*496	*437	-	*424	462	-
Stage 2	-	-	-	-	-	-	*624	*461	-	*495	436	-





Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	22.8	10.8
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	214	875	-	-	*777	-	-	649
HCM Lane V/C Ratio	0.056	0.022	-	-	0.001	-	-	0.037
HCM Control Delay (s)	22.8	9.2	-	-	9.6	-	-	10.8
HCM Lane LOS	C	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.1

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

HCM 6th TWSC
13: 48th Avenue & PA-3 Western Access

Long Term Total
AM Peak

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	38	1211	481	2	1	22
Future Vol, veh/h	38	1211	481	2	1	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	41	1316	523	2	1	24

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	525	0	0 1264 263
Stage 1	-	-	- 524 -
Stage 2	-	-	- 740 -
Critical Hdwy	4.6	-	- 7.3 7.4
Critical Hdwy Stg 1	-	-	- 6.3 -
Critical Hdwy Stg 2	-	-	- 6.3 -
Follow-up Hdwy	2.45	-	- 3.75 3.55
Pot Cap-1 Maneuver	*1199	-	- *203 *827
Stage 1	-	-	- *783 -
Stage 2	-	-	- *377 -
Platoon blocked, %	1	-	- 1 1
Mov Cap-1 Maneuver	*1199	-	- *196 *827
Mov Cap-2 Maneuver	-	-	- *196 -
Stage 1	-	-	- *757 -
Stage 2	-	-	- *377 -





Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	10.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	* 1199	-	-	-	725
HCM Lane V/C Ratio	0.034	-	-	-	0.034
HCM Control Delay (s)	8.1	-	-	-	10.1
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

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

HCM 6th TWSC
14: 48th Avenue & PA-3 Eastern Access

Long Term Total
AM Peak

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	1192	472	1	1	11
Future Vol, veh/h	20	1192	472	1	1	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	22	1296	513	1	1	12

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	514	0	0	1206	257
Stage 1	-	-	-	514	-
Stage 2	-	-	-	692	-
Critical Hdwy	4.6	-	-	7.3	7.4
Critical Hdwy Stg 1	-	-	-	6.3	-
Critical Hdwy Stg 2	-	-	-	6.3	-
Follow-up Hdwy	2.45	-	-	3.75	3.55
Pot Cap-1 Maneuver	1191	-	-	213	*850
Stage 1	-	-	-	770	-
Stage 2	-	-	-	401	-
Platoon blocked, %	1	-	-	1	1
Mov Cap-1 Maneuver	1191	-	-	209	*850
Mov Cap-2 Maneuver	-	-	-	209	-
Stage 1	-	-	-	756	-
Stage 2	-	-	-	401	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1191	-	-	-	677
HCM Lane V/C Ratio	0.018	-	-	-	0.019
HCM Control Delay (s)	8.1	-	-	-	10.4
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

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

HCM 6th TWSC
15: PA-8A Access & 48th Avenue

Long Term Total
AM Peak

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↑	↑↑	↑	
Traffic Vol, veh/h	811	19	6	299	7	5
Future Vol, veh/h	811	19	6	299	7	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	882	21	7	325	8	5

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	903
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.6
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.45
Pot Cap-1 Maneuver	-	-	*1004
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	1
Mov Cap-1 Maneuver	-	-	*1004
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-







Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	11.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	564	-	-	* 1004	-
HCM Lane V/C Ratio	0.023	-	-	0.006	-
HCM Control Delay (s)	11.5	-	-	8.6	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

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

HCM 6th TWSC
16: PA-8A Access/PA-4 Access & 48th Avenue

Long Term Total
AM Peak

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	773	31	45	281	6	17	0	25	5	0	7
Future Vol, veh/h	12	773	31	45	281	6	17	0	25	5	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	13	840	34	49	305	7	18	0	27	5	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	312	0	0	874	0	0	1134	1293	437	853	1307	156
Stage 1	-	-	-	-	-	-	883	883	-	407	407	-
Stage 2	-	-	-	-	-	-	251	410	-	446	900	-
Critical Hdwy	4.6	-	-	4.6	-	-	8	7	7.4	8	7	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-	7	6	-	7	6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7	6	-	7	6	-
Follow-up Hdwy	2.45	-	-	2.45	-	-	3.75	4.25	3.55	3.75	4.25	3.55
Pot Cap-1 Maneuver	1095	-	-	638	-	-	132	134	508	218	131	794
Stage 1	-	-	-	-	-	-	264	313	-	534	541	-
Stage 2	-	-	-	-	-	-	670	540	-	504	307	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1095	-	-	638	-	-	122	122	508	192	119	794
Mov Cap-2 Maneuver	-	-	-	-	-	-	122	122	-	192	119	-
Stage 1	-	-	-	-	-	-	261	309	-	528	499	-
Stage 2	-	-	-	-	-	-	613	498	-	471	303	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.5			25.3			15.9		
HCM LOS							D			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	223	1095	-	-	638	-	-	344
HCM Lane V/C Ratio	0.205	0.012	-	-	0.077	-	-	0.038
HCM Control Delay (s)	25.3	8.3	-	-	11.1	-	-	15.9
HCM Lane LOS	D	A	-	-	B	-	-	C
HCM 95th %tile Q(veh)	0.7	0	-	-	0.2	-	-	0.1

HCM 6th TWSC
17: PA-8B Access & 48th Avenue

Long Term Total
AM Peak

Intersection						
Int Delay, s/veh	0.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	
Traffic Vol, veh/h	448	13	46	465	7	27
Future Vol, veh/h	448	13	46	465	7	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	487	14	50	505	8	29

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	501	0	847
Stage 1	-	-	-	-	494
Stage 2	-	-	-	-	353
Critical Hdwy	-	-	4.6	-	7.3
Critical Hdwy Stg 1	-	-	-	-	6.3
Critical Hdwy Stg 2	-	-	-	-	6.3
Follow-up Hdwy	-	-	2.45	-	3.75
Pot Cap-1 Maneuver	-	-	914	-	259
Stage 1	-	-	-	-	517
Stage 2	-	-	-	-	619
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	914	-	245
Mov Cap-2 Maneuver	-	-	-	-	245
Stage 1	-	-	-	-	517
Stage 2	-	-	-	-	585

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	12.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	499	-	-	914	-
HCM Lane V/C Ratio	0.074	-	-	0.055	-
HCM Control Delay (s)	12.8	-	-	9.2	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.2	-

HCM 6th TWSC
18: Quail Run Drive & PA-8A Access

Long Term Total
AM Peak

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Traffic Vol, veh/h	54	0	0	2	0	7	0	120	3	7	264	96
Future Vol, veh/h	54	0	0	2	0	7	0	120	3	7	264	96
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	59	0	0	2	0	8	0	130	3	8	287	104







Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	491	488	339	487	539	132	391	0	0	133	0	0
Stage 1	355	355	-	132	132	-	-	-	-	-	-	-
Stage 2	136	133	-	355	407	-	-	-	-	-	-	-
Critical Hdwy	7.35	6.75	6.45	7.35	6.75	6.45	4.35	-	-	4.35	-	-
Critical Hdwy Stg 1	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.725	4.225	3.525	3.725	4.225	3.525	2.425	-	-	2.425	-	-
Pot Cap-1 Maneuver	526	496	753	530	457	859	1071	-	-	1322	-	-
Stage 1	698	630	-	819	745	-	-	-	-	-	-	-
Stage 2	815	744	-	698	590	-	-	-	-	-	-	-
Platoon blocked, %	1	1	1	1	1	1	-	-	-	-	-	-
Mov Cap-1 Maneuver	519	493	753	527	454	859	1071	-	-	1322	-	-
Mov Cap-2 Maneuver	519	493	-	527	454	-	-	-	-	-	-	-
Stage 1	698	626	-	819	745	-	-	-	-	-	-	-
Stage 2	808	744	-	694	587	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	12.8		9.8		0		0.1	
HCM LOS	B		A					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1071	-	-	519 754	1322	-	-
HCM Lane V/C Ratio	-	-	-	0.113 0.013	0.006	-	-
HCM Control Delay (s)	0	-	-	12.8 9.8	7.7	-	-
HCM Lane LOS	A	-	-	B A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4 0	0	-	-

HCM 6th TWSC
19: Cavanaugh Road & PA-8A Access/PA-8B Access

Long Term Total
AM Peak

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	0	3	4	0	7	6	71	7	13	254	30
Future Vol, veh/h	17	0	3	4	0	7	6	71	7	13	254	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	18	0	3	4	0	8	7	77	8	14	276	33
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	420	420	293	417	432	81	309	0	0	85	0	0
Stage 1	321	321	-	95	95	-	-	-	-	-	-	-
Stage 2	99	99	-	322	337	-	-	-	-	-	-	-
Critical Hdwy	7.35	6.75	6.45	7.35	6.75	6.45	4.35	-	-	4.35	-	-
Critical Hdwy Stg 1	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.725	4.225	3.525	3.725	4.225	3.525	2.425	-	-	2.425	-	-
Pot Cap-1 Maneuver	506	491	695	508	483	919	1132	-	-	1378	-	-
Stage 1	645	612	-	858	774	-	-	-	-	-	-	-
Stage 2	854	771	-	644	602	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	495	483	695	499	475	919	1132	-	-	1378	-	-
Mov Cap-2 Maneuver	495	483	-	499	475	-	-	-	-	-	-	-
Stage 1	641	606	-	853	769	-	-	-	-	-	-	-
Stage 2	842	766	-	634	596	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	12.3		10.2		0.6		0.3					
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1132	-	-	517	704	1378	-	-				
HCM Lane V/C Ratio	0.006	-	-	0.042	0.017	0.01	-	-				
HCM Control Delay (s)	8.2	-	-	12.3	10.2	7.6	-	-				
HCM Lane LOS	A	-	-	B	B	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-				

HCM 6th TWSC
20: Quail Run Drive & 42nd Avenue

Long Term Total
AM Peak

Intersection												
Int Delay, s/veh	2.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Traffic Vol, veh/h	54	0	0	20	0	16	0	53	37	27	143	96
Future Vol, veh/h	54	0	0	20	0	16	0	53	37	27	143	96
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	59	0	0	22	0	17	0	58	40	29	155	104







Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	352	363	207	343	395	78	259	0	0	98	0	0
Stage 1	265	265	-	78	78	-	-	-	-	-	-	-
Stage 2	87	98	-	265	317	-	-	-	-	-	-	-
Critical Hdwy	7.35	6.75	6.45	7.35	6.75	6.45	4.35	-	-	4.35	-	-
Critical Hdwy Stg 1	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.725	4.225	3.525	3.725	4.225	3.525	2.425	-	-	2.425	-	-
Pot Cap-1 Maneuver	613	561	842	623	536	922	1200	-	-	1363	-	-
Stage 1	739	672	-	877	787	-	-	-	-	-	-	-
Stage 2	867	771	-	739	634	-	-	-	-	-	-	-
Platoon blocked, %	1	1	1	1	1	1	1	-	-	-	-	-
Mov Cap-1 Maneuver	591	549	842	613	525	922	1200	-	-	1363	-	-
Mov Cap-2 Maneuver	591	549	-	613	525	-	-	-	-	-	-	-
Stage 1	739	658	-	877	787	-	-	-	-	-	-	-
Stage 2	851	771	-	723	620	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	11.8		10.3		0		0.8	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1200	-	-	591 720	1363	-	-
HCM Lane V/C Ratio	-	-	-	0.099 0.054 0.022	-	-	-
HCM Control Delay (s)	0	-	-	11.8 10.3 7.7	-	-	-
HCM Lane LOS	A	-	-	B B A	-	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3 0.2 0.1	-	-	-

HCM 6th TWSC
21: PA-9 Access/PA-8A Access & 42nd Avenue

Long Term Total
AM Peak

Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	45	13	9	26	0	5	0	7	0	0	5
Future Vol, veh/h	6	45	13	9	26	0	5	0	7	0	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	7	49	14	10	28	0	5	0	8	0	0	5







Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	28	0	0	63	0	0	121	118	56	122	125	28
Stage 1	-	-	-	-	-	-	70	70	-	48	48	-
Stage 2	-	-	-	-	-	-	51	48	-	74	77	-
Critical Hdwy	4.35	-	-	4.35	-	-	7.35	6.75	6.45	7.35	6.75	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Follow-up Hdwy	2.425	-	-	2.425	-	-	3.725	4.225	3.525	3.725	4.225	3.525
Pot Cap-1 Maneuver	1449	-	-	1405	-	-	803	731	949	802	725	985
Stage 1	-	-	-	-	-	-	885	794	-	910	812	-
Stage 2	-	-	-	-	-	-	907	812	-	881	788	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1449	-	-	1405	-	-	791	722	949	788	716	985
Mov Cap-2 Maneuver	-	-	-	-	-	-	791	722	-	788	716	-
Stage 1	-	-	-	-	-	-	881	790	-	905	806	-
Stage 2	-	-	-	-	-	-	896	806	-	870	784	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			1.9			9.2			8.7		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	876	1449	-	-	1405	-	-	985
HCM Lane V/C Ratio	0.015	0.005	-	-	0.007	-	-	0.006
HCM Control Delay (s)	9.2	7.5	-	-	7.6	-	-	8.7
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0







HCM 6th TWSC
22: PA-9 Access/PA-8A Access & 42nd Avenue

Long Term Total
AM Peak

Intersection												
Int Delay, s/veh	5.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	7	33	53	9	8	19	0	30	4	0	6
Future Vol, veh/h	12	7	33	53	9	8	19	0	30	4	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	13	8	36	58	10	9	21	0	33	4	0	7
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	19	0	0	44	0	0	186	187	26	200	201	15
Stage 1	-	-	-	-	-	-	52	52	-	131	131	-
Stage 2	-	-	-	-	-	-	134	135	-	69	70	-
Critical Hdwy	4.35	-	-	4.35	-	-	7.35	6.75	6.45	7.35	6.75	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Follow-up Hdwy	2.425	-	-	2.425	-	-	3.725	4.225	3.525	3.725	4.225	3.525
Pot Cap-1 Maneuver	1460	-	-	1429	-	-	727	668	987	711	656	1002
Stage 1	-	-	-	-	-	-	906	808	-	820	746	-
Stage 2	-	-	-	-	-	-	817	743	-	887	794	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1460	-	-	1429	-	-	695	635	987	662	623	1002
Mov Cap-2 Maneuver	-	-	-	-	-	-	695	635	-	662	623	-
Stage 1	-	-	-	-	-	-	898	801	-	813	715	-
Stage 2	-	-	-	-	-	-	779	713	-	850	787	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.7			5.8			9.5			9.4		
HCM LOS							A			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	849	1460	-	-	1429	-	-	831				
HCM Lane V/C Ratio	0.063	0.009	-	-	0.04	-	-	0.013				
HCM Control Delay (s)	9.5	7.5	-	-	7.6	-	-	9.4				
HCM Lane LOS	A	A	-	-	A	-	-	A				
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0				

HCM 6th TWSC
23: PA-8C Access/PA-8B Access & 42nd Avenue

Long Term Total
AM Peak

Intersection												
Int Delay, s/veh	3.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	71	10	51	75	4	5	0	29	2	0	3
Future Vol, veh/h	6	71	10	51	75	4	5	0	29	2	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	7	77	11	55	82	4	5	0	32	2	0	3





Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	86	0	0	88	0	0	293	293	83	307	296	84
Stage 1	-	-	-	-	-	-	97	97	-	194	194	-
Stage 2	-	-	-	-	-	-	196	196	-	113	102	-
Critical Hdwy	4.35	-	-	4.35	-	-	7.35	6.75	6.45	7.35	6.75	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Follow-up Hdwy	2.425	-	-	2.425	-	-	3.725	4.225	3.525	3.725	4.225	3.525
Pot Cap-1 Maneuver	1377	-	-	1375	-	-	616	581	916	603	579	915
Stage 1	-	-	-	-	-	-	856	772	-	758	699	-
Stage 2	-	-	-	-	-	-	756	697	-	839	768	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1377	-	-	1375	-	-	593	555	916	562	553	915
Mov Cap-2 Maneuver	-	-	-	-	-	-	593	555	-	562	553	-
Stage 1	-	-	-	-	-	-	852	768	-	754	671	-
Stage 2	-	-	-	-	-	-	723	669	-	806	764	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.5			3			9.4			10		
HCM LOS							A			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	848	1377	-	-	1375	-	-	731
HCM Lane V/C Ratio	0.044	0.005	-	-	0.04	-	-	0.007
HCM Control Delay (s)	9.4	7.6	-	-	7.7	-	-	10
HCM Lane LOS	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0

HCM 6th TWSC
24: Quail Run Drive & PA-9 Access

Long Term Total
AM Peak

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	2	88	17	4	160
Future Vol, veh/h	10	2	88	17	4	160
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	11	2	96	18	4	174
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	287	105	0	0	114	0
Stage 1	105	-	-	-	-	-
Stage 2	182	-	-	-	-	-
Critical Hdwy	6.65	6.45	-	-	4.35	-
Critical Hdwy Stg 1	5.65	-	-	-	-	-
Critical Hdwy Stg 2	5.65	-	-	-	-	-
Follow-up Hdwy	3.725	3.525	-	-	2.425	-
Pot Cap-1 Maneuver	657	890	-	-	1344	-
Stage 1	865	-	-	-	-	-
Stage 2	797	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	655	890	-	-	1344	-
Mov Cap-2 Maneuver	655	-	-	-	-	-
Stage 1	865	-	-	-	-	-
Stage 2	795	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	10.4	0	0.2			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	685	1344	-	
HCM Lane V/C Ratio	-	-	0.019	0.003	-	
HCM Control Delay (s)	-	-	10.4	7.7	-	
HCM Lane LOS	-	-	B	A	-	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

HCM 6th TWSC
25: Cavanaugh Road & PA-9 Access/PA-8C Access

Long Term Total
AM Peak

Intersection												
Int Delay, s/veh	2.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Traffic Vol, veh/h	7	0	20	11	0	5	34	66	2	9	199	13
Future Vol, veh/h	7	0	20	11	0	5	34	66	2	9	199	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	8	0	22	12	0	5	37	72	2	10	216	14






Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	393	391	223	401	397	73	230	0	0	74	0	0
Stage 1	243	243	-	147	147	-	-	-	-	-	-	-
Stage 2	150	148	-	254	250	-	-	-	-	-	-	-
Critical Hdwy	7.35	6.75	6.45	7.35	6.75	6.45	4.35	-	-	4.35	-	-
Critical Hdwy Stg 1	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.725	4.225	3.525	3.725	4.225	3.525	2.425	-	-	2.425	-	-
Pot Cap-1 Maneuver	527	510	762	521	506	928	1214	-	-	1392	-	-
Stage 1	712	664	-	804	734	-	-	-	-	-	-	-
Stage 2	801	733	-	702	659	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	509	491	762	492	487	928	1214	-	-	1392	-	-
Mov Cap-2 Maneuver	509	491	-	492	487	-	-	-	-	-	-	-
Stage 1	691	659	-	780	712	-	-	-	-	-	-	-
Stage 2	772	711	-	677	654	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	10.6		11.4		2.7		0.3	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1214	-	-	675	577	1392	-
HCM Lane V/C Ratio	0.03	-	-	0.043	0.03	0.007	-
HCM Control Delay (s)	8.1	-	-	10.6	11.4	7.6	-
HCM Lane LOS	A	-	-	B	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.1	0	-

HCM 6th TWSC
26: Quail Run Drive & PA-7 Access

























Long Term Total
AM Peak

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	19	31	101	162	8
Future Vol, veh/h	4	19	31	101	162	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	4	21	34	110	176	9
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	359	181	185	0	-	0
Stage 1	181	-	-	-	-	-
Stage 2	178	-	-	-	-	-
Critical Hdwy	6.65	6.45	4.35	-	-	-
Critical Hdwy Stg 1	5.65	-	-	-	-	-
Critical Hdwy Stg 2	5.65	-	-	-	-	-
Follow-up Hdwy	3.725	3.525	2.425	-	-	-
Pot Cap-1 Maneuver	596	806	1263	-	-	-
Stage 1	798	-	-	-	-	-
Stage 2	800	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	580	806	1263	-	-	-
Mov Cap-2 Maneuver	580	-	-	-	-	-
Stage 1	776	-	-	-	-	-
Stage 2	800	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	9.9	1.9		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1263	-	755	-	-	
HCM Lane V/C Ratio	0.027	-	0.033	-	-	
HCM Control Delay (s)	7.9	-	9.9	-	-	
HCM Lane LOS	A	-	A	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-	

Timings

1: Imboden Rd & 56th Avenue

Long Term Total
PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	433	8	1412	150	30	2	1692	333	47	1	367	304
Future Volume (vph)	433	8	1412	150	30	2	1692	333	47	1	367	304
Lane Group Flow (vph)	471	9	1535	163	33	2	1839	362	51	1	399	330
Turn Type	Prot	NA	pt+ov	Prot	NA	Perm	Prot	NA	pm+ov	Perm	NA	pm+ov
Protected Phases	7	4	4 5	3	8		5	2	3		6	7
Permitted Phases						8			2	6		6
Detector Phase	7	4	4 5	3	8	8	5	2	3	6	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.5	23.5		10.5	23.5	23.5	10.5	23.5	10.5	23.5	23.5	10.5
Total Split (s)	30.0	36.0		18.0	24.0	24.0	68.0	96.0	18.0	28.0	28.0	30.0
Total Split (%)	20.0%	24.0%		12.0%	16.0%	16.0%	45.3%	64.0%	12.0%	18.7%	18.7%	20.0%
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5		5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag		Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max	None	C-Max	C-Max	None
v/c Ratio	0.89	0.03	0.83	0.73	0.20	0.01	1.08	0.21	0.05	0.01	0.88	0.58
Control Delay	79.2	48.4	15.5	86.5	62.5	0.0	89.9	13.6	1.2	55.0	83.3	15.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.2	48.4	15.5	86.5	62.5	0.0	89.9	13.6	1.2	55.0	83.3	15.8
Queue Length 50th (ft)	~253	7	245	81	29	0	~712	81	0	1	205	85
Queue Length 95th (ft)	#368	24	296	#127	65	0	#804	107	10	7	#306	164
Internal Link Dist (ft)		8849			6426			4305			2093	
Turn Bay Length (ft)	100		100	100		100	100		100	100		100
Base Capacity (vph)	529	309	1867	233	187	280	1696	1760	958	118	451	571
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	0.89	0.03	0.82	0.70	0.18	0.01	1.08	0.21	0.05	0.01	0.88	0.58

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow

Natural Cycle: 150

Control Type: Actuated-Coordinated

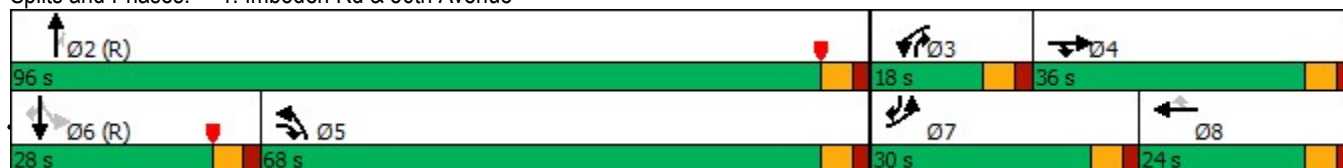
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Imboden Rd & 56th Avenue


























FHU

HCM 6th Signalized Intersection Summary

1: Imboden Rd & 56th Avenue

Long Term Total
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	433	8	1412	150	30	2	1692	333	47	1	367	304
Future Volume (veh/h)	433	8	1412	150	30	2	1692	333	47	1	367	304
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530
Adj Flow Rate, veh/h	471	9	1535	163	33	2	1839	362	51	1	399	330
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	25	25	25	25	25	25	25	25	25	25	25	25
Cap, veh/h	462	258	1869	200	116	98	1907	1891	935	128	436	406
Arrive On Green	0.16	0.17	0.17	0.07	0.08	0.08	0.46	0.65	0.65	0.15	0.15	0.15
Sat Flow, veh/h	2826	1530	2955	2826	1530	1296	4108	2906	1296	796	2906	1296
Grp Volume(v), veh/h	471	9	1535	163	33	2	1839	362	51	1	399	330
Grp Sat Flow(s),veh/h/ln	1413	1530	985	1413	1530	1296	1369	1453	1296	796	1453	1296
Q Serve(g_s), s	24.5	0.7	17.4	8.5	3.1	0.2	65.2	7.5	1.7	0.2	20.3	6.9
Cycle Q Clear(g_c), s	24.5	0.7	17.4	8.5	3.1	0.2	65.2	7.5	1.7	7.6	20.3	6.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	462	258	1869	200	116	98	1907	1891	935	128	436	406
V/C Ratio(X)	1.02	0.03	0.82	0.82	0.28	0.02	0.96	0.19	0.05	0.01	0.92	0.81
Avail Cap(c_a), veh/h	462	311	1973	235	189	160	1907	1891	935	128	436	406
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.8	52.2	7.2	68.7	65.5	64.2	39.0	10.4	6.1	60.8	62.8	27.0
Incr Delay (d2), s/veh	47.2	0.1	2.8	17.0	1.3	0.1	13.3	0.2	0.1	0.1	26.4	16.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	17.7	0.5	9.6	6.4	2.2	0.1	31.9	4.4	0.9	0.1	14.1	14.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	109.9	52.2	10.0	85.8	66.8	64.2	52.2	10.7	6.2	60.9	89.2	43.1
LnGrp LOS	F	D	B	F	E	E	D	B	A	E	F	D
Approach Vol, veh/h	2015			198			2252			730		
Approach Delay, s/veh	33.6			82.4			44.5			68.3		
Approach LOS	C			F			D			E		
Timer - Assigned Phs	2			3			4			5		
Phs Duration (G+Y+Rc), s	103.1			16.1			30.8			75.1		
Change Period (Y+Rc), s	5.5			5.5			5.5			5.5		
Max Green Setting (Gmax), s	90.5			12.5			30.5			62.5		
Max Q Clear Time (g_c+I1), s	9.5			10.5			19.4			67.2		
Green Ext Time (p_c), s	3.0			0.1			5.8			0.0		
Intersection Summary												
HCM 6th Ctrl Delay	45.1											
HCM 6th LOS	D											

Timings

2: Imboden Rd & 48th Avenue

Long Term Total

PM Peak

Previous comment
not addressed

prot/perm required,
AM and PM, typ

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	5	5	390	5	872	10	944	202	383	1145
Future Volume (vph)	5	5	390	5	872	10	944	202	383	1145
Lane Group Flow (vph)	5	16	424	479	474	11	1026	220	416	1250
Turn Type	Perm	NA	pm+pt	NA	pm+ov	Perm	NA	pm+ov	Prot	NA
Protected Phases		4	3	8	1		2	3	1	6
Permitted Phases	4		8		8	2		2		
Detector Phase	4	4	3	8	1	2	2	3	1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.5	23.5	10.5	23.5	10.5	23.5	23.5	10.5	10.5	23.5
Total Split (s)	24.0	24.0	40.0	64.0	26.0	30.0	30.0	40.0	26.0	56.0
Total Split (%)	20.0%	20.0%	33.3%	53.3%	21.7%	25.0%	25.0%	33.3%	21.7%	46.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lag	Lag	Lead		Lead	Lag	Lag	Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	None	C-Max
v/c Ratio	0.06	0.19	0.98	0.67	0.66	0.10	0.74	0.24	0.73	0.52
Control Delay	54.2	36.6	76.3	7.4	20.4	39.5	41.4	3.3	52.0	17.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.2	36.6	76.3	7.4	20.4	39.5	41.4	3.3	52.0	17.0
Queue Length 50th (ft)	4	4	~349	3	263	6	241	6	156	179
Queue Length 95th (ft)	17	27	#414	85	244	26	#449	49	201	293
Internal Link Dist (ft)		885		382			2909			761
Turn Bay Length (ft)	100		100		100	100		100	100	
Base Capacity (vph)	234	219	446	842	719	107	1386	925	584	2422
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.07	0.95	0.57	0.66	0.10	0.74	0.24	0.71	0.52

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

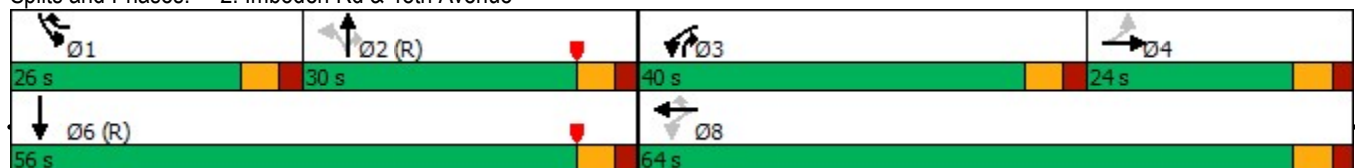
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Imboden Rd & 48th Avenue


























FHU

HCM 6th Signalized Intersection Summary

























2: Imboden Rd & 48th Avenue

Long Term Total
PM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	5	5	10	390	5	872	10	944	202	383	1145	5	
Future Volume (veh/h)	5	5	10	390	5	872	10	944	202	383	1145	5	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach	No			No			No			No			
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	
Adj Flow Rate, veh/h	5	5	11	424	0	951	11	1026	220	416	1245	5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Percent Heavy Veh, %	25	25	25	25	25	25	25	25	25	25	25	25	
Cap, veh/h	108	18	39	511	0	1391	178	1361	793	461	2295	9	
Arrive On Green	0.04	0.04	0.04	0.29	0.00	0.37	0.33	0.33	0.33	0.16	0.53	0.53	
Sat Flow, veh/h	1159	425	936	1457	0	2592	364	4176	1296	2826	4293	17	
Grp Volume(v), veh/h	5	0	16	424	0	951	11	1026	220	416	807	443	
Grp Sat Flow(s),veh/h/ln	1159	0	1361	1457	0	1296	364	1392	1296	1413	1392	1526	
Q Serve(g_s), s	0.5	0.0	1.4	32.3	0.0	32.2	2.5	26.4	9.5	17.3	22.8	22.8	
Cycle Q Clear(g_c), s	0.5	0.0	1.4	32.3	0.0	32.2	2.5	26.4	9.5	17.3	22.8	22.8	
Prop In Lane	1.00		0.69	1.00		1.00	1.00		1.00	1.00		0.01	
Lane Grp Cap(c), veh/h	108	0	57	511	0	1391	178	1361	793	461	1488	816	
V/C Ratio(X)	0.05	0.00	0.28	0.83	0.00	0.68	0.06	0.75	0.28	0.90	0.54	0.54	
Avail Cap(c_a), veh/h	239	0	210	513	0	1686	178	1361	793	483	1488	816	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	55.3	0.0	55.8	36.4	0.0	20.4	28.1	36.1	10.9	49.3	18.3	18.3	
Incr Delay (d2), s/veh	0.2	0.0	2.7	10.9	0.0	0.9	0.7	3.9	0.9	19.7	1.4	2.6	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(95%),veh/ln	0.3	0.0	0.9	18.7	0.0	14.7	0.5	14.4	5.1	11.8	12.0	13.2	
Unsig. Movement Delay, s/veh													
LnGrp Delay(d),s/veh	55.5	0.0	58.4	47.3	0.0	21.2	28.8	40.1	11.7	69.0	19.7	20.9	
LnGrp LOS	E	A	E	D	A	C	C	D	B	E	B	C	
Approach Vol, veh/h	21			1375				1257				1666	
Approach Delay, s/veh	57.7			29.3				35.0				32.3	
Approach LOS	E			C				D				C	
Timer - Assigned Phs	1	2	3	4	6			8					
Phs Duration (G+Y+Rc), s	25.1	44.6	39.8	10.5	69.7			50.3					
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5			5.5					
Max Green Setting (Gmax), s	20.5	24.5	34.5	18.5	50.5			58.5					
Max Q Clear Time (g_c+I1), s	19.3	28.4	34.3	3.4	24.8			34.2					
Green Ext Time (p_c), s	0.2	0.0	0.0	0.0	10.1			4.7					
Intersection Summary													
HCM 6th Ctrl Delay	32.3												
HCM 6th LOS	C												
Notes													
User approved pedestrian interval to be less than phase max green.													
User approved volume balancing among the lanes for turning movement.													

Timings 3: Quail Run Rd & 32nd Avenue

Long Term Total
PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	2	73	1031	7	53	22	1077	315	16	1700	4
Future Volume (vph)	17	2	73	1031	7	53	22	1077	315	16	1700	4
Lane Group Flow (vph)	18	2	79	1121	8	58	24	1171	342	17	1848	4
Turn Type	Perm	NA	Perm	Prot	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	Perm
Protected Phases		4		3	8		5	2	3	1	6	
Permitted Phases	4		4			8	2		2	6		6
Detector Phase	4	4	4	3	8	8	5	2	3	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.5	23.5	23.5	10.5	23.5	23.5	10.5	23.5	10.5	10.5	23.5	23.5
Total Split (s)	15.0	15.0	15.0	67.5	82.5	82.5	11.0	65.0	67.5	13.0	67.0	67.0
Total Split (%)	9.3%	9.3%	9.3%	42.1%	51.4%	51.4%	6.9%	40.5%	42.1%	8.1%	41.7%	41.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	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 Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lead	Lead	Lag			Lead	Lead	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max	Max	None	C-Max	None	None	C-Max	C-Max
v/c Ratio	0.27	0.02	0.40	1.04	0.01	0.09	0.28	0.70	0.30	0.11	1.08	0.01
Control Delay	82.6	72.0	6.7	84.5	22.0	1.2	39.6	43.5	1.1	35.8	92.5	0.0
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	82.6	72.0	6.7	84.5	22.0	1.2	39.6	43.5	1.1	35.8	92.5	0.0
Queue Length 50th (ft)	18	2	0	~650	4	0	16	394	0	11	~838	0
Queue Length 95th (ft)	48	12	4	#788	15	7	38	454	20	29	#931	0
Internal Link Dist (ft)		387			1393			912			5621	
Turn Bay Length (ft)	100		100	100		100	100		100	100		100
Base Capacity (vph)	67	89	197	1082	729	667	87	1672	1124	159	1704	584
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	0.27	0.02	0.40	1.04	0.01	0.09	0.28	0.70	0.30	0.11	1.08	0.01

Intersection Summary

Cycle Length: 160.5

Actuated Cycle Length: 160.5

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 150

Control Type: Actuated-Coordinated

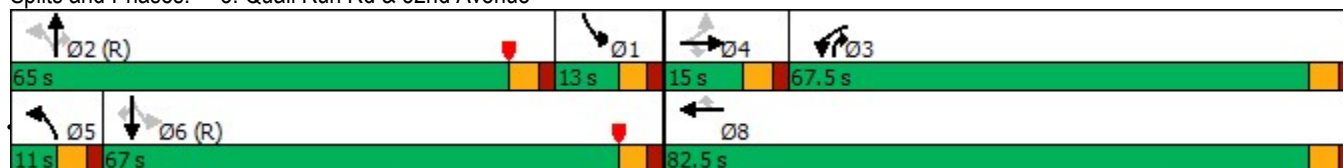
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

























Splits and Phases: 3: Quail Run Rd & 32nd Avenue



HCM 6th Signalized Intersection Summary

3: Quail Run Rd & 32nd Avenue

Long Term Total
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	2	73	1031	7	53	22	1077	315	16	1700	4
Future Volume (veh/h)	17	2	73	1031	7	53	22	1077	315	16	1700	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530
Adj Flow Rate, veh/h	18	2	79	1121	8	58	24	1171	342	17	1848	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	25	25	25	25	25	25	25	25	25	25	25	25
Cap, veh/h	110	91	77	1095	736	624	75	1553	984	154	1650	512
Arrive On Green	0.06	0.06	0.06	0.39	0.48	0.48	0.02	0.37	0.37	0.04	0.40	0.40
Sat Flow, veh/h	1151	1530	1296	2826	1530	1296	1457	4176	1296	1457	4176	1296
Grp Volume(v), veh/h	18	2	79	1121	8	58	24	1171	342	17	1848	4
Grp Sat Flow(s),veh/h/ln	1151	1530	1296	1413	1530	1296	1457	1392	1296	1457	1392	1296
Q Serve(g_s), s	2.4	0.2	8.6	62.0	0.4	3.9	1.7	39.2	0.0	0.0	63.2	0.3
Cycle Q Clear(g_c), s	2.8	0.2	8.6	62.0	0.4	3.9	1.7	39.2	0.0	0.0	63.2	0.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	110	91	77	1095	736	624	75	1553	984	154	1650	512
V/C Ratio(X)	0.16	0.02	1.03	1.02	0.01	0.09	0.32	0.75	0.35	0.11	1.12	0.01
Avail Cap(c_a), veh/h	110	91	77	1095	736	624	95	1553	984	158	1650	512
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	72.3	70.9	61.6	49.0	21.6	22.5	43.1	43.9	6.3	59.2	48.4	29.4
Incr Delay (d2), s/veh	3.2	0.4	110.1	33.4	0.0	0.3	2.4	3.4	1.0	0.3	62.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.5	0.2	9.0	35.9	0.3	2.3	1.2	20.2	7.0	1.1	43.9	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	75.5	71.3	171.7	82.4	21.7	22.8	45.5	47.3	7.3	59.6	111.2	29.4
LnGrp LOS	E	E	F	F	C	C	D	D	A	E	F	C
Approach Vol, veh/h	99			1187			1537			1869		
Approach Delay, s/veh	152.2			79.0			38.4			110.5		
Approach LOS	F			E			D			F		
Timer - Assigned Phs	1	2	3	4	5	6	8					
Phs Duration (G+Y+Rc), s	12.5	65.0	67.5	15.0	8.8	68.7	82.5					
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5					
Max Green Setting (Gmax), s	7.5	59.5	62.0	9.5	5.5	61.5	77.0					
Max Q Clear Time (g_c+l1), s	2.0	41.2	64.0	10.6	3.7	65.2	5.9					
Green Ext Time (p_c), s	0.0	9.7	0.0	0.0	0.0	0.0	0.2					
Intersection Summary												
HCM 6th Ctrl Delay	79.8											
HCM 6th LOS	E											
Notes												

Timings

4: Cavanaugh Road & 48th Avenue

Long Term Total

PM Peak

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘	↑
Traffic Volume (vph)	283	77	3	621	290	6
Future Volume (vph)	283	77	3	621	290	6
Lane Group Flow (vph)	308	84	3	675	315	7
Turn Type	NA	pm+ov	Perm	NA	Prot	Prot
Protected Phases	4	5		8	5	5
Permitted Phases		4	8			
Detector Phase	4	5	8	8	5	5
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.5	10.5	23.5	23.5	10.5	10.5
Total Split (s)	75.0	45.0	75.0	75.0	45.0	45.0
Total Split (%)	62.5%	37.5%	62.5%	62.5%	37.5%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	None	None
v/c Ratio	0.34	0.07	0.01	0.75	0.37	0.01
Control Delay	31.8	0.1	24.3	42.0	15.5	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.8	0.1	24.3	42.0	15.5	7.7
Queue Length 50th (ft)	96	0	2	246	119	0
Queue Length 95th (ft)	120	0	8	278	220	8
Internal Link Dist (ft)	580			1365	114	
Turn Bay Length (ft)		100	100		100	
Base Capacity (vph)	1672	1292	461	1672	860	772
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.07	0.01	0.40	0.37	0.01

Intersection Summary

Cycle Length: 120

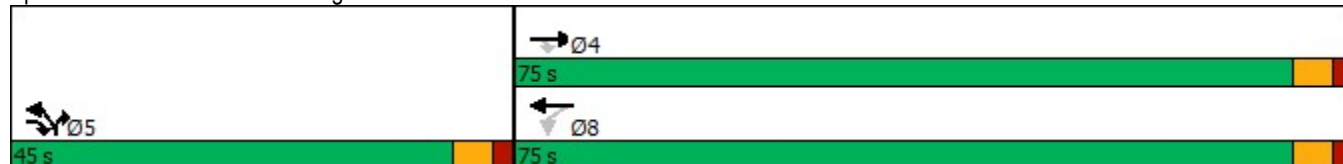
Actuated Cycle Length: 120

Offset: 39.5 (33%), Referenced to phase 2: and 6:, Start of Yellow

Natural Cycle: 45







Control Type: Actuated-Coordinated

Splits and Phases: 4: Cavanaugh Road & 48th Avenue











HCM 6th Signalized Intersection Summary 4: Cavanaugh Road & 48th Avenue

Long Term Total
PM Peak

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↖	↑↑	↖	↗
Traffic Volume (veh/h)	283	77	3	621	290	6
Future Volume (veh/h)	283	77	3	621	290	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530
Adj Flow Rate, veh/h	308	84	3	675	315	7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	25	25	25	25	25	25
Cap, veh/h	817	1177	232	817	913	813
Arrive On Green	0.28	0.28	0.28	0.28	0.63	0.63
Sat Flow, veh/h	2983	1296	876	2983	1457	1296
Grp Volume(v), veh/h	308	84	3	675	315	7
Grp Sat Flow(s),veh/h/ln	1453	1296	876	1453	1457	1296
Q Serve(g_s), s	10.2	0.8	0.3	26.1	12.3	0.2
Cycle Q Clear(g_c), s	10.2	0.8	10.6	26.1	12.3	0.2
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	817	1177	232	817	913	813
V/C Ratio(X)	0.38	0.07	0.01	0.83	0.34	0.01
Avail Cap(c_a), veh/h	1683	1564	493	1683	913	813
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.7	0.5	38.9	40.4	10.6	8.4
Incr Delay (d2), s/veh	0.3	0.0	0.0	2.2	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.6	0.0	0.1	14.6	7.0	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	35.0	0.6	38.9	42.6	10.9	8.4
LnGrp LOS	C	A	D	D	B	A
Approach Vol, veh/h	392			678	322	
Approach Delay, s/veh	27.6			42.6	10.8	
Approach LOS	C			D	B	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	80.8		39.2		39.2	
Change Period (Y+Rc), s	5.5		5.5		5.5	
Max Green Setting (Gmax), s	39.5		69.5		69.5	
Max Q Clear Time (g_c+I1), s	14.3		12.2		28.1	
Green Ext Time (p_c), s	1.0		2.6		5.7	
Intersection Summary						
HCM 6th Ctrl Delay			31.0			
HCM 6th LOS			C			

HCM 6th TWSC
5: Cavanaugh Road & 42nd Avenue

Long Term Total
PM Peak

Intersection												
Int Delay, s/veh	4.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	68	9	5	27	46	2	211	2	12	62	0
Future Vol, veh/h	0	68	9	5	27	46	2	211	2	12	62	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	0	74	10	5	29	50	2	229	2	13	67	0







Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	367	328	67	369	327	230	67	0	0	231	0	0
Stage 1	93	93	-	234	234	-	-	-	-	-	-	-
Stage 2	274	235	-	135	93	-	-	-	-	-	-	-
Critical Hdwy	7.35	6.75	6.45	7.35	6.75	6.45	4.35	-	-	4.35	-	-
Critical Hdwy Stg 1	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.725	4.225	3.525	3.725	4.225	3.525	2.425	-	-	2.425	-	-
Pot Cap-1 Maneuver	549	555	936	547	556	755	1400	-	-	1213	-	-
Stage 1	860	775	-	720	671	-	-	-	-	-	-	-
Stage 2	685	670	-	816	775	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	487	548	936	481	549	755	1400	-	-	1213	-	-
Mov Cap-2 Maneuver	487	548	-	481	549	-	-	-	-	-	-	-
Stage 1	859	766	-	719	670	-	-	-	-	-	-	-
Stage 2	611	669	-	722	766	-	-	-	-	-	-	-







Approach	EB		WB		NB		SB	
HCM Control Delay, s	12.3		11.3		0.1		1.3	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1400	-	-	-	576	481	663	1213	-	-
HCM Lane V/C Ratio	0.002	-	-	-	0.145	0.011	0.12	0.011	-	-
HCM Control Delay (s)	7.6	-	-	0	12.3	12.6	11.2	8	-	-
HCM Lane LOS	A	-	-	A	B	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0.5	0	0.4	0	-	-

HCM 6th TWSC
6: 32nd Avenue & Cavanaugh Road



















Long Term Total
PM Peak

Intersection						
Int Delay, s/veh	8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	75	223	86	141	237	103
Future Vol, veh/h	75	223	86	141	237	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	100	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	82	242	93	153	258	112
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	246	0	-	0	499	93
Stage 1	-	-	-	-	93	-
Stage 2	-	-	-	-	406	-
Critical Hdwy	4.35	-	-	-	6.65	6.45
Critical Hdwy Stg 1	-	-	-	-	5.65	-
Critical Hdwy Stg 2	-	-	-	-	5.65	-
Follow-up Hdwy	2.425	-	-	-	3.725	3.525
Pot Cap-1 Maneuver	1197	-	-	-	492	904
Stage 1	-	-	-	-	876	-
Stage 2	-	-	-	-	626	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1197	-	-	-	458	904
Mov Cap-2 Maneuver	-	-	-	-	458	-
Stage 1	-	-	-	-	816	-
Stage 2	-	-	-	-	626	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.1	0		18.6		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1197	-	-	-	458	904
HCM Lane V/C Ratio	0.068	-	-	-	0.562	0.124
HCM Control Delay (s)	8.2	-	-	-	22.5	9.5
HCM Lane LOS	A	-	-	-	C	A
HCM 95th %tile Q(veh)	0.2	-	-	-	3.4	0.4

Intersection						
Int Delay, s/veh	3.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	288	91	628	460	0
Future Vol, veh/h	0	288	91	628	460	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	0	313	99	683	500	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1040	250	500	0	-	0
Stage 1	500	-	-	-	-	-
Stage 2	540	-	-	-	-	-
Critical Hdwy	7.3	7.4	4.6	-	-	-
Critical Hdwy Stg 1	6.3	-	-	-	-	-
Critical Hdwy Stg 2	6.3	-	-	-	-	-
Follow-up Hdwy	3.75	3.55	2.45	-	-	-
Pot Cap-1 Maneuver	191	684	915	-	-	-
Stage 1	513	-	-	-	-	-
Stage 2	488	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	170	684	915	-	-	-
Mov Cap-2 Maneuver	170	-	-	-	-	-
Stage 1	458	-	-	-	-	-
Stage 2	488	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	14.6	1.2		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	915	-	-	684	-	-
HCM Lane V/C Ratio	0.108	-	-	0.458	-	-
HCM Control Delay (s)	9.4	-	0	14.6	-	-
HCM Lane LOS	A	-	A	B	-	-
HCM 95th %tile Q(veh)	0.4	-	-	2.4	-	-

Timings 8: Quail Run Drive & 48th Avenue

Long Term Total
PM Peak

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	9	414	127	9	748	377	0	1	0
Future Volume (vph)	9	414	127	9	748	377	0	1	0
Lane Group Flow (vph)	10	450	138	10	813	410	11	0	24
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	Perm	NA
Protected Phases	7	4	5	3	8	5	2		6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	5	3	8	5	2	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.5	23.5	10.5	10.5	23.5	10.5	23.5	23.5	23.5
Total Split (s)	13.0	51.5	42.0	13.0	51.5	42.0	66.0	24.0	24.0
Total Split (%)	10.0%	39.5%	32.2%	10.0%	39.5%	32.2%	50.6%	18.4%	18.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5		5.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max
v/c Ratio	0.07	0.48	0.17	0.04	0.87	0.60	0.01		0.05
Control Delay	24.9	36.6	1.7	24.3	52.1	23.1	0.0		0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	24.9	36.6	1.7	24.3	52.1	23.1	0.0		0.2
Queue Length 50th (ft)	6	156	0	6	333	195	0		0
Queue Length 95th (ft)	15	202	21	15	407	369	0		0
Internal Link Dist (ft)		798			1247		1347		653
Turn Bay Length (ft)	100		100	100		100			
Base Capacity (vph)	152	1023	884	252	1021	712	879		502
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	0.07	0.44	0.16	0.04	0.80	0.58	0.01		0.05

Intersection Summary

Cycle Length: 130.5

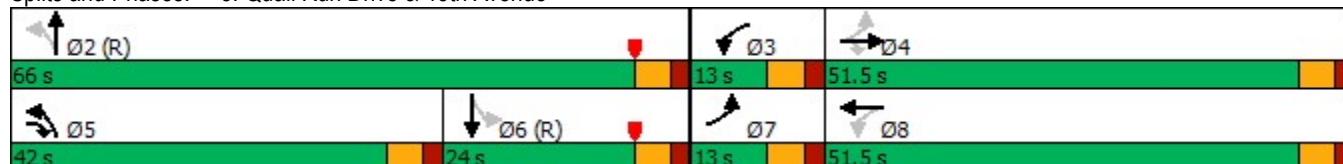
Actuated Cycle Length: 130.5

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated





















Splits and Phases: 8: Quail Run Drive & 48th Avenue









HCM 6th Signalized Intersection Summary

8: Quail Run Drive & 48th Avenue

Long Term Total
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	414	127	9	748	0	377	0	10	1	0	21
Future Volume (veh/h)	9	414	127	9	748	0	377	0	10	1	0	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530
Adj Flow Rate, veh/h	10	450	138	10	813	0	410	0	11	1	0	23
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	25	25	25	25	25	25	25	25	25	25	25	25
Cap, veh/h	97	907	677	216	907	0	725	0	712	34	11	369
Arrive On Green	0.01	0.31	0.31	0.01	0.31	0.00	0.21	0.00	0.55	0.30	0.00	0.30
Sat Flow, veh/h	1457	2906	1296	1457	2983	0	1457	0	1296	18	36	1245
Grp Volume(v), veh/h	10	450	138	10	813	0	410	0	11	24	0	0
Grp Sat Flow(s),veh/h/ln	1457	1453	1296	1457	1453	0	1457	0	1296	1299	0	0
Q Serve(g_s), s	0.6	16.4	7.4	0.6	34.7	0.0	24.3	0.0	0.5	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.6	16.4	7.4	0.6	34.7	0.0	24.3	0.0	0.5	1.7	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	0.04		0.96
Lane Grp Cap(c), veh/h	97	907	677	216	907	0	725	0	712	414	0	0
V/C Ratio(X)	0.10	0.50	0.20	0.05	0.90	0.00	0.57	0.00	0.02	0.06	0.00	0.00
Avail Cap(c_a), veh/h	164	1028	731	283	1028	0	828	0	712	414	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	34.6	36.4	16.6	31.0	42.7	0.0	20.6	0.0	13.3	32.8	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.4	0.1	0.1	9.5	0.0	0.7	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.4	9.9	4.0	0.4	19.6	0.0	13.0	0.0	0.3	1.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.1	36.8	16.7	31.1	52.2	0.0	21.3	0.0	13.4	33.0	0.0	0.0
LnGrp LOS	D	D	B	C	D	A	C	A	B	C	A	A
Approach Vol, veh/h	598			823			421			24		
Approach Delay, s/veh	32.1			52.0			21.1			33.0		
Approach LOS	C			D			C			C		
Timer - Assigned Phs	2		3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	76.9		7.0	46.1	32.9	44.0	7.0	46.1				
Change Period (Y+Rc), s	5.5		5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	60.5		7.5	46.0	36.5	18.5	7.5	46.0				
Max Q Clear Time (g_c+l1), s	2.5		2.6	18.4	26.3	3.7	2.6	36.7				
Green Ext Time (p_c), s	0.0		0.0	3.8	1.0	0.0	0.0	3.9				
Intersection Summary												
HCM 6th Ctrl Delay	38.4											
HCM 6th LOS	D											

Intersection						
Int Delay, s/veh	6.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	91	206	687	53	28	216
Future Vol, veh/h	91	206	687	53	28	216
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	99	224	747	58	30	235
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	805	0	-	0	1169	747
Stage 1	-	-	-	-	747	-
Stage 2	-	-	-	-	422	-
Critical Hdwy	4.35	-	-	-	6.65	6.45
Critical Hdwy Stg 1	-	-	-	-	5.65	-
Critical Hdwy Stg 2	-	-	-	-	5.65	-
Follow-up Hdwy	2.425	-	-	-	3.725	3.525
Pot Cap-1 Maneuver	727	-	-	-	192	378
Stage 1	-	-	-	-	430	-
Stage 2	-	-	-	-	615	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	727	-	-	-	166	378
Mov Cap-2 Maneuver	-	-	-	-	166	-
Stage 1	-	-	-	-	372	-
Stage 2	-	-	-	-	615	-
Approach	EB	WB		SB		
HCM Control Delay, s	3.3	0		29.2		
HCM LOS	D					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	727	-	-	-	166	378
HCM Lane V/C Ratio	0.136	-	-	-	0.183	0.621
HCM Control Delay (s)	10.7	-	-	-	31.5	28.9
HCM Lane LOS	B	-	-	-	D	D
HCM 95th %tile Q(veh)	0.5	-	-	-	0.6	4

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↗↗↗	↗	↘	↗↗↗
Traffic Vol, veh/h	0	7	1808	8	2	1528
Future Vol, veh/h	0	7	1808	8	2	1528
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	100	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	0	8	1965	9	2	1661
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	983	0	0	1974	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.6	-	-	5.8	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	4.15	-	-	3.35	-
Pot Cap-1 Maneuver	0	*464	-	-	*575	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %		1	-	-	1	-
Mov Cap-1 Maneuver	-	*464	-	-	*575	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	12.9	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	-	464	* 575	-	
HCM Lane V/C Ratio	-	-	0.016	0.004	-	
HCM Control Delay (s)	-	-	12.9	11.3	-	
HCM Lane LOS	-	-	B	B	-	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

HCM 6th TWSC
11: Imboden Rd & PA-5 Access

Long Term Total
PM Peak

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	YY		↑↑↑	↑	↑	↑↑↑
Traffic Vol, veh/h	50	7	1138	21	3	1532
Future Vol, veh/h	50	7	1138	21	3	1532
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	100	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	54	8	1237	23	3	1665

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1909	619	0	0	1260	0
Stage 1	1237	-	-	-	-	-
Stage 2	672	-	-	-	-	-
Critical Hdwy	6.2	7.6	-	-	5.8	-
Critical Hdwy Stg 1	7.1	-	-	-	-	-
Critical Hdwy Stg 2	6.5	-	-	-	-	-
Follow-up Hdwy	4.05	4.15	-	-	3.35	-
Pot Cap-1 Maneuver	*408	328	-	-	240	-
Stage 1	*144	-	-	-	-	-
Stage 2	*540	-	-	-	-	-
Platoon blocked, %	1	-	-	-	-	-
Mov Cap-1 Maneuver	*403	328	-	-	240	-
Mov Cap-2 Maneuver	*403	-	-	-	-	-
Stage 1	*144	-	-	-	-	-
Stage 2	*534	-	-	-	-	-







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

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	392	240
HCM Lane V/C Ratio	-	-	0.158	0.014
HCM Control Delay (s)	-	-	15.9	20.2
HCM Lane LOS	-	-	C	C
HCM 95th %tile Q(veh)	-	-	0.6	0

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

HCM 6th TWSC
12: PA-5 Access/PA-2 Access & 48th Avenue

Long Term Total
PM Peak

Intersection												
Int Delay, s/veh	1.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	568	8	1	1205	1	19	0	1	2	0	37
Future Vol, veh/h	8	568	8	1	1205	1	19	0	1	2	0	37
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	9	617	9	1	1310	1	21	0	1	2	0	40

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1311	0	0	626	0	0	1297	1953	313	1640	1957	656
Stage 1	-	-	-	-	-	-	640	640	-	1313	1313	-
Stage 2	-	-	-	-	-	-	657	1313	-	327	644	-
Critical Hdwy	4.6	-	-	4.6	-	-	8	7	7.4	8	7	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-	7	6	-	7	6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7	6	-	7	6	-
Follow-up Hdwy	2.45	-	-	2.45	-	-	3.75	4.25	3.55	3.75	4.25	3.55
Pot Cap-1 Maneuver	416	-	-	1138	-	-	98	49	*811	*52	48	358
Stage 1	-	-	-	-	-	-	713	641	-	*137	187	-
Stage 2	-	-	-	-	-	-	370	187	-	*768	637	-
Platoon blocked, %		-	-	1	-	-			1			
Mov Cap-1 Maneuver	416	-	-	1138	-	-	85	48	*811	*51	47	358
Mov Cap-2 Maneuver	-	-	-	-	-	-	85	48	-	*51	47	-
Stage 1	-	-	-	-	-	-	698	627	-	*134	187	-
Stage 2	-	-	-	-	-	-	328	187	-	*750	623	-





Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	58.1	20.5
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	89	416	-	-	1138	-	-	274
HCM Lane V/C Ratio	0.244	0.021	-	-	0.001	-	-	0.155
HCM Control Delay (s)	58.1	13.8	-	-	8.2	-	-	20.5
HCM Lane LOS	F	B	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.9	0.1	-	-	0	-	-	0.5

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

HCM 6th TWSC
13: 48th Avenue & PA-3 Western Access

Long Term Total
PM Peak

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	17	554	1166	0	2	41
Future Vol, veh/h	17	554	1166	0	2	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	18	602	1267	0	2	45

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1267	0	0 1604 634
Stage 1	-	-	- 1267 -
Stage 2	-	-	- 337 -
Critical Hdwy	4.6	-	- 7.3 7.4
Critical Hdwy Stg 1	-	-	- 6.3 -
Critical Hdwy Stg 2	-	-	- 6.3 -
Follow-up Hdwy	2.45	-	- 3.75 3.55
Pot Cap-1 Maneuver	*809	-	- *76 *558
Stage 1	-	-	- *529 -
Stage 2	-	-	- *631 -
Platoon blocked, %	1	-	- 1
Mov Cap-1 Maneuver	*809	-	- *74 *558
Mov Cap-2 Maneuver	-	-	- *74 -
Stage 1	-	-	- *517 -
Stage 2	-	-	- *631 -





Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	14.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	* 809	-	-	-	428
HCM Lane V/C Ratio	0.023	-	-	-	0.109
HCM Control Delay (s)	9.6	-	-	-	14.4
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

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

HCM 6th TWSC
14: 48th Avenue & PA-3 Eastern Access

Long Term Total
PM Peak

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	9	547	1145	0	1	21
Future Vol, veh/h	9	547	1145	0	1	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	10	595	1245	0	1	23

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1245	0	-	0	1563 623
Stage 1	-	-	-	-	1245 -
Stage 2	-	-	-	-	318 -
Critical Hdwy	4.6	-	-	-	7.3 7.4
Critical Hdwy Stg 1	-	-	-	-	6.3 -
Critical Hdwy Stg 2	-	-	-	-	6.3 -
Follow-up Hdwy	2.45	-	-	-	3.75 3.55
Pot Cap-1 Maneuver	*842	-	-	-	*82 *581
Stage 1	-	-	-	-	*550 -
Stage 2	-	-	-	-	*646 -
Platoon blocked, %	1	-	-	-	1
Mov Cap-1 Maneuver	*842	-	-	-	*81 *581
Mov Cap-2 Maneuver	-	-	-	-	*81 -
Stage 1	-	-	-	-	*543 -
Stage 2	-	-	-	-	*646 -

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	13.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	* 842	-	-	-	454
HCM Lane V/C Ratio	0.012	-	-	-	0.053
HCM Control Delay (s)	9.3	-	-	-	13.4
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

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

HCM 6th TWSC
15: PA-8A Access & 48th Avenue

Long Term Total
PM Peak

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↑	↑↑	↑	
Traffic Vol, veh/h	417	8	3	744	12	8
Future Vol, veh/h	417	8	3	744	12	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	453	9	3	809	13	9

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	462	0	869
Stage 1	-	-	-	-	458
Stage 2	-	-	-	-	411
Critical Hdwy	-	-	4.6	-	7.3
Critical Hdwy Stg 1	-	-	-	-	6.3
Critical Hdwy Stg 2	-	-	-	-	6.3
Follow-up Hdwy	-	-	2.45	-	3.75
Pot Cap-1 Maneuver	-	-	1205	-	370
Stage 1	-	-	-	-	780
Stage 2	-	-	-	-	575
Platoon blocked, %	-	-	1	-	1
Mov Cap-1 Maneuver	-	-	1205	-	369
Mov Cap-2 Maneuver	-	-	-	-	369
Stage 1	-	-	-	-	780
Stage 2	-	-	-	-	574







Approach	EB	WB	NB
HCM Control Delay, s	0	0	12.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	480	-	-	1205	-
HCM Lane V/C Ratio	0.045	-	-	0.003	-
HCM Control Delay (s)	12.9	-	-	8	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

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

HCM 6th TWSC
16: PA-8A Access/PA-4 Access & 48th Avenue

Long Term Total
PM Peak

Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	404	14	19	703	2	33	0	46	10	0	11
Future Vol, veh/h	6	404	14	19	703	2	33	0	46	10	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	7	439	15	21	764	2	36	0	50	11	0	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	766	0	0	454	0	0	885	1269	227	1041	1275	383
Stage 1	-	-	-	-	-	-	461	461	-	807	807	-
Stage 2	-	-	-	-	-	-	424	808	-	234	468	-
Critical Hdwy	4.6	-	-	4.6	-	-	8	7	7.4	8	7	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-	7	6	-	7	6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7	6	-	7	6	-
Follow-up Hdwy	2.45	-	-	2.45	-	-	3.75	4.25	3.55	3.75	4.25	3.55
Pot Cap-1 Maneuver	709	-	-	956	-	-	206	139	710	156	137	554
Stage 1	-	-	-	-	-	-	493	509	-	296	342	-
Stage 2	-	-	-	-	-	-	521	342	-	686	505	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	709	-	-	956	-	-	197	135	710	141	133	554
Mov Cap-2 Maneuver	-	-	-	-	-	-	197	135	-	141	133	-
Stage 1	-	-	-	-	-	-	488	504	-	293	334	-
Stage 2	-	-	-	-	-	-	499	334	-	631	500	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.2			19.1			22.3		
HCM LOS							C			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	340	709	-	-	956	-	-	231
HCM Lane V/C Ratio	0.253	0.009	-	-	0.022	-	-	0.099
HCM Control Delay (s)	19.1	10.1	-	-	8.8	-	-	22.3
HCM Lane LOS	C	B	-	-	A	-	-	C
HCM 95th %tile Q(veh)	1	0	-	-	0.1	-	-	0.3

HCM 6th TWSC
17: PA-8B Access & 48th Avenue

Long Term Total
PM Peak

Intersection						
Int Delay, s/veh	0.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	
Traffic Vol, veh/h	283	6	19	610	14	47
Future Vol, veh/h	283	6	19	610	14	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	308	7	21	663	15	51
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	315	0	686	158
Stage 1	-	-	-	-	312	-
Stage 2	-	-	-	-	374	-
Critical Hdwy	-	-	4.6	-	7.3	7.4
Critical Hdwy Stg 1	-	-	-	-	6.3	-
Critical Hdwy Stg 2	-	-	-	-	6.3	-
Follow-up Hdwy	-	-	2.45	-	3.75	3.55
Pot Cap-1 Maneuver	-	-	1092	-	334	791
Stage 1	-	-	-	-	651	-
Stage 2	-	-	-	-	602	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1092	-	328	791
Mov Cap-2 Maneuver	-	-	-	-	328	-
Stage 1	-	-	-	-	651	-
Stage 2	-	-	-	-	591	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.3		11.8	
HCM LOS	B					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	597	-	-	1092	-	
HCM Lane V/C Ratio	0.111	-	-	0.019	-	
HCM Control Delay (s)	11.8	-	-	8.4	-	
HCM Lane LOS	B	-	-	A	-	
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-	

HCM 6th TWSC
18: Quail Run Drive & PA-8A Access

Long Term Total
PM Peak

Intersection												
Int Delay, s/veh	3.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	101	0	0	4	0	12	0	274	1	3	90	42
Future Vol, veh/h	101	0	0	4	0	12	0	274	1	3	90	42
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	110	0	0	4	0	13	0	298	1	3	98	46

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	432	426	121	426	449	299	144	0	0	299	0	0
Stage 1	127	127	-	299	299	-	-	-	-	-	-	-
Stage 2	305	299	-	127	150	-	-	-	-	-	-	-
Critical Hdwy	7.35	6.75	6.45	7.35	6.75	6.45	4.35	-	-	4.35	-	-
Critical Hdwy Stg 1	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.725	4.225	3.525	3.725	4.225	3.525	2.425	-	-	2.425	-	-
Pot Cap-1 Maneuver	515	499	911	520	483	689	1323	-	-	1142	-	-
Stage 1	858	766	-	663	627	-	-	-	-	-	-	-
Stage 2	658	627	-	858	747	-	-	-	-	-	-	-
Platoon blocked, %	1	1	1	1	1	1	-	-	-	-	-	-
Mov Cap-1 Maneuver	504	498	911	519	482	689	1323	-	-	1142	-	-
Mov Cap-2 Maneuver	504	498	-	519	482	-	-	-	-	-	-	-
Stage 1	858	764	-	663	627	-	-	-	-	-	-	-
Stage 2	646	627	-	856	745	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	14.1		10.8		0		0.2	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1323	-	-	504 637	1142	-	-
HCM Lane V/C Ratio	-	-	-	0.218 0.027	0.003	-	-
HCM Control Delay (s)	0	-	-	14.1 10.8	8.2	-	-
HCM Lane LOS	A	-	-	B B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.8 0.1	0	-	-

HCM 6th TWSC
19: Cavanaugh Road & PA-8A Access/PA-8B Access

Long Term Total
PM Peak

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	32	0	7	7	0	14	3	250	3	6	60	14
Future Vol, veh/h	32	0	7	7	0	14	3	250	3	6	60	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	35	0	8	8	0	15	3	272	3	7	65	15
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	374	368	73	371	374	274	80	0	0	275	0	0
Stage 1	87	87	-	280	280	-	-	-	-	-	-	-
Stage 2	287	281	-	91	94	-	-	-	-	-	-	-
Critical Hdwy	7.35	6.75	6.45	7.35	6.75	6.45	4.35	-	-	4.35	-	-
Critical Hdwy Stg 1	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.725	4.225	3.525	3.725	4.225	3.525	2.425	-	-	2.425	-	-
Pot Cap-1 Maneuver	543	526	928	546	522	713	1384	-	-	1166	-	-
Stage 1	867	780	-	679	639	-	-	-	-	-	-	-
Stage 2	673	639	-	862	774	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	528	522	928	538	518	713	1384	-	-	1166	-	-
Mov Cap-2 Maneuver	528	522	-	538	518	-	-	-	-	-	-	-
Stage 1	865	775	-	678	638	-	-	-	-	-	-	-
Stage 2	657	638	-	850	769	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	11.8		10.8		0.1		0.6					
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1384	-	-	572 643	1166	-	-					
HCM Lane V/C Ratio	0.002	-	-	0.074 0.035	0.006	-	-					
HCM Control Delay (s)	7.6	-	-	11.8 10.8	8.1	-	-					
HCM Lane LOS	A	-	-	B B	A	-	-					
HCM 95th %tile Q(veh)	0	-	-	0.2 0.1	0	-	-					

HCM 6th TWSC
20: Quail Run Drive & 42nd Avenue

Long Term Total
PM Peak

Intersection												
Int Delay, s/veh	4.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Traffic Vol, veh/h	101	0	0	37	0	32	0	143	18	11	41	42
Future Vol, veh/h	101	0	0	37	0	32	0	143	18	11	41	42
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	110	0	0	40	0	35	0	155	20	12	45	46







Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	275	267	68	257	280	165	91	0	0	175	0	0
Stage 1	92	92	-	165	165	-	-	-	-	-	-	-
Stage 2	183	175	-	92	115	-	-	-	-	-	-	-
Critical Hdwy	7.35	6.75	6.45	7.35	6.75	6.45	4.35	-	-	4.35	-	-
Critical Hdwy Stg 1	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.725	4.225	3.525	3.725	4.225	3.525	2.425	-	-	2.425	-	-
Pot Cap-1 Maneuver	637	604	940	655	594	823	1373	-	-	1274	-	-
Stage 1	865	778	-	786	720	-	-	-	-	-	-	-
Stage 2	768	713	-	865	760	-	-	-	-	-	-	-
Platoon blocked, %	1	1	1	1	1	1	-	-	-	-	-	-
Mov Cap-1 Maneuver	606	599	940	650	589	823	1373	-	-	1274	-	-
Mov Cap-2 Maneuver	606	599	-	650	589	-	-	-	-	-	-	-
Stage 1	865	771	-	786	720	-	-	-	-	-	-	-
Stage 2	736	713	-	857	753	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	12.3		10.6		0		0.9	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1373	-	-	606	720	1274	-
HCM Lane V/C Ratio	-	-	-	0.181	0.104	0.009	-
HCM Control Delay (s)	0	-	-	12.3	10.6	7.9	-
HCM Lane LOS	A	-	-	B	B	A	-
HCM 95th %tile Q(veh)	0	-	-	0.7	0.3	0	-

HCM 6th TWSC
21: PA-9 Access/PA-8A Access & 42nd Avenue

Long Term Total
PM Peak

Intersection												
Int Delay, s/veh	3.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	20	6	4	48	0	11	0	13	0	0	10
Future Vol, veh/h	3	20	6	4	48	0	11	0	13	0	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	3	22	7	4	52	0	12	0	14	0	0	11







Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	52	0	0	29	0	0	98	92	26	99	95	52
Stage 1	-	-	-	-	-	-	32	32	-	60	60	-
Stage 2	-	-	-	-	-	-	66	60	-	39	35	-
Critical Hdwy	4.35	-	-	4.35	-	-	7.35	6.75	6.45	7.35	6.75	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Follow-up Hdwy	2.425	-	-	2.425	-	-	3.725	4.225	3.525	3.725	4.225	3.525
Pot Cap-1 Maneuver	1419	-	-	1447	-	-	832	756	987	831	754	954
Stage 1	-	-	-	-	-	-	929	825	-	897	802	-
Stage 2	-	-	-	-	-	-	890	802	-	921	822	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1419	-	-	1447	-	-	820	752	987	816	750	954
Mov Cap-2 Maneuver	-	-	-	-	-	-	820	752	-	816	750	-
Stage 1	-	-	-	-	-	-	927	823	-	895	800	-
Stage 2	-	-	-	-	-	-	877	800	-	906	820	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.8			0.6			9.1			8.8		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	903	1419	-	-	1447	-	-	954
HCM Lane V/C Ratio	0.029	0.002	-	-	0.003	-	-	0.011
HCM Control Delay (s)	9.1	7.5	-	-	7.5	-	-	8.8
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0







HCM 6th TWSC
22: PA-9 Access/PA-8A Access & 42nd Avenue

Long Term Total
PM Peak

Intersection												
Int Delay, s/veh	7.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	14	15	22	4	4	36	0	55	9	0	12
Future Vol, veh/h	5	14	15	22	4	4	36	0	55	9	0	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	5	15	16	24	4	4	39	0	60	10	0	13
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	8	0	0	31	0	0	94	89	23	117	95	6
Stage 1	-	-	-	-	-	-	33	33	-	54	54	-
Stage 2	-	-	-	-	-	-	61	56	-	63	41	-
Critical Hdwy	4.35	-	-	4.35	-	-	7.35	6.75	6.45	7.35	6.75	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Follow-up Hdwy	2.425	-	-	2.425	-	-	3.725	4.225	3.525	3.725	4.225	3.525
Pot Cap-1 Maneuver	1474	-	-	1445	-	-	837	759	991	808	754	1013
Stage 1	-	-	-	-	-	-	927	824	-	903	807	-
Stage 2	-	-	-	-	-	-	896	805	-	893	817	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1474	-	-	1445	-	-	814	744	991	747	739	1013
Mov Cap-2 Maneuver	-	-	-	-	-	-	814	744	-	747	739	-
Stage 1	-	-	-	-	-	-	924	822	-	900	793	-
Stage 2	-	-	-	-	-	-	870	791	-	836	815	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.1			5.5			9.4			9.2		
HCM LOS							A			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	913	1474	-	-	1445	-	-	879				
HCM Lane V/C Ratio	0.108	0.004	-	-	0.017	-	-	0.026				
HCM Control Delay (s)	9.4	7.5	-	-	7.5	-	-	9.2				
HCM Lane LOS	A	A	-	-	A	-	-	A				
HCM 95th %tile Q(veh)	0.4	0	-	-	0.1	-	-	0.1				

HCM 6th TWSC
23: PA-8C Access/PA-8B Access & 42nd Avenue

Long Term Total
PM Peak

Intersection												
Int Delay, s/veh	3.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	75	4	21	61	2	10	0	54	4	0	6
Future Vol, veh/h	3	75	4	21	61	2	10	0	54	4	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	3	82	4	23	66	2	11	0	59	4	0	7





Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	68	0	0	86	0	0	207	204	84	233	205	67
Stage 1	-	-	-	-	-	-	90	90	-	113	113	-
Stage 2	-	-	-	-	-	-	117	114	-	120	92	-
Critical Hdwy	4.35	-	-	4.35	-	-	7.35	6.75	6.45	7.35	6.75	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.75	-	6.35	5.75	-
Follow-up Hdwy	2.425	-	-	2.425	-	-	3.725	4.225	3.525	3.725	4.225	3.525
Pot Cap-1 Maneuver	1399	-	-	1377	-	-	704	654	915	676	653	936
Stage 1	-	-	-	-	-	-	864	778	-	839	760	-
Stage 2	-	-	-	-	-	-	835	759	-	832	776	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1399	-	-	1377	-	-	689	642	915	623	641	936
Mov Cap-2 Maneuver	-	-	-	-	-	-	689	642	-	623	641	-
Stage 1	-	-	-	-	-	-	862	776	-	837	747	-
Stage 2	-	-	-	-	-	-	815	746	-	777	774	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			1.9			9.5			9.7		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	870	1399	-	-	1377	-	-	779
HCM Lane V/C Ratio	0.08	0.002	-	-	0.017	-	-	0.014
HCM Control Delay (s)	9.5	7.6	-	-	7.7	-	-	9.7
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0







HCM 6th TWSC
24: Quail Run Drive & PA-9 Access

Long Term Total
PM Peak

Intersection						
Int Delay, s/veh	1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	19	5	157	8	2	76
Future Vol, veh/h	19	5	157	8	2	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	21	5	171	9	2	83
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	263	176	0	0	180	0
Stage 1	176	-	-	-	-	-
Stage 2	87	-	-	-	-	-
Critical Hdwy	6.65	6.45	-	-	4.35	-
Critical Hdwy Stg 1	5.65	-	-	-	-	-
Critical Hdwy Stg 2	5.65	-	-	-	-	-
Follow-up Hdwy	3.725	3.525	-	-	2.425	-
Pot Cap-1 Maneuver	679	811	-	-	1268	-
Stage 1	802	-	-	-	-	-
Stage 2	882	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	678	811	-	-	1268	-
Mov Cap-2 Maneuver	678	-	-	-	-	-
Stage 1	802	-	-	-	-	-
Stage 2	880	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	10.3	0		0.2		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	702	1268	-	
HCM Lane V/C Ratio	-	-	0.037	0.002	-	
HCM Control Delay (s)	-	-	10.3	7.8	-	
HCM Lane LOS	-	-	B	A	-	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	






HCM 6th TWSC
25: Cavanaugh Road & PA-9 Access/PA-8C Access

Long Term Total
PM Peak

Intersection												
Int Delay, s/veh	2.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	0	36	23	0	9	16	193	10	4	67	5
Future Vol, veh/h	13	0	36	23	0	9	16	193	10	4	67	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	14	0	39	25	0	10	17	210	11	4	73	5
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	339	339	76	353	336	216	78	0	0	221	0	0
Stage 1	84	84	-	250	250	-	-	-	-	-	-	-
Stage 2	255	255	-	103	86	-	-	-	-	-	-	-
Critical Hdwy	7.35	6.75	6.45	7.35	6.75	6.45	4.35	-	-	4.35	-	-
Critical Hdwy Stg 1	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.35	5.75	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.725	4.225	3.525	3.725	4.225	3.525	2.425	-	-	2.425	-	-
Pot Cap-1 Maneuver	574	547	925	561	549	769	1387	-	-	1223	-	-
Stage 1	870	782	-	706	659	-	-	-	-	-	-	-
Stage 2	701	656	-	850	781	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	560	539	925	531	541	769	1387	-	-	1223	-	-
Mov Cap-2 Maneuver	560	539	-	531	541	-	-	-	-	-	-	-
Stage 1	860	780	-	698	651	-	-	-	-	-	-	-
Stage 2	684	648	-	811	779	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	9.9		11.6		0.6		0.4					
HCM LOS	A		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1387	-	-	789	582	1223	-	-				
HCM Lane V/C Ratio	0.013	-	-	0.068	0.06	0.004	-	-				
HCM Control Delay (s)	7.6	-	-	9.9	11.6	8	-	-				
HCM Lane LOS	A	-	-	A	B	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.2	0.2	0	-	-				
























HCM 6th TWSC
26: Quail Run Drive & PA-7 Access

Long Term Total
PM Peak

Intersection						
Int Delay, s/veh	1.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	33	13	157	92	3
Future Vol, veh/h	8	33	13	157	92	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	25	25	25	25	25	25
Mvmt Flow	9	36	14	171	100	3
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	301	102	103	0	-	0
Stage 1	102	-	-	-	-	-
Stage 2	199	-	-	-	-	-
Critical Hdwy	6.65	6.45	4.35	-	-	-
Critical Hdwy Stg 1	5.65	-	-	-	-	-
Critical Hdwy Stg 2	5.65	-	-	-	-	-
Follow-up Hdwy	3.725	3.525	2.425	-	-	-
Pot Cap-1 Maneuver	645	894	1357	-	-	-
Stage 1	868	-	-	-	-	-
Stage 2	782	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	639	894	1357	-	-	-
Mov Cap-2 Maneuver	639	-	-	-	-	-
Stage 1	859	-	-	-	-	-
Stage 2	782	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	9.6	0.6		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1357	-	829	-	-	
HCM Lane V/C Ratio	0.01	-	0.054	-	-	
HCM Control Delay (s)	7.7	-	9.6	-	-	
HCM Lane LOS	A	-	A	-	-	
HCM 95th %tile Q(veh)	0	-	0.2	-	-	













Lanes, Volumes, Timings
1: Imboden & 56th Avenue

Long Term Total
Long Term Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			 			 			 	
Traffic Volume (vph)	389	29	0	43	8	0	0	283	0	0	225	0
Future Volume (vph)	389	29	0	43	8	0	0	283	0	0	225	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt												
Flt Protected	0.950			0.950								
Satd. Flow (prot)	3433	3539	0	1703	3406	0	0	3505	0	0	3471	0
Flt Permitted	0.950			0.950								
Satd. Flow (perm)	3433	3539	0	1703	3406	0	0	3505	0	0	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		98			104			592			587	
Travel Time (s)		2.2			2.4			13.5			13.3	
Peak Hour Factor	0.84	0.84	0.84	0.73	0.73	0.73	0.89	0.89	0.89	0.93	0.93	0.93
Heavy Vehicles (%)	2%	2%	2%	6%	6%	6%	3%	3%	3%	4%	4%	4%
Adj. Flow (vph)	463	35	0	59	11	0	0	318	0	0	242	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	463	35	0	59	11	0	0	318	0	0	242	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	L NA	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		34			34			40			40	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		6			6			6			6	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1			1			1	
Detector Template	Left			Left								
Leading Detector (ft)	20	20		20	20			100			100	
Trailing Detector (ft)	0	0		0	0			0			0	
Detector 1 Position(ft)	0	0		0	0			0			0	
Detector 1 Size(ft)	20	20		20	20			100			100	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA			NA			NA	
Protected Phases	1	4		1	4			2			2	
Permitted Phases												
Detector Phase	7	4		3	4			2			2	
Switch Phase	4			8								
Minimum Initial (s)	10.0	10.0		10.0	10.0			10.0			10.0	
Minimum Split (s)	16.0	16.0		16.0	16.0			16.0			16.0	
Total Split (s)	37.0	18.0		37.0	18.0			65.0			65.0	
Total Split (%)	30.8%	15.0%		30.8%	15.0%			54.2%			54.2%	
Maximum Green (s)	31.0	12.0		31.0	12.0			59.0			59.0	

Lanes, Volumes, Timings
1: Imboden & 56th Avenue

Long Term Total
Long Term Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Yellow Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0			2.0			2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lead/Lag	Lead			Lead				Lag			Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0		1.0	1.0			1.0			1.0	
Recall Mode	Max	Min		Max	Min			C-Max			C-Max	
Act Effct Green (s)	31.0	12.0		31.0	12.0			59.0			59.0	
Actuated g/C Ratio	0.26	0.10		0.26	0.10			0.49			0.49	
v/c Ratio	0.52	0.10		0.13	0.03			0.18			0.14	
Control Delay	17.8	30.0		13.9	30.5			17.4			17.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	17.8	30.0		13.9	30.5			17.4			17.0	
LOS	B	C		B	C			B			B	
Approach Delay	18.6			16.5				17.4			17.0	
Approach LOS	B			B				B			B	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 17.8

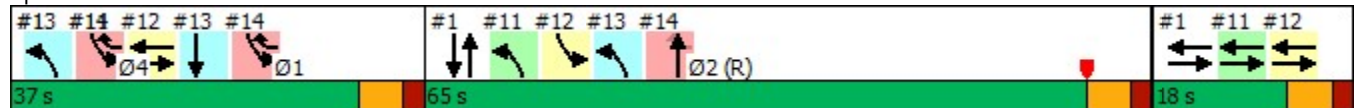
Intersection LOS: B

Intersection Capacity Utilization 36.1%

ICU Level of Service A













Analysis Period (min) 15

Splits and Phases: 1: Imboden & 56th Avenue



Lanes, Volumes, Timings
11: Imboden NBL & 56th Avenue

Long Term Total
Long Term Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑↑		↑↑		↑↑					↑
Traffic Volume (vph)	0	418	1421	0	8	0	834	0	0	0	0	217
Future Volume (vph)	0	418	1421	0	8	0	834	0	0	0	0	217
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.86	0.88	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Fr't			0.850									0.865
Flt Protected							0.950					
Satd. Flow (prot)	0	6408	2787	0	3406	0	3400	0	0	0	0	1611
Flt Permitted							0.950					
Satd. Flow (perm)	0	6408	2787	0	3406	0	3400	0	0	0	0	1611
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			1692									494
Link Speed (mph)		30			30			30				30
Link Distance (ft)		410			98			575				587
Travel Time (s)		9.3			2.2			13.1				13.3
Peak Hour Factor	0.92	0.84	0.84	0.73	0.73	0.92	0.89	0.92	0.89	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	6%	6%	2%	3%	2%	3%	2%	2%	2%
Adj. Flow (vph)	0	498	1692	0	11	0	937	0	0	0	0	236
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	498	1692	0	11	0	937	0	0	0	0	236
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	L NA	Left	Right	Left	Left	Right
Median Width(ft)		10			10			24				24
Link Offset(ft)		-12			12			0				-12
Crosswalk Width(ft)		16			6			6				16
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	60		9	15		60	15		9	60		60
Number of Detectors		1	1		1		1					1
Detector Template			Right				Left					Right
Leading Detector (ft)		100	20		20		20					20
Trailing Detector (ft)		0	0		0		0					0
Detector 1 Position(ft)		0	0		0		0					0
Detector 1 Size(ft)		100	20		20		20					20
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex					Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0		0.0		0.0					0.0
Detector 1 Queue (s)		0.0	0.0		0.0		0.0					0.0
Detector 1 Delay (s)		0.0	0.0		0.0		0.0					0.0
Turn Type		NA	Free		NA		Prot					Free
Protected Phases		1 4			1 4		2					
Permitted Phases			Free									Free
Detector Phase		1 4			8		2					
Switch Phase												
Minimum Initial (s)							10.0					
Minimum Split (s)							16.0					
Total Split (s)							65.0					
Total Split (%)							54.2%					
Maximum Green (s)							59.0					

Lane Group	Ø1	Ø4
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Turn Type		
Protected Phases	1	4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	16.0	16.0
Total Split (s)	37.0	18.0
Total Split (%)	31%	15%
Maximum Green (s)	31.0	12.0

Lanes, Volumes, Timings
11: Imboden NBL & 56th Avenue

Long Term Total
Long Term Total AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Yellow Time (s)							4.0					
All-Red Time (s)							2.0					
Lost Time Adjust (s)							0.0					
Total Lost Time (s)							6.0					
Lead/Lag							Lag					
Lead-Lag Optimize?												
Vehicle Extension (s)							1.0					
Recall Mode							C-Max					
Act Effect Green (s)	49.0	120.0		49.0			59.0					120.0
Actuated g/C Ratio	0.41	1.00		0.41			0.49					1.00
v/c Ratio	0.19	0.61		0.01			0.56					0.15
Control Delay	23.0	1.0		0.4			15.2					0.2
Queue Delay	0.0	0.0		0.0			0.0					0.0
Total Delay	23.0	1.0		0.4			15.2					0.2
LOS	C	A		A			B					A
Approach Delay	6.0			0.4			15.2				0.2	
Approach LOS	A			A			B				A	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 8.1

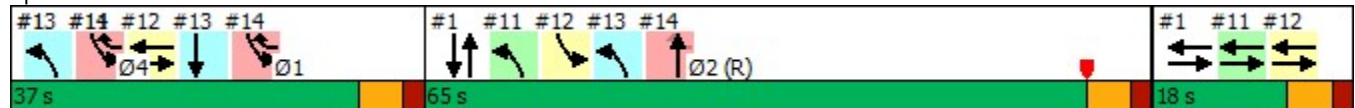
Intersection LOS: A

Intersection Capacity Utilization 40.5%

ICU Level of Service A

Analysis Period (min) 15













Splits and Phases: 11: Imboden NBL & 56th Avenue



Lane Group	Ø1	Ø4
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?		
Vehicle Extension (s)	1.0	1.0
Recall Mode	Max	Min
Act Effect Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Lanes, Volumes, Timings
12: 56th Avenue & Imboden SBL













Long Term Total
Long Term Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑↑	↑			↑	↑		
Traffic Volume (vph)	0	29	0	0	51	1	0	0	140	2	0	0
Future Volume (vph)	0	29	0	0	51	1	0	0	140	2	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	375		450	0		0	0		0
Storage Lanes	0		0	1		1	0		1	1		0
Taper Length (ft)	50			50			25			50		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850				0.865		
Flt Protected										0.950		
Satd. Flow (prot)	0	3539	0	0	4893	1524	0	0	1611	1736	0	0
Flt Permitted										0.950		
Satd. Flow (perm)	0	3539	0	0	4893	1524	0	0	1611	1736	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						136				1040		
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		104			579			599			581	
Travel Time (s)		2.4			13.2			13.6			13.2	
Peak Hour Factor	0.84	0.84	0.92	0.92	0.73	0.73	0.92	0.92	0.92	0.93	0.92	0.93
Heavy Vehicles (%)	2%	2%	2%	2%	6%	6%	2%	2%	2%	4%	2%	4%
Adj. Flow (vph)	0	35	0	0	70	1	0	0	152	2	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	35	0	0	70	1	0	0	152	2	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	L NA	Left	Right
Median Width(ft)		22			22			12			12	
Link Offset(ft)		6			-6			-12			0	
Crosswalk Width(ft)		6			16			16			6	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		60	60		9	60		60	15		9
Number of Detectors		1			1	1			1	1		
Detector Template						Right			Right	Left		
Leading Detector (ft)		20			100	20			20	20		
Trailing Detector (ft)		0			0	0			0	0		
Detector 1 Position(ft)		0			0	0			0	0		
Detector 1 Size(ft)		20			100	20			20	20		
Detector 1 Type		Cl+Ex			Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex		
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0	0.0			0.0	0.0		
Detector 1 Queue (s)		0.0			0.0	0.0			0.0	0.0		
Detector 1 Delay (s)		0.0			0.0	0.0			0.0	0.0		
Turn Type		NA			NA	Free			Free	Prot		
Protected Phases		1 4			1 4					2		
Permitted Phases						Free			Free			
Detector Phase		1 4			1 4					2		
Switch Phase												
Minimum Initial (s)										10.0		
Minimum Split (s)										16.0		

Lane Group	Ø1	Ø4
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Turn Type		
Protected Phases	1	4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	16.0	16.0

Lanes, Volumes, Timings
12: 56th Avenue & Imboden SBL

Long Term Total
Long Term Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)										65.0		
Total Split (%)										54.2%		
Maximum Green (s)										59.0		
Yellow Time (s)										4.0		
All-Red Time (s)										2.0		
Lost Time Adjust (s)										0.0		
Total Lost Time (s)										6.0		
Lead/Lag										Lag		
Lead-Lag Optimize?												
Vehicle Extension (s)										1.0		
Recall Mode										C-Max		
Act Effect Green (s)		49.0			49.0	120.0			120.0	59.0		
Actuated g/C Ratio		0.41			0.41	1.00			1.00	0.49		
v/c Ratio		0.02			0.04	0.00			0.09	0.00		
Control Delay		0.0			21.4	0.0			0.1	29.0		
Queue Delay		0.0			0.0	0.0			0.0	0.0		
Total Delay		0.0			21.4	0.0			0.1	29.0		
LOS		A			C	A			A	C		
Approach Delay					21.1			0.1			29.0	
Approach LOS					C			A			C	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 6.1

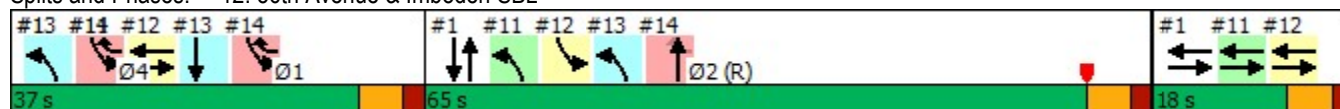
Intersection LOS: A

Intersection Capacity Utilization 20.0%

ICU Level of Service A

Analysis Period (min) 15

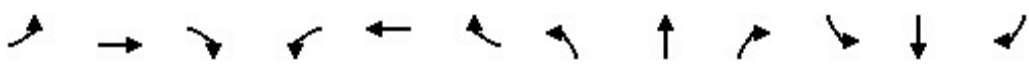
Splits and Phases: 12: 56th Avenue & Imboden SBL



Lane Group	Ø1	Ø4
Total Split (s)	37.0	18.0
Total Split (%)	31%	15%
Maximum Green (s)	31.0	12.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?		
Vehicle Extension (s)	1.0	1.0
Recall Mode	Max	Min
Act Effect Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Lanes, Volumes, Timings
13: Imboden & 56th Avenue EBR

Long Term Total
Long Term Total AM













												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↔↔				↔↔	↕↕			↕↕	
Traffic Volume (vph)	0	0	1421	0	0	0	834	283	140	0	268	0
Future Volume (vph)	0	0	1421	0	0	0	834	283	140	0	268	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	450		0	0		0
Storage Lanes	0		2	0		0	1		0	0		0
Taper Length (ft)	50			25			50			50		
Lane Util. Factor	1.00	1.00	0.88	1.00	1.00	1.00	0.97	0.95	0.95	1.00	0.95	1.00
Frt			0.850					0.950				
Flt Protected							0.950					
Satd. Flow (prot)	0	0	2787	0	0	0	3433	3362	0	0	3574	0
Flt Permitted							0.950					
Satd. Flow (perm)	0	0	2787	0	0	0	3433	3362	0	0	3574	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			1473					51				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		103			599			650			592	
Travel Time (s)		2.3			13.6			14.8			13.5	
Peak Hour Factor	0.88	0.92	0.88	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	1%	1%
Adj. Flow (vph)	0	0	1615	0	0	0	907	308	152	0	288	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	1615	0	0	0	907	460	0	0	288	0
Enter Blocked Intersection	No	No	No	No	No	No	No	Yes	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			40			40	
Link Offset(ft)		38			-43			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	60		60	15		60	60		9
Number of Detectors			1				1	2			2	
Detector Template			Right				Left	Thru			Thru	
Leading Detector (ft)			20				20	100			100	
Trailing Detector (ft)			0				0	0			0	
Detector 1 Position(ft)			0				0	0			0	
Detector 1 Size(ft)			20				20	6			6	
Detector 1 Type			Cl+Ex				Cl+Ex	Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)			0.0				0.0	0.0			0.0	
Detector 1 Queue (s)			0.0				0.0	0.0			0.0	
Detector 1 Delay (s)			0.0				0.0	0.0			0.0	
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type			Free				Prot	NA			NA	
Protected Phases							2 4	Free			1	

Lane Group	Ø2	Ø4
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	2	4

Lanes, Volumes, Timings

13: Imboden & 56th Avenue EBR

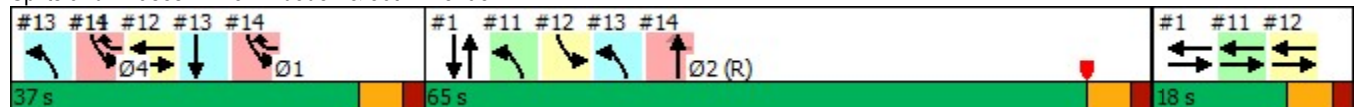
Long Term Total
Long Term Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	Free											
Detector Phase	2 4						1					
Switch Phase												
Minimum Initial (s)												10.0
Minimum Split (s)												16.0
Total Split (s)												37.0
Total Split (%)												30.8%
Maximum Green (s)												31.0
Yellow Time (s)												4.0
All-Red Time (s)												2.0
Lost Time Adjust (s)												0.0
Total Lost Time (s)												6.0
Lead/Lag												Lead
Lead-Lag Optimize?												
Vehicle Extension (s)												1.0
Recall Mode												Max
Act Effct Green (s)	120.0			77.0			120.0			31.0		
Actuated g/C Ratio	1.00			0.64			1.00			0.26		
v/c Ratio	0.58			0.41			0.14			0.31		
Control Delay	0.7			11.2			0.1			49.5		
Queue Delay	0.0			0.0			0.0			0.0		
Total Delay	0.7			11.2			0.1			49.5		
LOS	A			B			A			D		
Approach Delay	0.7						7.4			49.5		
Approach LOS	A						A			D		

Intersection Summary

Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 7.8	Intersection LOS: A
Intersection Capacity Utilization 40.5%	ICU Level of Service A
Analysis Period (min) 15	



















Splits and Phases: 13: Imboden & 56th Avenue EBR



Lane Group	Ø2	Ø4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	16.0	16.0
Total Split (s)	65.0	18.0
Total Split (%)	54%	15%
Maximum Green (s)	59.0	12.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?		
Vehicle Extension (s)	1.0	1.0
Recall Mode	C-Max	Min
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Lanes, Volumes, Timings
14: Imboden & 56th Avenue WBR













Long Term Total
Long Term Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								 			 	
Traffic Volume (vph)	0	0	0	0	0	1	0	672	0	2	225	217
Future Volume (vph)	0	0	0	0	0	1	0	672	0	2	225	217
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	450		0
Storage Lanes	0		0	0		1	0		0	1		0
Taper Length (ft)	25			50			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt						0.865					0.926	
Flt Protected										0.950		
Satd. Flow (prot)	0	0	0	0	0	1550	0	3505	0	1736	3245	0
Flt Permitted										0.950		
Satd. Flow (perm)	0	0	0	0	0	1550	0	3505	0	1736	3245	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)											148	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		587			110			587			1480	
Travel Time (s)		13.3			2.5			13.3			33.6	
Peak Hour Factor	0.92	0.92	0.92	0.73	0.92	0.73	0.92	0.89	0.89	0.93	0.93	0.92
Heavy Vehicles (%)	2%	2%	2%	6%	2%	6%	2%	3%	3%	4%	4%	2%
Adj. Flow (vph)	0	0	0	0	0	1	0	755	0	2	242	236
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	1	0	755	0	2	478	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	Yes	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			40			40	
Link Offset(ft)		-38			48			6			-6	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	60		60	15		9	60		9	15		60
Number of Detectors						1		2		1	2	
Detector Template						Right		Thru		Left	Thru	
Leading Detector (ft)						20		100		20	100	
Trailing Detector (ft)						0		0		0	0	
Detector 1 Position(ft)						0		0		0	0	
Detector 1 Size(ft)						20		6		20	6	
Detector 1 Type						Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)						0.0		0.0		0.0	0.0	
Detector 1 Queue (s)						0.0		0.0		0.0	0.0	
Detector 1 Delay (s)						0.0		0.0		0.0	0.0	
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type						pt+ov		NA		Prot	NA	
Protected Phases						1 4		2		1 4	Free	

Lane Group	Ø1	Ø4
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	1	4

Lanes, Volumes, Timings
14: Imboden & 56th Avenue WBR

Long Term Total
Long Term Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2											
Detector Phase								2		1 4		
Switch Phase												
Minimum Initial (s)								10.0				
Minimum Split (s)								16.0				
Total Split (s)								65.0				
Total Split (%)								54.2%				
Maximum Green (s)								59.0				
Yellow Time (s)								4.0				
All-Red Time (s)								2.0				
Lost Time Adjust (s)								0.0				
Total Lost Time (s)								6.0				
Lead/Lag								Lag				
Lead-Lag Optimize?												
Vehicle Extension (s)								1.0				
Recall Mode								C-Max				
Act Effct Green (s)						120.0		59.0		49.0	120.0	
Actuated g/C Ratio						1.00		0.49		0.41	1.00	
v/c Ratio						0.00		0.44		0.00	0.15	
Control Delay						0.0		18.0		21.0	0.1	
Queue Delay						0.0		0.0		0.0	0.0	
Total Delay						0.0		18.0		21.0	0.1	
LOS						A		B		C	A	
Approach Delay								18.0			0.2	
Approach LOS								B			A	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 11.1

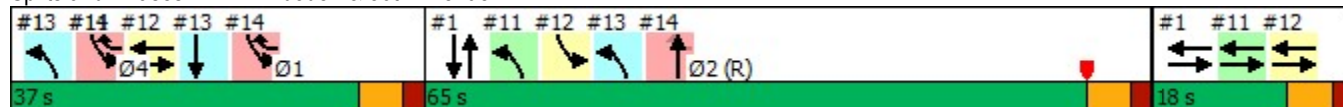
Intersection LOS: B

Intersection Capacity Utilization 36.9%

ICU Level of Service A

Analysis Period (min) 15

























Splits and Phases: 14: Imboden & 56th Avenue WBR



Lane Group	Ø1	Ø4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	16.0	16.0
Total Split (s)	37.0	18.0
Total Split (%)	31%	15%
Maximum Green (s)	31.0	12.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?		
Vehicle Extension (s)	1.0	1.0
Recall Mode	Max	Min
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		













Lanes, Volumes, Timings
1: Imboden & 56th Avenue

Long Term Total
Long Term Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 		 	 			 			 	
Traffic Volume (vph)	433	8	0	150	30	0	0	333	0	0	367	0
Future Volume (vph)	433	8	0	150	30	0	0	333	0	0	367	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt												
Flt Protected	0.950			0.950								
Satd. Flow (prot)	3433	3539	0	1752	3505	0	0	3505	0	0	3574	0
Flt Permitted	0.950			0.950								
Satd. Flow (perm)	3433	3539	0	1752	3505	0	0	3505	0	0	3574	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		98			104			592			587	
Travel Time (s)		1.7			1.8			9.0			8.9	
Peak Hour Factor	0.88	0.88	0.88	0.84	0.84	0.84	0.89	0.89	0.89	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	3%	3%	3%	1%	1%	1%
Adj. Flow (vph)	492	9	0	179	36	0	0	374	0	0	408	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	492	9	0	179	36	0	0	374	0	0	408	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	L NA	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		34			34			40			40	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		6			6			6			6	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		12	15		12
Number of Detectors	1	1		1	1			1			1	
Detector Template	Left			Left								
Leading Detector (ft)	20	20		20	20			100			100	
Trailing Detector (ft)	0	0		0	0			0			0	
Detector 1 Position(ft)	0	0		0	0			0			0	
Detector 1 Size(ft)	20	20		20	20			100			100	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA			NA			NA	
Protected Phases	1	4		1	4			2			2	
Permitted Phases												
Detector Phase	7	4		3	4			2			2	
Switch Phase	4			8								
Minimum Initial (s)	5.0	10.0		5.0	10.0			10.0			10.0	
Minimum Split (s)	9.5	16.0		9.5	16.0			16.0			16.0	
Total Split (s)	26.0	16.0		26.0	16.0			78.0			78.0	
Total Split (%)	21.7%	13.3%		21.7%	13.3%			65.0%			65.0%	
Maximum Green (s)	21.5	10.0		21.5	10.0			72.0			72.0	

Lanes, Volumes, Timings
1: Imboden & 56th Avenue

Long Term Total
Long Term Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Yellow Time (s)	3.5	4.0		3.5	4.0			4.0			4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0			2.0			2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	4.5	6.0		4.5	6.0			6.0			6.0	
Lead/Lag	Lead			Lead				Lag			Lag	
Lead-Lag Optimize?	Yes			Yes								
Vehicle Extension (s)	3.0	1.0		3.0	1.0			1.0			1.0	
Recall Mode	None	Min		None	Min			C-Max			C-Max	
Act Effect Green (s)	21.3	10.0		21.3	10.0			72.2			72.2	
Actuated g/C Ratio	0.18	0.08		0.18	0.08			0.60			0.60	
v/c Ratio	0.81	0.03		0.58	0.12			0.18			0.19	
Control Delay	27.9	29.1		23.7	24.7			11.0			11.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	27.9	29.1		23.7	24.7			11.0			11.1	
LOS	C	C		C	C			B			B	
Approach Delay		27.9			23.9			11.0			11.1	
Approach LOS		C			C			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 18.5

Intersection LOS: B

Intersection Capacity Utilization 39.2%

ICU Level of Service A













Analysis Period (min) 15

Splits and Phases: 1: Imboden & 56th Avenue



Lanes, Volumes, Timings
11: Imboden NBL & 56th Avenue

Long Term Total
Long Term Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑↑		↑↑		↑↑					↑
Traffic Volume (vph)	0	441	1412	0	30	0	1692	0	0	0	0	304
Future Volume (vph)	0	441	1412	0	30	0	1692	0	0	0	0	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.86	0.88	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850									0.865
Fl _t Protected							0.950					
Satd. Flow (prot)	0	6408	2787	0	3505	0	3400	0	0	0	0	1611
Fl _t Permitted							0.950					
Satd. Flow (perm)	0	6408	2787	0	3505	0	3400	0	0	0	0	1611
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			1605									297
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		410			98			575			587	
Travel Time (s)		7.0			1.7			8.7			8.9	
Peak Hour Factor	0.92	0.88	0.88	0.84	0.84	0.92	0.89	0.92	0.89	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	3%	3%	2%	3%	2%	3%	2%	2%	2%
Adj. Flow (vph)	0	501	1605	0	36	0	1901	0	0	0	0	330
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	501	1605	0	36	0	1901	0	0	0	0	330
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	L NA	Left	Right	Left	Left	Right
Median Width(ft)		10			10			24			24	
Link Offset(ft)		-12			12			0			-12	
Crosswalk Width(ft)		16			6			6			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		12	15		9	15		9	15		9
Number of Detectors		1	1		1		1					1
Detector Template			Right				Left					Right
Leading Detector (ft)		100	20		20		20					20
Trailing Detector (ft)		0	0		0		0					0
Detector 1 Position(ft)		0	0		0		0					0
Detector 1 Size(ft)		100	20		20		20					20
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex					Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0		0.0		0.0					0.0
Detector 1 Queue (s)		0.0	0.0		0.0		0.0					0.0
Detector 1 Delay (s)		0.0	0.0		0.0		0.0					0.0
Turn Type		NA	Free		NA		Prot					Free
Protected Phases		1 4			1 4		2					
Permitted Phases			Free									Free
Detector Phase		1 4			1 4		2					
Switch Phase												
Minimum Initial (s)							10.0					
Minimum Split (s)							16.0					
Total Split (s)							78.0					
Total Split (%)							65.0%					
Maximum Green (s)							72.0					

Lane Group	Ø1	Ø4
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Turn Type		
Protected Phases	1	4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	10.0
Minimum Split (s)	9.5	16.0
Total Split (s)	26.0	16.0
Total Split (%)	22%	13%
Maximum Green (s)	21.5	10.0

Lanes, Volumes, Timings
11: Imboden NBL & 56th Avenue

Long Term Total
Long Term Total PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Yellow Time (s)							4.0					
All-Red Time (s)							2.0					
Lost Time Adjust (s)							0.0					
Total Lost Time (s)							6.0					
Lead/Lag							Lag					
Lead-Lag Optimize?												
Vehicle Extension (s)							1.0					
Recall Mode							C-Max					
Act Effect Green (s)		37.3	120.0		37.3		72.2					120.0
Actuated g/C Ratio		0.31	1.00		0.31		0.60					1.00
v/c Ratio		0.25	0.58		0.03		0.93					0.20
Control Delay		31.3	0.9		0.1		19.7					0.3
Queue Delay		0.1	0.0		0.0		0.0					0.0
Total Delay		31.3	0.9		0.1		19.7					0.3
LOS		C	A		A		B					A
Approach Delay		8.1			0.1			19.7			0.3	
Approach LOS		A			A			B			A	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 12.5

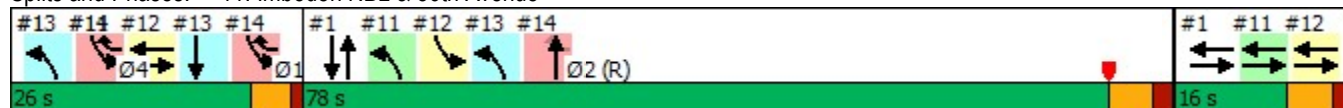
Intersection LOS: B

Intersection Capacity Utilization 61.7%

ICU Level of Service B

Analysis Period (min) 15













Splits and Phases: 11: Imboden NBL & 56th Avenue



Lane Group	Ø1	Ø4
Yellow Time (s)	3.5	4.0
All-Red Time (s)	1.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	1.0
Recall Mode	None	Min
Act Effect Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Lanes, Volumes, Timings
12: 56th Avenue & Imboden SBL













Long Term Total
Long Term Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑↑	↑			↑	↑		
Traffic Volume (vph)	0	8	0	0	180	2	0	0	47	1	0	0
Future Volume (vph)	0	8	0	0	180	2	0	0	47	1	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	375		450	0		0	0		0
Storage Lanes	0		0	1		1	0		1	1		0
Taper Length (ft)	50			50			25			50		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850				0.865		
Flt Protected										0.950		
Satd. Flow (prot)	0	3539	0	0	5036	1568	0	0	1611	1787	0	0
Flt Permitted										0.950		
Satd. Flow (perm)	0	3539	0	0	5036	1568	0	0	1611	1787	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						123				1077		
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		104			579			599			581	
Travel Time (s)		1.8			9.9			9.1			8.8	
Peak Hour Factor	0.88	0.88	0.92	0.92	0.84	0.84	0.92	0.92	0.92	0.90	0.92	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%	2%	2%	2%	1%	2%	1%
Adj. Flow (vph)	0	9	0	0	214	2	0	0	51	1	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	214	2	0	0	51	1	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	L NA	Left	Right
Median Width(ft)		22			22			12			12	
Link Offset(ft)		6			-6			-12			0	
Crosswalk Width(ft)		6			16			16			6	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		12	15		9	15		9
Number of Detectors		1			1	1			1	1		
Detector Template						Right			Right	Left		
Leading Detector (ft)		20			100	20			20	20		
Trailing Detector (ft)		0			0	0			0	0		
Detector 1 Position(ft)		0			0	0			0	0		
Detector 1 Size(ft)		20			100	20			20	20		
Detector 1 Type		Cl+Ex			Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex		
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0	0.0			0.0	0.0		
Detector 1 Queue (s)		0.0			0.0	0.0			0.0	0.0		
Detector 1 Delay (s)		0.0			0.0	0.0			0.0	0.0		
Turn Type		NA			NA	Free			Free	Prot		
Protected Phases		1 4			1 4					2		
Permitted Phases						Free			Free			
Detector Phase		1 4			1 4					2		
Switch Phase												
Minimum Initial (s)										10.0		
Minimum Split (s)										16.0		

Lane Group	Ø1	Ø4
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Turn Type		
Protected Phases	1	4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	10.0
Minimum Split (s)	9.5	16.0

Lanes, Volumes, Timings
12: 56th Avenue & Imboden SBL

Long Term Total
Long Term Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)										78.0		
Total Split (%)										65.0%		
Maximum Green (s)										72.0		
Yellow Time (s)										4.0		
All-Red Time (s)										2.0		
Lost Time Adjust (s)										0.0		
Total Lost Time (s)										6.0		
Lead/Lag										Lag		
Lead-Lag Optimize?												
Vehicle Extension (s)										1.0		
Recall Mode										C-Max		
Act Effct Green (s)		37.3			37.3	120.0			120.0	72.2		
Actuated g/C Ratio		0.31			0.31	1.00			1.00	0.60		
v/c Ratio		0.01			0.14	0.00			0.03	0.00		
Control Delay		0.0			30.0	0.0			0.0	25.0		
Queue Delay		0.0			0.0	0.0			0.0	0.0		
Total Delay		0.0			30.0	0.0			0.0	25.0		
LOS		A			C	A			A	C		
Approach Delay					29.7						25.0	
Approach LOS					C						C	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 23.3

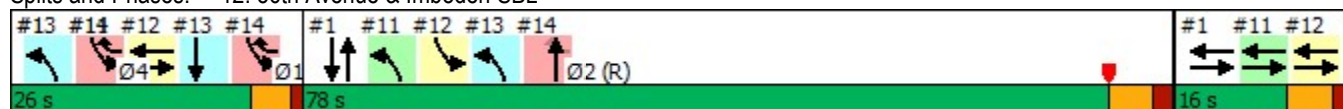
Intersection LOS: C

Intersection Capacity Utilization 14.6%

ICU Level of Service A

Analysis Period (min) 15

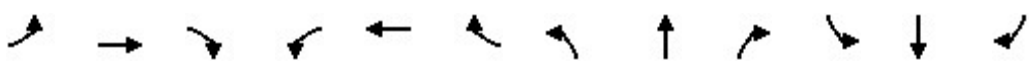
Splits and Phases: 12: 56th Avenue & Imboden SBL



Lane Group	Ø1	Ø4
Total Split (s)	26.0	16.0
Total Split (%)	22%	13%
Maximum Green (s)	21.5	10.0
Yellow Time (s)	3.5	4.0
All-Red Time (s)	1.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	1.0
Recall Mode	None	Min
Act Effect Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Lanes, Volumes, Timings
13: Imboden & 56th Avenue EBR













Long Term Total
Long Term Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↔↔				↔↔	↕↕			↕↕	
Traffic Volume (vph)	0	0	1412	0	0	0	1692	333	47	0	517	0
Future Volume (vph)	0	0	1412	0	0	0	1692	333	47	0	517	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	450		0	0		0
Storage Lanes	0		2	0		0	1		0	0		0
Taper Length (ft)	50			25			50			50		
Lane Util. Factor	1.00	1.00	0.88	1.00	1.00	1.00	0.97	0.95	0.95	1.00	0.95	1.00
Frt			0.850					0.982				
Flt Protected							0.950					
Satd. Flow (prot)	0	0	2787	0	0	0	3433	3476	0	0	3574	0
Flt Permitted							0.950					
Satd. Flow (perm)	0	0	2787	0	0	0	3433	3476	0	0	3574	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			1527					9				
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		103			599			650			592	
Travel Time (s)		1.6			9.1			9.8			9.0	
Peak Hour Factor	0.88	0.92	0.88	0.92	0.92	0.92	0.91	0.91	0.92	0.92	0.93	0.93
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	1%	1%
Adj. Flow (vph)	0	0	1605	0	0	0	1859	366	51	0	556	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	1605	0	0	0	1859	417	0	0	556	0
Enter Blocked Intersection	No	No	No	No	No	No	No	Yes	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			40			40	
Link Offset(ft)		38			-43			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		45	15		9	15		45	15		9
Number of Detectors			1				1	2			2	
Detector Template			Right				Left	Thru			Thru	
Leading Detector (ft)			20				20	100			100	
Trailing Detector (ft)			0				0	0			0	
Detector 1 Position(ft)			0				0	0			0	
Detector 1 Size(ft)			20				20	6			6	
Detector 1 Type			Cl+Ex				Cl+Ex	Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)			0.0				0.0	0.0			0.0	
Detector 1 Queue (s)			0.0				0.0	0.0			0.0	
Detector 1 Delay (s)			0.0				0.0	0.0			0.0	
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type			Free				Prot	NA			NA	
Protected Phases							2 4	Free			1	

Lane Group	Ø2	Ø4
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	2	4

Lanes, Volumes, Timings
13: Imboden & 56th Avenue EBR

Long Term Total
Long Term Total PM

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Permitted Phases	Free												
Detector Phase	2 4						1						
Switch Phase													
Minimum Initial (s)												5.0	
Minimum Split (s)												9.5	
Total Split (s)												26.0	
Total Split (%)												21.7%	
Maximum Green (s)												21.5	
Yellow Time (s)												3.5	
All-Red Time (s)												1.0	
Lost Time Adjust (s)												0.0	
Total Lost Time (s)												4.5	
Lead/Lag												Lead	
Lead-Lag Optimize?												Yes	
Vehicle Extension (s)												3.0	
Recall Mode												None	
Act Effct Green (s)	120.0			88.2			120.0	21.3					
Actuated g/C Ratio	1.00			0.74			1.00	0.18					
v/c Ratio	0.58			0.74			0.12	0.88					
Control Delay	0.7			11.5			0.1	68.7					
Queue Delay	0.0			0.3			0.0	0.0					
Total Delay	0.7			11.8			0.1	68.7					
LOS	A			B			A	E					
Approach Delay	0.7							9.6	68.7				
Approach LOS	A							A	E				

Intersection Summary

Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 13.8	Intersection LOS: B
Intersection Capacity Utilization 69.6%	ICU Level of Service C
Analysis Period (min) 15	


Splits and Phases: 13: Imboden & 56th Avenue EBR



Lane Group	Ø2	Ø4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	10.0	10.0
Minimum Split (s)	16.0	16.0
Total Split (s)	78.0	16.0
Total Split (%)	65%	13%
Maximum Green (s)	72.0	10.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	
Lead-Lag Optimize?		
Vehicle Extension (s)	1.0	1.0
Recall Mode	C-Max	Min
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Lanes, Volumes, Timings
14: Imboden & 56th Avenue WBR













Long Term Total
Long Term Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations						↗		↗↗		↗	↗↗	
Traffic Volume (vph)	0	0	0	0	0	2	0	766	0	1	367	304
Future Volume (vph)	0	0	0	0	0	2	0	766	0	1	367	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	450		0
Storage Lanes	0		0	0		1	0		0	1		0
Taper Length (ft)	25			50			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt						0.865					0.933	
Flt Protected										0.950		
Satd. Flow (prot)	0	0	0	0	0	1596	0	3505	0	1787	3320	0
Flt Permitted										0.950		
Satd. Flow (perm)	0	0	0	0	0	1596	0	3505	0	1787	3320	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)											122	
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		587			110			587			1480	
Travel Time (s)		8.9			1.7			8.9			22.4	
Peak Hour Factor	0.92	0.92	0.92	0.84	0.92	0.84	0.92	0.89	0.89	0.90	0.90	0.92
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	1%	1%	2%
Adj. Flow (vph)	0	0	0	0	0	2	0	861	0	1	408	330
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	2	0	861	0	1	738	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	Yes	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			40			40	
Link Offset(ft)		-38			48			6			-6	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		45	15		9	15		45
Number of Detectors						1		2		1	2	
Detector Template						Right		Thru		Left	Thru	
Leading Detector (ft)						20		100		20	100	
Trailing Detector (ft)						0		0		0	0	
Detector 1 Position(ft)						0		0		0	0	
Detector 1 Size(ft)						20		6		20	6	
Detector 1 Type						Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)						0.0		0.0		0.0	0.0	
Detector 1 Queue (s)						0.0		0.0		0.0	0.0	
Detector 1 Delay (s)						0.0		0.0		0.0	0.0	
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type						pt+ov		NA		Prot	NA	
Protected Phases						1 4		2		1 4	Free	

Lane Group	Ø1	Ø4
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	1	4

Lanes, Volumes, Timings
14: Imboden & 56th Avenue WBR

Long Term Total
Long Term Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2											
Detector Phase	1 4						2			1 4		
Switch Phase												
Minimum Initial (s)							10.0					
Minimum Split (s)							16.0					
Total Split (s)							78.0					
Total Split (%)							65.0%					
Maximum Green (s)							72.0					
Yellow Time (s)							4.0					
All-Red Time (s)							2.0					
Lost Time Adjust (s)							0.0					
Total Lost Time (s)							6.0					
Lead/Lag							Lag					
Lead-Lag Optimize?												
Vehicle Extension (s)							1.0					
Recall Mode							C-Max					
Act Effct Green (s)	120.0						72.2			37.3		
Actuated g/C Ratio	1.00						0.60			0.31		
v/c Ratio	0.00						0.41			0.00		
Control Delay	0.0						13.9			28.0		
Queue Delay	0.0						0.0			0.0		
Total Delay	0.0						13.9			28.0		
LOS	A						B			C		
Approach Delay							13.9			0.2		
Approach LOS							B			A		

Intersection Summary

Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 7.6	Intersection LOS: A
Intersection Capacity Utilization 34.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 14: Imboden & 56th Avenue WBR



Lane Group	Ø1	Ø4
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	10.0
Minimum Split (s)	9.5	16.0
Total Split (s)	26.0	16.0
Total Split (%)	22%	13%
Maximum Green (s)	21.5	10.0
Yellow Time (s)	3.5	4.0
All-Red Time (s)	1.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	1.0
Recall Mode	None	Min
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

APPENDIX G. SIGNAL WARRANT WORKSHEETS

MUTCD Volume-based Warrant Evaluation
Imboden Rd & 56th Avenue
2040_No Build



Major Street: Imboden Rd
 Lanes Moving Traffic: 2 or more
 Approach Speed: 30 MPH
 Option: Rural Community

Minor Street: 56th Avenue
 Lanes Moving Traffic: 1
 Right Turn Volume Included: 50% EB

WARRANT 1, Condition A - Minimum Vehicular Volume

70% Satisfied **Yes**

	Vehicles per hour 70% (56%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	420 (336)	1502	1410	1318	1226	1134	1042	950	858
Highest Apprch. Minor Street	105 (84)	815	765	715	665	615	565	515	465

WARRANT 1, Condition B - Interruption of Continuous Traffic

70% Satisfied **Yes**

	Vehicles per hour 70% (56%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	630 (504)	1502	1410	1318	1226	1134	1042	950	858
Highest Apprch. Minor Street	53 (42)	815	765	715	665	615	565	515	465

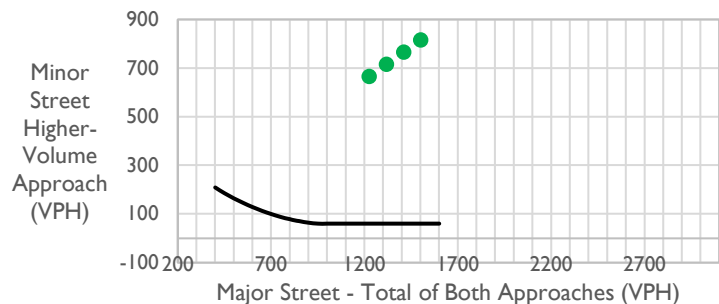
WARRANT 1, Condition A and Condition B

56% Satisfied **Yes**

WARRANT 2, Four Hour Volume

70% Satisfied **Yes**

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1502	815
2nd Highest	1410	765
3rd Highest	1318	715
4th Highest	1226	665



WARRANT 3, Peak Hour Volume

70% Satisfied **Yes**

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1502	815

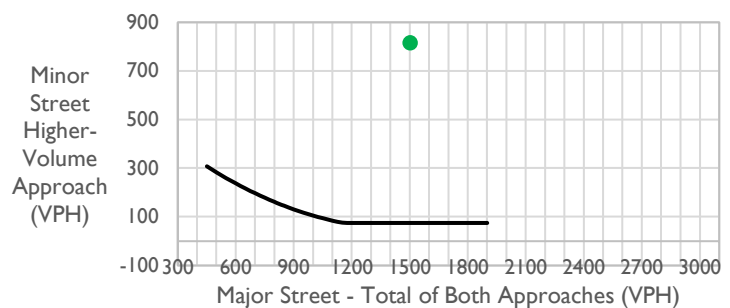
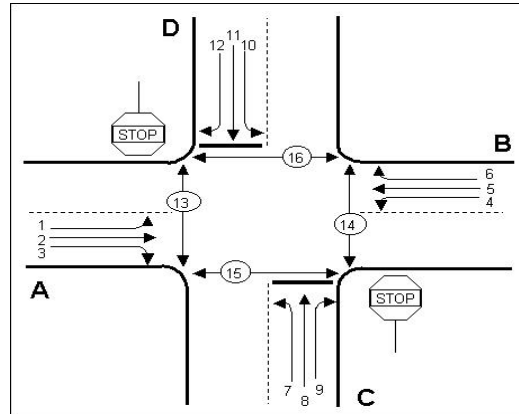


Figure 2 - 11. Minor-road right-turn volume reduction for warrant check.
Imboden Rd & 56th Avenue
2040_No Build



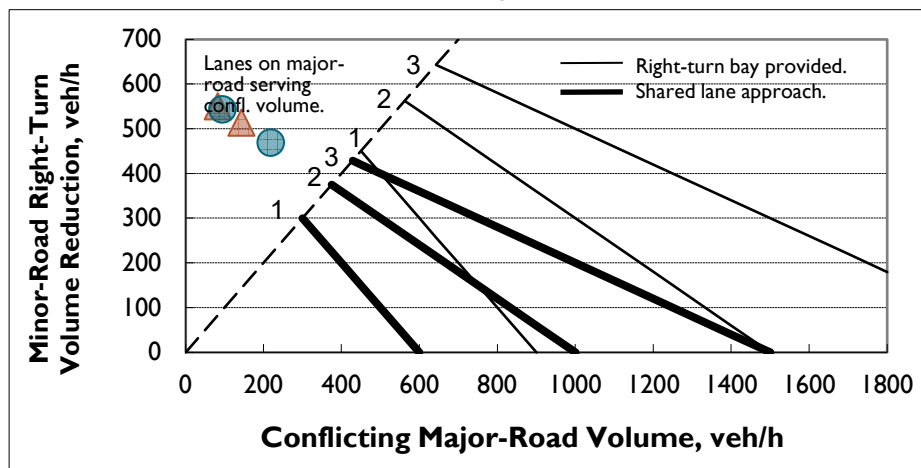
INPUT

Number of lanes on major-road approach:			2	
Right-turn geometry on minor-road:			Shared-lane approach	
Approach	Number	Movement	Volume (veh/hr)	
			AM	PM
Major A	2	Through	164	188
	3	Right	0	0
Major B	5	Through	127	217
	6	Right	159	219
Minor C	7	Left	0	0
	8	Through	0	0
	9	Right	0	0
Minor D	10	Left	291	328
	11	Through	0	0
	12	Right	862	973

OUTPUT

Variable	Volume (veh/hr)	
	AM	PM
Conflicting major-road volume (Vc9):	82	94
Conflicting major-road volume (Vc12):	143	218
Right-turn volume reduction (Vr9):	551	544
Right-turn volume reduction (Vr12):	514	469
Adjusted right-turn volume reduction (Vr9):	0	0
Adjusted right-turn volume reduction (Vr12):	514	469
Adjusted minor-road volume:	639	832

Chart Legend:



Source: NCHRP Report 457

MUTCD Volume-based Warrant Evaluation
Imboden Rd & 48th Avenue
2040_No Build



Major Street: Imboden Rd
 Lanes Moving Traffic: 2 or more
 Approach Speed: 30 MPH
 Option: Rural Community

Minor Street: 48th Avenue
 Lanes Moving Traffic: 1
 Right Turn Volume Included: 25% EB, 50% WB

WARRANT 1, Condition A - Minimum Vehicular Volume

70% Satisfied Yes

	Vehicles per hour 70% (56%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	420 (336)	1401	1315	1229	1143	1058	972	886	800
Highest Apprch. Minor Street	105 (84)	283	266	248	231	214	196	179	162

WARRANT 1, Condition B - Interruption of Continuous Traffic

70% Satisfied Yes

	Vehicles per hour 70% (56%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	630 (504)	1401	1315	1229	1143	1058	972	886	800
Highest Apprch. Minor Street	53 (42)	283	266	248	231	214	196	179	162

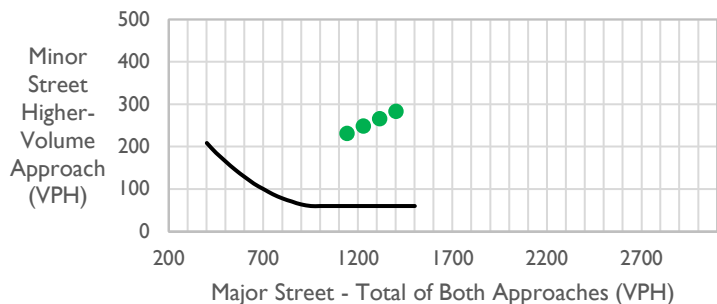
WARRANT 1, Condition A and Condition B

56% Satisfied Yes

WARRANT 2, Four Hour Volume

70% Satisfied Yes

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1401	283
2nd Highest	1315	266
3rd Highest	1229	248
4th Highest	1143	231



WARRANT 3, Peak Hour Volume

70% Satisfied Yes

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1401	283

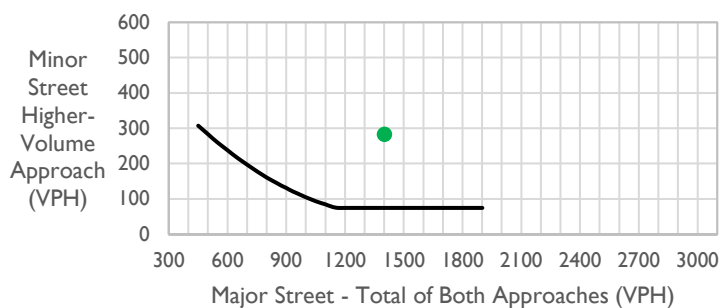
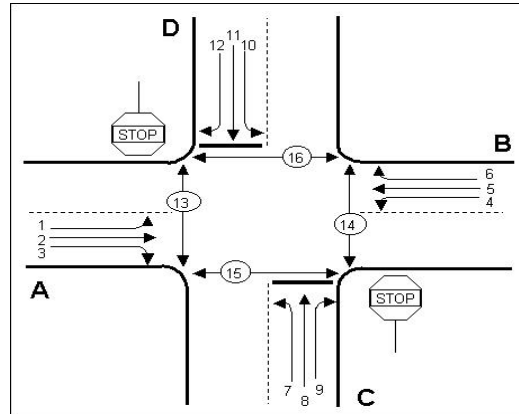


Figure 2 - 11. Minor-road right-turn volume reduction for warrant check.
Imboden Rd & 48th Avenue
2040_No Build



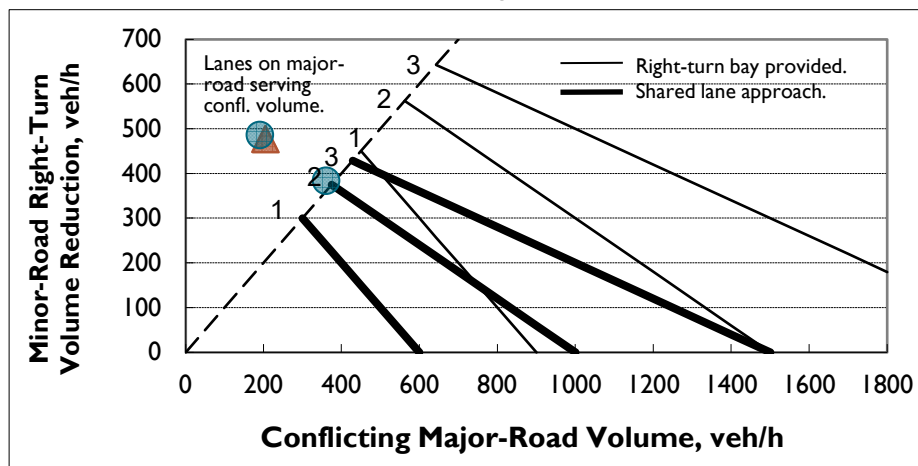
INPUT

Number of lanes on major-road approach:			2	
Right-turn geometry on minor-road:			Shared-lane approach	
Approach	Number	Movement	Volume (veh/hr)	
Major A	2	Through	409	376
	3	Right	2	4
Major B	5	Through	402	715
	6	Right	5	5
Minor C	7	Left	2	2
	8	Through	5	5
	9	Right	129	552
Minor D	10	Left	5	5
	11	Through	5	5
	12	Right	10	10

OUTPUT

Variable	Volume (veh/hr)	
	AM	PM
Conflicting major-road volume (Vc9):	206	190
Conflicting major-road volume (Vc12):	204	360
Right-turn volume reduction (Vr9):	477	486
Right-turn volume reduction (Vr12):	478	384
Adjusted right-turn volume reduction (Vr9):	129	486
Adjusted right-turn volume reduction (Vr12):	10	10
Adjusted minor-road volume:	10	73

Chart Legend:



Source: NCHRP Report 457

MUTCD Volume-based Warrant Evaluation
Quail Run Rd & 32nd Avenue
2040_No Build



Major Street: Quail Run Rd
 Lanes Moving Traffic: 2 or more
 Approach Speed: 30 MPH
 Option: Rural Community

Minor Street: 32nd Avenue
 Lanes Moving Traffic: 1
 Right Turn Volume Included: 0% WB

WARRANT 1, Condition A - Minimum Vehicular Volume

70% Satisfied **Yes**

	Vehicles per hour 70% (56%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	420 (336)	1142	1072	1002	932	862	792	722	652
Highest Apprch. Minor Street	105 (84)	291	273	255	237	220	202	184	166

WARRANT 1, Condition B - Interruption of Continuous Traffic

70% Satisfied **Yes**

	Vehicles per hour 70% (56%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	630 (504)	1142	1072	1002	932	862	792	722	652
Highest Apprch. Minor Street	53 (42)	291	273	255	237	220	202	184	166

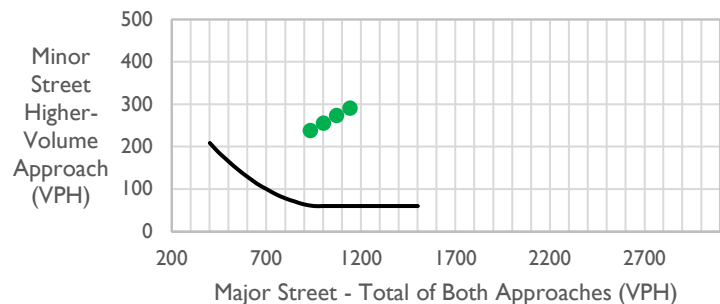
WARRANT 1, Condition A and Condition B

56% Satisfied **Yes**

WARRANT 2, Four Hour Volume

70% Satisfied **Yes**

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1142	291
2nd Highest	1072	273
3rd Highest	1002	255
4th Highest	932	237



WARRANT 3, Peak Hour Volume

70% Satisfied **Yes**

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1142	291

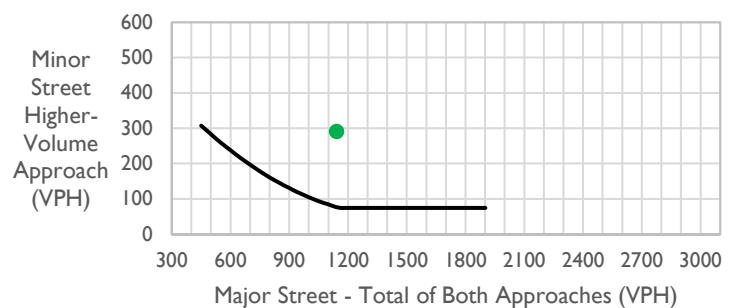
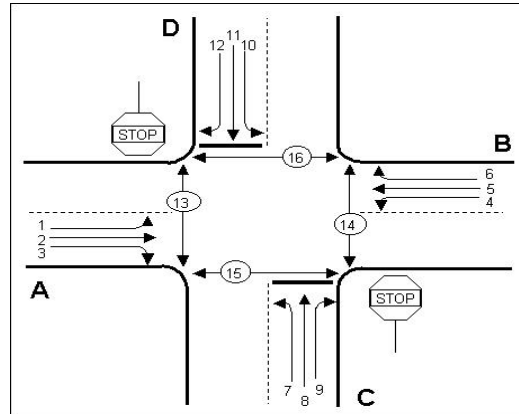


Figure 2 - 11. Minor-road right-turn volume reduction for warrant check.
Quail Run Rd & 32nd Avenue
2040_No Build



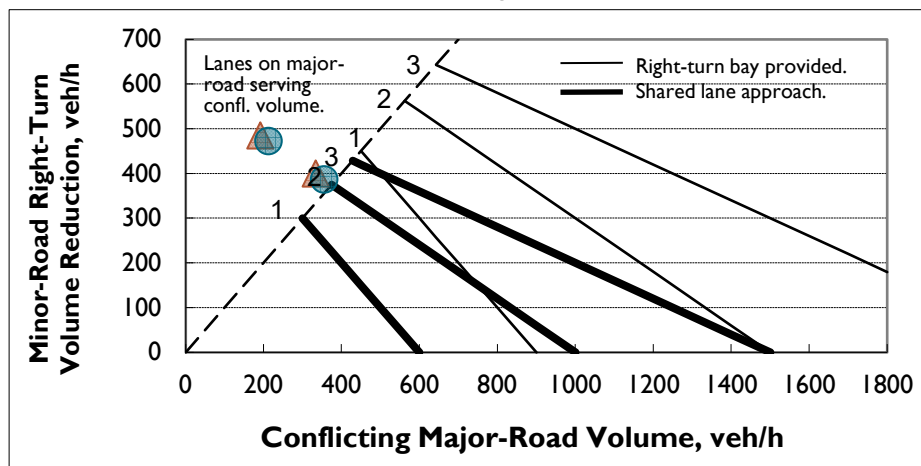
INPUT

Number of lanes on major-road approach:			2	
Right-turn geometry on minor-road:			Shared-lane approach	
Approach	Number	Movement	Volume (veh/hr)	
			AM	PM
Major A	2	Through	405	356
	3	Right	261	69
Major B	5	Through	382	710
	6	Right	0	0
Minor C	7	Left	62	267
	8	Through	0	0
	9	Right	6	24
Minor D	10	Left	0	0
	11	Through	0	0
	12	Right	0	0

OUTPUT

Variable	Volume (veh/hr)	
	AM	PM
Conflicting major-road volume (Vc9):	333	213
Conflicting major-road volume (Vc12):	191	355
Right-turn volume reduction (Vr9):	400	473
Right-turn volume reduction (Vr12):	485	387
Adjusted right-turn volume reduction (Vr9):	6	24
Adjusted right-turn volume reduction (Vr12):	0	0
Adjusted minor-road volume:	62	267

Chart Legend:



Source: NCHRP Report 457

MUTCD Volume-based Warrant Evaluation
Cavanaugh Road & 48th Avenue
LT_Build



Major Street: 48th Avenue
 Lanes Moving Traffic: 1
 Approach Speed: 30 MPH
 Option: Rural Community

Minor Street: Cavanaugh Road
 Lanes Moving Traffic: 2 or more
 Right Turn Volume Included: 50% NB

WARRANT 1, Condition A - Minimum Vehicular Volume

70% Satisfied Yes

	Vehicles per hour 70% (56%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	350 (280)	1220	1145	1070	996	921	846	771	697
Highest Apprch. Minor Street	140 (112)	293	275	257	239	221	203	185	167

WARRANT 1, Condition B - Interruption of Continuous Traffic

70% Satisfied Yes

	Vehicles per hour 70% (56%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	525 (420)	1220	1145	1070	996	921	846	771	697
Highest Apprch. Minor Street	70 (56)	293	275	257	239	221	203	185	167

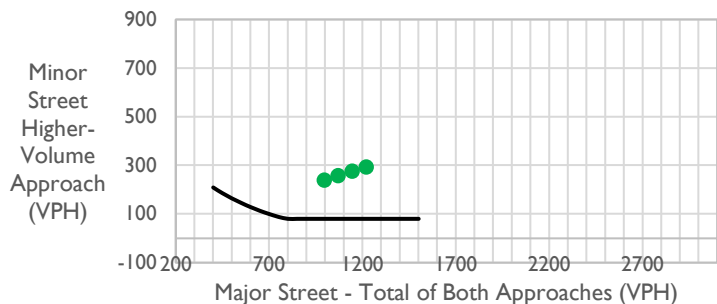
WARRANT 1, Condition A and Condition B

56% Satisfied Yes

WARRANT 2, Four Hour Volume

70% Satisfied Yes

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1220	293
2nd Highest	1145	275
3rd Highest	1070	257
4th Highest	996	239



WARRANT 3, Peak Hour Volume

70% Satisfied Yes

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1220	293

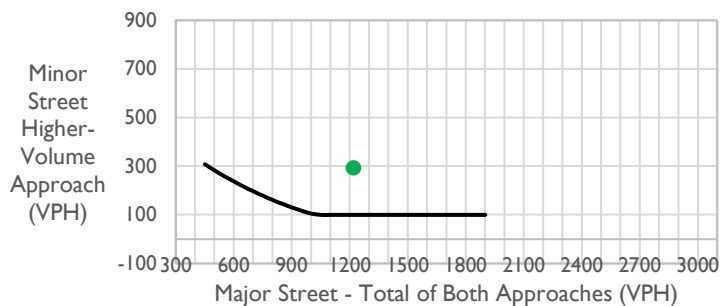
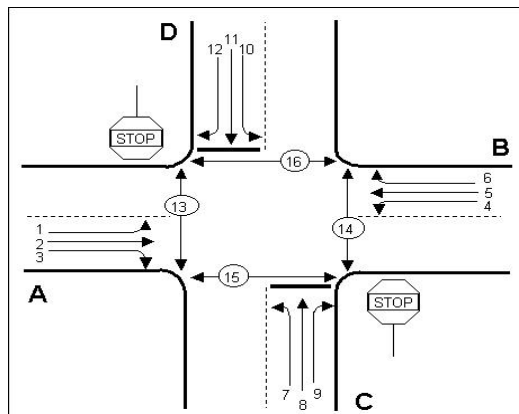


Figure 2 - 11. Minor-road right-turn volume reduction for warrant check.
Cavanaugh Road & 48th Avenue
LT_Build



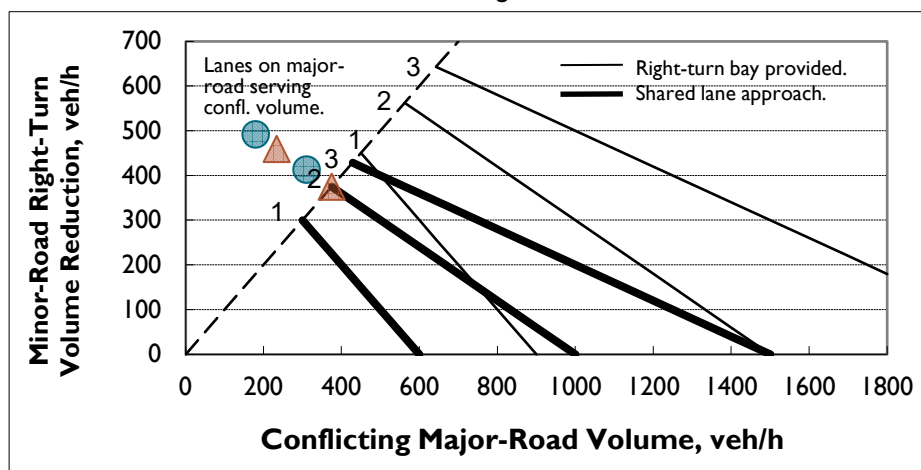
INPUT

Number of lanes on major-road approach:			2	
Right-turn geometry on minor-road:			Shared-lane approach	
Approach	Number	Movement	Volume (veh/hr)	
Major A	2	Through	457	283
	3	Right	291	77
Major B	5	Through	466	621
	6	Right	0	0
Minor C	7	Left	91	290
	8	Through	0	0
	9	Right	3	6
Minor D	10	Left	0	0
	11	Through	0	0
	12	Right	0	0

OUTPUT

Variable	Volume (veh/hr)	
	AM	PM
Conflicting major-road volume (Vc9):	374	180
Conflicting major-road volume (Vc12):	233	311
Right-turn volume reduction (Vr9):	376	492
Right-turn volume reduction (Vr12):	460	414
Adjusted right-turn volume reduction (Vr9):	3	6
Adjusted right-turn volume reduction (Vr12):	0	0
Adjusted minor-road volume:	91	290

Chart Legend:



Source: NCHRP Report 457

MUTCD Volume-based Warrant Evaluation
Cavanaugh Road & 32nd Avenue
LT_Build



Major Street: 32nd Avenue
 Lanes Moving Traffic: 1
 Approach Speed: 30 MPH
 Option: Rural Community

Minor Street: Cavanaugh Road
 Lanes Moving Traffic: 2 or more
 Right Turn Volume Included: 50% SB

WARRANT 1, Condition A - Minimum Vehicular Volume

70% Satisfied Yes

	Vehicles per hour 70% (56%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	350 (280)	634	595	556	517	479	440	401	362
Highest Apprch. Minor Street	140 (112)	289	271	254	236	218	200	183	165

WARRANT 1, Condition B - Interruption of Continuous Traffic

70% Satisfied No

	Vehicles per hour 70% (56%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	525 (420)	634	595	556	517	479	440	401	362
Highest Apprch. Minor Street	70 (56)	289	271	254	236	218	200	183	165

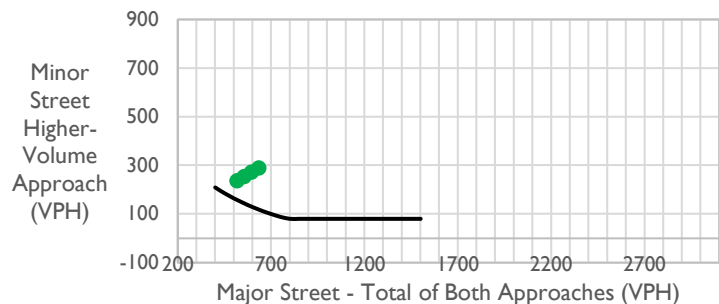
WARRANT 1, Condition A and Condition B

56% Satisfied No

WARRANT 2, Four Hour Volume

70% Satisfied Yes

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	634	289
2nd Highest	595	271
3rd Highest	556	254
4th Highest	517	236



WARRANT 3, Peak Hour Volume

70% Satisfied Yes

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	634	289

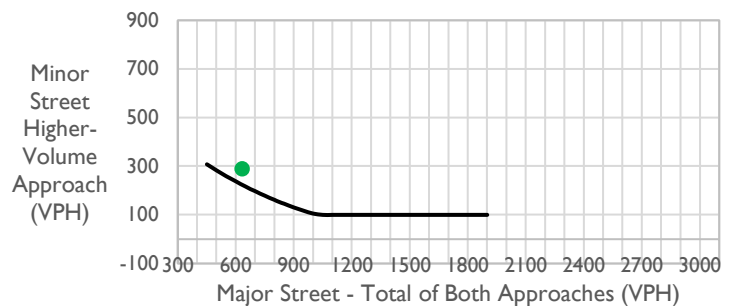
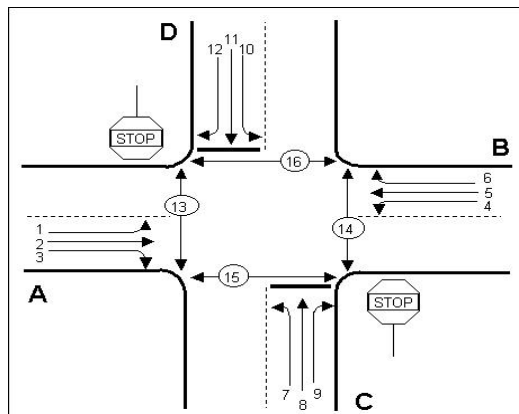


Figure 2 - 11. Minor-road right-turn volume reduction for warrant check.
Cavanaugh Road & 32nd Avenue
LT_Build



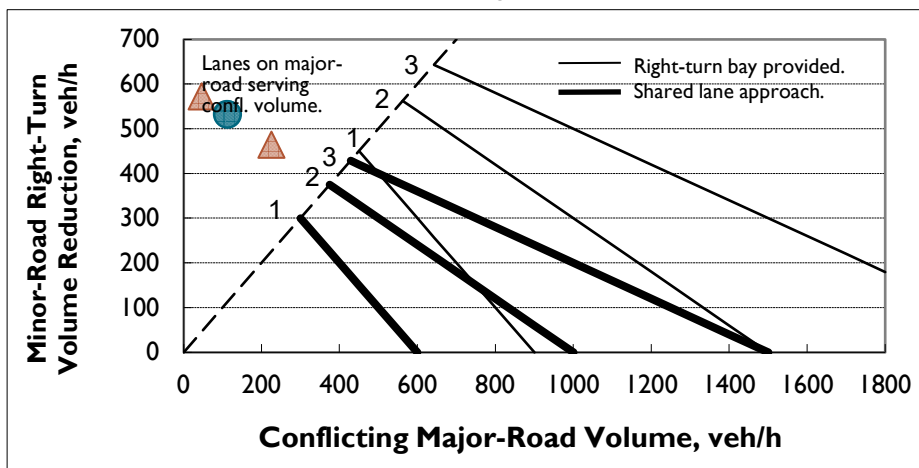
INPUT

Number of lanes on major-road approach:			2	
Right-turn geometry on minor-road:			Shared-lane approach	
Approach	Number	Movement	Volume (veh/hr)	
Major A	2	Through	AM 91	PM 223
	3	Right	0	0
Major B	5	Through	219	86
	6	Right	231	141
Minor C	7	Left	0	0
	8	Through	0	0
	9	Right	0	0
Minor D	10	Left	145	237
	11	Through	0	0
	12	Right	75	103

OUTPUT

Variable	Volume (veh/hr)	
	AM	PM
Conflicting major-road volume (Vc9):	46	112
Conflicting major-road volume (Vc12):	225	114
Right-turn volume reduction (Vr9):	573	533
Right-turn volume reduction (Vr12):	465	532
Adjusted right-turn volume reduction (Vr9):	0	0
Adjusted right-turn volume reduction (Vr12):	75	103
Adjusted minor-road volume:	145	237

Chart Legend:



Source: NCHRP Report 457

MUTCD Volume-based Warrant Evaluation
Quail Run Drive & 48th Avenue
LT_Build



Major Street: 48th Avenue
 Lanes Moving Traffic: 1
 Approach Speed: 30 MPH
 Option: Rural Community

Minor Street: Quail Run Drive
 Lanes Moving Traffic: 2 or more
 Right Turn Volume Included: 50% SB, 50% NB

WARRANT 1, Condition A - Minimum Vehicular Volume

70% Satisfied Yes

	Vehicles per hour 70% (56%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	350 (280)	1500	1408	1316	1224	1132	1040	948	857
Highest Apprch. Minor Street	140 (112)	382	359	335	312	288	265	242	218

WARRANT 1, Condition B - Interruption of Continuous Traffic

70% Satisfied Yes

	Vehicles per hour 70% (56%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	525 (420)	1500	1408	1316	1224	1132	1040	948	857
Highest Apprch. Minor Street	70 (56)	382	359	335	312	288	265	242	218

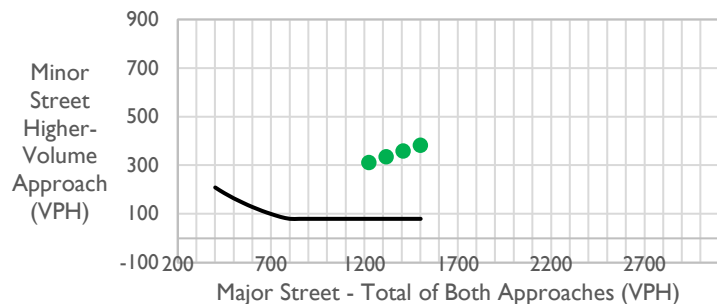
WARRANT 1, Condition A and Condition B

56% Satisfied Yes

WARRANT 2, Four Hour Volume

70% Satisfied Yes

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1500	382
2nd Highest	1408	359
3rd Highest	1316	335
4th Highest	1224	312



WARRANT 3, Peak Hour Volume

70% Satisfied Yes

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1500	382

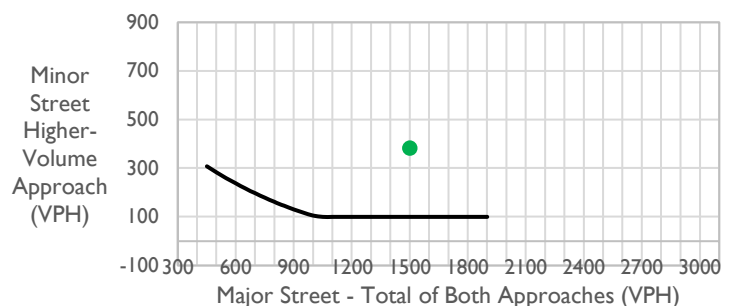
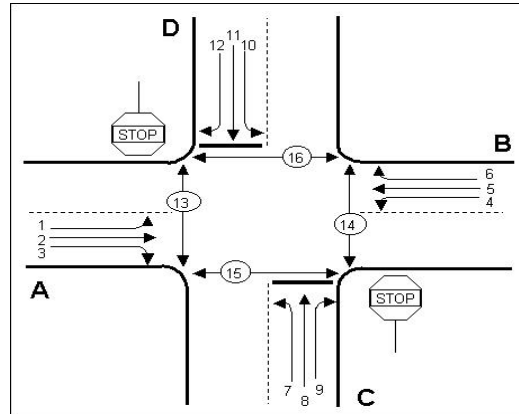


Figure 2 - 11. Minor-road right-turn volume reduction for warrant check.
Quail Run Drive & 48th Avenue
LT_Build



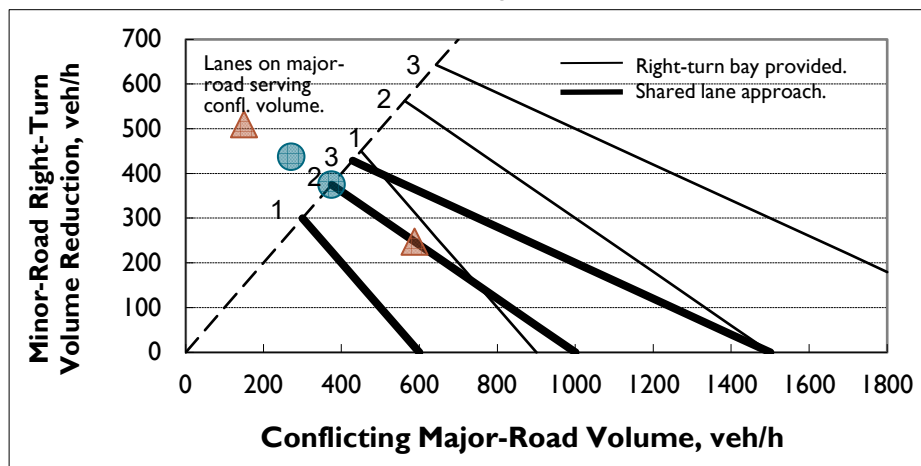
INPUT

Number of lanes on major-road approach:			2	
Right-turn geometry on minor-road:			Shared-lane approach	
Approach	Number	Movement	Volume (veh/hr)	
			AM	PM
Major A	2	Through	814	414
	3	Right	360	127
Major B	5	Through	297	748
	6	Right	1	0
Minor C	7	Left	165	377
	8	Through	0	0
	9	Right	16	10
Minor D	10	Left	1	1
	11	Through	0	0
	12	Right	11	21

OUTPUT

Variable	Volume (veh/hr)	
	AM	PM
Conflicting major-road volume (Vc9):	587	271
Conflicting major-road volume (Vc12):	149	374
Right-turn volume reduction (Vr9):	248	438
Right-turn volume reduction (Vr12):	511	376
Adjusted right-turn volume reduction (Vr9):	16	10
Adjusted right-turn volume reduction (Vr12):	11	21
Adjusted minor-road volume:	165	377

Chart Legend:



Source: NCHRP Report 457

MUTCD Volume-based Warrant Evaluation
Quail Run Drive & 32nd Avenue
LT_Build



Major Street: 32nd Avenue
 Lanes Moving Traffic: 1
 Approach Speed: 30 MPH
 Option: Rural Community

Minor Street: Quail Run Drive
 Lanes Moving Traffic: 2 or more
 Right Turn Volume Included: 50% SB

WARRANT 1, Condition A - Minimum Vehicular Volume

70% Satisfied No

	Vehicles per hour 70% (56%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	350 (280)	1104	1036	969	901	833	766	698	630
Highest Apprch. Minor Street	140 (112)	136	128	119	111	103	94	86	78

WARRANT 1, Condition B - Interruption of Continuous Traffic

70% Satisfied Yes

	Vehicles per hour 70% (56%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	525 (420)	1104	1036	969	901	833	766	698	630
Highest Apprch. Minor Street	70 (56)	136	128	119	111	103	94	86	78

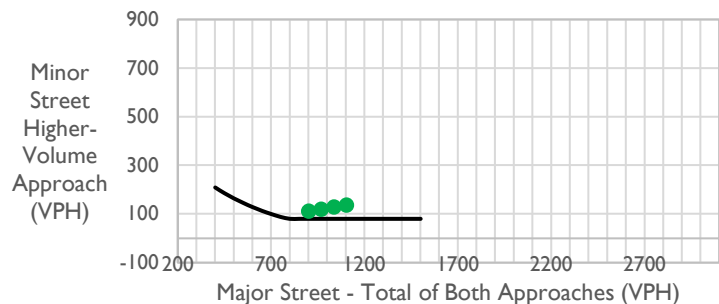
WARRANT 1, Condition A and Condition B

56% Satisfied No

WARRANT 2, Four Hour Volume

70% Satisfied Yes

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1104	136
2nd Highest	1036	128
3rd Highest	969	119
4th Highest	901	111



WARRANT 3, Peak Hour Volume

70% Satisfied Yes

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1104	136

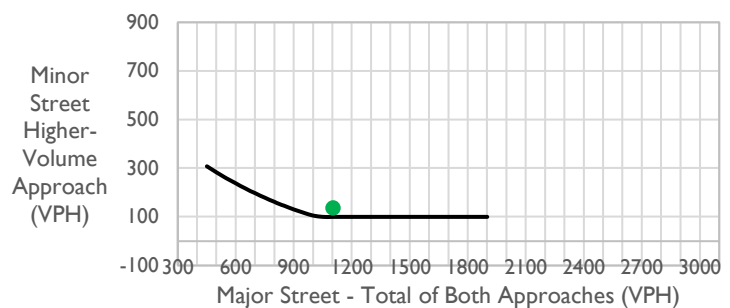
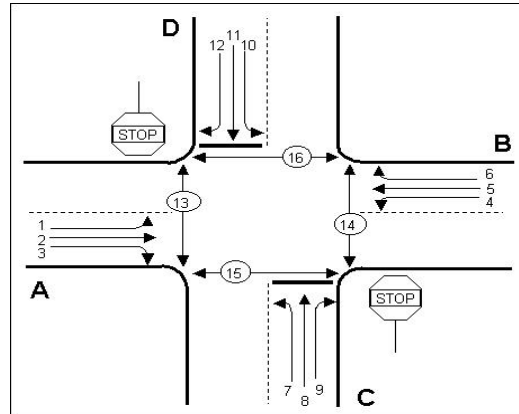


Figure 2 - 11. Minor-road right-turn volume reduction for warrant check.
Quail Run Drive & 32nd Avenue

LT_Build



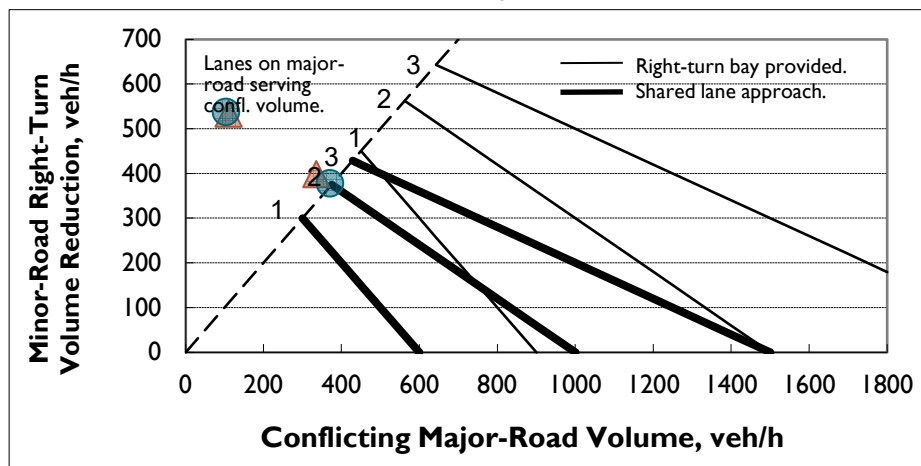
INPUT

Number of lanes on major-road approach:			2	
Right-turn geometry on minor-road:			Shared-lane approach	
Approach	Number	Movement	Volume (veh/hr)	
Major A	2	Through	669	206
	3	Right	0	0
Major B	5	Through	190	687
	6	Right	30	53
Minor C	7	Left	0	0
	8	Through	0	0
	9	Right	0	0
Minor D	10	Left	56	28
	11	Through	0	0
	12	Right	99	216

OUTPUT

Variable	Volume (veh/hr)	
	AM	PM
Conflicting major-road volume (Vc9):	335	103
Conflicting major-road volume (Vc12):	110	370
Right-turn volume reduction (Vr9):	399	538
Right-turn volume reduction (Vr12):	534	378
Adjusted right-turn volume reduction (Vr9):	0	0
Adjusted right-turn volume reduction (Vr12):	99	216
Adjusted minor-road volume:	56	28

Chart Legend:



Source: NCHRP Report 457

APPENDIX H. QUEUEING TABLE

previous comment not addressed

results are not consistent with worksheets

Intersection #	Intersection	Movement	Existing AM(PM)	2040 Background AM (PM)	2040 Total AM (PM)	Long Term Background AM (PM)	Long Term Total AM (PM)
1	56th Avenue & Imboden Road	EBL	25 (25)	325 (400)	325 (475)	300 (375)	300 (400)
		EBT	N/A	N/A	N/A	41 (20)	41 (25)
		EBR	N/A	44 (163)	134 (217)	189 (362)	309 (314)
		WBL	0 (0)	N/A	N/A	50 (150)	50 (175)
		WBT	N/A	N/A	N/A	22 (56)	22 (77)
		WBR	N/A	N/A	N/A	0 (0)	0 (0)
		NBL	0 (0)	350 (525)	425 (650)	325 (#553)	375 (750)
		NBT	N/A	30 (m43)	26 (52)	50 (m51)	m41 (100)
		NBR	N/A	N/A	N/A	4 (m0)	m6 (9)
		SBL	0 (0)	N/A	N/A	25 (6)	25 (25)
2	48th Avenue & Imboden Road	EBL	0 (0)	25 (25)	25 (25)	25 (25)	25 (25)
		EBTR	N/A	26 (25)	27 (27)	27 (27)	28 (27)
		WBL	0 (25)	25 (25)	#301 (450)	51 (54)	325 (#511)
		WBTR	N/A	51 (97)	57 (82)	73 (88)	65 (177)
		WBR	N/A	75 (325)	38 (375)	100 (350)	100 (400)
		NBL	0 (0)	25 (25)	25 (25)	25 (25)	29 (25)
		NBT	N/A	157 (150)	250 (200)	225 (275)	#441 (350)
		NBR	N/A	N/A	300 (75)	50 (50)	425 (150)
		SBL	25 (0)	350 (125)	500 (175)	475 (200)	550 (300)
		SBTR	N/A	32 (200)	104 (275)	120 (225)	150 (325)
3	32nd Avenue & Quail Run Road	EBL	N/A	N/A	N/A	25 (35)	25 (50)
		EBT	N/A	N/A	N/A	0 (98)	23 (12)
		EBR	N/A	N/A	N/A	N/A	0 (106)
		WBL	N/A	125 (375)	225 (550)	175 (600)	225 (875)
		WBT	N/A	15 (21)	14 (19)	14 (0)	5 (#15)
		WBR	N/A	N/A	N/A	N/A	11 (39)
		NBL	N/A	N/A	N/A	96 (53)	#103 (75)
		NBT	N/A	48 (98)	170 (179)	270 (314)	363 (359)
		NBR	N/A	0 (0)	0 (0)	32 (26)	#48 (9)
		SBL	N/A	25 (25)	25 (25)	52 (25)	#122 (28)
4	48th Avenue & Cavanaugh Road	EBT	N/A	N/A	N/A	N/A	178 (78)
		EBR	N/A	N/A	N/A	N/A	0 (0)
		WBL	N/A	0 (0)	0 (0)	0 (0)	25 (25)
		WBT	N/A	N/A	N/A	N/A	232 (278)
		NBL	N/A	25 (75)	50 (125)	25 (100)	m52 (220)
		NBR	N/A	N/A	N/A	0 (0)	m3 (8)
5	42nd Avenue & Cavanaugh Road	EBL	N/A	N/A	0 (0)	N/A	0 (0)
		EBTR	N/A	N/A	25 (25)	N/A	25 (25)
		WBL	N/A	0 (25)	0 (0)	0 (25)	0 (0)
		WBTR	N/A	N/A	25 (25)	N/A	25 (25)
		NBL	N/A	N/A	0 (0)	N/A	0 (0)
6	32nd Avenue & Cavanaugh Road	SBL	N/A	25 (0)	25 (0)	25 (0)	25 (0)
		EBL	N/A	25 (25)	25 (25)	25 (25)	25 (25)
		SBL	N/A	25 (50)	50 (75)	50 (75)	50 (75)
7	Manila Road & 42nd Avenue	SBR	N/A	25 (25)	25 (25)	25 (25)	25 (25)
		EBL	N/A	0 (0)	0 (0)	0 (0)	0 (0)
		EBR	N/A	25 (25)	25 (75)	25 (25)	25 (75)
8	48th Avenue & Quail Run Drive	NBL	N/A	25 (25)	50 (25)	25 (25)	50 (25)
		EBL	N/A	N/A	25 (0)	N/A	19 (15)
		EBT	N/A	N/A	N/A	N/A	381 (233)
		EBR	N/A	N/A	N/A	N/A	20 (m2)
		WBL	N/A	N/A	0 (0)	0 (0)	25 (25)
		WBT	N/A	N/A	N/A	N/A	83 (327)
		NBL	N/A	N/A	150 (250)	25 (50)	m129 (302)
9	32nd Avenue & Quail Run Drive	NBTR	N/A	N/A	25 (0)	0 (0)	m0 (0)
		SBLTR	N/A	N/A	25 (25)	N/A	m0 (0)
		EBL	N/A	N/A	25 (25)	25 (25)	m25 (25)
10	PA-2 Access & Imboden	SBL	N/A	N/A	25 (25)	50 (25)	75 (25)
		SBR	N/A	N/A	N/A	25 (50)	25 (100)
		WBR	N/A	N/A	0 (0)	N/A	0 (25)
11	PA-5 Access & Imboden	SBL	N/A	N/A	0 (0)	N/A	0 (0)
		WBL	N/A	N/A	25 (25)	N/A	25 (25)
		SBL	N/A	N/A	0 (0)	N/A	25 (0)
12	PA-2 Access & 48th Avenue	EBL	N/A	N/A	25 (25)	N/A	25 (25)
		WBL	N/A	N/A	0 (0)	N/A	0 (0)
		NBLTR	N/A	N/A	25 (25)	N/A	25 (25)
		SBLTR	N/A	N/A	25 (25)	N/A	25 (25)

13	PA-3 Western Access & 48th Avenue	EBL	N/A	N/A	25 (25)	N/A	25 (25)
		SBLR	N/A	N/A	25 (25)	N/A	25 (25)
14	PA-3 Eastern Access & 48th Avenue	EBL	N/A	N/A	25 (25)	N/A	25 (0)
		SBLR	N/A	N/A	25 (25)	N/A	25 (25)
15	PA-8A Access & 48th Avenue	WBL	N/A	N/A	0 (0)	N/A	0 (0)
		NBLR	N/A	N/A	25 (25)	N/A	25 (25)
16	PA-4 Access & 48th Avenue	EBL	N/A	N/A	0 (0)	N/A	0 (0)
		WBL	N/A	N/A	25 (25)	N/A	25 (25)
		NBLTR	N/A	N/A	25 (25)	N/A	25 (25)
		SBLTR	N/A	N/A	25 (25)	N/A	25 (25)
17	PA-8B Access & 48th Avenue	WBL	N/A	N/A	25 (25)	N/A	25 (25)
		NBLR	N/A	N/A	25 (25)	N/A	25 (25)
18	PA-8A Access & Quail Run Drive	EBLTR	N/A	N/A	25 (25)	N/A	25 (25)
		WBLTR	N/A	N/A	0 (25)	N/A	0 (25)
		NBL	N/A	N/A	0 (0)	N/A	0 (0)
		SBL	N/A	N/A	0 (0)	N/A	0 (0)
19	PA-8B Access & Cavanaugh Road	EBLTR	N/A	N/A	25 (25)	N/A	25 (25)
		WBLTR	N/A	N/A	25 (25)	N/A	25 (25)
		NBL	N/A	N/A	0 (0)	N/A	0 (0)
		SBL	N/A	N/A	0 (0)	N/A	0 (0)
20	42nd Avenue & Quail Run Drive	EBL	N/A	N/A	25 (25)	N/A	25 (25)
		WBL	N/A	N/A	25 (25)	N/A	25 (25)
		NBL	N/A	N/A	0 (0)	N/A	0 (0)
		SBL	N/A	N/A	25 (0)	N/A	25 (0)
21	PA-9 Western Access & 42nd Avenue	EBL	N/A	N/A	0 (0)	N/A	0 (0)
		WBL	N/A	N/A	0 (0)	N/A	0 (0)
		NBLTR	N/A	N/A	0 (25)	N/A	0 (25)
		SBLTR	N/A	N/A	0 (0)	N/A	0 (0)
22	PA-9 Eastern Access & 42nd Avenue	EBL	N/A	N/A	0 (0)	N/A	0 (0)
		WBL	N/A	N/A	25 (25)	N/A	25 (25)
		NBLTR	N/A	N/A	25 (25)	N/A	25 (25)
		SBLTR	N/A	N/A	0 (25)	N/A	0 (25)
23	PA-8C Access & 42nd Avenue	EBL	N/A	N/A	0 (0)	N/A	0 (0)
		WBL	N/A	N/A	25 (25)	N/A	25 (25)
		NBLTR	N/A	N/A	25 (25)	N/A	25 (25)
		SBLTR	N/A	N/A	0 (0)	N/A	0 (0)
24	PA-9 Access & Quail Run Drive	WBLR	N/A	N/A	25 (25)	N/A	25 (25)
		SBL	N/A	N/A	0 (0)	N/A	0 (0)
25	PA-9 Access & Cavanaugh Road	EBLTR	N/A	N/A	25 (25)	N/A	25 (25)
		WBLTR	N/A	N/A	25 (25)	N/A	25 (25)
		NBL	N/A	N/A	25 (0)	N/A	25 (0)
		SBL	N/A	N/A	0 (0)	N/A	0 (0)
26	PA-7 Access & Quail Run Drive	EBLR	N/A	N/A	25 (25)	N/A	25 (25)
		NBL	N/A	N/A	25 (0)	N/A	25 (0)

*m delineates that queue is metered by an upstream signal

*# delineates that volume for the 95th percentile cycle exceeds capacity

previous comment not addressed

results are not consistent with worksheets