

TRAFFIC IMPACT STUDY

Green Valley Ranch East
Planning Areas 8 & 9

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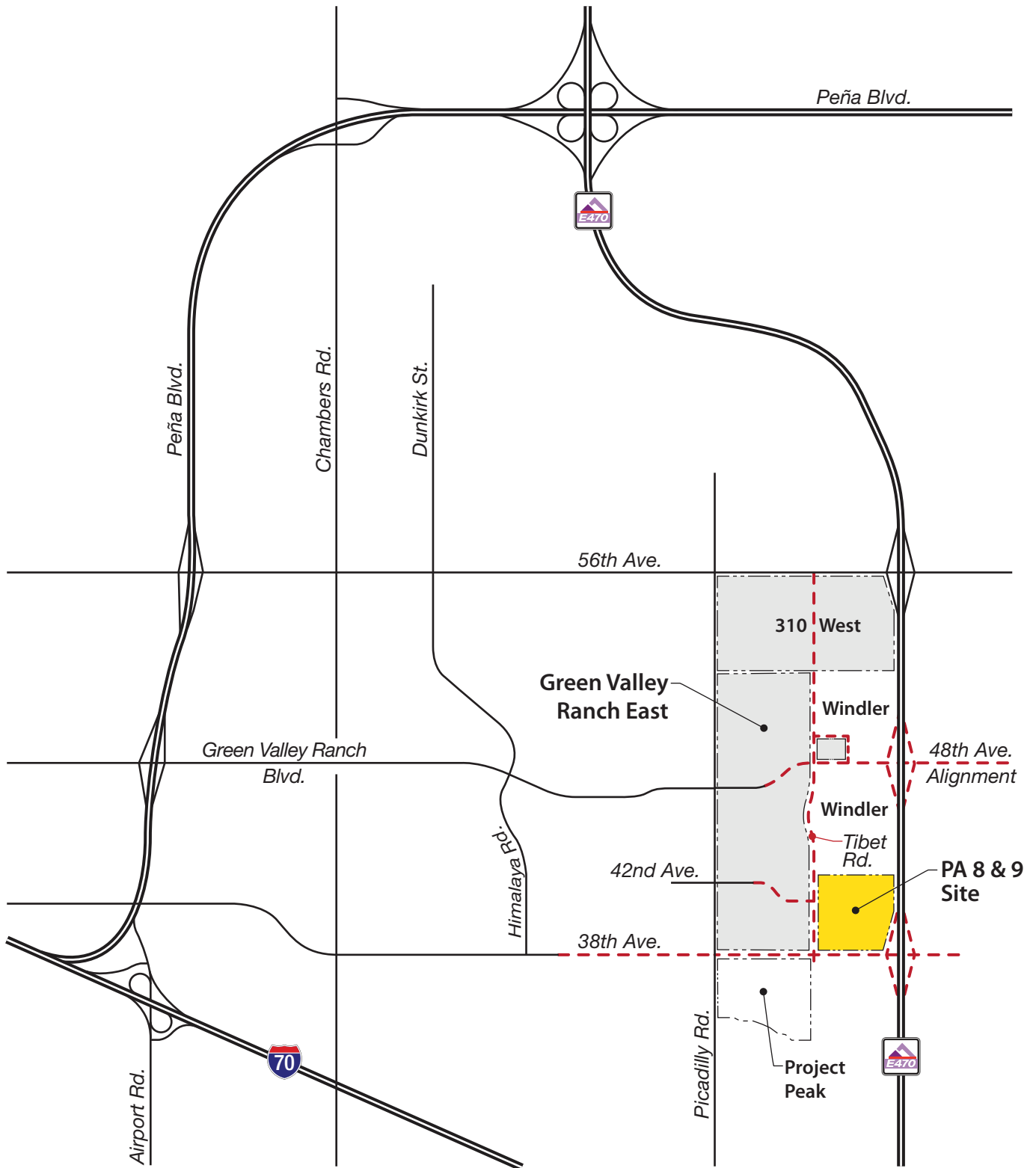
I. INTRODUCTION

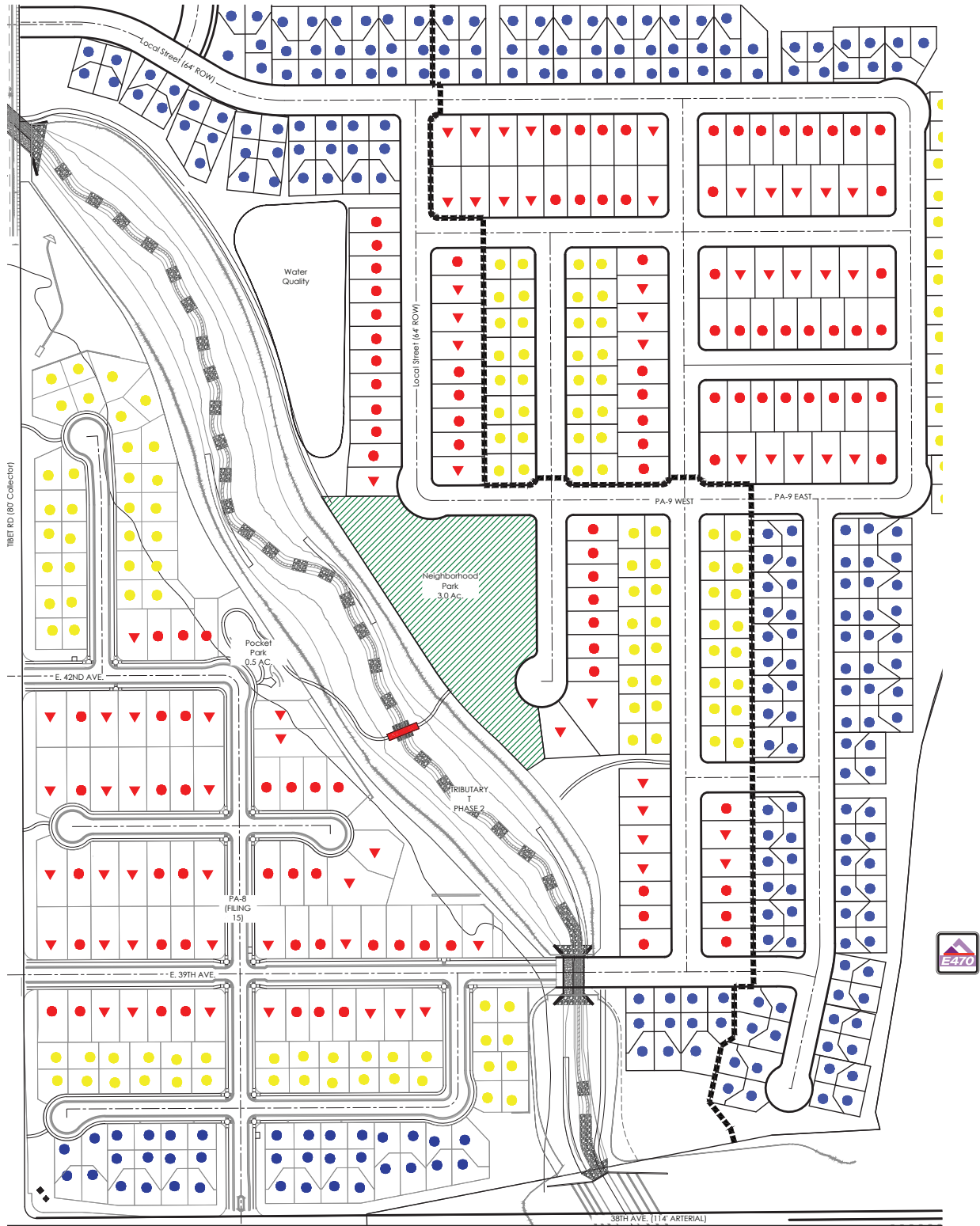
Green Valley Ranch East Planning Areas 8 & 9 include a total of 568 single-family dwelling units. As shown on **Figure 1**, the site is located in the northeast quadrant of the future 38th Avenue/Tibet Road intersection in Aurora, Colorado. Vehicular access would be via connection to Tibet Road at the 39th, 42nd, and 45th Avenue (approximate) future alignments. These local street connections would be full-movement (unsignalized), consistent with previous planning efforts at Green Valley Ranch East. A local street right-in/right-out (RIRO) connection to 38th Avenue is also planned. **Figure 2** depicts the current site plan concept.

Previous traffic analyses conducted for Green Valley Ranch East include the following:

- *Transportation Analysis, Green Valley Ranch East*, Felsburg Holt & Ullevig, updated May 2020
- *Traffic Impact Study, Green Valley Ranch East CSP 3*, updated May 2020
- *Traffic Impact Study, Green Valley Ranch East Filing 7*, updated May 2020

The proposed development is in general conformance with the *Transportation Analysis, Green Valley Ranch East* master report, which assumed approximately 620 single family homes within Planning Areas 8 & 9. By incorporating the above documents, as well as more recent analyses conducted within the surrounding area, this traffic study identifies the potential impacts specific to the residential development in Planning Areas 8 & 9 and identifies the resultant roadway and traffic control improvements required. Because the adjacent roadway system has yet to be constructed, this analysis focuses on the Long-Range (year 2040) planning horizon.





II. EXISTING CONDITIONS

II.A. Land Use

Green Valley Ranch Planning Areas 8 & 9 are currently vacant. E-470 forms the eastern site boundary. Lands to the west in Green Valley Ranch East are currently under development with residential uses. Lands to the south include Project Peak, an industrial development.

II.B. Roadways

The primary existing study area includes:

- **38th Avenue.** This east-west roadway extends east from Tower Road to Himalaya Street as a 4-lane arterial in the City and County of Denver, and is posted with a 40 miles per hour (MPH) speed limit. To the west, 38th Avenue transitions to 40th Avenue and interchanges with Peña Boulevard. 38th Avenue is currently under construction between Himalaya Street and Project Peak, which will have access at the future Tibet Road alignment. In the future, 38th Avenue will have an interchange on E-470.
- **Tibet Road.** This planned north-south roadway will be constructed as adjacent lands develop. Tibet Road between 38th Avenue and 48th Avenue is planned as a 3-lane collector. As noted above, Project Peak (on the south side of 38th Avenue) will have vehicular access at the Tibet Road alignment.

III. PROPOSED FUTURE CONDITIONS

III.A. Trip Generation

As previously noted, the planned residential uses within Planning Areas 8 & 9 would consist of 568 single-family residential units. The proposed development is in general conformance with the planning data previously assumed for the *Transportation Analysis, Green Valley Ranch East* master report. The trip generation analysis, summarized in **Table I**, was conducted using the fitted curve equations contained in *Trip Generation*, 11th Edition, Institute of Transportation Engineers (ITE), 2021 (ITE worksheets are included in **Appendix A**).

Table I. Planning Areas 8 & 9 Trip Generation Analysis

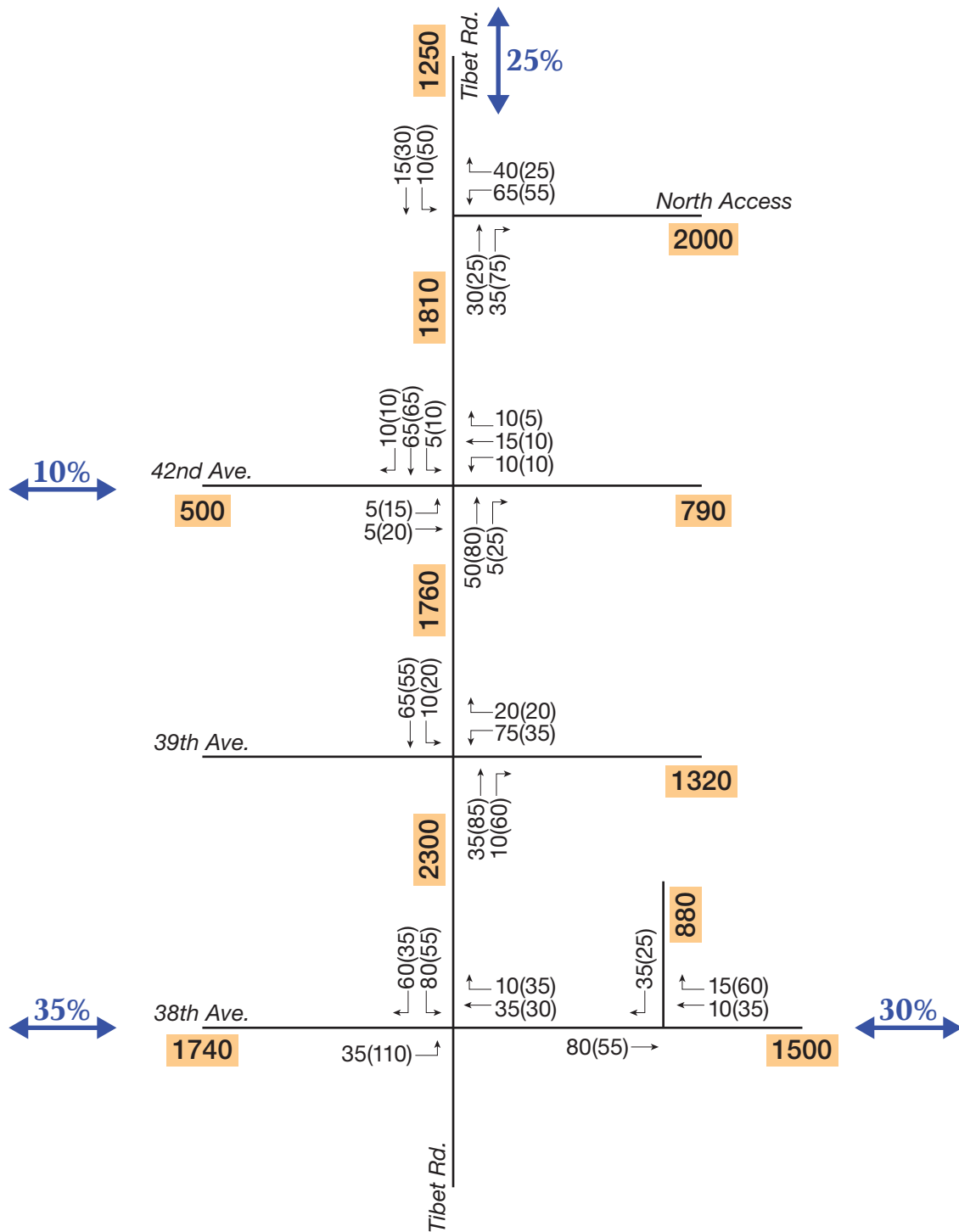
Land Use	Quantity	Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Single Family Detached Housing (I)	568 DU	4,990	95	270	365	320	190	510
I ITE Land Use Code 210 Single Family Detached Housing. Fitted curve equation results shown.								

As shown in **Table I**, the site would have a trip generation potential of about 4,990 trips per day, with 365 AM peak hour trips and 510 PM peak hour trips.

III.B. Site Trip Distribution and Site-Generated Traffic Assignment

In the future, it is projected that the adjacent study area roadway system would be built, including Tibet Road, 38th Avenue, and the E-470 interchange at 38th Avenue. The trip distribution, as depicted on **Figure 3**, is based on the location of the site relative to regional connections and on previous traffic engineering efforts at Green Valley Ranch East.

Figure 3 also shows the resultant site-generated traffic assignment. As shown, Tibet Road would carry between 1,250 and 2,300 vehicles per day (VPD) in site-related volumes. 38th Avenue would carry 1,500 to 1,740 VPD generated by the site.



LEGEND

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

XXX = Daily Traffic Volumes

XX% = Trip Distribution

IV. FUTURE CONDITIONS

IV.A. Background Traffic Conditions

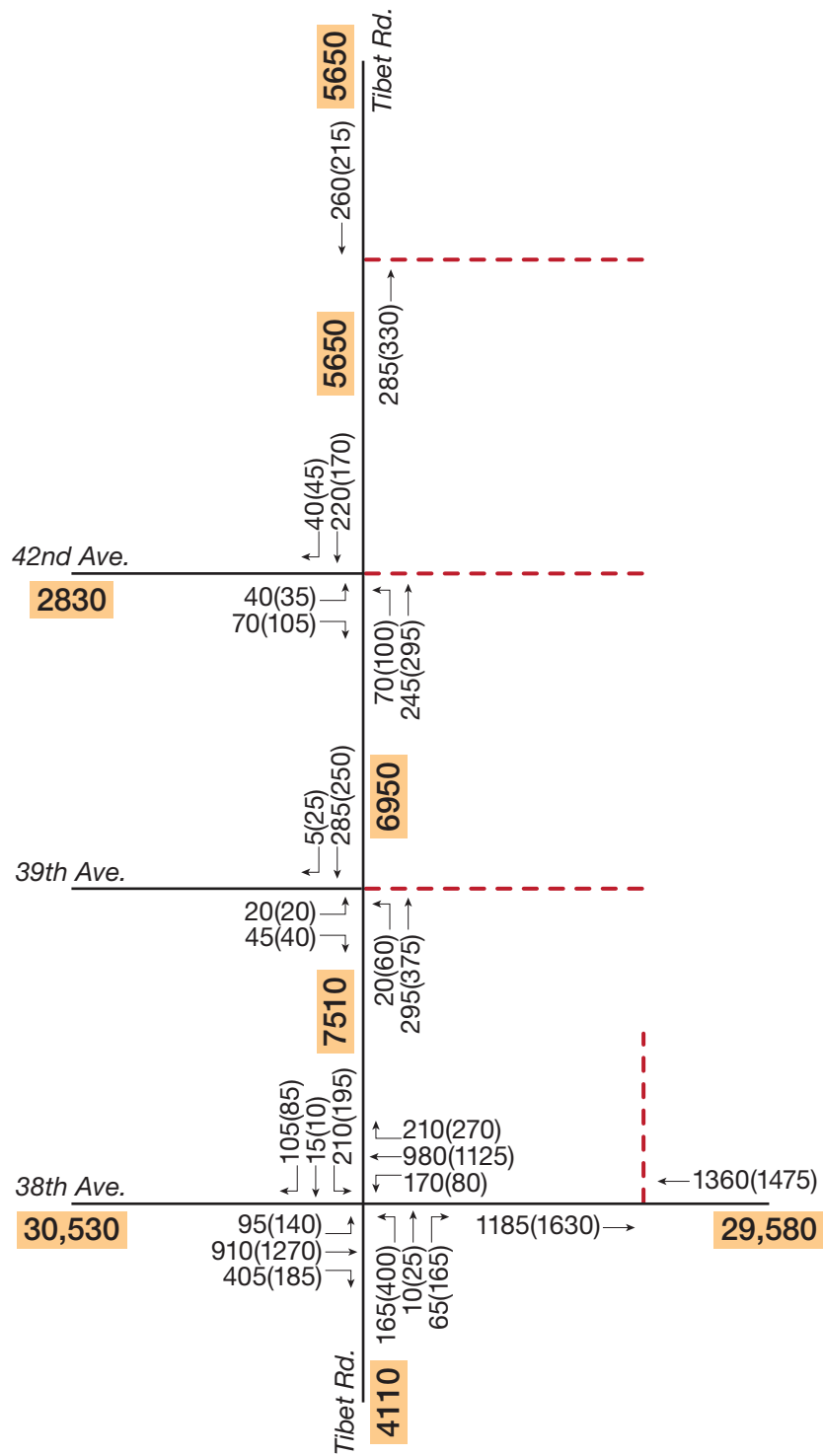
For the Long Range Future scenario (year 2040), background volumes were based on the following:

- Other Green Valley Ranch East development per the Final Development Plan (FDP) and the CSP 1, CSP 2, CSP 3, and Filing 7 Traffic Impact Studies
- Development of Project Peak, per the Traffic Impact Study for this site dated April 2019, by Kimley-Horn and Associates, Inc.
- Background growth based on the 2018 NEATS Refresh project, including anticipated development in the surrounding area, as follows:
 - The Aurora Highlands 3,500 acres east of E-470 and The Aurora Highlands 310 located at Picadilly Road and 56th Avenue.
 - Porteos, estimated to generate approximately 120,000 trips per day when built out, based on the Denver Regional Council of Governments (DRCOG) model (this master plan's traffic impact study shows more given a maximum buildout scenario).
 - Windler and Cardon properties that straddle E-470.
 - Avelon, located in the northeast quadrant of 56th Avenue and Picadilly Road. A mix of residential and commercial uses is planned for this site.
 - Painted Prairie, 1,628 acres of future mixed-use development located in the northwest quadrant of 56th Avenue and Picadilly Road.
 - Majestic (southwest of E-470 and 38th Avenue). Project Peak is a portion of this overall development.

Figure 4 illustrates the resultant Long Range Future background projections. As shown, background volumes on 38th Avenue would be approximately 29,580 to 30,530 VPD. Daily volumes on Tibet Road adjacent to Planning Areas 8 & 9 would range between about 5,650 to 7,510 VPD. These volumes are in broad agreement with the previously approved *Transportation Analysis, Green Valley Ranch East* master report.

The Long Range Future peak hour background volumes were used as the basis for intersection Level of Service (LOS) analyses, the results of which are graphically depicted on **Figure 5**. As shown, year 2040 background traffic operations are projected to remain generally acceptable at study area intersections (**Appendix B** contains LOS worksheets). The analyses assume the following improvements:

- Tibet Road would be constructed to a three-lane collector cross section with adjacent development. The projected traffic volumes along Tibet Road would remain within the general capacity of a three-lane collector roadway.
- 38th Avenue would be constructed to four-lane arterial standards. For this analysis, it is assumed that the planned interchange at E-470/38th Avenue would be constructed.
- The intersection at 38th Avenue/Tibet Street would require signalization per the Project Peak Traffic Impact Study. Dual left-turn lanes would be needed on the northbound approach at this intersection. Signalization of this intersection should be anticipated following connection of 38th Avenue across E-470.



LEGEND

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

XXX = Daily Traffic Volumes

- - - - - = Future Roadway

LEGEND

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

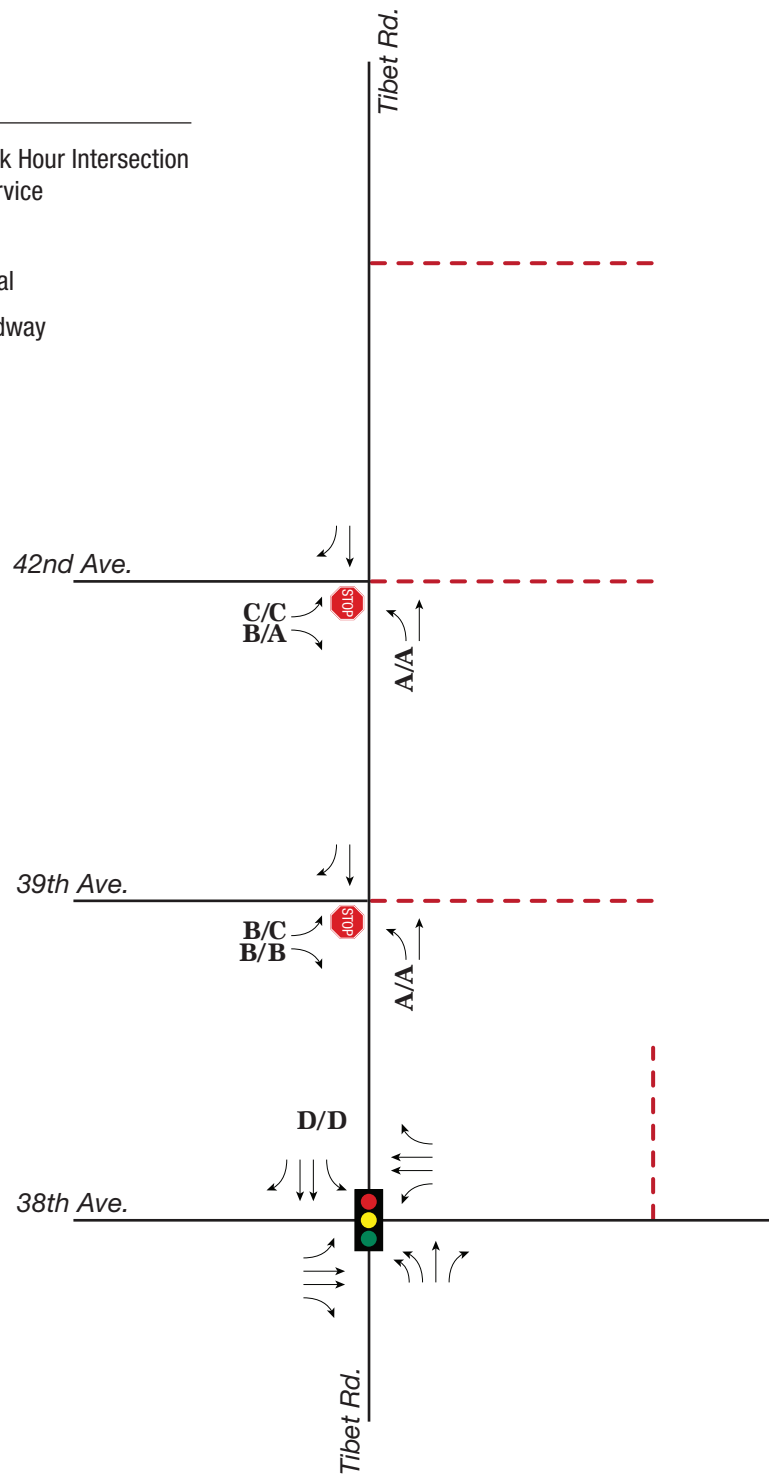


= Stop Sign



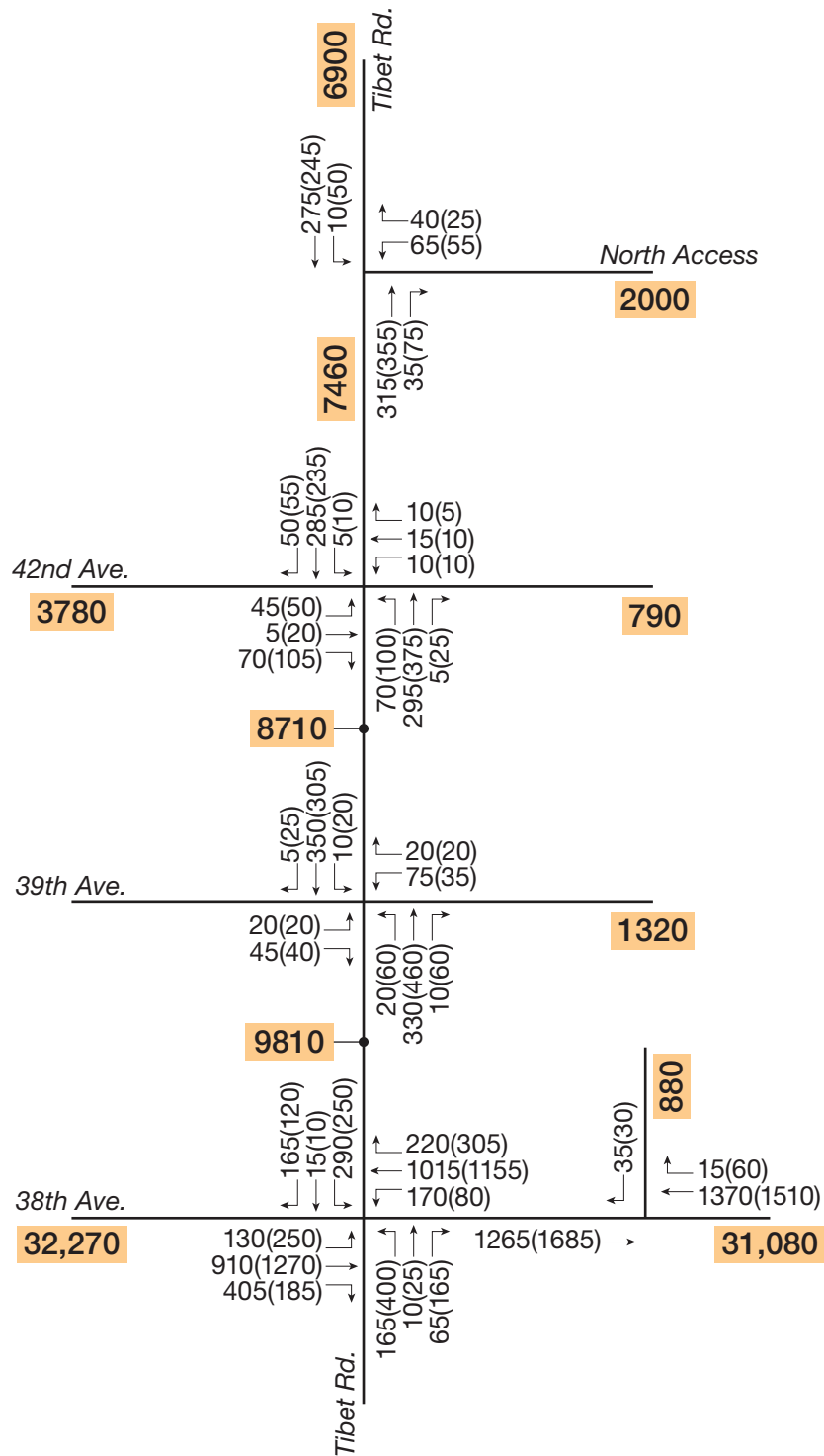
= Traffic Signal

- - - - = Future Roadway



IV.B. Total Future Traffic

The site-generated traffic volumes previously shown on **Figure 3** were added to the 2040 background traffic volumes (**Figure 5**) to produce the Long Range Future total traffic volumes as illustrated on **Figure 6**. As shown, Tibet Road daily volumes would range between about 6,900 and 9,810 VPD within the study area. 38th Avenue is estimated to serve approximately 31,080 to 32,270 VPD in the vicinity of the site.



LEGEND

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

XXX = Daily Traffic Volumes

V. EVALUATION

V.A. Level of Service

The Long Range total traffic peak hour intersection operations are shown on **Figure 7 (Appendix C)** contains LOS worksheets). As shown, study area traffic operations would continue to be acceptable at the study area signalized intersections. As previously noted, the intersection at Tibet Road/38th Avenue would warrant signalization. A traffic signal at this intersection would operate at LOS D during peak time. **Table 2** provides a summary of the results.

Table 2. LOS Summary

Intersection/Movement	2040 Background		2040 Total Traffic	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
38th Ave/Tibet Road	Traffic Signal			
Northbound Left	E	E	E	E
Northbound Through	C	C	C	C
Northbound Right	C	C	C	C
Southbound Left	E	E	E	E
Southbound Through	C	C	C	D
Southbound Right	C	C	C	C
Eastbound Left	C	C	D	E
Eastbound Through	D	D	D	D
Eastbound Right	C	C	C	B
Westbound Left	D	D	D	C
Westbound Through	D	D	D	D
Westbound Right	B	B	C	C
Tibet Road/39th Ave	STOP Sign Control (EB/WB)			
Northbound Left	A	A	A	A
Southbound Left	–	–	A	A
Eastbound Left	B	C	C	D
Eastbound Through-Right	B	B	B	B
Westbound Left	–	–	C	D
Westbound Through-Right	–	–	B	B
Tibet Road/42nd Ave	STOP Sign Control (EB/WB)			
Northbound Left	A	A	A	A
Southbound Left	–	–	A	A
Eastbound Left	C	C	C	D
Eastbound Through-Right	B	A	B	B
Westbound Left	–	–	C	D
Westbound Through-Right	–	–	C	C
Tibet Road/North Access				
Southbound Left	–	–	A	A
Westbound Left	–	–	C	C
Westbound Right	–	–	B	B
38th Ave/RIRO Access				
Southbound Right	–	–	C	C
Note: Highlighted cells denote dual left-turn lanes				

Of note, Long Range Total volumes at 38th Avenue/Tibet Road would include southbound left-turn movements approaching 300 vehicles per hour (VPH) would be the typical threshold for dual left-turn lanes. Therefore, this improvement was added to the intersection geometry in the total traffic scenario as shown on **Figure 7**. The northbound and southbound left-turns would remain at LOS E, but the per-lane queue lengths would be reduced for the southbound left-turn movement (see queue analysis in section V. E.). This improvement would also afford greater flexibility in signal timing in the future.

LEGEND

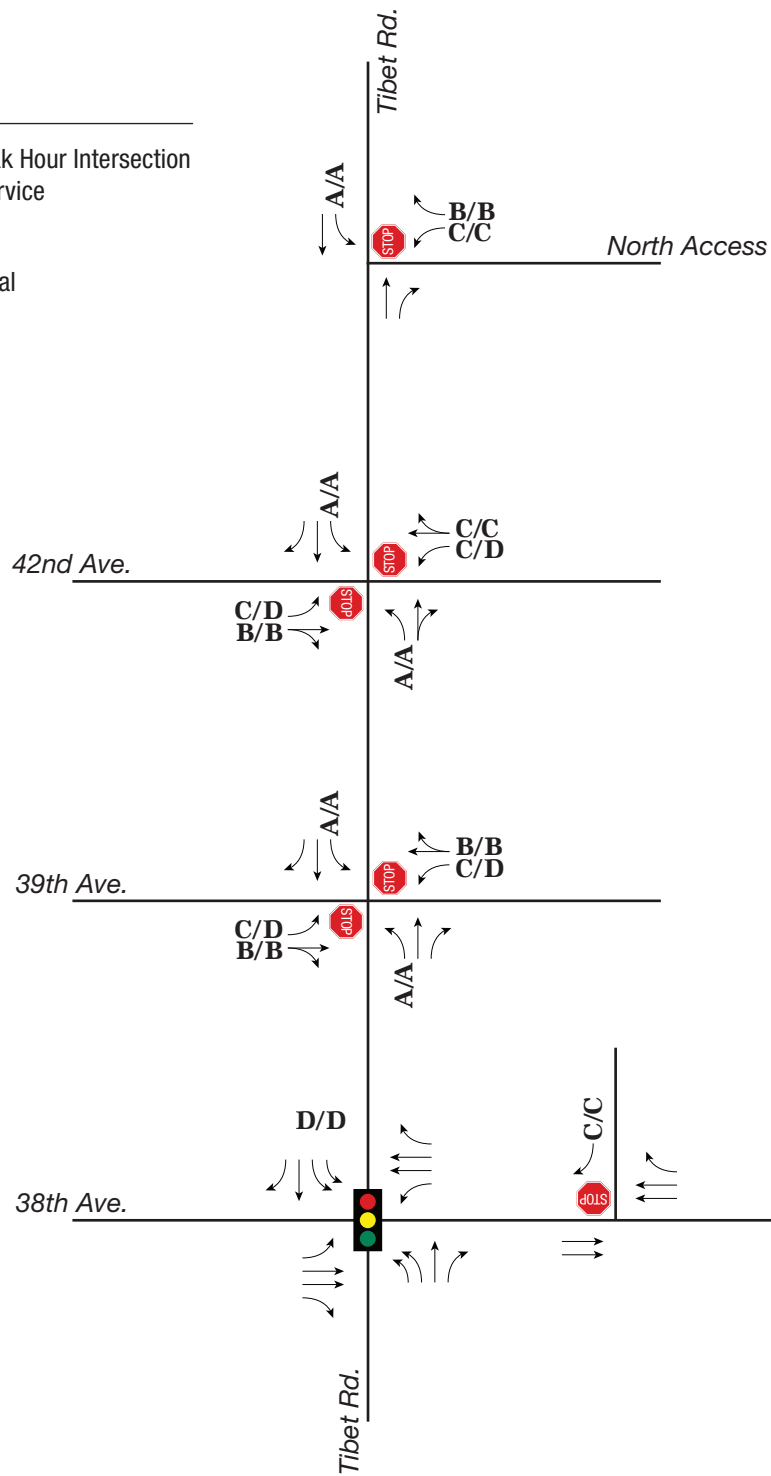
X/X = AM/PM Peak Hour Intersection
Level of Service



= Stop Sign



= Traffic Signal



V.B. Internal Traffic Control

At Tibet Road/42nd Avenue, traffic operations would be acceptable under STOP sign control. Per our previous traffic engineering efforts for CSP 3 and Filing 7, however, this intersection is adjacent to a future school site and could require a protected pedestrian crossing in the future. Therefore, future traffic and pedestrian conditions should be periodically monitored, and appropriate traffic control measures implemented, when warranted. Particular consideration of Warrant 5, School Crossing, would be anticipated. If signalized, the intersection would operate acceptably during peak times.

Traffic control at the internal intersections within Planning Areas 8 & 9 would be unsignalized, with STOP sign control on the minor approaches. **Figure 8** depicts the proposed internal traffic control.

V.C. Street Layout

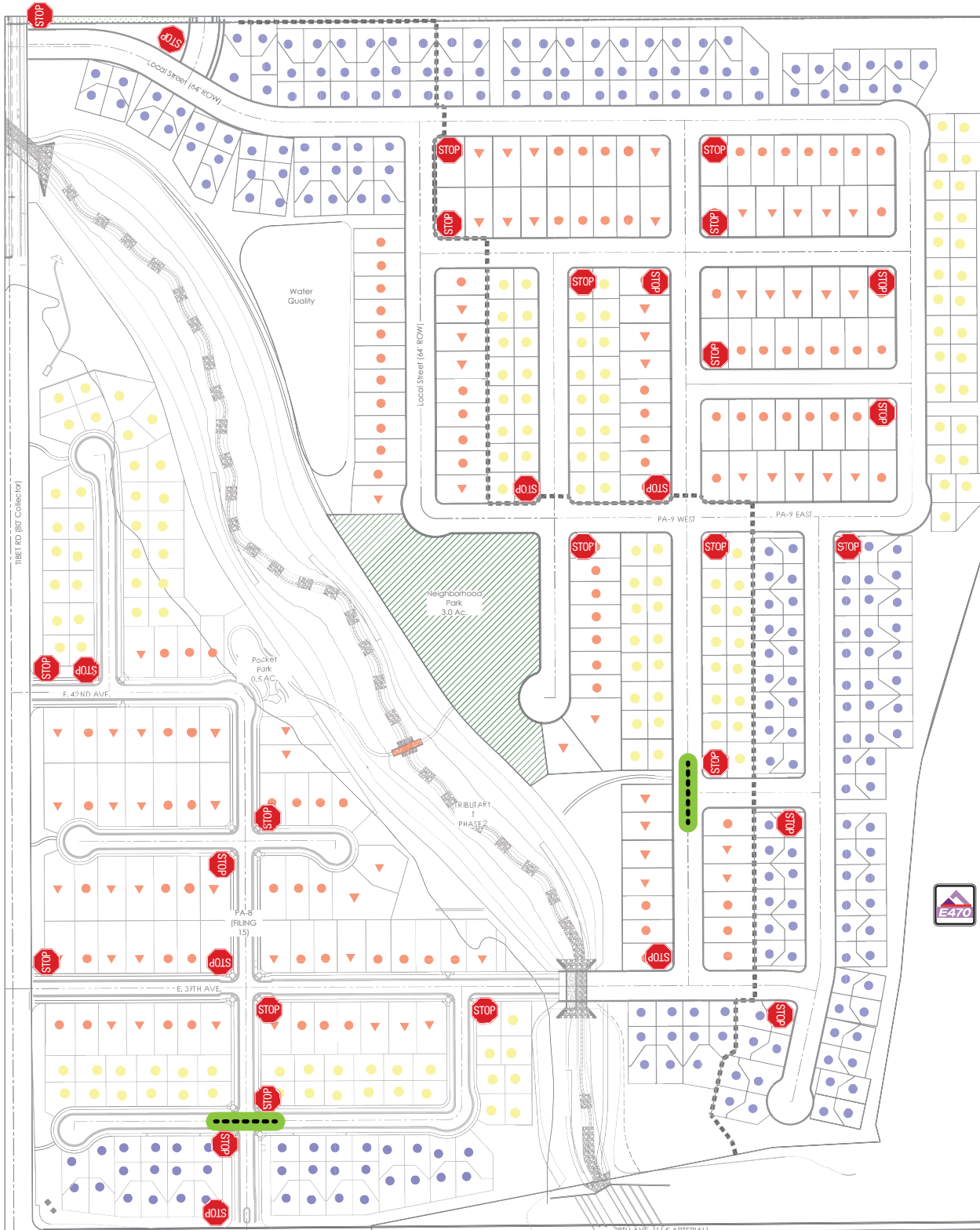
The proposed street layout for Planning Areas 8 & 9 is generally consistent with Section 4.04.1 of the City's Roadway Design and Construction Standards, as follows:

- Arterial spacing (38th Avenue, 48th Avenue, Picadilly Road and E-470 are at the approximate one-mile spacing per standards)
- Collector spacing (42nd Avenue and Tibet Road) generally meets the half-mile spacing requirement and is consistent with previous planning at Green Valley Ranch East.
- There are three local street connections to Tibet Road, which forms the western perimeter of the site. Of note, the northernmost connection to Tibet would provide for a potential future local connection into the Windler site north of Planning Areas 8 & 9. The site plan also shows one local street connection to 38th Avenue on the southern site perimeter.
- There are no cul-de-sacs longer than 500 feet proposed. No dead ends or hammerheads are proposed.

Several areas within Planning Areas 8 & 9 require travel on three local streets to connect to an internal destination (Aurora standards specify no more than two local streets to a destination)

V.D. Traffic Calming

Given the length of several internal streets, some potential traffic calming measures would help provide speed mitigation. Based on the site layout, curb extensions (or neckdowns) on the eastbound and westbound approaches at the first internal intersection on 39th Avenue would discourage speeding within Planning Area 8. Midblock curb extensions on the northbound and southbound approaches at the first intersection north of 39th Avenue on the primary north-south roadway within Planning Area 9 would also help to maintain low speeds within the site. These traffic calming locations are also depicted on **Figure 8**.



LEGEND



= Stop Sign



= Traffic Calming

V.E. Queues

The 95th percentile maximum probable queue lengths for Long Range Future conditions were extracted from the SYNCHRO LOS worksheets contained in the Appendix. The queue lengths are converted into feet (assuming a typical length of 25 feet per vehicle) and are summarized in **Table 3**. The table also provides CDOT storage requirements per the State Highway Access Code (SHAC). The recommended storage lengths consider both the CDOT criteria and the queueing projections.

Table 3. Queue Length Summary – Long Range Future

Intersection/Movement	95 % Queue Length (ft)		CDOT Storage Requirement (ft)	Recommended Storage (ft)
	AM Peak Hour	PM Peak Hour		
38 th Ave/Tibet Road	Traffic Signal			
Northbound Left (2-lane)	125	300	200	300
Northbound Right	75	200	165	200
Southbound Left (2-lane)	225	200	145	225
Southbound Right	175	150	165	175
Eastbound Left	150	300	250	300
Eastbound Right	400	125	405	400
Westbound Left	200	75	170	200
Westbound Right	200	275	305	300
Tibet Rd/39 th Ave	STOP Sign			
Northbound Left	25	25	60	75
Northbound Right	–	–	60	75
Southbound Left	0	25	40	50
Southbound Right	–	–	40	50
Eastbound Left	25	25	40	50
Eastbound Thru-Right	25	25	45	50
Westbound Left	50	25	75	75
Westbound Thru-Right	25	25	40	50
Tibet Rd/42 nd Ave	STOP Sign			
Northbound Left	25	25	100	100
Northbound Right	–	–	Not Required	Not Required
Southbound Left	0	0	40	50
Southbound Right	–	–	55	75
Eastbound Left	25	25	50	50
Eastbound Thru-Right	25	25	125	125
Westbound Left	25	25	40	50
Westbound Thru-Right	25	25	40	50
Tibet Rd/North Site Access	STOP Sign			
Northbound Right	–	–	75	75
Southbound Left	0	25	50	50
Westbound Left	25	25	65	75
Westbound Right	25	25	40	50
38 th Ave/Site RIRO Access	STOP Sign			
Westbound Right	–	–	60	75

V.F. Auxiliary Lanes

The site access intersections along Tibet Road and 38th Avenue were evaluated relative to auxiliary lane criteria in the CDOT *State Highway Access Code*. The proposed design for Tibet Road is a three-lane Collector with an assumed 35 MPH posted speed limit (typical for collector roads in Aurora). 38th Avenue is planned to be a four-lane arterial with an assumed speed limit of 40 MPH. For this evaluation, CDOT NR-B criteria was applied. **Table 4** summarizes the auxiliary lane length requirements for the site accesses.

Table 4. Auxiliary Lanes – Planning Areas 8 & 9 Accesses⁽¹⁾

Intersection	Direction	Left-Turn Lane			Right-Turn Lane		
		Storage	Taper	Total	Storage	Taper	Total
39 th Avenue	SB	50	120	170			
	NB				75	120	195
42 nd Avenue	SB	50	120	170			
	NB						
North Access	SB	50	120	170			
	NB				75	120	195
RIRO Access	WB				75	144	219
I. Dimensions are given in feet.							

V.G. Recommendations

The roadway and intersection improvements that should ultimately be implemented within the study area include the following:

- Construct 38th Avenue adjacent to the site as a four-lane Arterial.
- Construct Tibet Road as a three-lane Collector.
- Construct the intersection of Tibet Road/38th Avenue to include separate left-turn and right-turn lanes along each approach. Dual left-turn lanes will be required on the northbound and southbound approaches. Periodically monitor this intersection and install a traffic signal, when warranted.
- Install STOP-sign control on the westbound approach at Tibet Road/39th Place. Provide a southbound left-turn lane and a northbound right-turn lane.
- Install STOP sign control on the westbound site access approach at the 42nd Avenue/Tibet Road intersection. Provide a southbound left-turn lane. Periodically monitor traffic and pedestrian conditions at this intersection. Ultimately, a signal could be warranted due to its proximity to the future school site and the potential need for a protected school crossing.
- Install STOP-sign control on the westbound approach at the Tibet Road/north site access intersection. Provide a southbound left-turn lane and a northbound right-turn lane.
- Install STOP sign control on the southbound RIRO access approach to 38th Avenue. Provide a westbound right-turn lane at this site access.
- Install STOP-sign control at the site-internal intersections as previously depicted.
- Install curb extensions as a traffic calming measure at two internal intersections as previously depicted.

VI. CONCLUSIONS AND RECOMMENDATIONS

It is currently proposed to develop 568 single-family homes within Green Valley Ranch East Planning Areas 8 & 9. The site is located along the east side of the future Tibet Road alignment, north of the future 38th Avenue alignment. Vehicular access would be via three roadway connections along Tibet Road and one along 38th Avenue.

The proposed development at Planning Areas 8 & 9 would have a trip generation potential of about 4,990 trips per day, with 365 AM peak hour trips and 510 PM peak hour trips. Because the adjacent roadway system has yet to be developed, the potential impacts of the site-generated traffic were evaluated under a Long Range Future scenario. In general, the existing and planned roadway system would have sufficient reserve capacity to accommodate the projected increases. Relative to this, the following findings and recommendations are specific to planning Areas 8 & 9:

- Construct 38th Avenue adjacent to the site as a four-lane Arterial.
- Construct Tibet Road as a three-lane Collector.
- Construct the intersection of Tibet Road/38th Avenue to include separate left-turn and right-turn lanes along each approach. Dual left-turn lanes will be required on the northbound and southbound approaches – all other approaches would have single left-turn lanes. Periodically monitor this intersection and install a traffic signal, when warranted.
- Install STOP-sign control on the westbound approach at Tibet Road/39th Place. Provide a southbound left-turn lane and a northbound right-turn lane.
- Install STOP-sign control on the westbound site access approach at the 42nd Avenue/Tibet Road intersection. Provide a southbound left-turn lane. Periodically monitor traffic and pedestrian conditions at this intersection. Ultimately, a signal could be warranted due to its proximity to the future school site and the potential need for a protected school crossing.
- Install STOP-sign control on the westbound approach at the Tibet Road/north site access intersection. Provide a southbound left-turn lane and a northbound right-turn lane.
- Install STOP-sign control on the southbound RIRO access approach to 38th Avenue. Provide a westbound right-turn lane at this site access.
- Install STOP-sign control at the site-internal intersections as previously depicted on **Figure 8**.
- Install curb extensions as a traffic calming measure at two internal intersections as previously depicted.

APPENDIX A. TRIP GENERATION

Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 174

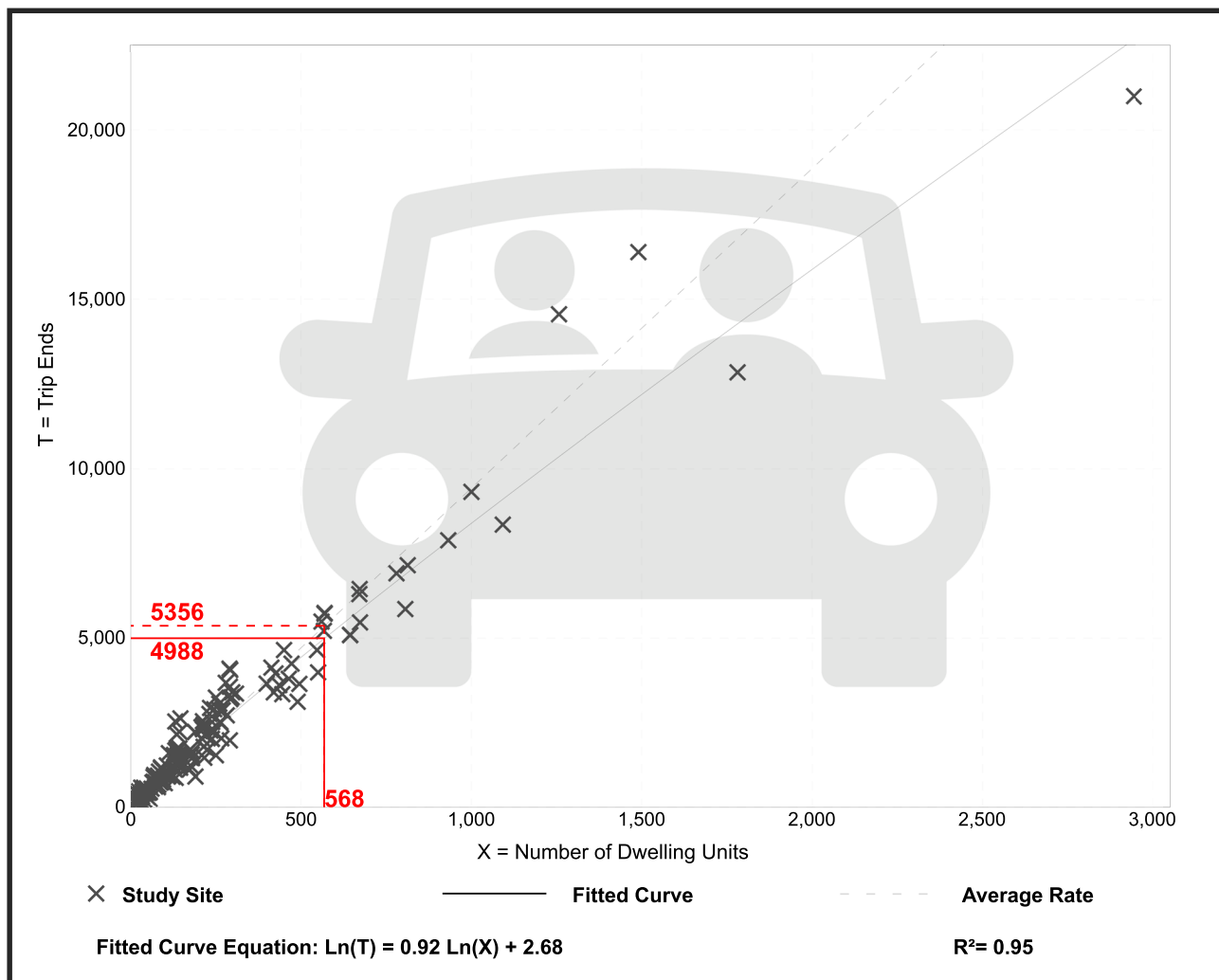
Avg. Num. of Dwelling Units: 246

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.43	4.45 - 22.61	2.13

Data Plot and Equation



Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 192

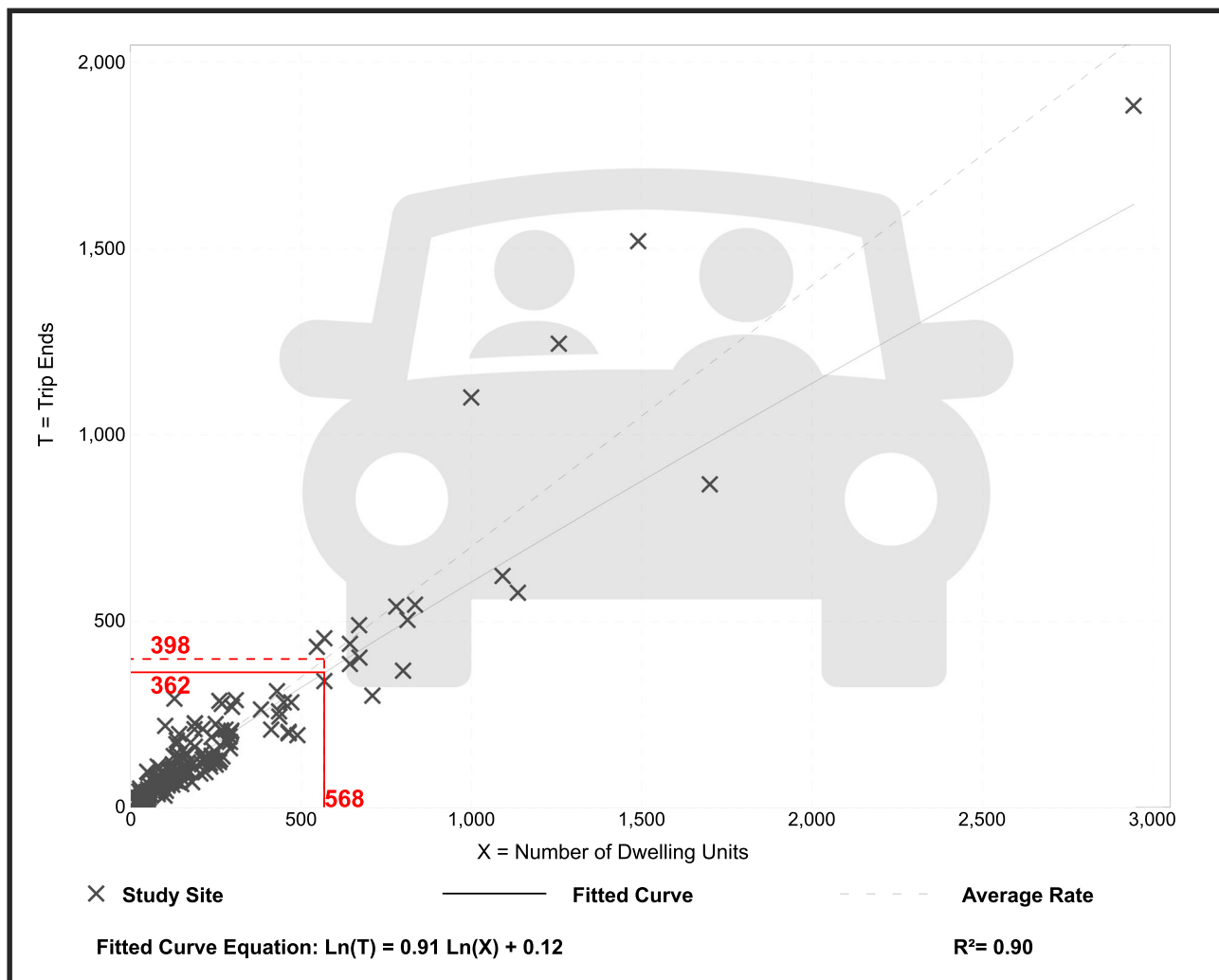
Avg. Num. of Dwelling Units: 226

Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.70	0.27 - 2.27	0.24

Data Plot and Equation



Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 208

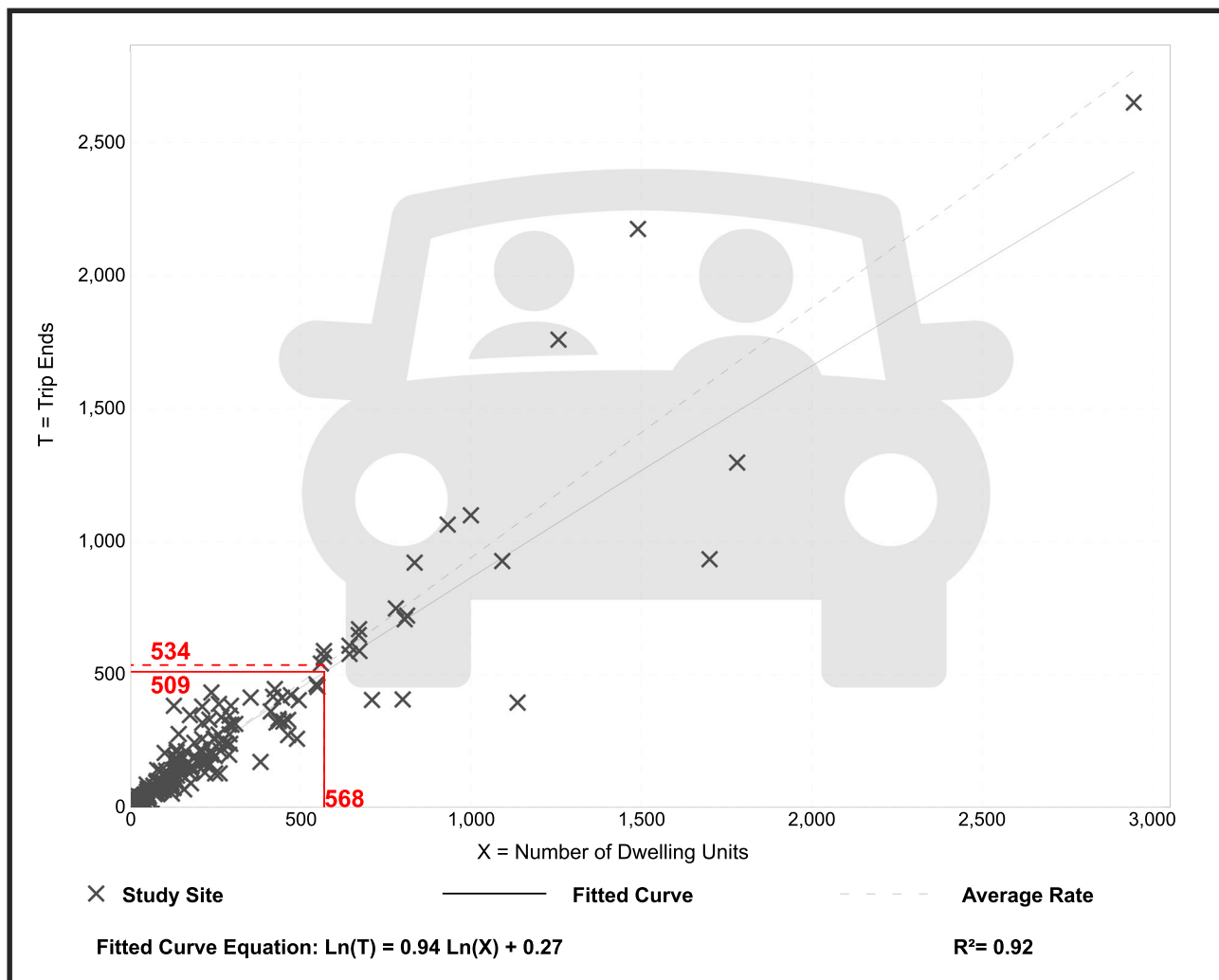
Avg. Num. of Dwelling Units: 248

Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.94	0.35 - 2.98	0.31

























Data Plot and Equation



APPENDIX B. LONG RANGE FUTURE BACKGROUND LOS

Timings 2: Tibet Rd & 38th Ave

Long Range Background
PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	910	405	170	980	210	165	10	65	210	15	105
Future Volume (vph)	95	910	405	170	980	210	165	10	65	210	15	105
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pt+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	2 3	1	6	7
Permitted Phases	4		4	8		8						6
Detector Phase	7	4	5	3	8	1	5	2	2 3	1	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)	9.5	22.5	9.5	9.5	22.5	9.5	9.5	22.5		9.5	22.5	9.5
Total Split (s)	12.0	52.0	27.0	17.0	57.0	27.0	27.0	24.0		27.0	24.0	12.0
Total Split (%)	10.0%	43.3%	22.5%	14.2%	47.5%	22.5%	22.5%	20.0%		22.5%	20.0%	10.0%
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)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
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)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	None
Act Effect Green (s)	49.0	41.6	58.1	57.5	46.0	70.1	12.0	29.0	45.3	19.6	36.6	48.5
Actuated g/C Ratio	0.41	0.35	0.48	0.48	0.38	0.58	0.10	0.24	0.38	0.16	0.30	0.40
v/c Ratio	0.58	0.81	0.44	0.78	0.78	0.22	0.52	0.02	0.11	0.79	0.03	0.16
Control Delay	30.2	40.9	2.7	47.5	36.8	1.5	56.4	41.2	7.3	67.5	34.6	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.2	40.9	2.7	47.5	36.8	1.5	56.4	41.2	7.3	67.5	34.6	5.7
LOS	C	D	A	D	D	A	E	D	A	E	C	A
Approach Delay		29.2			32.7			42.4			46.4	
Approach LOS		C			C			D			D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 19.5 (16%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 33.3









Intersection LOS: C

Intersection Capacity Utilization 64.1%

ICU Level of Service C

Analysis Period (min) 15

























Splits and Phases: 2: Tibet Rd & 38th Ave

 Ø1	 Ø2 (R)	 Ø3	 Ø4
27 s	24 s	17 s	52 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
27 s	24 s	12 s	57 s

HCM 6th Signalized Intersection Summary

2: Tibet Rd & 38th Ave

Long Range Background
PM Peak







												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	95	910	405	170	980	210	165	10	65	210	15	105
Future Volume (veh/h)	95	910	405	170	980	210	165	10	65	210	15	105
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	103	989	440	185	1065	228	179	11	71	228	16	114
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	195	1195	646	239	1305	811	246	534	585	258	672	652
Arrive On Green	0.05	0.34	0.34	0.08	0.37	0.37	0.07	0.29	0.29	0.14	0.36	0.36
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	103	989	440	185	1065	228	179	11	71	228	16	114
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1781	1870	1585
Q Serve(g_s), s	4.5	30.7	27.3	7.9	32.5	9.8	6.1	0.5	3.6	15.1	0.7	5.5
Cycle Q Clear(g_c), s	4.5	30.7	27.3	7.9	32.5	9.8	6.1	0.5	3.6	15.1	0.7	5.5
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	195	1195	646	239	1305	811	246	534	585	258	672	652
V/C Ratio(X)	0.53	0.83	0.68	0.77	0.82	0.28	0.73	0.02	0.12	0.88	0.02	0.17
Avail Cap(c_a), veh/h	212	1407	740	276	1555	923	648	534	585	334	672	652
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	28.3	36.6	29.2	28.2	34.3	16.7	54.6	30.8	25.0	50.3	24.9	22.4
Incr Delay (d2), s/veh	2.2	3.7	2.1	11.3	3.0	0.2	4.1	0.1	0.4	19.6	0.1	0.6
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(50%),veh/ln	2.0	13.8	10.7	4.1	14.4	3.6	2.8	0.2	1.4	8.1	0.3	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.6	40.3	31.3	39.4	37.3	16.9	58.7	30.9	25.4	69.9	24.9	23.0
LnGrp LOS	C	D	C	D	D	B	E	C	C	E	C	C
Approach Vol, veh/h		1532			1478			261			358	
Approach Delay, s/veh		37.1			34.4			48.5			52.9	
Approach LOS		D			C			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	21.9	38.8	14.5	44.8	13.0	47.6	10.8	48.6				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	22.5	19.5	12.5	47.5	22.5	19.5	7.5	52.5				
Max Q Clear Time (g_c+I1), s	17.1	5.6	9.9	32.7	8.1	7.5	6.5	34.5				
Green Ext Time (p_c), s	0.3	0.2	0.1	7.6	0.5	0.3	0.0	8.3				







Intersection Summary

HCM 6th Ctrl Delay	38.4
HCM 6th LOS	D

Notes

























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

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	45	20	295	285	5
Future Vol, veh/h	20	45	20	295	285	5
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, %	2	2	2	2	2	2
Mvmt Flow	22	49	22	321	310	5
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	675	310	315	0	-	0
Stage 1	310	-	-	-	-	-
Stage 2	365	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	419	730	1245	-	-	-
Stage 1	744	-	-	-	-	-
Stage 2	702	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	411	730	1245	-	-	-
Mov Cap-2 Maneuver	411	-	-	-	-	-
Stage 1	731	-	-	-	-	-
Stage 2	702	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	11.5	0.5		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1245	-	411	730	-	-
HCM Lane V/C Ratio	0.017	-	0.053	0.067	-	-
HCM Control Delay (s)	7.9	-	14.2	10.3	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	0.2	-	-

Intersection						
Int Delay, s/veh	2.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	40	70	70	245	220	40
Future Vol, veh/h	40	70	70	245	220	40
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, %	2	2	2	2	2	2
Mvmt Flow	43	76	76	266	239	43
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	657	239	282	0	-	0
Stage 1	239	-	-	-	-	-
Stage 2	418	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	430	800	1280	-	-	-
Stage 1	801	-	-	-	-	-
Stage 2	664	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	405	800	1280	-	-	-
Mov Cap-2 Maneuver	405	-	-	-	-	-
Stage 1	754	-	-	-	-	-
Stage 2	664	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	11.8	1.8		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1280	-	405	800	-	-
HCM Lane V/C Ratio	0.059	-	0.107	0.095	-	-
HCM Control Delay (s)	8	-	15	10	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.4	0.3	-	-

Timings
2: Tibet Rd & 38th Ave

Long Range Background PM
PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	1270	185	80	1125	270	400	25	165	195	10	85
Future Volume (vph)	140	1270	185	80	1125	270	400	25	165	195	10	85
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pt+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	2 3	1	6	7
Permitted Phases	4		4	8		8						6
Detector Phase	7	4	5	3	8	1	5	2	2 3	1	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)	9.5	22.5	9.5	9.5	22.5	9.5	9.5	22.5		9.5	22.5	9.5
Total Split (s)	12.0	52.0	27.0	17.0	57.0	27.0	27.0	24.0		27.0	24.0	12.0
Total Split (%)	10.0%	43.3%	22.5%	14.2%	47.5%	22.5%	22.5%	20.0%		22.5%	20.0%	10.0%
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)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
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)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	None
Act Effect Green (s)	58.7	51.2	75.5	60.6	52.1	75.4	19.8	23.6	36.6	18.8	22.6	34.6
Actuated g/C Ratio	0.49	0.43	0.63	0.50	0.43	0.63	0.16	0.20	0.30	0.16	0.19	0.29
v/c Ratio	0.86	0.92	0.19	0.47	0.80	0.27	0.77	0.07	0.33	0.77	0.03	0.18
Control Delay	62.5	43.1	1.6	23.0	34.0	1.4	57.4	42.6	18.9	66.4	42.5	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.5	43.1	1.6	23.0	34.0	1.4	57.4	42.6	18.9	66.4	42.5	7.3
LOS	E	D	A	C	C	A	E	D	B	E	D	A
Approach Delay		40.0			27.5			46.0			48.3	
Approach LOS		D			C			D			D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 19.5 (16%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 36.8









Intersection LOS: D

Intersection Capacity Utilization 68.9%

ICU Level of Service C

Analysis Period (min) 15

























Splits and Phases: 2: Tibet Rd & 38th Ave

 Ø1	 Ø2 (R)	 Ø3	 Ø4
27 s	24 s	17 s	52 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
27 s	24 s	12 s	57 s

HCM 6th Signalized Intersection Summary 2: Tibet Rd & 38th Ave

Long Range Background PM

PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	1270	185	80	1125	270	400	25	165	195	10	85
Future Volume (veh/h)	140	1270	185	80	1125	270	400	25	165	195	10	85
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	152	1380	201	87	1223	293	435	27	179	212	11	92
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	199	1478	892	152	1411	845	507	476	473	242	456	486
Arrive On Green	0.06	0.42	0.42	0.04	0.40	0.40	0.15	0.25	0.25	0.14	0.24	0.24
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	152	1380	201	87	1223	293	435	27	179	212	11	92
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1781	1870	1585
Q Serve(g_s), s	6.1	44.5	7.6	3.4	38.0	12.7	14.7	1.3	10.7	14.0	0.5	5.1
Cycle Q Clear(g_c), s	6.1	44.5	7.6	3.4	38.0	12.7	14.7	1.3	10.7	14.0	0.5	5.1
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	199	1478	892	152	1411	845	507	476	473	242	456	486
V/C Ratio(X)	0.76	0.93	0.23	0.57	0.87	0.35	0.86	0.06	0.38	0.88	0.02	0.19
Avail Cap(c_a), veh/h	199	1478	892	260	1555	909	648	476	473	334	456	486
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	27.7	33.5	13.2	28.7	33.3	16.1	50.0	33.8	33.3	50.9	34.5	30.6
Incr Delay (d2), s/veh	16.0	11.2	0.1	3.3	5.1	0.2	9.2	0.2	2.3	17.2	0.1	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	6.1	28.5	4.9	2.8	23.8	8.1	11.3	1.1	7.9	11.8	0.5	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.7	44.6	13.3	32.1	38.4	16.3	59.1	34.1	35.6	68.0	34.6	31.5
LnGrp LOS	D	D	B	C	D	B	E	C	D	E	C	C
Approach Vol, veh/h	1733			1603			641			315		
Approach Delay, s/veh	40.9			34.0			51.5			56.2		
Approach LOS	D			C			D			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.8	35.1	9.7	54.4	22.1	33.8	12.0	52.1				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	22.5	19.5	12.5	47.5	22.5	19.5	7.5	52.5				
Max Q Clear Time (g_c+I1), s	16.0	12.7	5.4	46.5	16.7	7.1	8.1	40.0				
Green Ext Time (p_c), s	0.3	0.4	0.1	0.8	0.8	0.2	0.0	7.7				







Intersection Summary







HCM 6th Ctrl Delay 41.0

HCM 6th LOS D

Notes

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

Intersection						
Int Delay, s/veh	1.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	40	60	375	250	25
Future Vol, veh/h	20	40	60	375	250	25
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, %	2	2	2	2	2	2
Mvmt Flow	22	43	65	408	272	27
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	810	272	299	0	-	0
Stage 1	272	-	-	-	-	-
Stage 2	538	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	349	767	1262	-	-	-
Stage 1	774	-	-	-	-	-
Stage 2	585	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	331	767	1262	-	-	-
Mov Cap-2 Maneuver	331	-	-	-	-	-
Stage 1	734	-	-	-	-	-
Stage 2	585	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	12.2	1.1		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1262	-	331	767	-	-
HCM Lane V/C Ratio	0.052	-	0.066	0.057	-	-
HCM Control Delay (s)	8	-	16.6	10	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.2	0.2	-	-

Intersection						
Int Delay, s/veh	3.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	35	105	100	295	170	45
Future Vol, veh/h	35	105	100	295	170	45
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, %	2	2	2	2	2	2
Mvmt Flow	38	114	109	321	185	49

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	724	185	234	0	-	0
Stage 1	185	-	-	-	-	-
Stage 2	539	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	393	857	1333	-	-	-
Stage 1	847	-	-	-	-	-
Stage 2	585	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	361	857	1333	-	-	-
Mov Cap-2 Maneuver	361	-	-	-	-	-
Stage 1	778	-	-	-	-	-
Stage 2	585	-	-	-	-	-

























Approach	EB	NB	SB
HCM Control Delay, s	11.4	2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1333	-	361	857	-	-
HCM Lane V/C Ratio	0.082	-	0.105	0.133	-	-
HCM Control Delay (s)	7.9	-	16.1	9.8	-	-
HCM Lane LOS	A	-	C	A	-	-
HCM 95th %tile Q(veh)	0.3	-	0.3	0.5	-	-

APPENDIX C. LONG RANGE FUTURE TOTAL TRAFFIC LOS

Timings
2: Tibet Rd & 38th Ave

Long Range Total
AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	910	405	170	1015	220	165	10	65	290	15	165
Future Volume (vph)	130	910	405	170	1015	220	165	10	65	290	15	165
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pt+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	2 3	1	6	7
Permitted Phases	4		4	8		8						6
Detector Phase	7	4	5	3	8	1	5	2	2 3	1	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)	9.5	22.5	9.5	9.5	22.5	9.5	9.5	22.5		9.5	22.5	9.5
Total Split (s)	12.0	48.0	31.0	17.0	53.0	31.0	31.0	24.0		31.0	24.0	12.0
Total Split (%)	10.0%	40.0%	25.8%	14.2%	44.2%	25.8%	25.8%	20.0%		25.8%	20.0%	10.0%
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)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
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)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	None
Act Effect Green (s)	48.1	40.6	57.0	56.4	44.9	65.9	12.0	33.1	49.5	16.5	37.6	49.6
Actuated g/C Ratio	0.40	0.34	0.48	0.47	0.37	0.55	0.10	0.28	0.41	0.14	0.31	0.41
v/c Ratio	0.82	0.83	0.45	0.78	0.83	0.24	0.52	0.02	0.10	0.67	0.03	0.24
Control Delay	57.6	43.1	2.9	48.4	40.2	1.8	56.4	36.6	6.3	56.1	32.7	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	43.1	2.9	48.4	40.2	1.8	56.4	36.6	6.3	56.1	32.7	6.2
LOS	E	D	A	D	D	A	E	D	A	E	C	A
Approach Delay		33.1			35.2			41.9			37.8	
Approach LOS		C			D			D			D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 19.5 (16%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 35.2









Intersection LOS: D

Intersection Capacity Utilization 61.4%

ICU Level of Service B

Analysis Period (min) 15

























Splits and Phases: 2: Tibet Rd & 38th Ave

			
Ø1	Ø2 (R)	Ø3	Ø4
31 s	24 s	17 s	48 s
			
Ø5	Ø6 (R)	Ø7	Ø8
31 s	24 s	12 s	53 s

HCM 6th Signalized Intersection Summary

2: Tibet Rd & 38th Ave

Long Range Total
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	910	405	170	1015	220	165	10	65	290	15	165
Future Volume (veh/h)	130	910	405	170	1015	220	165	10	65	290	15	165
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	141	989	440	185	1103	239	179	11	71	315	16	179
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	201	1203	650	241	1280	751	247	587	631	392	665	663
Arrive On Green	0.06	0.34	0.34	0.08	0.36	0.36	0.07	0.31	0.31	0.11	0.36	0.36
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	3456	1870	1585
Grp Volume(v), veh/h	141	989	440	185	1103	239	179	11	71	315	16	179
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1728	1870	1585
Q Serve(g_s), s	6.2	30.6	27.2	8.0	34.6	11.2	6.1	0.5	3.4	10.7	0.7	8.9
Cycle Q Clear(g_c), s	6.2	30.6	27.2	8.0	34.6	11.2	6.1	0.5	3.4	10.7	0.7	8.9
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	201	1203	650	241	1280	751	247	587	631	392	665	663
V/C Ratio(X)	0.70	0.82	0.68	0.77	0.86	0.32	0.72	0.02	0.11	0.80	0.02	0.27
Avail Cap(c_a), veh/h	201	1288	688	277	1436	820	763	587	631	763	665	663
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(l)	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	29.3	36.4	28.9	28.3	35.6	19.6	54.5	28.4	22.7	51.9	25.1	22.9
Incr Delay (d2), s/veh	10.5	4.2	2.5	10.7	5.1	0.2	4.0	0.1	0.4	3.9	0.1	1.0
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	5.7	19.9	16.0	7.3	22.1	7.5	5.0	0.4	2.4	8.4	0.6	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.8	40.6	31.4	39.0	40.8	19.8	58.5	28.5	23.1	55.8	25.2	23.9
LnGrp LOS	D	D	C	D	D	B	E	C	C	E	C	C
Approach Vol, veh/h		1570			1527			261			510	
Approach Delay, s/veh		37.9			37.3			47.6			43.7	
Approach LOS		D			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.1	42.2	14.6	45.1	13.1	47.2	12.0	47.7				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	26.5	19.5	12.5	43.5	26.5	19.5	7.5	48.5				
Max Q Clear Time (g_c+l1), s	12.7	5.4	10.0	32.6	8.1	10.9	8.2	36.6				
Green Ext Time (p_c), s	0.9	0.2	0.1	6.2	0.5	0.4	0.0	6.7				

Intersection Summary











HCM 6th Ctrl Delay	39.1
HCM 6th LOS	D

Notes

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

HCM 6th TWSC
3: Tibet Rd & 39th Ave

Long Range Total
AM 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	20	0	45	75	0	20	20	330	10	10	350	5
Future Vol, veh/h	20	0	45	75	0	20	20	330	10	10	350	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	-	-	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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	0	49	82	0	22	22	359	11	11	380	5










Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	822	816	380	832	810	359	385	0	0	370	0	0
Stage 1	402	402	-	403	403	-	-	-	-	-	-	-
Stage 2	420	414	-	429	407	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	293	311	667	288	314	685	1173	-	-	1189	-	-
Stage 1	625	600	-	624	600	-	-	-	-	-	-	-
Stage 2	611	593	-	604	597	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	278	302	667	261	305	685	1173	-	-	1189	-	-
Mov Cap-2 Maneuver	278	302	-	261	305	-	-	-	-	-	-	-
Stage 1	613	595	-	612	589	-	-	-	-	-	-	-
Stage 2	581	582	-	555	592	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	13.3		21.8		0.5		0.2	
HCM LOS	B		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1173	-	-	278	667	261	685	1189	-	-
HCM Lane V/C Ratio	0.019	-	-	0.078	0.073	0.312	0.032	0.009	-	-
HCM Control Delay (s)	8.1	-	-	19	10.8	24.9	10.4	8.1	-	-
HCM Lane LOS	A	-	-	C	B	C	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.2	1.3	0.1	0	-	-

HCM 6th TWSC
4: Tibet Rd & 42nd Ave







Long Range Total
AM Peak

Intersection												
Int Delay, s/veh	3.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	5	70	10	15	10	70	295	5	5	285	50
Future Vol, veh/h	45	5	70	10	15	10	70	295	5	5	285	50
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	-	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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	5	76	11	16	11	76	321	5	5	310	54

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	809	798	310	864	850	324	364	0	0	326	0	0
Stage 1	320	320	-	476	476	-	-	-	-	-	-	-
Stage 2	489	478	-	388	374	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	299	319	730	274	298	717	1195	-	-	1234	-	-
Stage 1	692	652	-	570	557	-	-	-	-	-	-	-
Stage 2	561	556	-	636	618	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	267	297	730	230	278	717	1195	-	-	1234	-	-
Mov Cap-2 Maneuver	267	297	-	230	278	-	-	-	-	-	-	-
Stage 1	648	649	-	534	521	-	-	-	-	-	-	-
Stage 2	501	520	-	563	616	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	15.1		17.3		1.6		0.1	
HCM LOS	C		C					

























Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1195	-	-	267	665	230	368	1234	-	-
HCM Lane V/C Ratio	0.064	-	-	0.183	0.123	0.047	0.074	0.004	-	-
HCM Control Delay (s)	8.2	-	-	21.5	11.2	21.4	15.6	7.9	-	-
HCM Lane LOS	A	-	-	C	B	C	C	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.7	0.4	0.1	0.2	0	-	-

Intersection						
Int Delay, s/veh	2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	65	40	315	35	10	275
Future Vol, veh/h	65	40	315	35	10	275
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	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	71	43	342	38	11	299
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	663	342	0	0	380	0
Stage 1	342	-	-	-	-	-
Stage 2	321	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	426	701	-	-	1178	-
Stage 1	719	-	-	-	-	-
Stage 2	735	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	422	701	-	-	1178	-
Mov Cap-2 Maneuver	422	-	-	-	-	-
Stage 1	719	-	-	-	-	-
Stage 2	728	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	13.4	0	0.3			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 422 701 1178	-	-		
HCM Lane V/C Ratio	-	- 0.167 0.062 0.009	-	-		
HCM Control Delay (s)	-	- 15.2 10.5 8.1	-	-		
HCM Lane LOS	-	- C B A	-	-		
HCM 95th %tile Q(veh)	-	- 0.6 0.2 0	-	-		

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑	↗		↗
Traffic Vol, veh/h	0	1265	1370	15	0	35
Future Vol, veh/h	0	1265	1370	15	0	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	0	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1375	1489	16	0	38
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	-	745
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	-	0	357
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	357
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		16.3		
HCM LOS				C		
Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1		
Capacity (veh/h)	-	-	-	357		
HCM Lane V/C Ratio	-	-	-	0.107		
HCM Control Delay (s)	-	-	-	16.3		
HCM Lane LOS	-	-	-	C		
HCM 95th %tile Q(veh)	-	-	-	0.4		

Timings
2: Tibet Rd & 38th Ave

Long Range Total
PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	1270	185	80	1155	305	400	25	165	250	10	120
Future Volume (vph)	250	1270	185	80	1155	305	400	25	165	250	10	120
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pt+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	2 3	1	6	7
Permitted Phases	4		4	8		8						6
Detector Phase	7	4	5	3	8	1	5	2	2 3	1	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)	9.5	22.5	9.5	9.5	22.5	9.5	9.5	22.5		9.5	22.5	9.5
Total Split (s)	20.0	52.0	28.0	16.0	48.0	28.0	28.0	24.0		28.0	24.0	20.0
Total Split (%)	16.7%	43.3%	23.3%	13.3%	40.0%	23.3%	23.3%	20.0%		23.3%	20.0%	16.7%
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)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
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)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	None
Act Effect Green (s)	63.4	50.5	75.1	52.1	43.6	63.1	20.2	28.0	41.1	15.0	22.8	42.7
Actuated g/C Ratio	0.53	0.42	0.63	0.43	0.36	0.53	0.17	0.23	0.34	0.12	0.19	0.36
v/c Ratio	0.94	0.93	0.19	0.47	0.98	0.34	0.76	0.06	0.31	0.64	0.03	0.22
Control Delay	72.3	45.1	1.6	24.5	58.1	2.3	56.2	38.2	19.6	56.5	42.2	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.3	45.1	1.6	24.5	58.1	2.3	56.2	38.2	19.6	56.5	42.2	17.4
LOS	E	D	A	C	E	A	E	D	B	E	D	B
Approach Delay		44.4			45.3			45.2			43.8	
Approach LOS		D			D			D			D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 19.5 (16%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 44.8









Intersection LOS: D

Intersection Capacity Utilization 75.1%

ICU Level of Service D

Analysis Period (min) 15

























Splits and Phases: 2: Tibet Rd & 38th Ave

 Ø1	 Ø2 (R)	 Ø3	 Ø4
28 s	24 s	16 s	52 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
28 s	24 s	20 s	48 s

HCM 6th Signalized Intersection Summary

2: Tibet Rd & 38th Ave

Long Range Total
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	250	1270	185	80	1155	305	400	25	165	250	10	120
Future Volume (veh/h)	250	1270	185	80	1155	305	400	25	165	250	10	120
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	272	1380	201	87	1255	332	435	27	179	272	11	130
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	295	1587	941	171	1288	733	509	484	481	344	395	539
Arrive On Green	0.13	0.45	0.45	0.05	0.36	0.36	0.15	0.26	0.26	0.10	0.21	0.21
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	3456	1870	1585
Grp Volume(v), veh/h	272	1380	201	87	1255	332	435	27	179	272	11	130
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1728	1870	1585
Q Serve(g_s), s	13.7	42.2	7.1	3.7	41.8	17.1	14.7	1.3	10.6	9.2	0.6	7.1
Cycle Q Clear(g_c), s	13.7	42.2	7.1	3.7	41.8	17.1	14.7	1.3	10.6	9.2	0.6	7.1
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	295	1587	941	171	1288	733	509	484	481	344	395	539
V/C Ratio(X)	0.92	0.87	0.21	0.51	0.97	0.45	0.85	0.06	0.37	0.79	0.03	0.24
Avail Cap(c_a), veh/h	295	1587	941	262	1288	733	677	484	481	677	395	539
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	35.8	30.0	11.3	28.0	37.7	22.0	49.9	33.5	32.8	52.8	37.6	28.5
Incr Delay (d2), s/veh	33.0	5.5	0.1	2.3	19.1	0.4	8.1	0.2	2.2	4.1	0.1	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	11.4	25.9	4.5	3.0	28.8	10.6	11.2	1.1	7.8	7.6	0.5	5.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.7	35.5	11.4	30.3	56.8	22.4	58.0	33.7	35.0	56.9	37.7	29.5
LnGrp LOS	E	D	B	C	E	C	E	C	C	E	D	C
Approach Vol, veh/h	1853			1674			641			413		
Approach Delay, s/veh	37.8			48.6			50.6			47.7		
Approach LOS	D			D			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.5	35.5	9.9	58.1	22.2	29.8	20.0	48.0				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	23.5	19.5	11.5	47.5	23.5	19.5	15.5	43.5				
Max Q Clear Time (g_c+I1), s	11.2	12.6	5.7	44.2	16.7	9.1	15.7	43.8				
Green Ext Time (p_c), s	0.7	0.4	0.1	2.7	0.9	0.3	0.0	0.0				

Intersection Summary











HCM 6th Ctrl Delay 44.4
HCM 6th LOS D

Notes

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

HCM 6th TWSC
3: Tibet Rd & 39th Ave

Long Range 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	20	0	40	35	0	20	60	460	60	20	305	25
Future Vol, veh/h	20	0	40	35	0	20	60	460	60	20	305	25
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	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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	0	43	38	0	22	65	500	65	22	332	27










Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1050	1071	332	1041	1033	500	359	0	0	565	0	0
Stage 1	376	376	-	630	630	-	-	-	-	-	-	-
Stage 2	674	695	-	411	403	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	205	221	710	208	232	571	1200	-	-	1007	-	-
Stage 1	645	616	-	470	475	-	-	-	-	-	-	-
Stage 2	444	444	-	618	600	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	186	204	710	184	215	571	1200	-	-	1007	-	-
Mov Cap-2 Maneuver	186	204	-	184	215	-	-	-	-	-	-	-
Stage 1	610	602	-	445	449	-	-	-	-	-	-	-
Stage 2	404	420	-	567	587	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	15.9		23.1		0.8		0.5	
HCM LOS	C		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1200	-	-	186	710	184	571	1007	-	-
HCM Lane V/C Ratio	0.054	-	-	0.117	0.061	0.207	0.038	0.022	-	-
HCM Control Delay (s)	8.2	-	-	26.9	10.4	29.6	11.6	8.7	-	-
HCM Lane LOS	A	-	-	D	B	D	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.4	0.2	0.8	0.1	0.1	-	-

HCM 6th TWSC
4: Tibet Rd & 42nd Ave

Long Range 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	50	20	105	10	10	5	100	375	25	10	235	55
Future Vol, veh/h	50	20	105	10	10	5	100	375	25	10	235	55
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	-	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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	54	22	114	11	11	5	109	408	27	11	255	60







Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	925	930	255	1015	977	422	315	0	0	435	0	0
Stage 1	277	277	-	640	640	-	-	-	-	-	-	-
Stage 2	648	653	-	375	337	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	250	267	784	217	251	632	1245	-	-	1125	-	-
Stage 1	729	681	-	464	470	-	-	-	-	-	-	-
Stage 2	459	464	-	646	641	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	221	241	784	160	227	632	1245	-	-	1125	-	-
Mov Cap-2 Maneuver	221	241	-	160	227	-	-	-	-	-	-	-
Stage 1	665	674	-	423	429	-	-	-	-	-	-	-
Stage 2	405	423	-	529	635	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	17		22.6		1.6		0.3	
HCM LOS	C		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1245	-	-	221	576	160	289	1125	-	-
HCM Lane V/C Ratio	0.087	-	-	0.246	0.236	0.068	0.056	0.01	-	-
HCM Control Delay (s)	8.2	-	-	26.5	13.2	29.1	18.2	8.2	-	-
HCM Lane LOS	A	-	-	D	B	D	C	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.9	0.9	0.2	0.2	0	-	-

HCM 6th TWSC
10: Tibet Rd & North Access

Long Range Total
PM Peak

Intersection						
Int Delay, s/veh	2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	55	25	355	75	50	245
Future Vol, veh/h	55	25	355	75	50	245
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	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	60	27	386	82	54	266
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	760	386	0	0	468	0
Stage 1	386	-	-	-	-	-
Stage 2	374	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	374	662	-	-	1094	-
Stage 1	687	-	-	-	-	-
Stage 2	696	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	356	662	-	-	1094	-
Mov Cap-2 Maneuver	356	-	-	-	-	-
Stage 1	687	-	-	-	-	-
Stage 2	662	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	15.1	0		1.4		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	356	662	1094	-
HCM Lane V/C Ratio	-	-	0.168	0.041	0.05	-
HCM Control Delay (s)	-	-	17.1	10.7	8.5	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.6	0.1	0.2	-

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑	↗		↗
Traffic Vol, veh/h	0	1685	1510	60	0	30
Future Vol, veh/h	0	1685	1510	60	0	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	0	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1832	1641	65	0	33
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	-	821
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	-	0	318
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	318
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		17.6		
HCM LOS	C					
Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1		
Capacity (veh/h)	-	-	-	318		
HCM Lane V/C Ratio	-	-	-	0.103		
HCM Control Delay (s)	-	-	-	17.6		
HCM Lane LOS	-	-	-	C		
HCM 95th %tile Q(veh)	-	-	-	0.3		