

DRAFT MEMORANDUM

Date: August 17, 2017

To: Cecily Barclay, Perkins Coie
Lisa Borba, GBN Partners

From: Kathrin Tellez

Subject: Vineyards at Sand Creek – Supplemental 2017 Transportation Impact Assessment

WC17-3385

The purpose of this memorandum is to evaluate a changed project description for the approved Vineyards at Sand Creek project. During the 2016 project approval process, the City evaluated the transportation impacts of constructing up to 650-single family homes on a parcel west of Heidorn Ranch Road, east of the future southern extension of Hillcrest Avenue, south of Prewett Ranch Drive, and north of the future extension of Sand Creek Road, as shown on **Figure 1** (all figures are provided at the end of this memorandum). As part of the 2016 project, roadway improvements would be constructed along the project boundaries, including, the eastern half-section of Hillcrest Avenue (two lanes) as part of a four-lane roadway, the western half section of Heidorn Ranch Road (two lanes) as part of a four-lane roadway, and Sand Creek Road (four lanes).

Proposed changes to the project description (2017 Project) include construction of two-lane facilities for Heidorn Ranch Road and Hillcrest Avenue with dedication of full right-of-way for future expansion if necessary, and a two-lane cross-section on Sand Creek Road with dedication of the full right-of-way¹. In addition, the 2017 project would obligate the developer of the property to the south to construct the additional two lanes of Sand Creek Road upon the earlier of: (a) operation of an extension of Hillcrest Avenue south of Sand Creek Road that is constructed by the southern property developer; or (b) issuance of the 25th building permit and first certificate of occupancy for any new units on that southern property. No changes to the number of units is proposed.

¹ All dedications are limited to such land owned or controlled by the applicant as is needed to achieve the four-lane rights-of-way.



The purpose of this assessment is to evaluate peak hour intersection operations for intersections where operations may change from those presented in the 2016 project Certified Environmental Impact Report. The following provides project background, analysis parameters, and results.

BACKGROUND

Fehr & Peers prepared a transportation impact assessment (TIA) for the Vineyards at Sand Creek project in March 2015. The results of the 2015 TIA were incorporated into a Certified Environmental Impact Report (EIR) for the project, and the project was approved in 2016 by the City of Antioch. The 2016 project anticipated four-lane extensions of Hillcrest Avenue, Heidorn Ranch Road and Sand Creek Road along the project frontage.

As part of the 2015 TIA, Fehr & Peers evaluated the peak hour operation of select intersections and freeway segments under existing, near-term and cumulative conditions. The analysis of existing conditions was based on traffic conditions as of 2014 as well as the roadway system in 2014. The Existing with Project analysis scenario included the four-lane extensions of Hillcrest Avenue and Heidorn Ranch Road along the project frontage, but did not evaluate intersections on the Sand Creek Road extension as little traffic is projected to use the roadway as it would not serve other land uses and more direct travel routes from the development to the regional roadway system are provided. The analysis did not identify significant impacts to the roadway system, demonstrating that the Sand Creek Road extension is not needed to serve project build-out in the existing condition.

The analysis of near-term conditions was based on traffic conditions as of 2014 plus the addition of traffic from approved and pending projects reflecting likely traffic conditions in the five to ten year horizon from analysis completion (2020 to 2025 timeframe). The projections include the neighboring Aviano project as an unrestricted project (i.e., without senior only housing restrictions). Roadway improvements reflected in that scenario included four-lane extensions of Hillcrest Avenue and Heidorn Ranch Road along the project frontage, and some minor intersection reconfigurations planned by the City of Antioch along Lone Tree Way. Similar to the Existing with Project scenario, the Near-term with Project analysis scenario included the four-lane extensions of Hillcrest Avenue and Heidorn Ranch Road along the project frontage. The analysis did not evaluate intersections on the Sand Creek Road extension as little traffic is projected to use the roadway due to the fact that the roadway would not serve other land uses and more direct travel routes from the development



to the regional roadway system are provided. This was intended to provide a worst-case assessment of potential impacts. The analysis did not identify significant impacts to the roadway system in the near-term scenario, demonstrating that the Sand Creek Road extension is not needed to serve project buildout or the construction/occupation of approved development in the near-term condition.

For the assessment of cumulative conditions, a number of roadway improvements consistent with the City of Antioch and City of Brentwood General Plans were assumed, including the extension of Hillcrest Avenue as a four-lane facility to Balfour Road, the extension of Heidorn Ranch Road to Sand Creek Road as a four-lane facility, and the construction of Sand Creek Road between State Route 4 and Deer Valley Road as a four-lane facility.

The project applicant proposes to modify the 2016 project. The 2017 project includes two-lane extensions of Hillcrest Avenue, Heidorn Ranch Road and Sand Creek Road along the project frontage; no changes to the number of dwelling units is proposed. The right-of-way to construct the full four lane cross section on Sand Creek Road would be dedicated to the City (see footnote 1), with construction of the additional two lanes on Sand Creek Road conditioned on the parcel on the south side of Sand Creek Road (APN 057-050-024). This supplemental report is intended to evaluate the roadway network modifications.

ANALYSIS PARAMETERS

Intersections evaluated for this assessment include:

1. Lone Tree Way/Deer Valley Road
2. Lone Tree Way/Hillcrest Avenue
3. Lone Tree Way/Heidorn Ranch Road
4. Project Entrance/Hillcrest Avenue
5. Project Entrance/Heidorn Ranch Road
6. Sand Creek Road/Hillcrest Avenue
7. Sand Creek Road/Heidorn Ranch Road
8. Sand Creek Road/Eastbound (EB) SR-4 Ramps
9. Sand Creek Road/Westbound (WB) SR-4 Ramps



Intersections 4 through 7 were evaluated under 2017 project conditions for the existing, near-term and cumulative conditions as the analysis results would not change at the other study intersections from the results presented in the 2015 TIA. The nine intersection listed above were also evaluated under the cumulative scenario under 2017 project conditions considering several hypothetical scenarios. Three additional intersections were included in the 2015 TIA but were not included in this assessment as they were projected to operate with sufficient excess capacity to accommodate the potential changes in traffic patterns discussed below.

Intersection operations were evaluated based on the same methods outlined in the 2015 TIA (*Highway Capacity Manual*, Transportation Research Board). The City of Antioch has set LOS D as the level of acceptable delay at the above intersections. This analysis was conducted using Synchro 9.0.

For this assessment, the following scenarios were evaluated:

- **Existing with 2017 Project** (Only Intersections 4-7; no changes from the results presented in the 2015 TIA would occur at the remaining study intersections) – this scenario reflects the existing condition as of the preparation of the transportation impact assessment that was used as the basis for the Certified EIR, with the addition of project traffic assuming two-lane cross sections on Hillcrest Avenue, Heidorn Ranch Road, and Sand Creek Road. Minimal traffic is projected to travel on Hillcrest Avenue, Sand Creek Road and Heidorn Ranch Road south of the project entries as these roadways in this scenario would loop around the project site and would not connect to other land use developments or roadways. Peak hour intersection volumes for this scenario are presented on **Figure 2**.
- **Near-Term with 2017 Project** (Only Intersections 4-7; no changes from the results presented in the 2015 TIA would occur at the remaining study intersections) – this scenario reflects the near-term condition as of the preparation of the transportation impact assessment that was used as the basis for the Certified EIR, with the addition of project traffic assuming two-lane cross sections on Hillcrest Avenue, Heidorn Ranch Road, and Sand Creek Road. Minimal traffic is projected to travel on Hillcrest Avenue, Sand Creek Road and Heidorn Ranch Road south of the project entries in this scenario as these roadways would loop around the project site and neighboring Aviano project when that project is developed. Travel using these routes would be circuitous to the regional roadway network. Peak hour intersection volumes for this scenario are presented on **Figure 2**.



- **Cumulative with 2017 Project** – this scenario reflects the cumulative condition as of the preparation of the transportation impact assessment that was used as the basis for the Certified EIR, with the addition of project traffic assuming two-lane cross sections on Hillcrest Avenue and Heidorn Ranch Road. A four-lane cross section is assumed on Sand Creek Road because the cumulative traffic forecasts include traffic from the development of parcels on the south side of Sand Creek which would be conditioned to construct the remaining two lanes of Sand Creek Road between Hillcrest Avenue and Heidorn Ranch Road. Peak hour intersection volumes for this scenario are presented on **Figure 3**.

This analysis also evaluates whether the 2017 project proposes construction of the third and fourth lanes of Sand Creek Road in time to accommodate projected traffic volumes. To evaluate this issue, Fehr & Peers assessed three hypothetical development scenarios that assume (contrary to the 2017 project) a two-lane Sand Creek Road. These hypothetical scenarios were evaluated to determine which, if any, would theoretically cause significant impacts. So long as the third and fourth lanes of Sand Creek Road are required before the scenario that could cause such impacts could be achieved, the impacts would be avoided and would never occur.

Three hypothetical scenarios developed through an iterative process based on Cumulative traffic forecasts from the 2015 TIA as well as a model run of the CCTA model that reflected this condition. These three hypothetical scenarios reflect conditions with Hillcrest Avenue, Heidorn Ranch Road and Sand Creek Road constructed as two-lane facilities along the project frontage, plus left-turn pockets at intersections. The lane configuration and traffic controls assumed in the analysis are shown on the referenced volume-figure graphics noted below. The three scenarios pivot from the 2015 TIA cumulative forecasts as follows:

- Hypothetical Scenario A includes all cumulative development evaluated in the 2015 TIA (**Figure 4**). As explained in detail below, this hypothetical scenario would result in some traffic diverting from Sand Creek Road on to Lone Tree Way, and that traffic shift is reflected in the analysis..
- Hypothetical Scenario B assumes that no development occurs south of Sand Creek Road that would use the Hillcrest Avenue extension (**Figure 5**), and as such, that traffic is not added to the roadway network.
- Hypothetical Scenario C reflects 20 percent less traffic generated by from development within the Sand Creek Focus Area (**Figure 6**).



For comparison purposes, the 2016 project Cumulative without and with project peak hour traffic volumes are shown on **Figures 7** and **8**.

ANALYSIS RESULTS

Operations of the study intersections were evaluated for the scenarios noted above and presented in **Table 1** for the 2017 project under existing, near-term and cumulative conditions. Level of service worksheets are attached. As shown in Table 1, the four intersections evaluated with the 2017 Project would operate within the City of Antioch level of service standards. Intersection operations results would remain unchanged from the 2015 TIA at the other study intersections as the traffic volumes and lane configurations remain unchanged from the 2015 TIA.

As discussed above, several hypothetical cumulative scenarios were evaluated with the results presented in **Table 2** and further described below.



TABLE 1
2017 PROJECT ANALYSIS
EXISTING, NEAR-TERM AND CUMULATIVE SCENARIOS

Intersection	Peak Hour	Existing with Project		Near-Term with Project		Cumulative with Project	
		Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS
4. Project Entrance/ Hillcrest Avenue	AM	8 (9)	A (A)	11 (16)	A (C)	21	C
	PM	8 (9)	A (A)	9 (25)	A (C)	21	C
5. Project Entrance/ Heidorn Ranch Road	AM	7 (10)	A (A)	7 (10)	A (A)	21	C
	PM	4 (10)	A (A)	4 (10)	A (A)	29	C
6. Sand Creek Road/ Hillcrest Avenue	AM	--	--	--	--	22	C
	PM	--	--	--	--	25	C
7. Sand Creek Road/ Heidorn Ranch Road	AM	7	A	7	A	12	B
	PM	7	A	7	A	12	B

Source: Fehr & Peers, 2017.



TABLE 2 INTERSECTION LEVEL OF SERVICE SUMMARY – CUMULATIVE CONDITIONS

Intersection	Peak Hour	EIR Analysis: Cumulative without Project (4-Lanes)		EIR Analysis: Cumulative with 2016 Project (4 lanes)		Hypothetical Scenario A: All Cumulative Growth (2-Lanes)		Hypothetical Scenario B: Cumulative without Hillcrest Avenue Extension South of Sand Creek Road (2-Lanes)		Hypothetical Scenario C Cumulative without 20 percent of Sand Creek Focus Area Growth (2-Lanes)	
		Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS
1. Lone Tree Way/Deer Valley Road	AM	48	D	49	D	56	E	50	D	50	D
	PM	50	D	51	D	58	E	51	D	51	D
2. Lone Tree Way/ Hillcrest Avenue	AM	41	D	44	D	57	E	55	D	55	D
	PM	40	D	43	D	47	D	48	D	46	D
3. Lone Tree Way/Heidorn Ranch Road	AM	7	A	9	A	10	A	9	A	10	A
	PM	8	A	12	B	16	B	12	B	12	B
4. Project Entrance/ Hillcrest Avenue	AM	9	A	19	B	21	C	20	B	21	C
	PM	10	A	20	B	21	C	21	C	21	C
5. Project Entrance/ Heidorn Ranch Road	AM	11	B	20	B	21	C	21	C	21	C
	PM	11	B	21	C	29	C	29	C	29	C
6. Sand Creek Road/ Hillcrest Avenue	AM	20	B	22	C	30	C	17	B	32	C
	PM	19	B	25	C	52	D	36	D	55	D
7. Sand Creek Road/ Heidorn Ranch Road	AM	9	A	12	B	18	B	20	B	18	B
	PM	12	B	12	B	42	D	90/32¹	E/C	32	D
8. Sand Creek Road/EB SR- 4 Ramps ³	AM	36	D	38	D	23	C	23	C	23	C
	PM	77	E	93/23²	F/C	36	D	57/20²	E/B	36	D
9. Sand Creek Road/WB SR-4 Ramps ³	AM	26	C	28	C	22	C	23	C	23	C
	PM	28	C	31	C	23	C	26	C	26	C

Bold indicates that the level of service *potentially* exceeds City Standards. The EIR analysis columns 2 reflect results from EIR

1. Reflects conditions without mitigation / conditions with mitigation. The mitigation consists of a westbound right-turn-only lane from Sand Creek Road to Heidorn Ranch Road.
 2. Reflects conditions without mitigation / conditions with mitigation. The mitigation consists of payment of fees to ECCRFFA to fund the construction of regional improvements at this location.
 3. At the time the EIR analysis was completed, the Sand Creek Road interchange was under construction and its configuration was uncertain. Updated analysis reflects configuration as of June 2017.
- Source: Fehr & Peers, 2017



HYPOTHETICAL SCENARIO A – TWO-LANE SAND CREEK ROAD PLUS ALL CUMULATIVE DEVELOPMENT

This scenario assumes that all cumulative development and the resulting vehicle traffic included in the 2015 TIA would occur, but (contrary to the 2017 project proposal to require the southern developer to construct the additional lanes) no other development would contribute towards improvements along the Sand Creek Road project frontage, leaving only the two-lane configuration. (See **Figure 4**).

Under this scenario, the analysis shows that Hillcrest Avenue and Heidorn Ranch Road intersections with Sand Creek Road would theoretically operate at deficient levels of service during the weekday evening peak hour, resulting in the potential for traffic diversion to routes that are less congested. The CCTA 2040 Travel Demand Model was used to estimate the amount of traffic that would divert to parallel routes.

The travel model indicates that reducing the capacity of Sand Creek Road (assumed from Deer Valley to the existing Sand Creek Road) to two lanes would result in a 20 percent reduction in traffic volumes on Sand Creek Road as compared with the four-lane scenario, with traffic volumes on parallel routes increasing proportionately. For the evaluation, background traffic volumes on Sand Creek Road were decreased by 20 percent, with a proportionate amount of traffic added to through movements on Lone Tree Way and some turning movements at the intersections of Deer Valley, Hillcrest Avenue, and Heidorn Ranch Road. Project trips were then added to the resulting traffic forecasts and intersection operations evaluated.

Results of the analysis indicate that under this hypothetical scenario, the intersections of Lone Tree Way with Deer Valley Road and Hillcrest Avenue would degrade to unacceptable service levels. These cumulative deficiencies would occur as a result of the traffic diversion caused by the two-lane configuration of Sand Creek Road. The two-lane configurations of Hillcrest Avenue and Heidorn Ranch Road would not contribute towards any new impacts.

Additionally, operations of the Sand Creek Road and the Eastbound SR-4 ramps would improve during the PM peak hour to acceptable levels. All other intersections would operate acceptably.



HYPOTHETICAL SCENARIO B – TWO-LANE SAND CREEK ROAD WITH NO HILLCREST AVENUE EXTENSION SOUTH OF SAND CREEK ROAD

This scenario is based on the Cumulative forecasts presented in the Environmental Impact Report, but eliminates traffic expected from potential land use development south of Sand Creek Road served by the Hillcrest Avenue extension. This traffic was removed assuming that the Hillcrest Avenue extension would only be constructed to serve development in that area, and if the roadway was not constructed, there would be less traffic growth on the roadway system. Hypothetical Scenario B retains all development of the Sand Creek Focus Area. (See **Figure 5**.)

Under this scenario, a westbound right-turn-only lane would need to be provided at the Sand Creek Road/Heidorn Ranch Road intersection to accommodate traffic flows. All study intersections except for the Sand Creek Road at Eastbound SR-4 Ramp terminal intersection would operate at acceptable service levels. The mitigation measure at the Sand Creek Road and Eastbound SR-4 Ramp terminal intersection imposed in the 2016 approvals, consisting of payment of traffic impact fees to the ECCRFFA, would be required to mitigate this impact. The secondary impacts caused by Hypothetical Scenario A at the Lone Tree Way intersections, would not occur. All other intersections would operate acceptably.

HYPOTHETICAL SCENARIO C - TWO-LANE SAND CREEK ROAD, PLUS CUMULATIVE DEVELOPMENT LESS 20% OF THE DEVELOPMENT IN SAND CREEK FOCUS AREA

This variant incorporates the same assumptions as Hypothetical Scenario B, but eliminates 20 percent of the growth forecasted in the Sand Creek Focus Area. Hypothetical Scenario C retains the extension of Hillcrest Avenue south of Sand Creek Road. (See **Figure 6**.)

With approximately 20 percent less growth along the Sand Creek Road corridor than included in the cumulative forecasts, but considering the Hillcrest Avenue extension to the south of Sand Creek Road, the intersections of Hillcrest Avenue and Heidorn Ranch Road with Sand Creek Road, Deer Valley Road and Lone Tree Way would operate at LOS D or better during the weekday evening peak hour. Additionally, operations of the Sand Creek Road and the Eastbound SR-4 ramps would improve during the PM peak hour to acceptable levels. The secondary impacts caused by Hypothetical Scenario A at the Lone Tree Way intersections would not occur. All other intersections would operate acceptably.



In summary, the third and fourth lanes are not needed when there is no extension of Hillcrest south of Sand Creek Road (Hypothetical Scenario B). Likewise, the third and fourth lanes are not needed until more than 80 percent of the Sand Creek Focus area is built out (Hypothetical Scenario C). It is only if both those events have occurred, *and* Sand Creek Road has not been expanded to four lanes (as posited in hypothetical Scenario A), that an impact would result.

FAIR SHARE ANALYSIS

Based on the results of this analysis, two-lane configurations of Heidorn Ranch Road, Hillcrest Avenue, and Sand Creek road would serve the 2017 project and near-term development. Long-term, cumulative development generates the need for the third and fourth lanes of Sand Creek Road. Although other development triggers the need for the third and fourth lanes on Sand Creek Road, the project does contribute to the overall travel cumulative travel demand along the corridor as shown in **Table 3**. Project related traffic on Sand Creek Road in the project vicinity ranges between 4 percent and 14 percent depending on the time of day and roadway segment, with project traffic, on average, comprising approximately 7 percent of the total cumulative volume.

TABLE 3
FAIRSHARE CALCULATIONS – SAND CREEK ROAD

Location	Peak Hour	Project Traffic	Projected Growth	Total Traffic	Project Percent of Growth
Sand Creek Road east of Heidorn Ranch Road	AM	224	1,370	1,565	14%
	PM	300	2,640	2,900	10%
Sand Creek Road between Heidorn Ranch Road and Hillcrest Avenue	AM	80	1,160	1,160	6%
	PM	114	2,560	2,560	4%
Sand Creek Road, west of Hillcrest Avenue	AM	69	1,220	1,244	5%
	PM	92	2,460	2,493	4%

Source: Fehr & Peers, 2017.



SUMMARY OF FINDINGS AND RECOMMENDATIONS

Results of the assessment indicate that the 2017 project would not change the overall conclusions of the Certified Environmental Impact Report for the project. The two-lane configurations of Heidorn Ranch Road, Hillcrest Avenue, and Sand Creek Road are adequate to accommodate traffic from the project and near-term development. The assessment also demonstrates that, so long as the third and fourth lanes of Sand Creek Road are constructed prior to the occurrence of both (a) constructing of an extension of Hillcrest Avenue south of Sand Creek Road and (b) development of more than 80 percent of the Sand Creek Focus Area, Sand Creek Road at a two-lane facility would be adequate to accommodate forecasted cumulative traffic.

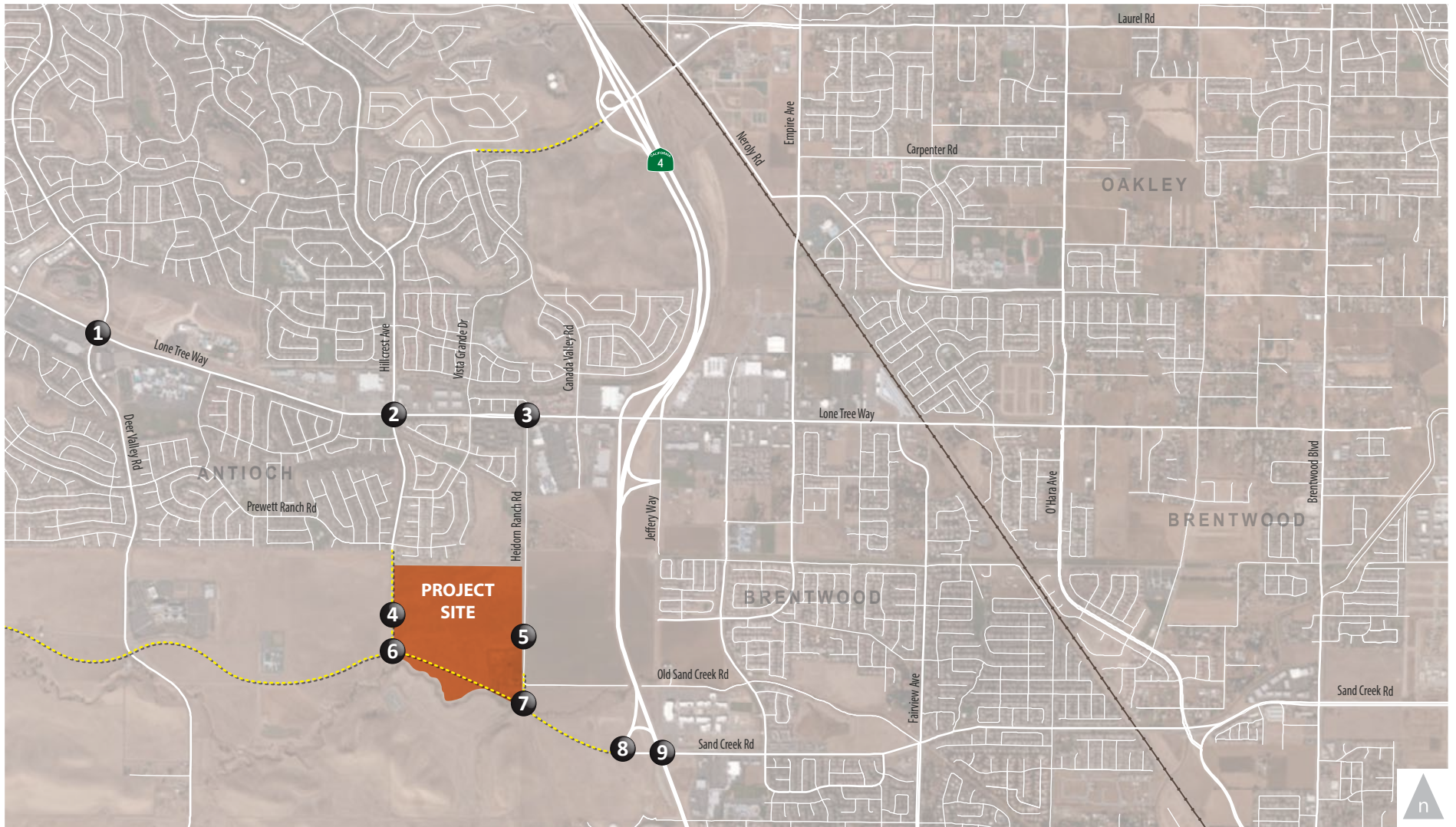
The 2017 project includes construction of the third and fourth lanes prior to the earlier of (a) the opening of an extension of Hillcrest Avenue south of Sand Creek Road constructed by the developer of the property immediately south of the Vineyards; or (b) issuance of 25th building permit and first certificate of occupancy for any new residences on that southern property. It accordingly ensures the third and fourth lanes will be constructed before they are needed.

This completes our transportation assessment for the 2017 project for the Vineyards at Sand Creek. Please call Kathrin at (925) 930-7100 with questions.

Attachments:

- Figure 1 Project Site Vicinity
- Figure 2 Existing and Near-term with 2017 Project Peak Hour Traffic Volumes
- Figure 3 Cumulative with 2017 Project Peak Hour Traffic Volumes
- Figure 4 Hypothetical Scenario A: Cumulative With 2017 Project (Two Lanes); Cumulative Modified to Consider Traffic Shifts
- Figure 5 Hypothetical Scenario B: Cumulative With 2017 Project (Two Lane); Cumulative Modified to Exclude Hillcrest Avenue Extension South of Sand Creek
- Figure 6 Hypothetical Scenario C: Cumulative With 2017 Project (two lanes); Cumulative Modified to Exclude 20 Percent of Sand Creek Focus Area Growth
- Figure 7 Cumulative Without 2016 Project (Four Lanes); No Roadway or Forecast Modifications From 2015 TIA/EIR
- Figure 7 Cumulative With 2016 Project (Four Lanes); No Roadway or Forecast Modifications From 2015 TIA/EIR

Level of Service Calculations



LEGEND

- # Study Intersection
- Future Roadway Extension



Figure 1



LEGEND

XX (YY) AM (PM) Peak Hour Traffic Volumes

Study Intersection Future Roadway Extension



WC17-3385_2_Vol-Ex+NT-2017

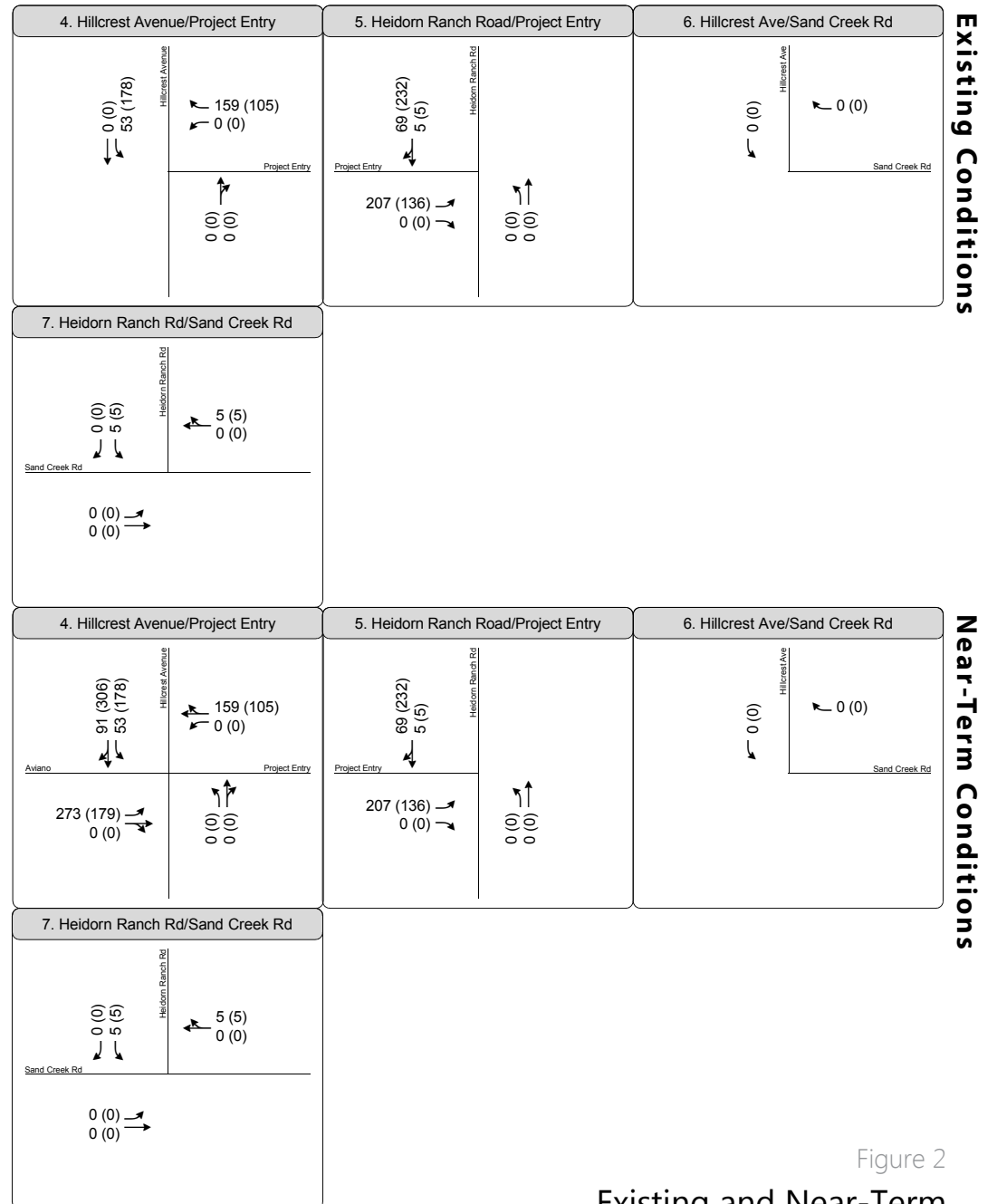
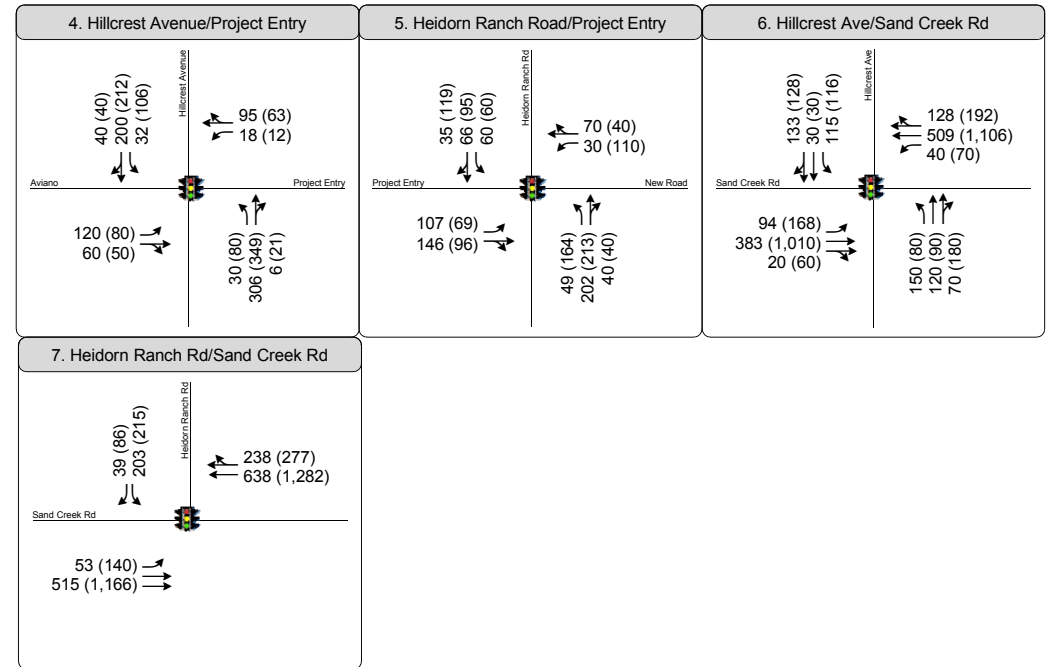


Figure 2
Existing and Near-Term
2017 Project Conditions



Cumulative Conditions

LEGEND

XX (YY) AM (PM) Peak Hour Traffic Volumes



Signalized Intersection



Stop Sign



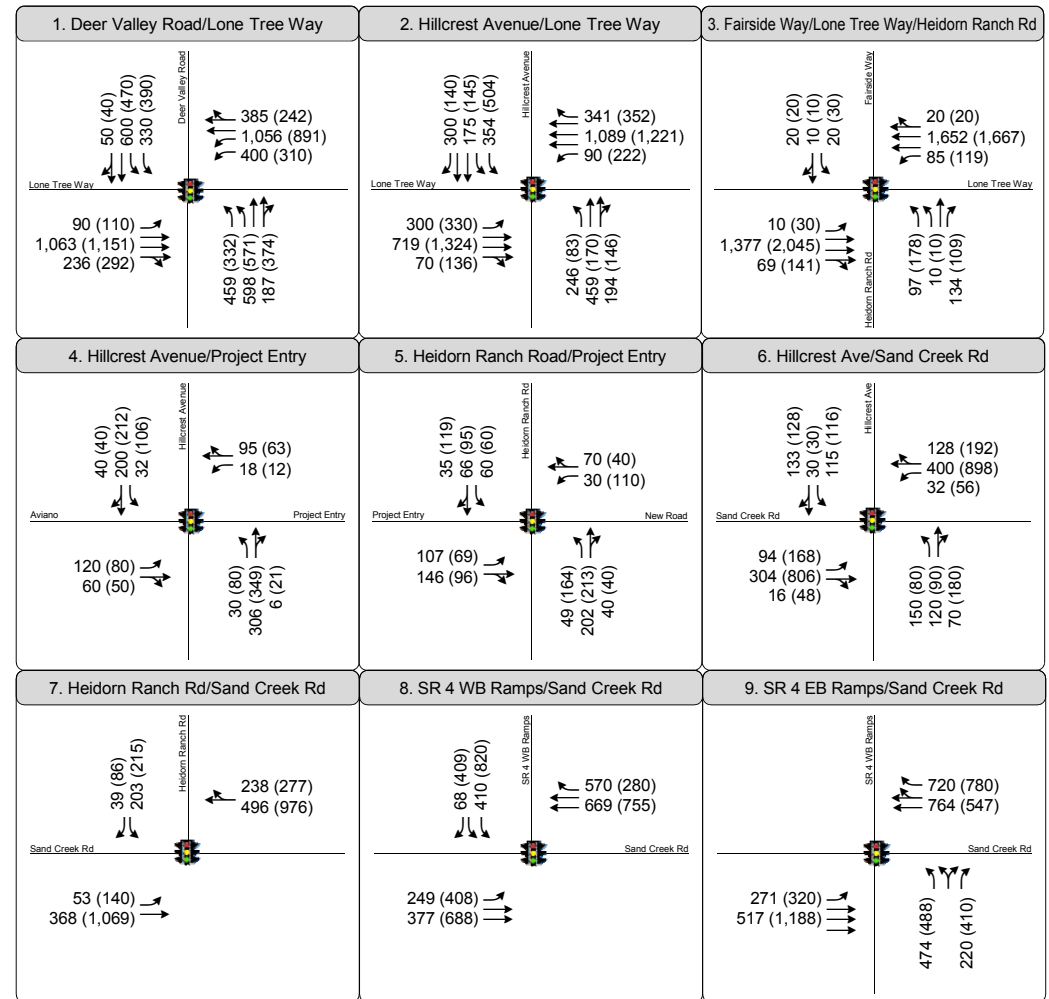
Study Intersection



Future Roadway Extension



Figure 3
Cumulative
2017 Project Conditions



LEGEND

XX (YY) AM (PM) Peak Hour Traffic Volumes Signalized Intersection Stop Sign

Study Intersection Future Roadway Extension



Figure 4
Hypothetical Cumulative Scenario A: Cumulative with 2017 Project Peak Hour (Two Lanes); Same Assumptions as 2015 TIA



1. Deer Valley Road/Lone Tree Way 	2. Hillcrest Avenue/Lone Tree Way 	3. Fairside Way/Lone Tree Way/Heidorn Ranch Rd
4. Hillcrest Avenue/Project Entry 	5. Heidorn Ranch Road/Project Entry 	6. Hillcrest Ave/Sand Creek Rd
7. Heidorn Ranch Rd/Sand Creek Rd 	8. SR 4 WB Ramps/Sand Creek Rd 	9. SR 4 EB Ramps/Sand Creek Rd

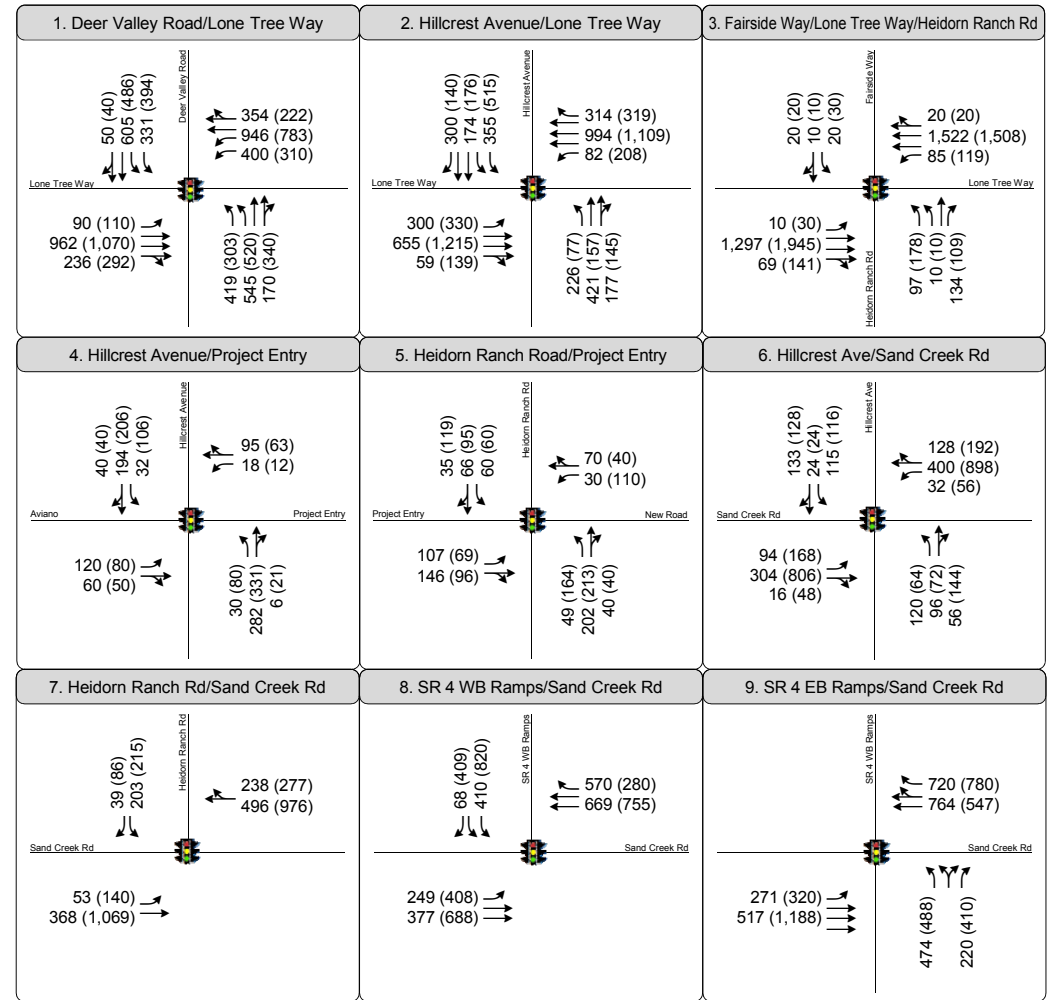
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XX (YY) AM (PM) Peak Hour Traffic Volumes Signalized Intersection Stop Sign

Study Intersection Future Roadway Extension



Figure 5
Hypothetical Cumulative Scenario B: Cumulative with 2017 Project Peak Hour (Two Lanes); without Hillcrest Avenue Extension South of Sand Creek



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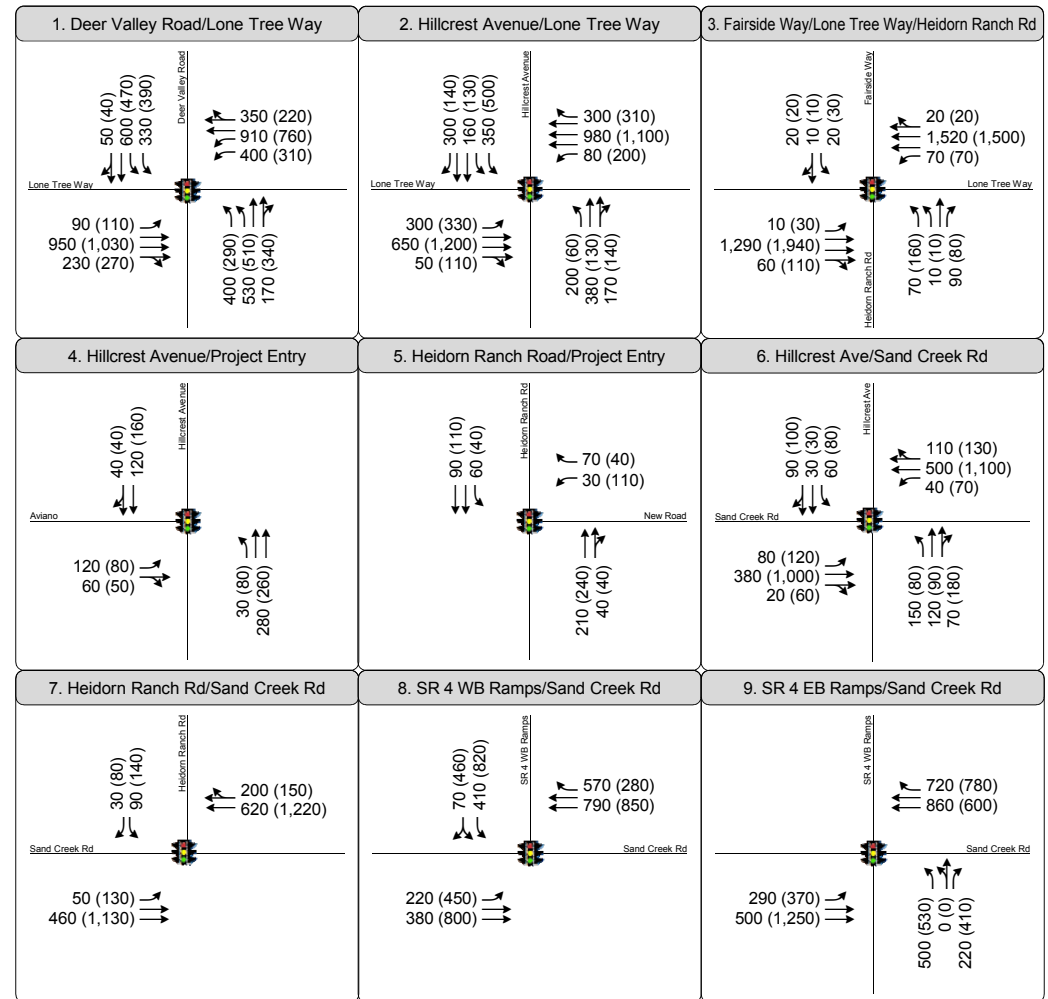
XX (YY) AM (PM) Peak Hour Traffic Volumes Signalized Intersection Stop Sign

Proposed Study Intersection Proposed Roadway Extension



Figure 6

Hypothetical Cumulative Scenario C: Cumulative with 2017 Project Peak Hour (Two Lanes); without 20 Percent of Sand Creek Focus Area Growth



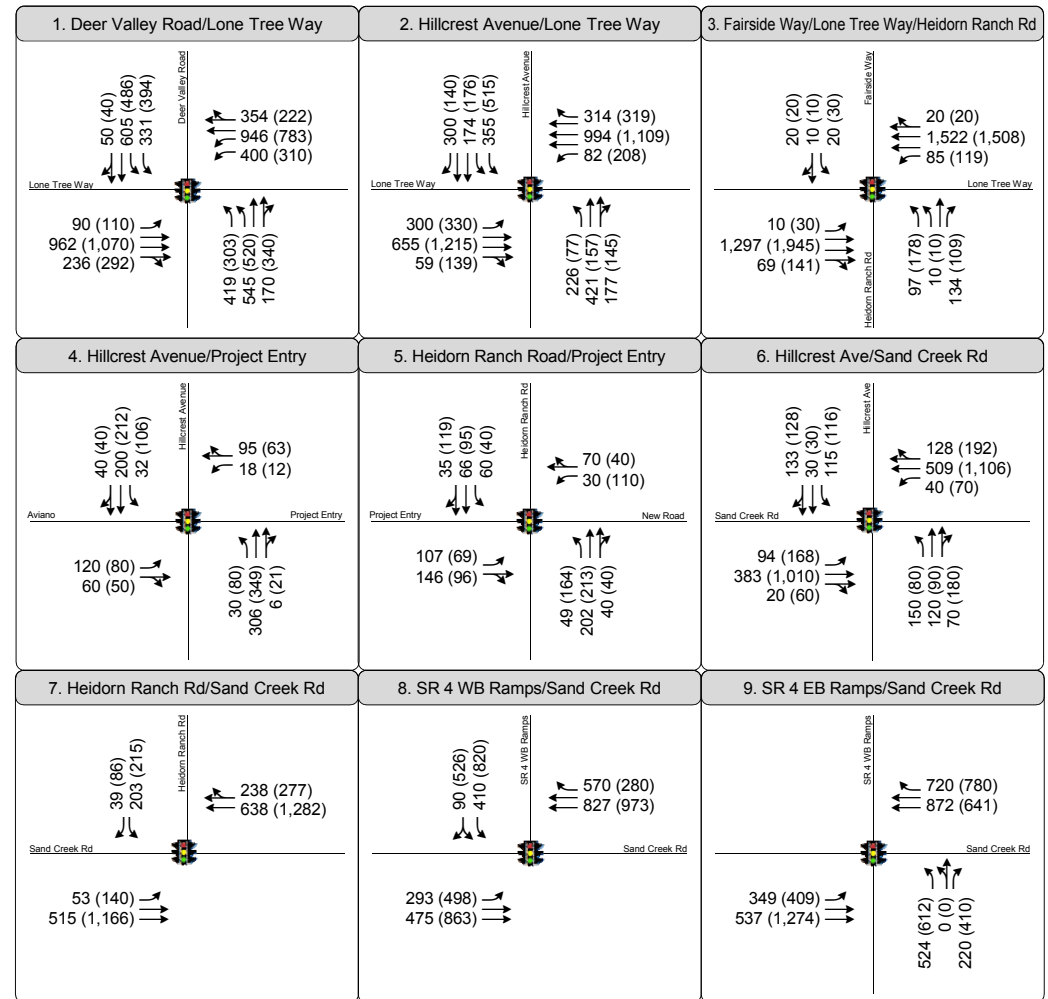
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XX (YY) AM (PM) Peak Hour Traffic Volumes Signalized Intersection Stop Sign

Study Intersection Future Roadway Extension



Figure 7
Cumulative without 2016 Project
Peak Hour (Four Lanes); No Roadway or Forecast Modifications from 2015 TIA



LEGEND

XX (YY) AM (PM) Peak Hour Traffic Volumes Signalized Intersection Stop Sign

Study Intersection Future Roadway Extension



Figure 8
Cumulative with 2016 Project
Peak Hour (Four Lanes); No Roadway or Forecast Modifications from 2015 TIA



Level of Service Worksheets – Existing with 2017 Project

Intersection

Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBU	SBL	SBR
Lane Configurations									
Traffic Vol, veh/h	0	0	0	0	0	5	0	5	0
Future Vol, veh/h	0	0	0	0	0	5	0	5	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	5	0	5	0
Number of Lanes	0	1	1	0	1	0	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	0	6.8	7.8
HCM LOS	-	A	A

Lane	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	0%	0%	100%	0%
Vol Thru, %	100%	100%	0%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	0	5	5	0
LT Vol	0	0	0	5	0
Through Vol	0	0	0	0	0
RT Vol	0	0	5	0	0
Lane Flow Rate	0	0	5	5	0
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0	0	0.005	0.007	0
Departure Headway (Hd)	4.544	4.544	3.742	5.042	4.542
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	0	0	961	714	0
Service Time	2.251	2.251	1.748	2.744	2.244
HCM Lane V/C Ratio	0	0	0.005	0.007	0
HCM Control Delay	7.3	7.3	6.8	7.8	7.2
HCM Lane LOS	N	N	A	A	N
HCM 95th-tile Q	0	0	0	0	0

Intersection						
Int Delay, s/veh	8.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	159	0	6	53	0
Future Vol, veh/h	0	159	0	6	53	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	0	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	159	0	6	53	0
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	109	3	0	0	6	0
Stage 1	3	-	-	-	-	-
Stage 2	106	-	-	-	-	-
Critical Hdwy	7.12	6.22	-	-	4.12	-
Critical Hdwy Stg 1	6.12	-	-	-	-	-
Critical Hdwy Stg 2	6.12	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	870	1081	-	-	1615	-
Stage 1	1020	-	-	-	-	-
Stage 2	900	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	848	1081	-	-	1615	-
Mov Cap-2 Maneuver	848	-	-	-	-	-
Stage 1	1020	-	-	-	-	-
Stage 2	870	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	8.9		0		7.3	
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 1081	1615	-		
HCM Lane V/C Ratio	-	- 0.147	0.033	-		
HCM Control Delay (s)	-	- 8.9	7.3	-		
HCM Lane LOS	-	- A	A	-		
HCM 95th %tile Q(veh)	-	- 0.5	0.1	-		

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Intersection							
Int Delay, s/veh	7						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Vol, veh/h	207	0	0	5	5	69	
Future Vol, veh/h	207	0	0	5	5	69	
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	0	300	-	-	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	100	100	100	100	100	100	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	207	0	0	5	5	69	
Major/Minor	Minor2	Major1		Major2			
Conflicting Flow All	45	40	74	0	-	0	
Stage 1	40	-	-	-	-	-	
Stage 2	5	-	-	-	-	-	
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	965	1031	1526	-	-	-	
Stage 1	982	-	-	-	-	-	
Stage 2	1018	-	-	-	-	-	
Platoon blocked, %				-	-	-	
Mov Cap-1 Maneuver	965	1031	1526	-	-	-	
Mov Cap-2 Maneuver	965	-	-	-	-	-	
Stage 1	982	-	-	-	-	-	
Stage 2	1018	-	-	-	-	-	
Approach	EB	NB		SB			
HCM Control Delay, s	9.7	0		0			
HCM LOS	A						
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR	
Capacity (veh/h)	1526	-	965	-	-	-	
HCM Lane V/C Ratio	-	-	0.215	-	-	-	
HCM Control Delay (s)	0	-	9.7	0	-	-	
HCM Lane LOS	A	-	A	A	-	-	
HCM 95th %tile Q(veh)	0	-	0.8	-	-	-	

Intersection

Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBU	SBL	SBR
Lane Configurations									
Traffic Vol, veh/h	0	0	0	0	0	5	0	5	0
Future Vol, veh/h	0	0	0	0	0	5	0	5	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	5	0	5	0
Number of Lanes	0	1	1	0	1	0	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	0	6.8	7.8
HCM LOS	-	A	A

Lane	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	0%	0%	100%	0%
Vol Thru, %	100%	100%	0%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	0	5	5	0
LT Vol	0	0	0	5	0
Through Vol	0	0	0	0	0
RT Vol	0	0	5	0	0
Lane Flow Rate	0	0	5	5	0
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0	0	0.005	0.007	0
Departure Headway (Hd)	4.544	4.544	3.742	5.042	4.542
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	0	0	961	714	0
Service Time	2.251	2.251	1.748	2.744	2.244
HCM Lane V/C Ratio	0	0	0.005	0.007	0
HCM Control Delay	7.3	7.3	6.8	7.8	7.2
HCM Lane LOS	N	N	A	A	N
HCM 95th-tile Q	0	0	0	0	0

Intersection						
Int Delay, s/veh	7.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	105	0	6	178	0
Future Vol, veh/h	0	105	0	6	178	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	0	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	105	0	6	178	0
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	359	3	0	0	6	0
Stage 1	3	-	-	-	-	-
Stage 2	356	-	-	-	-	-
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	640	1081	-	-	1615	-
Stage 1	1020	-	-	-	-	-
Stage 2	709	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	569	1081	-	-	1615	-
Mov Cap-2 Maneuver	569	-	-	-	-	-
Stage 1	1020	-	-	-	-	-
Stage 2	631	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	8.7	0		7.5		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 1081	1615	-		
HCM Lane V/C Ratio	-	- 0.097	0.11	-		
HCM Control Delay (s)	-	- 8.7	7.5	-		
HCM Lane LOS	-	- A	A	-		
HCM 95th %tile Q(veh)	-	- 0.3	0.4	-		

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Intersection							
Int Delay, s/veh	3.6						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Vol, veh/h	136	0	0	5	5	232	
Future Vol, veh/h	136	0	0	5	5	232	
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	0	300	-	-	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	100	100	100	100	100	100	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	136	0	0	5	5	232	
Major/Minor	Minor2	Major1		Major2			
Conflicting Flow All	126	121	237	0	-	0	
Stage 1	121	-	-	-	-	-	
Stage 2	5	-	-	-	-	-	
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	869	930	1330	-	-	-	
Stage 1	904	-	-	-	-	-	
Stage 2	1018	-	-	-	-	-	
Platoon blocked, %				-	-	-	
Mov Cap-1 Maneuver	869	930	1330	-	-	-	
Mov Cap-2 Maneuver	869	-	-	-	-	-	
Stage 1	904	-	-	-	-	-	
Stage 2	1018	-	-	-	-	-	
Approach	EB	NB		SB			
HCM Control Delay, s	9.9	0		0			
HCM LOS	A						
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR	
Capacity (veh/h)	1330	-	869	-	-	-	
HCM Lane V/C Ratio	-	-	0.157	-	-	-	
HCM Control Delay (s)	0	-	9.9	0	-	-	
HCM Lane LOS	A	-	A	A	-	-	
HCM 95th %tile Q(veh)	0	-	0.6	-	-	-	



Level of Service Worksheets – Near-term with 2017 Project

Intersection

Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBU	SBL	SBR
Lane Configurations									
Traffic Vol, veh/h	0	0	0	0	0	5	0	5	0
Future Vol, veh/h	0	0	0	0	0	5	0	5	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	5	0	5	0
Number of Lanes	0	1	1	0	1	0	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	0	6.8	7.8
HCM LOS	-	A	A

Lane	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	0%	0%	100%	0%
Vol Thru, %	100%	100%	0%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	0	5	5	0
LT Vol	0	0	0	5	0
Through Vol	0	0	0	0	0
RT Vol	0	0	5	0	0
Lane Flow Rate	0	0	5	5	0
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0	0	0.005	0.007	0
Departure Headway (Hd)	4.544	4.544	3.742	5.042	4.542
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	0	0	961	714	0
Service Time	2.251	2.251	1.748	2.744	2.244
HCM Lane V/C Ratio	0	0	0.005	0.007	0
HCM Control Delay	7.3	7.3	6.8	7.8	7.2
HCM Lane LOS	N	N	A	A	N
HCM 95th-tile Q	0	0	0	0	0

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Intersection												
Int Delay, s/veh	10.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	273	0	0	0	0	159	0	0	6	53	0	91
Future Vol, veh/h	273	0	0	0	0	159	0	0	6	53	0	91
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	0	-	-	0	-	-	300	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	273	0	0	0	0	159	0	0	6	53	0	91

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	235	158	46	155	200	3	91	0	0	6	0	0
Stage 1	152	152	-	3	3	-	-	-	-	-	-	-
Stage 2	83	6	-	152	197	-	-	-	-	-	-	-
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	720	734	1023	812	696	1081	1504	-	-	1615	-	-
Stage 1	850	772	-	1020	893	-	-	-	-	-	-	-
Stage 2	925	891	-	850	738	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	599	710	1023	792	673	1081	1504	-	-	1615	-	-
Mov Cap-2 Maneuver	599	710	-	792	673	-	-	-	-	-	-	-
Stage 1	850	747	-	1020	893	-	-	-	-	-	-	-
Stage 2	789	891	-	822	714	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.9	8.9	0	2.7
HCM LOS	C	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1504	-	-	599	-	-	1081	1615	-	-
HCM Lane V/C Ratio	-	-	-	0.456	-	-	0.147	0.033	-	-
HCM Control Delay (s)	0	-	-	15.9	0	0	8.9	7.3	-	-
HCM Lane LOS	A	-	-	C	A	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	2.4	-	-	0.5	0.1	-	-

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Intersection							
Int Delay, s/veh	7						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Vol, veh/h	207	0	0	5	5	69	
Future Vol, veh/h	207	0	0	5	5	69	
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	0	300	-	-	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	100	100	100	100	100	100	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	207	0	0	5	5	69	
Major/Minor	Minor2	Major1		Major2			
Conflicting Flow All	45	40	74	0	-	0	
Stage 1	40	-	-	-	-	-	
Stage 2	5	-	-	-	-	-	
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	965	1031	1526	-	-	-	
Stage 1	982	-	-	-	-	-	
Stage 2	1018	-	-	-	-	-	
Platoon blocked, %				-	-	-	
Mov Cap-1 Maneuver	965	1031	1526	-	-	-	
Mov Cap-2 Maneuver	965	-	-	-	-	-	
Stage 1	982	-	-	-	-	-	
Stage 2	1018	-	-	-	-	-	
Approach	EB	NB		SB			
HCM Control Delay, s	9.7	0		0			
HCM LOS	A						
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR	
Capacity (veh/h)	1526	-	965	-	-	-	
HCM Lane V/C Ratio	-	-	0.215	-	-	-	
HCM Control Delay (s)	0	-	9.7	0	-	-	
HCM Lane LOS	A	-	A	A	-	-	
HCM 95th %tile Q(veh)	0	-	0.8	-	-	-	

Intersection

Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBU	SBL	SBR
Lane Configurations									
Traffic Vol, veh/h	0	0	0	0	0	5	0	5	0
Future Vol, veh/h	0	0	0	0	0	5	0	5	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	5	0	5	0
Number of Lanes	0	1	1	0	1	0	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	0	6.8	7.8
HCM LOS	-	A	A

Lane	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	0%	0%	100%	0%
Vol Thru, %	100%	100%	0%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	0	5	5	0
LT Vol	0	0	0	5	0
Through Vol	0	0	0	0	0
RT Vol	0	0	5	0	0
Lane Flow Rate	0	0	5	5	0
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0	0	0.005	0.007	0
Departure Headway (Hd)	4.544	4.544	3.742	5.042	4.542
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	0	0	961	714	0
Service Time	2.251	2.251	1.748	2.744	2.244
HCM Lane V/C Ratio	0	0	0.005	0.007	0
HCM Control Delay	7.3	7.3	6.8	7.8	7.2
HCM Lane LOS	N	N	A	A	N
HCM 95th-tile Q	0	0	0	0	0

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Intersection

Int Delay, s/veh 8.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	179	0	0	0	0	105	0	0	6	178	0	306
Future Vol, veh/h	179	0	0	0	0	105	0	0	6	178	0	306
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	0	-	-	0	-	-	300	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	179	0	0	0	0	105	0	0	6	178	0	306

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	565	515	153	512	665	3	306	0	0	6	0	0
Stage 1	509	509	-	3	3	-	-	-	-	-	-	-
Stage 2	56	6	-	509	662	-	-	-	-	-	-	-
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	436	464	893	472	381	1081	1255	-	-	1615	-	-
Stage 1	547	538	-	1020	893	-	-	-	-	-	-	-
Stage 2	956	891	-	547	459	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	360	413	893	432	339	1081	1255	-	-	1615	-	-
Mov Cap-2 Maneuver	360	413	-	432	339	-	-	-	-	-	-	-
Stage 1	547	479	-	1020	893	-	-	-	-	-	-	-
Stage 2	863	891	-	487	408	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.5	8.7	0	2.8
HCM LOS	C	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1255	-	-	360	-	-	1081	1615	-	-
HCM Lane V/C Ratio	-	-	-	0.497	-	-	0.097	0.11	-	-
HCM Control Delay (s)	0	-	-	24.5	0	0	8.7	7.5	-	-
HCM Lane LOS	A	-	-	C	A	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	2.7	-	-	0.3	0.4	-	-

HCM 2010 TWSC
12: Heidorn Ranch Rd & Project Access

2017 Proejct
Near-Term With Proejct PM Peak Hour

Intersection							
Int Delay, s/veh	3.6						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Vol, veh/h	136	0	0	5	5	232	
Future Vol, veh/h	136	0	0	5	5	232	
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	0	300	-	-	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	100	100	100	100	100	100	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	136	0	0	5	5	232	
Major/Minor	Minor2	Major1		Major2			
Conflicting Flow All	126	121	237	0	-	0	
Stage 1	121	-	-	-	-	-	
Stage 2	5	-	-	-	-	-	
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	869	930	1330	-	-	-	
Stage 1	904	-	-	-	-	-	
Stage 2	1018	-	-	-	-	-	
Platoon blocked, %				-	-	-	
Mov Cap-1 Maneuver	869	930	1330	-	-	-	
Mov Cap-2 Maneuver	869	-	-	-	-	-	
Stage 1	904	-	-	-	-	-	
Stage 2	1018	-	-	-	-	-	
Approach	EB	NB		SB			
HCM Control Delay, s	9.9	0		0			
HCM LOS	A						
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR	
Capacity (veh/h)	1330	-	869	-	-	-	
HCM Lane V/C Ratio	-	-	0.157	-	-	-	
HCM Control Delay (s)	0	-	9.9	0	-	-	
HCM Lane LOS	A	-	A	A	-	-	
HCM 95th %tile Q(veh)	0	-	0.6	-	-	-	



Level of Service Worksheets – Cumulative Scenarios

HCM 2010 Signalized Intersection Summary

1: Deer Valley Road & Lone Tree Way

Cumulative AM Without Project
1/20/2015

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	950	230	400	910	350	400	530	170	330	600	50
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0
Adj Flow Rate, veh/h	90	950	230	400	910	350	400	530	170	330	600	50
Adj No. of Lanes	1	3	0	2	2	0	2	2	0	2	2	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	111	1483	358	458	1085	415	450	607	194	376	690	57
Arrive On Green	0.06	0.73	0.73	0.13	0.87	0.87	0.13	0.23	0.23	0.11	0.21	0.21
Sat Flow, veh/h	1774	4091	988	3442	2505	958	3442	2640	843	3442	3308	275
Grp Volume(v), veh/h	90	787	393	400	641	619	400	354	346	330	320	330
Grp Sat Flow(s),veh/h/ln	1774	1695	1688	1721	1770	1694	1721	1770	1714	1721	1770	1814
Q Serve(g_s), s	7.3	17.3	17.4	16.6	25.6	26.3	16.6	28.0	28.3	13.7	25.4	25.5
Cycle Q Clear(g_c), s	7.3	17.3	17.4	16.6	25.6	26.3	16.6	28.0	28.3	13.7	25.4	25.5
Prop In Lane	1.00		0.58	1.00		0.57	1.00		0.49	1.00		0.15
Lane Grp Cap(c), veh/h	111	1229	612	458	767	734	450	407	394	376	369	378
V/C Ratio(X)	0.81	0.64	0.64	0.87	0.84	0.84	0.89	0.87	0.88	0.88	0.87	0.87
Avail Cap(c_a), veh/h	134	1229	612	592	767	734	497	426	413	402	377	387
HCM Platoon Ratio	1.00	2.00	2.00	1.00	2.00	2.00	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	67.3	15.1	15.1	61.8	7.2	7.3	62.2	53.9	54.0	63.8	55.6	55.6
Incr Delay (d2), s/veh	26.2	2.6	5.1	11.1	10.5	11.4	16.7	17.0	18.2	18.4	18.7	18.6
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	4.4	8.4	8.8	8.6	13.7	13.7	9.0	15.6	15.4	7.5	14.4	14.8
LnGrp Delay(d),s/veh	93.5	17.7	20.3	72.9	17.7	18.6	78.9	70.9	72.2	82.1	74.3	74.3
LnGrp LOS	F	B	C	E	B	B	E	E	E	F	E	E
Approach Vol, veh/h	1270		1660				1100				980	
Approach Delay, s/veh	23.9		31.4				74.2				76.9	
Approach LOS	C		C				E				E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	21.9	39.4	25.4	63.3	25.0	36.3	15.1	73.6				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	17.0	35.0	25.0	49.0	21.0	31.0	11.0	63.0				
Max Q Clear Time (g_c+l1), s	15.7	30.3	18.6	19.4	18.6	27.5	9.3	28.3				
Green Ext Time (p_c), s	0.2	3.2	0.8	19.9	0.4	2.4	0.0	22.1				
Intersection Summary												
HCM 2010 Ctrl Delay	47.8											
HCM 2010 LOS	D											

HCM 2010 Signalized Intersection Summary

2: Hillcrest Avenue & Lone Tree Way

Cumulative AM Without Project
12/9/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	300	650	50	80	980	300	200	380	170	350	160	300
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	186.3	186.3	190.0	186.3	186.3	186.3	186.3	186.3	190.0	186.3	186.3	186.3
Adj Flow Rate, veh/h	300	650	50	80	980	300	200	380	170	350	160	300
Adj No. of Lanes	1	3	0	1	3	1	1	2	0	2	2	1
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	335	1909	146	101	1345	419	233	513	226	424	731	327
Arrive On Green	0.19	0.40	0.40	0.11	0.53	0.53	0.13	0.21	0.21	0.12	0.21	0.21
Sat Flow, veh/h	1774	4820	368	1774	5085	1583	1774	2391	1055	3442	3539	1583
Grp Volume(v), veh/h	300	456	244	80	980	300	200	280	270	350	160	300
Grp Sat Flow(s),veh/h/ln	1774	1695	1798	1774	1695	1583	1774	1770	1677	1721	1770	1583
Q Serve(g_s), s	19.0	10.8	10.9	5.0	17.0	16.5	12.7	16.9	17.3	11.4	4.3	21.3
Cycle Q Clear(g_c), s	19.0	10.8	10.9	5.0	17.0	16.5	12.7	16.9	17.3	11.4	4.3	21.3
Prop In Lane	1.00		0.20	1.00		1.00	1.00		0.63	1.00		1.00
Lane Grp Cap(c), veh/h	335	1343	712	101	1345	419	233	380	360	424	731	327
V/C Ratio(X)	0.90	0.34	0.34	0.79	0.73	0.72	0.86	0.74	0.75	0.82	0.22	0.92
Avail Cap(c_a), veh/h	541	1772	940	201	1683	524	448	493	467	630	740	331
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.93	0.93	0.93	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.5	24.2	24.2	50.2	23.9	23.8	48.8	42.1	42.2	49.1	37.9	44.6
Incr Delay (d2), s/veh	11.3	0.7	1.3	11.9	3.2	9.4	8.9	4.1	4.9	5.7	0.1	29.3
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	10.3	5.2	5.7	2.8	8.1	8.1	6.8	8.7	8.5	5.7	2.1	12.0
LnGrp Delay(d),s/veh	56.7	24.9	25.5	62.1	27.1	33.2	57.7	46.2	47.1	54.8	38.0	73.9
LnGrp LOS	E	C	C	E	C	C	E	D	D	D	D	E
Approach Vol, veh/h		1000			1360			750			810	
Approach Delay, s/veh		34.6			30.5			49.6			58.5	
Approach LOS		C			C			D			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.2	30.6	12.6	86.7	21.1	29.7	27.7	71.6				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	21.0	32.0	13.0	60.0	29.0	24.0	35.0	38.0				
Max Q Clear Time (g_c+l1), s	13.4	19.3	7.0	12.9	14.7	23.3	21.0	19.0				
Green Ext Time (p_c), s	0.8	4.3	0.1	17.5	0.4	0.4	0.7	11.4				
Intersection Summary												
HCM 2010 Ctrl Delay			41.0									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary

3: Heidorn Ranch Road/Fairside Way & Lone Tree Way

Cumulative AM Without Project
12/9/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	1290	60	70	1520	20	70	10	90	20	10	20
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	186.3	186.3	186.3	190.0
Adj Flow Rate, veh/h	10	1290	60	70	1520	20	70	10	90	20	10	20
Adj No. of Lanes	1	3	0	1	3	0	2	1	1	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	12	3342	155	89	3696	49	115	138	118	24	30	61
Arrive On Green	0.01	1.00	1.00	0.10	1.00	1.00	0.03	0.07	0.07	0.01	0.05	0.05
Sat Flow, veh/h	1774	4980	232	1774	5173	68	3442	1863	1583	1774	556	1111
Grp Volume(v), veh/h	10	878	472	70	996	544	70	10	90	20	0	30
Grp Sat Flow(s),veh/h/ln	1774	1695	1822	1774	1695	1851	1721	1863	1583	1774	0	1667
Q Serve(g_s), s	0.7	0.0	0.0	4.9	0.0	0.0	2.5	0.6	7.0	1.4	0.0	2.2
Cycle Q Clear(g_c), s	0.7	0.0	0.0	4.9	0.0	0.0	2.5	0.6	7.0	1.4	0.0	2.2
Prop In Lane	1.00		0.13	1.00		0.04	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	12	2275	1223	89	2422	1322	115	138	118	24	0	91
V/C Ratio(X)	0.80	0.39	0.39	0.78	0.41	0.41	0.61	0.07	0.76	0.82	0.00	0.33
Avail Cap(c_a), veh/h	70	2275	1223	296	2422	1322	355	340	289	113	0	238
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.88	0.88	0.88	0.87	0.87	0.87	0.98	0.98	0.98	1.00	0.00	1.00
Uniform Delay (d), s/veh	62.0	0.0	0.0	56.0	0.0	0.0	60.1	54.3	57.2	62.0	0.0	57.3
Incr Delay (d2), s/veh	64.4	0.4	0.8	12.0	0.4	0.8	5.0	0.2	9.7	47.1	0.0	2.1
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(50%),veh/ln	0.6	0.1	0.3	2.7	0.2	0.3	1.3	0.3	3.4	1.0	0.0	1.1
LnGrp Delay(d),s/veh	126.4	0.4	0.8	68.0	0.4	0.8	65.1	54.5	66.9	109.1	0.0	59.4
LnGrp LOS	F	A	A	E	A	A	E	D	E	F		E
Approach Vol, veh/h	1360				1610				170		50	
Approach Delay, s/veh	1.5				3.5				65.4		79.3	
Approach LOS	A				A				E		E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.7	15.4	12.4	114.6	10.2	12.9	6.9	120.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	8.0	23.0	21.0	74.0	13.0	18.0	5.0	90.0				
Max Q Clear Time (g_c+I1), s	3.4	9.0	6.9	2.0	4.5	4.2	2.7	2.0				
Green Ext Time (p_c), s	0.0	0.3	0.1	41.7	0.1	0.3	0.0	46.1				
Intersection Summary												
HCM 2010 Ctrl Delay			7.1									
HCM 2010 LOS			A									

HCM 2010 Signalized Intersection Summary

11: Hillcrest Ave & Project Access

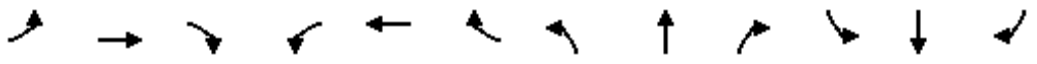
Cumulative AM Without Project

06/19/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	0	60	0	0	0	30	280	0	0	120	40
Future Volume (veh/h)	120	0	60	0	0	0	30	280	0	0	120	40
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	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
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900				1863	1863	1900	0	1863	1900
Adj Flow Rate, veh/h	120	0	60				30	280	0	0	120	40
Adj No. of Lanes	1	1	0				1	2	0	0	2	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2				2	2	2	0	2	2
Cap, veh/h	205	0	183				53	1588	0	0	530	170
Arrive On Green	0.12	0.00	0.12				0.03	0.45	0.00	0.00	0.20	0.20
Sat Flow, veh/h	1774	0	1583				1774	3632	0	0	2730	846
Grp Volume(v), veh/h	120	0	60				30	280	0	0	79	81
Grp Sat Flow(s),veh/h/ln	1774	0	1583				1774	1770	0	0	1770	1713
Q Serve(g_s), s	1.8	0.0	1.0				0.5	1.3	0.0	0.0	1.0	1.1
Cycle Q Clear(g_c), s	1.8	0.0	1.0				0.5	1.3	0.0	0.0	1.0	1.1
Prop In Lane	1.00		1.00				1.00		0.00	0.00		0.49
Lane Grp Cap(c), veh/h	205	0	183				53	1588	0	0	356	344
V/C Ratio(X)	0.59	0.00	0.33				0.57	0.18	0.00	0.00	0.22	0.24
Avail Cap(c_a), veh/h	1031	0	920				451	4113	0	0	1221	1182
HCM Platoon Ratio	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	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	11.6	0.0	11.2				13.2	4.5	0.0	0.0	9.2	9.2
Incr Delay (d2), s/veh	2.6	0.0	1.0				9.2	0.1	0.0	0.0	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.5				0.4	0.6	0.0	0.0	0.5	0.6
LnGrp Delay(d),s/veh	14.2	0.0	12.2				22.4	4.6	0.0	0.0	9.5	9.6
LnGrp LOS	B		B				C	A			A	A
Approach Vol, veh/h		180						310			160	
Approach Delay, s/veh		13.5						6.3			9.5	
Approach LOS		B						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		18.4		9.2	6.8	11.5						
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0						
Max Green Setting (Gmax), s		32.0		16.0	7.0	19.0						
Max Q Clear Time (g_c+I1), s		3.3		3.8	2.5	3.1						
Green Ext Time (p_c), s		2.9		0.5	0.0	2.4						
Intersection Summary												
HCM 2010 Ctrl Delay			9.1									
HCM 2010 LOS			A									

HCM 2010 Signalized Intersection Summary 12: Heidorn Ranch Rd & Project Access

Cumulative AM Without Project
06/19/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	30	0	70	0	210	40	60	90	0
Future Volume (veh/h)	0	0	0	30	0	70	0	210	40	60	90	0
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				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
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1863	1863	1900	0	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h				30	0	70	0	210	40	60	90	0
Adj No. of Lanes				1	1	0	0	2	0	1	2	0
Peak Hour Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %				2	2	2	0	2	2	2	2	2
Cap, veh/h				139	0	124	0	581	109	95	1674	0
Arrive On Green				0.08	0.00	0.08	0.00	0.20	0.20	0.05	0.47	0.00
Sat Flow, veh/h				1774	0	1583	0	3070	557	1774	3632	0
Grp Volume(v), veh/h				30	0	70	0	123	127	60	90	0
Grp Sat Flow(s),veh/h/ln				1774	0	1583	0	1770	1764	1774	1770	0
Q Serve(g_s), s				0.4	0.0	1.1	0.0	1.6	1.7	0.9	0.4	0.0
Cycle Q Clear(g_c), s				0.4	0.0	1.1	0.0	1.6	1.7	0.9	0.4	0.0
Prop In Lane				1.00		1.00	0.00		0.32	1.00		0.00
Lane Grp Cap(c), veh/h				139	0	124	0	345	344	95	1674	0
V/C Ratio(X)				0.22	0.00	0.56	0.00	0.36	0.37	0.63	0.05	0.00
Avail Cap(c_a), veh/h				1061	0	947	0	1058	1055	332	3572	0
HCM Platoon Ratio				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	0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh				11.6	0.0	11.9	0.0	9.3	9.3	12.4	3.8	0.0
Incr Delay (d2), s/veh				0.8	0.0	4.0	0.0	0.6	0.7	6.6	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
%ile BackOfQ(50%),veh/ln				0.2	0.0	0.6	0.0	0.8	0.9	0.6	0.2	0.0
LnGrp Delay(d),s/veh				12.3	0.0	15.9	0.0	9.9	10.0	19.0	3.8	0.0
LnGrp LOS				B		B		A	A	B	A	
Approach Vol, veh/h					100			250			150	
Approach Delay, s/veh					14.8			10.0			9.9	
Approach LOS					B			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	7.4	11.2				18.7		8.1				
Change Period (Y+Rc), s	6.0	6.0				6.0		6.0				
Max Green Setting (Gmax), s	5.0	16.0				27.0		16.0				
Max Q Clear Time (g_c+I1), s	2.9	3.7				2.4		3.1				
Green Ext Time (p_c), s	0.0	1.6				2.0		0.3				
Intersection Summary												
HCM 2010 Ctrl Delay				10.9								
HCM 2010 LOS				B								

HCM 2010 Signalized Intersection Summary
7: Hillcrest Ave & Sand Creek Rd

Cumulative AM Without Project
12/9/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	80	380	20	40	500	110	150	120	70	60	30	90
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0
Adj Flow Rate, veh/h	80	380	20	40	500	110	150	120	70	60	30	90
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	103	1397	73	55	1101	241	192	326	179	112	182	163
Arrive On Green	0.06	0.41	0.41	0.06	0.76	0.76	0.11	0.15	0.15	0.06	0.10	0.10
Sat Flow, veh/h	1774	3421	180	1774	2889	632	1774	2208	1211	1774	1770	1583
Grp Volume(v), veh/h	80	196	204	40	305	305	150	95	95	60	30	90
Grp Sat Flow(s),veh/h/ln	1774	1770	1831	1774	1770	1751	1774	1770	1649	1774	1770	1583
Q Serve(g_s), s	3.1	5.1	5.1	1.5	4.3	4.3	5.7	3.3	3.6	2.2	1.1	3.7
Cycle Q Clear(g_c), s	3.1	5.1	5.1	1.5	4.3	4.3	5.7	3.3	3.6	2.2	1.1	3.7
Prop In Lane	1.00		0.10	1.00		0.36	1.00		0.73	1.00		1.00
Lane Grp Cap(c), veh/h	103	722	748	55	675	668	192	262	244	112	182	163
V/C Ratio(X)	0.78	0.27	0.27	0.72	0.45	0.46	0.78	0.36	0.39	0.54	0.17	0.55
Avail Cap(c_a), veh/h	233	722	748	155	675	668	388	413	385	414	439	392
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.9	13.5	13.5	31.9	5.6	5.6	29.8	26.3	26.4	31.2	28.1	29.3
Incr Delay (d2), s/veh	11.7	0.9	0.9	15.7	2.1	2.1	6.8	0.8	1.0	4.0	0.4	2.9
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(50%),veh/ln	1.8	2.6	2.7	1.0	2.4	2.4	3.1	1.7	1.7	1.2	0.5	1.8
LnGrp Delay(d),s/veh	43.5	14.4	14.4	47.6	7.6	7.7	36.6	27.2	27.5	35.1	28.5	32.2
LnGrp LOS	D	B	B	D	A	A	D	C	C	D	C	C
Approach Vol, veh/h		480			650			340			180	
Approach Delay, s/veh		19.3			10.1			31.4			32.6	
Approach LOS		B			B			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.3	16.1	8.1	55.4	13.4	13.0	10.0	53.6				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	16.0	16.0	6.0	28.0	15.0	17.0	9.0	25.0				
Max Q Clear Time (g_c+I1), s	4.2	5.6	3.5	7.1	7.7	5.7	5.1	6.3				
Green Ext Time (p_c), s	0.1	1.3	0.0	6.4	0.2	1.3	0.0	6.1				
Intersection Summary												
HCM 2010 Ctrl Delay			19.6									
HCM 2010 LOS			B									

HCM 2010 Signalized Intersection Summary 8: Sand Creek Rd & Heidorn Ranch Rd

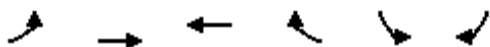
Cumulative AM Without Project
12/9/2014

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Volume (veh/h)	50	460	620	200	90	30		
Number	7	4	8	18	1	16		
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		
Adj Sat Flow, veh/h/ln	186.3	186.3	186.3	190.0	186.3	186.3		
Adj Flow Rate, veh/h	50	460	620	200	90	30		
Adj No. of Lanes	1	2	2	0	1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	63	2719	1721	554	129	115		
Arrive On Green	0.07	1.00	0.65	0.65	0.07	0.07		
Sat Flow, veh/h	1774	3632	2727	849	1774	1583		
Grp Volume(v), veh/h	50	460	416	404	90	30		
Grp Sat Flow(s),veh/h/ln	1774	1770	1770	1713	1774	1583		
Q Serve(g_s), s	2.1	0.0	8.1	8.1	3.7	1.4		
Cycle Q Clear(g_c), s	2.1	0.0	8.1	8.1	3.7	1.4		
Prop In Lane	1.00			0.50	1.00	1.00		
Lane Grp Cap(c), veh/h	63	2719	1156	1119	129	115		
V/C Ratio(X)	0.79	0.17	0.36	0.36	0.70	0.26		
Avail Cap(c_a), veh/h	235	2719	1156	1119	470	419		
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.98	0.98	0.65	0.65	1.00	1.00		
Uniform Delay (d), s/veh	34.8	0.0	5.9	5.9	34.2	33.1		
Incr Delay (d2), s/veh	19.2	0.1	0.6	0.6	6.6	1.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	1.3	0.0	4.0	3.9	2.1	1.2		
LnGrp Delay(d),s/veh	54.0	0.1	6.5	6.5	40.8	34.3		
LnGrp LOS	D	A	A	A	D	C		
Approach Vol, veh/h		510	820		120			
Approach Delay, s/veh		5.4	6.5		39.1			
Approach LOS		A	A		D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				78.5		11.5	8.7	69.8
Change Period (Y+Rc), s				6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s				58.0		20.0	10.0	42.0
Max Q Clear Time (g_c+I1), s				2.0		5.7	4.1	10.1
Green Ext Time (p_c), s				10.5		0.2	0.0	9.5
Intersection Summary								
HCM 2010 Ctrl Delay			8.8					
HCM 2010 LOS			A					

HCM Signalized Intersection Capacity Analysis

9: Sand Creek Rd & SR 4 Eastbound

Cumulative AM Without Project
12/9/2014



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	220	380	790	570	410	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	
Frt	1.00	1.00	1.00	0.85	0.98	
Flt Protected	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (prot)	1770	3539	3539	1583	3390	
Flt Permitted	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (perm)	1770	3539	3539	1583	3390	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	220	380	790	570	410	70
RTOR Reduction (vph)	0	0	0	318	16	0
Lane Group Flow (vph)	220	380	790	252	464	0
Turn Type	Prot	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	
Permitted Phases				8		
Actuated Green, G (s)	15.9	61.7	39.8	39.8	16.3	
Effective Green, g (s)	15.9	61.7	39.8	39.8	16.3	
Actuated g/C Ratio	0.18	0.69	0.44	0.44	0.18	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	312	2426	1565	700	613	
v/s Ratio Prot	c0.12	0.11	c0.22		c0.14	
v/s Ratio Perm				0.16		
v/c Ratio	0.71	0.16	0.50	0.36	0.76	
Uniform Delay, d1	34.8	5.0	18.0	16.7	35.0	
Progression Factor	1.00	1.00	1.20	3.90	1.00	
Incremental Delay, d2	7.1	0.0	0.9	1.1	5.3	
Delay (s)	41.9	5.0	22.5	66.1	40.3	
Level of Service	D	A	C	E	D	
Approach Delay (s)		18.5	40.8		40.3	
Approach LOS		B	D		D	

Intersection Summary

HCM 2000 Control Delay	35.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

10: SR 4 Westbound & Sand Creek Rd

Cumulative AM Without Project
12/9/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	290	500	0	0	860	720	500	0	220	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0			
Lane Util. Factor	1.00	0.95			0.95	1.00	0.95	0.95	1.00			
Frt	1.00	1.00			1.00	0.85	1.00	1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95	0.95	1.00			
Satd. Flow (prot)	1770	3539			3539	1583	1681	1681	1583			
Flt Permitted	0.95	1.00			1.00	1.00	0.95	0.95	1.00			
Satd. Flow (perm)	1770	3539			3539	1583	1681	1681	1583			
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	290	500	0	0	860	720	500	0	220	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	376	0	0	178	0	0	0
Lane Group Flow (vph)	290	500	0	0	860	344	250	250	42	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Actuated Green, G (s)	18.5	60.8			36.3	36.3	17.2	17.2	17.2			
Effective Green, g (s)	18.5	60.8			36.3	36.3	17.2	17.2	17.2			
Actuated g/C Ratio	0.21	0.68			0.40	0.40	0.19	0.19	0.19			
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	363	2390			1427	638	321	321	302			
v/s Ratio Prot	c0.16	0.14			c0.24							
v/s Ratio Perm						0.22	c0.15	0.15	0.03			
v/c Ratio	0.80	0.21			0.60	0.54	0.78	0.78	0.14			
Uniform Delay, d1	34.0	5.5			21.2	20.5	34.6	34.6	30.2			
Progression Factor	0.82	0.57			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	10.8	0.2			1.9	3.2	11.3	11.3	0.2			
Delay (s)	38.6	3.3			23.1	23.7	45.9	45.9	30.5			
Level of Service	D	A			C	C	D	D	C			
Approach Delay (s)		16.3			23.4			41.2			0.0	
Approach LOS		B			C			D			A	
Intersection Summary												
HCM 2000 Control Delay			25.7				HCM 2000 Level of Service		C			
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)		18.0			
Intersection Capacity Utilization			89.5%				ICU Level of Service		E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary

1: Deer Valley Road & Lone Tree Way

Cumulative PM Without Project
1/20/2015

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	110	1030	270	310	760	220	290	510	340	390	470	40
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0
Adj Flow Rate, veh/h	110	1030	270	310	760	220	290	510	340	390	470	40
Adj No. of Lanes	1	3	0	2	2	0	2	2	0	2	2	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	132	1349	353	356	988	286	343	549	365	438	980	83
Arrive On Green	0.07	0.67	0.67	0.10	0.73	0.73	0.10	0.27	0.27	0.13	0.30	0.30
Sat Flow, veh/h	1774	4016	1052	3442	2710	784	3442	2037	1356	3442	3303	280
Grp Volume(v), veh/h	110	869	431	310	496	484	290	443	407	390	251	259
Grp Sat Flow(s),veh/h/ln	1774	1695	1677	1721	1770	1724	1721	1770	1623	1721	1770	1813
Q Serve(g_s), s	8.9	25.2	25.3	13.0	25.2	25.2	12.1	35.6	35.7	16.3	17.0	17.1
Cycle Q Clear(g_c), s	8.9	25.2	25.3	13.0	25.2	25.2	12.1	35.6	35.7	16.3	17.0	17.1
Prop In Lane	1.00		0.63	1.00		0.45	1.00		0.84	1.00		0.15
Lane Grp Cap(c), veh/h	132	1138	563	356	646	629	343	476	437	438	525	538
V/C Ratio(X)	0.83	0.76	0.76	0.87	0.77	0.77	0.85	0.93	0.93	0.89	0.48	0.48
Avail Cap(c_a), veh/h	158	1138	563	377	646	629	448	497	456	472	525	538
HCM Platoon Ratio	1.00	2.00	2.00	1.00	2.00	2.00	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	66.6	20.1	20.1	64.5	15.9	15.9	64.6	52.0	52.0	62.7	42.0	42.1
Incr Delay (d2), s/veh	26.5	4.9	9.5	18.7	8.6	8.8	11.1	23.6	25.5	18.0	0.7	0.7
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	5.3	12.4	13.0	7.1	13.4	13.1	6.3	20.5	19.2	8.8	8.4	8.7
LnGrp Delay(d),s/veh	93.2	24.9	29.6	83.2	24.5	24.7	75.7	75.6	77.5	80.6	42.7	42.8
LnGrp LOS	F	C	C	F	C	C	E	E	E	F	D	D
Approach Vol, veh/h		1410			1290			1140			900	
Approach Delay, s/veh		31.7			38.7			76.3			59.2	
Approach LOS		C			D			E			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	24.6	45.3	21.1	59.1	20.5	49.3	16.8	63.3				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	20.0	41.0	16.0	49.0	19.0	42.0	13.0	52.0				
Max Q Clear Time (g_c+I1), s	18.3	37.7	15.0	27.3	14.1	19.1	10.9	27.2				
Green Ext Time (p_c), s	0.3	1.6	0.1	14.9	0.4	9.6	0.0	16.3				
Intersection Summary												
HCM 2010 Ctrl Delay			49.5									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary

2: Hillcrest Avenue & Lone Tree Way

Cumulative PM Without Project
12/9/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	330	1200	110	200	1100	310	60	130	140	500	130	140
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	186.3	186.3	190.0	186.3	186.3	186.3	186.3	186.3	190.0	186.3	186.3	186.3
Adj Flow Rate, veh/h	330	1200	110	200	1100	310	60	130	140	500	130	140
Adj No. of Lanes	1	3	0	1	3	1	1	2	0	2	2	1
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	363	1977	181	192	1629	507	78	200	179	559	819	366
Arrive On Green	0.20	0.42	0.42	0.22	0.64	0.64	0.04	0.11	0.11	0.16	0.23	0.23
Sat Flow, veh/h	1774	4742	435	1774	5085	1583	1774	1770	1583	3442	3539	1583
Grp Volume(v), veh/h	330	858	452	200	1100	310	60	130	140	500	130	140
Grp Sat Flow(s),veh/h/ln	1774	1695	1786	1774	1695	1583	1774	1770	1583	1721	1770	1583
Q Serve(g_s), s	21.9	23.8	23.8	13.0	16.5	13.9	4.0	8.5	10.4	17.1	3.5	9.0
Cycle Q Clear(g_c), s	21.9	23.8	23.8	13.0	16.5	13.9	4.0	8.5	10.4	17.1	3.5	9.0
Prop In Lane	1.00		0.24	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	363	1414	745	192	1629	507	78	200	179	559	819	366
V/C Ratio(X)	0.91	0.61	0.61	1.04	0.68	0.61	0.77	0.65	0.78	0.89	0.16	0.38
Avail Cap(c_a), veh/h	531	1747	920	192	1648	513	398	441	395	601	819	366
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.90	0.90	0.90	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.8	27.4	27.4	47.2	17.7	17.2	56.9	51.1	51.9	49.4	36.9	39.0
Incr Delay (d2), s/veh	14.8	1.9	3.7	73.7	2.0	4.9	14.4	3.5	7.2	15.3	0.1	0.7
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	12.2	11.5	12.4	10.2	7.8	6.7	2.3	4.3	4.9	9.3	1.7	4.0
LnGrp Delay(d),s/veh	61.5	29.3	31.0	120.9	19.7	22.1	71.3	54.6	59.1	64.7	37.0	39.6
LnGrp LOS	E	C	C	F	B	C	E	D	E	E	D	D
Approach Vol, veh/h	1640			1610			330			770		
Approach Delay, s/veh	36.3			32.7			59.5			55.5		
Approach LOS	D			C			E			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.5	19.6	19.0	85.8	11.3	33.8	30.6	74.2				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	21.0	30.0	13.0	62.0	27.0	24.0	36.0	39.0				
Max Q Clear Time (g_c+I1), s	19.1	12.4	15.0	25.8	6.0	11.0	23.9	18.5				
Green Ext Time (p_c), s	0.4	1.3	0.0	24.4	0.1	2.3	0.8	16.0				
Intersection Summary												
HCM 2010 Ctrl Delay	40.1											
HCM 2010 LOS	D											

HCM 2010 Signalized Intersection Summary

3: Heidorn Ranch Road/Fairside Way & Lone Tree Way

Cumulative PM Without Project
12/9/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	1940	110	70	1500	20	160	10	80	30	10	20
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	186.3	186.3	186.3	190.0
Adj Flow Rate, veh/h	30	1940	110	70	1500	20	160	10	80	30	10	20
Adj No. of Lanes	1	3	0	1	3	0	2	1	1	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	38	3294	186	89	3608	48	213	141	120	38	20	39
Arrive On Green	0.04	1.00	1.00	0.10	1.00	1.00	0.06	0.08	0.08	0.02	0.04	0.04
Sat Flow, veh/h	1774	4925	278	1774	5172	69	3442	1863	1583	1774	556	1111
Grp Volume(v), veh/h	30	1334	716	70	983	537	160	10	80	30	0	30
Grp Sat Flow(s),veh/h/ln	1774	1695	1814	1774	1695	1851	1721	1863	1583	1774	0	1667
Q Serve(g_s), s	2.2	0.0	0.0	5.0	0.0	0.0	6.0	0.7	6.4	2.2	0.0	2.3
Cycle Q Clear(g_c), s	2.2	0.0	0.0	5.0	0.0	0.0	6.0	0.7	6.4	2.2	0.0	2.3
Prop In Lane	1.00		0.15	1.00		0.04	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	38	2267	1213	89	2365	1291	213	141	120	38	0	59
V/C Ratio(X)	0.79	0.59	0.59	0.78	0.42	0.42	0.75	0.07	0.67	0.79	0.00	0.51
Avail Cap(c_a), veh/h	95	2267	1213	272	2365	1291	290	257	219	136	0	217
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.62	0.62	0.62	0.85	0.85	0.85	0.98	0.98	0.98	1.00	0.00	1.00
Uniform Delay (d), s/veh	62.2	0.0	0.0	58.0	0.0	0.0	60.2	56.0	58.7	63.5	0.0	61.8
Incr Delay (d2), s/veh	20.3	0.7	1.3	12.0	0.5	0.8	7.0	0.2	6.2	29.5	0.0	6.8
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(50%),veh/ln	1.3	0.2	0.4	2.7	0.2	0.3	3.1	0.3	3.0	1.4	0.0	1.2
LnGrp Delay(d),s/veh	82.5	0.7	1.3	69.9	0.5	0.8	67.2	56.2	64.9	93.0	0.0	68.6
LnGrp LOS	F	A	A	E	A	A	E	E	E	F		E
Approach Vol, veh/h	2080			1590			250			60		
Approach Delay, s/veh	2.1			3.6			66.0			80.8		
Approach LOS	A			A			E			F		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.8	15.9	12.6	112.8	14.1	10.6	8.8	116.6				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	10.0	18.0	20.0	78.0	11.0	17.0	7.0	91.0				
Max Q Clear Time (g_c+I1), s	4.2	8.4	7.0	2.0	8.0	4.3	4.2	2.0				
Green Ext Time (p_c), s	0.0	0.2	0.1	58.8	0.1	0.3	0.0	66.2				
Intersection Summary												
HCM 2010 Ctrl Delay	7.9											
HCM 2010 LOS	A											

HCM 2010 Signalized Intersection Summary

11: Hillcrest Ave & Project Access

Cumulative PM Without Project

06/19/2017

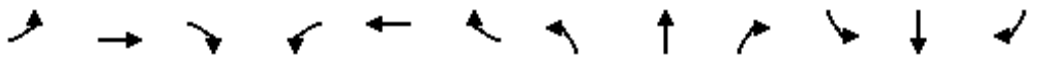
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	0	50	0	0	0	80	260	0	0	160	40
Future Volume (veh/h)	80	0	50	0	0	0	80	260	0	0	160	40
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900				1863	1863	1900	0	1863	1900
Adj Flow Rate, veh/h	80	0	50				80	260	0	0	160	40
Adj No. of Lanes	1	1	0				1	2	0	0	2	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2				2	2	2	0	2	2
Cap, veh/h	161	0	144				117	1705	0	0	570	139
Arrive On Green	0.09	0.00	0.09				0.07	0.48	0.00	0.00	0.20	0.20
Sat Flow, veh/h	1774	0	1583				1774	3632	0	0	2916	688
Grp Volume(v), veh/h	80	0	50				80	260	0	0	99	101
Grp Sat Flow(s),veh/h/ln	1774	0	1583				1774	1770	0	0	1770	1741
Q Serve(g_s), s	1.2	0.0	0.8				1.2	1.2	0.0	0.0	1.3	1.4
Cycle Q Clear(g_c), s	1.2	0.0	0.8				1.2	1.2	0.0	0.0	1.3	1.4
Prop In Lane	1.00		1.00				1.00		0.00	0.00		0.39
Lane Grp Cap(c), veh/h	161	0	144				117	1705	0	0	357	351
V/C Ratio(X)	0.50	0.00	0.35				0.68	0.15	0.00	0.00	0.28	0.29
Avail Cap(c_a), veh/h	1011	0	903				316	3404	0	0	1009	993
HCM Platoon Ratio	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	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	12.1	0.0	12.0				12.8	4.1	0.0	0.0	9.5	9.5
Incr Delay (d2), s/veh	2.4	0.0	1.4				6.8	0.0	0.0	0.0	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.4				0.8	0.6	0.0	0.0	0.7	0.7
LnGrp Delay(d),s/veh	14.5	0.0	13.4				19.6	4.1	0.0	0.0	9.9	9.9
LnGrp LOS	B		B				B	A			A	A
Approach Vol, veh/h		130						340			200	
Approach Delay, s/veh		14.1						7.8			9.9	
Approach LOS		B						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		19.5		8.5	7.9	11.7						
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0						
Max Green Setting (Gmax), s		27.0		16.0	5.0	16.0						
Max Q Clear Time (g_c+I1), s		3.2		3.2	3.2	3.4						
Green Ext Time (p_c), s		2.9		0.3	0.0	2.3						
Intersection Summary												
HCM 2010 Ctrl Delay			9.6									
HCM 2010 LOS			A									

HCM 2010 Signalized Intersection Summary

12: Heidorn Ranch Rd & Project Access

Cumulative PM Without Project

06/19/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	110	0	40	0	240	40	40	110	0
Future Volume (veh/h)	0	0	0	110	0	40	0	240	40	40	110	0
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				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
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1863	1863	1900	0	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h				110	0	40	0	240	40	40	110	0
Adj No. of Lanes				1	1	0	0	2	0	1	2	0
Peak Hour Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %				2	2	2	0	2	2	2	2	2
Cap, veh/h				181	0	162	0	629	103	68	1637	0
Arrive On Green				0.10	0.00	0.10	0.00	0.21	0.21	0.04	0.46	0.00
Sat Flow, veh/h				1774	0	1583	0	3137	500	1774	3632	0
Grp Volume(v), veh/h				110	0	40	0	138	142	40	110	0
Grp Sat Flow(s),veh/h/ln				1774	0	1583	0	1770	1774	1774	1770	0
Q Serve(g_s), s				1.6	0.0	0.6	0.0	1.9	1.9	0.6	0.5	0.0
Cycle Q Clear(g_c), s				1.6	0.0	0.6	0.0	1.9	1.9	0.6	0.5	0.0
Prop In Lane				1.00		1.00	0.00		0.28	1.00		0.00
Lane Grp Cap(c), veh/h				181	0	162	0	366	367	68	1637	0
V/C Ratio(X)				0.61	0.00	0.25	0.00	0.38	0.39	0.59	0.07	0.00
Avail Cap(c_a), veh/h				1737	0	1550	0	1027	1029	257	3337	0
HCM Platoon Ratio				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	0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh				11.8	0.0	11.4	0.0	9.4	9.4	13.0	4.1	0.0
Incr Delay (d2), s/veh				3.2	0.0	0.8	0.0	0.6	0.7	7.9	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
%ile BackOfQ(50%),veh/ln				1.0	0.0	0.3	0.0	0.9	1.0	0.4	0.2	0.0
LnGrp Delay(d),s/veh				15.1	0.0	12.2	0.0	10.1	10.1	20.9	4.1	0.0
LnGrp LOS				B		B		B	B	C	A	
Approach Vol, veh/h					150			280			150	
Approach Delay, s/veh					14.3			10.1			8.6	
Approach LOS					B			B			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	7.1	11.7				18.8		8.8				
Change Period (Y+Rc), s	6.0	6.0				6.0		6.0				
Max Green Setting (Gmax), s	4.0	16.0				26.0		27.0				
Max Q Clear Time (g_c+I1), s	2.6	3.9				2.5		3.6				
Green Ext Time (p_c), s	0.0	1.8				2.3		0.5				
Intersection Summary												
HCM 2010 Ctrl Delay				10.8								
HCM 2010 LOS				B								

HCM 2010 Signalized Intersection Summary
7: Hillcrest Ave & Sand Creek Rd

Cumulative PM Without Project
12/9/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	120	1000	60	70	1100	130	80	90	180	80	30	100
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0
Adj Flow Rate, veh/h	120	1000	60	70	1100	130	80	90	180	80	30	100
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	151	1512	91	90	1311	155	103	259	232	121	277	248
Arrive On Green	0.09	0.89	0.89	0.05	0.82	0.82	0.06	0.15	0.15	0.07	0.16	0.16
Sat Flow, veh/h	1774	3393	204	1774	3190	376	1774	1770	1583	1774	1770	1583
Grp Volume(v), veh/h	120	522	538	70	610	620	80	90	180	80	30	100
Grp Sat Flow(s),veh/h/ln	1774	1770	1827	1774	1770	1796	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	5.5	6.5	6.5	3.2	16.3	16.5	3.7	3.8	9.1	3.7	1.2	4.7
Cycle Q Clear(g_c), s	5.5	6.5	6.5	3.2	16.3	16.5	3.7	3.8	9.1	3.7	1.2	4.7
Prop In Lane	1.00		0.11	1.00		0.21	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	151	789	814	90	728	739	103	259	232	121	277	248
V/C Ratio(X)	0.79	0.66	0.66	0.78	0.84	0.84	0.78	0.35	0.78	0.66	0.11	0.40
Avail Cap(c_a), veh/h	192	789	814	128	728	739	150	341	305	150	341	305
HCM Platoon Ratio	1.00	2.00	2.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00	0.99	0.99	0.99
Uniform Delay (d), s/veh	37.3	2.8	2.8	38.9	5.8	5.8	38.6	31.9	34.1	37.7	30.0	31.5
Incr Delay (d2), s/veh	16.0	4.3	4.2	12.1	7.7	7.7	14.5	0.8	8.9	7.4	0.2	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(50%),veh/ln	3.4	3.7	3.8	1.9	8.8	9.0	2.2	1.9	4.5	2.1	0.6	2.1
LnGrp Delay(d),s/veh	53.3	7.2	7.0	51.1	13.5	13.5	53.1	32.7	43.0	45.2	30.2	32.6
LnGrp LOS	D	A	A	D	B	B	D	C	D	D	C	C
Approach Vol, veh/h	1180			1300			350			210		
Approach Delay, s/veh	11.8			15.5			42.7			37.0		
Approach LOS	B			B			D			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.7	18.1	10.2	50.0	10.8	19.0	13.1	47.1				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	16.0	6.0	37.0	7.0	16.0	9.0	34.0				
Max Q Clear Time (g_c+l1), s	5.7	11.1	5.2	8.5	5.7	6.7	7.5	18.5				
Green Ext Time (p_c), s	0.0	1.1	0.0	19.6	0.0	1.7	0.0	12.3				
Intersection Summary												
HCM 2010 Ctrl Delay	18.7											
HCM 2010 LOS	B											

HCM 2010 Signalized Intersection Summary

8: Sand Creek Rd & Heidorn Ranch Rd

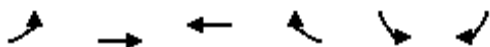
Cumulative PM Without Project
12/9/2014

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Volume (veh/h)	130	1130	1220	150	140	80		
Number	7	4	8	18	1	16		
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		
Adj Sat Flow, veh/h/ln	186.3	186.3	186.3	190.0	186.3	186.3		
Adj Flow Rate, veh/h	130	1130	1220	150	140	80		
Adj No. of Lanes	1	2	2	0	1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	162	2655	1861	228	186	166		
Arrive On Green	0.12	1.00	0.59	0.59	0.10	0.10		
Sat Flow, veh/h	1774	3632	3268	389	1774	1583		
Grp Volume(v), veh/h	130	1130	678	692	140	80		
Grp Sat Flow(s),veh/h/ln	1774	1770	1770	1794	1774	1583		
Q Serve(g_s), s	5.9	0.1	21.3	21.5	6.3	3.9		
Cycle Q Clear(g_c), s	5.9	0.1	21.3	21.5	6.3	3.9		
Prop In Lane	1.00			0.22	1.00	1.00		
Lane Grp Cap(c), veh/h	162	2655	1037	1052	186	166		
V/C Ratio(X)	0.80	0.43	0.65	0.66	0.75	0.48		
Avail Cap(c_a), veh/h	215	2655	1037	1052	343	306		
HCM Platoon Ratio	1.33	1.33	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.79	0.79	0.65	0.65	1.00	1.00		
Uniform Delay (d), s/veh	35.6	0.0	11.5	11.5	36.0	34.9		
Incr Delay (d2), s/veh	12.0	0.4	2.1	2.1	6.1	2.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	3.4	0.2	10.8	11.2	3.4	3.6		
LnGrp Delay(d),s/veh	47.5	0.4	13.6	13.6	42.0	37.0		
LnGrp LOS	D	A	B	B	D	D		
Approach Vol, veh/h		1260	1370		220			
Approach Delay, s/veh		5.3	13.6		40.2			
Approach LOS		A	B		D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				75.3		14.7	13.6	61.8
Change Period (Y+Rc), s				6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s				62.0		16.0	10.0	46.0
Max Q Clear Time (g_c+I1), s				2.1		8.3	7.9	23.5
Green Ext Time (p_c), s				34.0		0.4	0.1	17.5
Intersection Summary								
HCM 2010 Ctrl Delay			12.0					
HCM 2010 LOS			B					

HCM Signalized Intersection Capacity Analysis

9: Sand Creek Rd & SR 4 Eastbound

Cumulative PM Without Project
12/9/2014



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	450	800	850	280	820	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	
Frt	1.00	1.00	1.00	0.85	0.95	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1770	3539	3539	1583	3313	
Flt Permitted	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (perm)	1770	3539	3539	1583	3313	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	450	800	850	280	820	460
RTOR Reduction (vph)	0	0	0	205	92	0
Lane Group Flow (vph)	450	800	850	75	1188	0
Turn Type	Prot	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	
Permitted Phases				8		
Actuated Green, G (s)	21.0	51.0	24.0	24.0	27.0	
Effective Green, g (s)	21.0	51.0	24.0	24.0	27.0	
Actuated g/C Ratio	0.23	0.57	0.27	0.27	0.30	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	413	2005	943	422	993	
v/s Ratio Prot	c0.25	0.23	c0.24		c0.36	
v/s Ratio Perm				0.05		
v/c Ratio	1.09	0.40	0.90	0.18	1.20	
Uniform Delay, d1	34.5	10.9	31.9	25.4	31.5	
Progression Factor	1.00	1.00	1.07	2.86	1.00	
Incremental Delay, d2	70.6	0.1	11.2	0.7	98.4	
Delay (s)	105.1	11.0	45.4	73.5	129.9	
Level of Service	F	B	D	E	F	
Approach Delay (s)		44.9	52.3		129.9	
Approach LOS		D	D		F	
Intersection Summary						
HCM 2000 Control Delay			76.9		HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio			1.07			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	18.0
Intersection Capacity Utilization			101.3%		ICU Level of Service	G
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

10: SR 4 Westbound & Sand Creek Rd

Cumulative PM Without Project
12/9/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Volume (vph)	370	1250	0	0	600	780	530	0	410	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0			
Lane Util. Factor	1.00	0.95			0.95	1.00	0.95	0.95	1.00			
Frt	1.00	1.00			1.00	0.85	1.00	1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95	0.95	1.00			
Satd. Flow (prot)	1770	3539			3539	1583	1681	1681	1583			
Flt Permitted	0.95	1.00			1.00	1.00	0.95	0.95	1.00			
Satd. Flow (perm)	1770	3539			3539	1583	1681	1681	1583			
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	370	1250	0	0	600	780	530	0	410	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	391	0	0	85	0	0	0
Lane Group Flow (vph)	370	1250	0	0	600	389	265	265	325	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Actuated Green, G (s)	21.5	58.2			30.7	30.7	19.8	19.8	19.8			
Effective Green, g (s)	21.5	58.2			30.7	30.7	19.8	19.8	19.8			
Actuated g/C Ratio	0.24	0.65			0.34	0.34	0.22	0.22	0.22			
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	422	2288			1207	539	369	369	348			
v/s Ratio Prot	c0.21	0.35			0.17							
v/s Ratio Perm						c0.25	0.16	0.16	c0.21			
v/c Ratio	0.88	0.55			0.50	0.72	0.72	0.72	0.93			
Uniform Delay, d1	33.0	8.7			23.5	25.9	32.5	32.5	34.5			
Progression Factor	0.93	0.56			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	11.6	0.5			1.5	8.1	6.5	6.5	31.5			
Delay (s)	42.3	5.4			25.0	34.0	39.1	39.1	66.0			
Level of Service	D	A			C	C	D	D	E			
Approach Delay (s)		13.8			30.1			50.8			0.0	
Approach LOS		B			C			D			A	
Intersection Summary												
HCM 2000 Control Delay			28.3				HCM 2000 Level of Service		C			
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)		18.0			
Intersection Capacity Utilization			98.5%				ICU Level of Service		F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary

1: Deer Valley Road & Lone Tree Way

Cumulative AM With Project
1/20/2015

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	962	236	400	946	354	419	545	170	331	605	50
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0
Adj Flow Rate, veh/h	90	962	236	400	946	354	419	545	170	331	605	50
Adj No. of Lanes	1	3	0	2	2	0	2	2	0	2	2	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	111	1453	355	458	1079	401	470	627	195	377	692	57
Arrive On Green	0.06	0.71	0.71	0.13	0.85	0.85	0.14	0.24	0.24	0.11	0.21	0.21
Sat Flow, veh/h	1774	4079	998	3442	2527	939	3442	2660	827	3442	3311	273
Grp Volume(v), veh/h	90	799	399	400	660	640	419	362	353	331	323	332
Grp Sat Flow(s),veh/h/ln	1774	1695	1687	1721	1770	1697	1721	1770	1717	1721	1770	1815
Q Serve(g_s), s	7.3	18.6	18.7	16.6	31.2	32.5	17.4	28.5	28.7	13.8	25.6	25.7
Cycle Q Clear(g_c), s	7.3	18.6	18.7	16.6	31.2	32.5	17.4	28.5	28.7	13.8	25.6	25.7
Prop In Lane	1.00		0.59	1.00		0.55	1.00		0.48	1.00		0.15
Lane Grp Cap(c), veh/h	111	1207	601	458	756	725	470	417	405	377	370	379
V/C Ratio(X)	0.81	0.66	0.66	0.87	0.87	0.88	0.89	0.87	0.87	0.88	0.87	0.88
Avail Cap(c_a), veh/h	134	1207	601	592	756	725	521	439	426	403	378	387
HCM Platoon Ratio	1.00	2.00	2.00	1.00	2.00	2.00	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	67.2	16.1	16.1	61.7	8.4	8.5	61.6	53.3	53.4	63.7	55.6	55.6
Incr Delay (d2), s/veh	26.1	2.9	5.7	11.1	13.4	14.7	16.4	16.1	17.1	18.4	19.4	19.3
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	4.4	9.0	9.5	8.6	16.9	16.9	9.3	15.8	15.6	7.5	14.5	14.9
LnGrp Delay(d),s/veh	93.3	19.0	21.8	72.8	21.7	23.1	78.0	69.4	70.5	82.1	74.9	74.9
LnGrp LOS	F	B	C	E	C	C	E	E	E	F	E	E
Approach Vol, veh/h	1288			1700			1134			986		
Approach Delay, s/veh	25.1			34.3			72.9			77.3		
Approach LOS	C			C			E			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	21.9	40.2	25.3	62.5	25.8	36.3	15.1	72.8				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	17.0	36.0	25.0	48.0	22.0	31.0	11.0	62.0				
Max Q Clear Time (g_c+l1), s	15.8	30.7	18.6	20.7	19.4	27.7	9.3	34.5				
Green Ext Time (p_c), s	0.2	3.5	0.8	19.3	0.4	2.3	0.0	19.4				
Intersection Summary												
HCM 2010 Ctrl Delay	48.9											
HCM 2010 LOS	D											

HCM 2010 Signalized Intersection Summary

2: Hillcrest Avenue & Lone Tree Way

Cumulative AM With Project
12/9/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	300	655	59	82	994	314	226	421	177	355	174	300
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	186.3	186.3	190.0	186.3	186.3	186.3	186.3	186.3	190.0	186.3	186.3	186.3
Adj Flow Rate, veh/h	300	655	59	82	994	314	226	421	177	355	174	300
Adj No. of Lanes	1	3	0	1	3	1	1	2	0	2	2	1
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	333	1872	167	103	1343	418	258	544	226	426	712	319
Arrive On Green	0.19	0.39	0.39	0.12	0.53	0.53	0.15	0.22	0.22	0.12	0.20	0.20
Sat Flow, veh/h	1774	4753	425	1774	5085	1583	1774	2439	1015	3442	3539	1583
Grp Volume(v), veh/h	300	466	248	82	994	314	226	304	294	355	174	300
Grp Sat Flow(s),veh/h/ln	1774	1695	1788	1774	1695	1583	1774	1770	1684	1721	1770	1583
Q Serve(g_s), s	19.7	11.5	11.7	5.4	18.1	18.5	14.9	19.2	19.6	12.0	4.9	22.3
Cycle Q Clear(g_c), s	19.7	11.5	11.7	5.4	18.1	18.5	14.9	19.2	19.6	12.0	4.9	22.3
Prop In Lane	1.00		0.24	1.00		1.00	1.00		0.60	1.00		1.00
Lane Grp Cap(c), veh/h	333	1335	704	103	1343	418	258	395	375	426	712	319
V/C Ratio(X)	0.90	0.35	0.35	0.79	0.74	0.75	0.88	0.77	0.78	0.83	0.24	0.94
Avail Cap(c_a), veh/h	521	1706	900	193	1621	505	432	475	452	606	712	319
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.92	0.92	0.92	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.3	25.4	25.4	52.0	25.0	25.1	49.9	43.5	43.6	51.0	40.0	46.9
Incr Delay (d2), s/veh	12.7	0.7	1.4	11.9	3.4	10.9	10.5	6.3	7.2	6.8	0.2	35.2
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(50%),veh/ln	10.8	5.5	6.0	3.0	8.8	9.1	8.0	10.1	9.9	6.1	2.4	12.9
LnGrp Delay(d),s/veh	60.0	26.1	26.8	63.9	28.4	36.0	60.4	49.8	50.8	57.9	40.2	82.1
LnGrp LOS	E	C	C	E	C	D	E	D	D	E	D	F
Approach Vol, veh/h	1014			1390			824			829		
Approach Delay, s/veh	36.3			32.2			53.1			62.9		
Approach LOS	D			C			D			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.7	32.6	12.9	83.7	23.3	30.0	28.4	68.3				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	21.0	32.0	13.0	60.0	29.0	24.0	35.0	38.0				
Max Q Clear Time (g_c+I1), s	14.0	21.6	7.4	13.7	16.9	24.3	21.7	20.5				
Green Ext Time (p_c), s	0.7	4.1	0.1	18.0	0.5	0.0	0.7	11.0				
Intersection Summary												
HCM 2010 Ctrl Delay	43.7											
HCM 2010 LOS	D											

HCM 2010 Signalized Intersection Summary

3: Heidorn Ranch Road/Fairside Way & Lone Tree Way

Cumulative AM With Project
12/9/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	1297	69	85	1522	20	97	10	134	20	10	20
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	186.3	186.3	186.3	190.0
Adj Flow Rate, veh/h	10	1297	69	85	1522	20	97	10	134	20	10	20
Adj No. of Lanes	1	3	0	1	3	0	2	1	1	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	12	3163	168	107	3585	47	147	189	161	24	40	81
Arrive On Green	0.01	1.00	1.00	0.12	1.00	1.00	0.04	0.10	0.10	0.01	0.07	0.07
Sat Flow, veh/h	1774	4944	263	1774	5173	68	3442	1863	1583	1774	556	1111
Grp Volume(v), veh/h	10	889	477	85	997	545	97	10	134	20	0	30
Grp Sat Flow(s),veh/h/ln	1774	1695	1816	1774	1695	1851	1721	1863	1583	1774	0	1667
Q Serve(g_s), s	0.7	0.0	0.0	6.1	0.0	0.0	3.6	0.6	10.8	1.5	0.0	2.2
Cycle Q Clear(g_c), s	0.7	0.0	0.0	6.1	0.0	0.0	3.6	0.6	10.8	1.5	0.0	2.2
Prop In Lane	1.00		0.14	1.00		0.04	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	12	2169	1162	107	2349	1283	147	189	161	24	0	121
V/C Ratio(X)	0.81	0.41	0.41	0.80	0.42	0.42	0.66	0.05	0.83	0.82	0.00	0.25
Avail Cap(c_a), veh/h	68	2169	1162	287	2349	1283	344	330	280	109	0	231
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.87	0.87	0.87	0.86	0.86	0.86	0.98	0.98	0.98	1.00	0.00	1.00
Uniform Delay (d), s/veh	63.9	0.0	0.0	56.4	0.0	0.0	61.2	52.7	57.3	63.9	0.0	56.9
Incr Delay (d2), s/veh	65.0	0.5	0.9	11.0	0.5	0.9	4.8	0.1	10.4	46.6	0.0	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(50%),veh/ln	0.6	0.2	0.3	3.3	0.2	0.3	1.8	0.3	5.2	1.0	0.0	1.1
LnGrp Delay(d),s/veh	129.0	0.5	0.9	67.4	0.5	0.9	66.1	52.8	67.7	110.5	0.0	58.0
LnGrp LOS	F	A	A	E	A	A	E	D	E	F		E
Approach Vol, veh/h	1376				1627				241		50	
Approach Delay, s/veh	1.6				4.1				66.4		79.0	
Approach LOS	A				A				E		E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.8	19.2	13.8	109.2	11.6	15.4	6.9	116.1				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	8.0	23.0	21.0	74.0	13.0	18.0	5.0	90.0				
Max Q Clear Time (g_c+I1), s	3.5	12.8	8.1	2.0	5.6	4.2	2.7	2.0				
Green Ext Time (p_c), s	0.0	0.4	0.1	42.2	0.1	0.5	0.0	46.7				
Intersection Summary												
HCM 2010 Ctrl Delay			8.8									
HCM 2010 LOS			A									

HCM 2010 Signalized Intersection Summary

11: Hillcrest Ave & Project Access

Cumulative AM With Project

08/11/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	0	60	18	0	95	30	306	6	32	200	40
Future Volume (veh/h)	120	0	60	18	0	95	30	306	6	32	200	40
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	120	0	60	18	0	95	30	306	6	32	200	40
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	158	0	279	32	0	166	50	704	14	53	590	116
Arrive On Green	0.09	0.00	0.18	0.02	0.00	0.11	0.03	0.20	0.20	0.03	0.20	0.20
Sat Flow, veh/h	1774	0	1583	1774	0	1583	1774	3551	70	1774	2951	579
Grp Volume(v), veh/h	120	0	60	18	0	95	30	152	160	32	118	122
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1774	0	1583	1774	1770	1850	1774	1770	1761
Q Serve(g_s), s	2.7	0.0	1.3	0.4	0.0	2.4	0.7	3.1	3.1	0.7	2.4	2.5
Cycle Q Clear(g_c), s	2.7	0.0	1.3	0.4	0.0	2.4	0.7	3.1	3.1	0.7	2.4	2.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.04	1.00		0.33
Lane Grp Cap(c), veh/h	158	0	279	32	0	166	50	351	367	53	354	352
V/C Ratio(X)	0.76	0.00	0.22	0.56	0.00	0.57	0.60	0.43	0.44	0.61	0.33	0.35
Avail Cap(c_a), veh/h	683	0	1067	256	0	686	299	1022	1069	342	1065	1059
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	18.5	0.0	14.7	20.2	0.0	17.7	20.0	14.6	14.6	19.9	14.3	14.3
Incr Delay (d2), s/veh	7.2	0.0	0.4	14.5	0.0	3.1	11.0	0.8	0.8	10.7	0.6	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	1.7	0.0	0.6	0.3	0.0	1.2	0.5	1.6	1.7	0.5	1.2	1.2
LnGrp Delay(d),s/veh	25.7	0.0	15.0	34.7	0.0	20.8	31.0	15.5	15.4	30.6	14.8	14.9
LnGrp LOS	C		B	C		C	C	B	B	C	B	B
Approach Vol, veh/h	180				113				342		272	
Approach Delay, s/veh	22.1				23.0				16.8		16.7	
Approach LOS	C				C				B		B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.2	14.2	6.8	13.3	7.2	14.3	9.7	10.4				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	8.0	24.0	6.0	28.0	7.0	25.0	16.0	18.0				
Max Q Clear Time (g_c+I1), s	2.7	5.1	2.4	3.3	2.7	4.5	4.7	4.4				
Green Ext Time (p_c), s	0.0	3.1	0.0	0.9	0.0	3.2	0.2	0.7				
Intersection Summary												
HCM 2010 Ctrl Delay			18.6									
HCM 2010 LOS			B									

HCM 2010 Signalized Intersection Summary 12: Heidorn Ranch Rd & Project Access

Cumulative AM With Project
08/11/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	107	0	146	30	0	70	49	202	40	60	66	35
Future Volume (veh/h)	107	0	146	30	0	70	49	202	40	60	66	35
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	107	0	146	30	0	70	49	202	40	60	66	35
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	140	0	258	50	0	177	75	465	90	86	377	187
Arrive On Green	0.08	0.00	0.16	0.03	0.00	0.11	0.04	0.16	0.16	0.05	0.16	0.16
Sat Flow, veh/h	1774	0	1583	1774	0	1583	1774	2956	575	1774	2296	1136
Grp Volume(v), veh/h	107	0	146	30	0	70	49	119	123	60	50	51
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1774	0	1583	1774	1770	1761	1774	1770	1662
Q Serve(g_s), s	2.4	0.0	3.4	0.7	0.0	1.6	1.1	2.4	2.5	1.3	1.0	1.1
Cycle Q Clear(g_c), s	2.4	0.0	3.4	0.7	0.0	1.6	1.1	2.4	2.5	1.3	1.0	1.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.33	1.00		0.68
Lane Grp Cap(c), veh/h	140	0	258	50	0	177	75	279	277	86	290	273
V/C Ratio(X)	0.76	0.00	0.57	0.60	0.00	0.39	0.66	0.43	0.44	0.69	0.17	0.19
Avail Cap(c_a), veh/h	713	0	1074	312	0	716	356	933	929	490	1067	1002
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	18.0	0.0	15.4	19.1	0.0	16.4	18.8	15.2	15.2	18.6	14.3	14.4
Incr Delay (d2), s/veh	8.3	0.0	2.0	10.8	0.0	1.4	9.4	1.0	1.1	9.5	0.3	0.3
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	1.5	0.0	1.6	0.5	0.0	0.8	0.7	1.2	1.3	0.9	0.5	0.5
LnGrp Delay(d),s/veh	26.3	0.0	17.3	29.9	0.0	17.8	28.2	16.2	16.3	28.2	14.6	14.7
LnGrp LOS	C		B	C		B	C	B	B	C	B	B
Approach Vol, veh/h	253		100				291				161	
Approach Delay, s/veh	21.1		21.5				18.3				19.7	
Approach LOS	C		C				B				B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.9	12.3	7.1	12.5	7.7	12.5	9.1	10.5				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	11.0	21.0	7.0	27.0	8.0	24.0	16.0	18.0				
Max Q Clear Time (g_c+I1), s	3.3	4.5	2.7	5.4	3.1	3.1	4.4	3.6				
Green Ext Time (p_c), s	0.1	1.8	0.0	1.3	0.0	1.9	0.2	1.1				
Intersection Summary												
HCM 2010 Ctrl Delay	19.8											
HCM 2010 LOS	B											

HCM 2010 Signalized Intersection Summary

7: Hillcrest Ave & Sand Creek Rd

Cumulative AM With Project
12/9/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	94	383	20	40	509	128	150	120	70	115	30	133
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0
Adj Flow Rate, veh/h	94	383	20	40	509	128	150	120	70	115	30	133
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	122	1378	72	54	1024	256	191	331	181	148	223	199
Arrive On Green	0.07	0.40	0.40	0.06	0.73	0.73	0.11	0.15	0.15	0.08	0.13	0.13
Sat Flow, veh/h	1774	3423	178	1774	2806	702	1774	2208	1211	1774	1770	1583
Grp Volume(v), veh/h	94	197	206	40	320	317	150	95	95	115	30	133
Grp Sat Flow(s),veh/h/ln	1774	1770	1831	1774	1770	1739	1774	1770	1649	1774	1770	1583
Q Serve(g_s), s	3.8	5.4	5.4	1.6	5.5	5.6	5.9	3.5	3.8	4.6	1.1	5.8
Cycle Q Clear(g_c), s	3.8	5.4	5.4	1.6	5.5	5.6	5.9	3.5	3.8	4.6	1.1	5.8
Prop In Lane	1.00		0.10	1.00		0.40	1.00		0.73	1.00		1.00
Lane Grp Cap(c), veh/h	122	713	738	54	646	634	191	265	247	148	223	199
V/C Ratio(X)	0.77	0.28	0.28	0.74	0.50	0.50	0.79	0.36	0.39	0.78	0.13	0.67
Avail Cap(c_a), veh/h	246	713	738	148	646	634	370	467	435	296	393	352
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.91	0.91	0.91	1.00	1.00	1.00	0.99	0.99	0.99
Uniform Delay (d), s/veh	33.0	14.5	14.5	33.5	6.9	6.9	31.3	27.5	27.6	32.3	28.0	30.0
Incr Delay (d2), s/veh	10.0	1.0	0.9	16.1	2.5	2.6	7.0	0.8	1.0	8.3	0.3	3.8
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(50%),veh/ln	2.2	2.8	2.9	1.0	2.9	2.9	3.3	1.7	1.8	2.6	0.5	2.7
LnGrp Delay(d),s/veh	43.0	15.4	15.4	49.7	9.4	9.5	38.4	28.3	28.6	40.7	28.2	33.8
LnGrp LOS	D	B	B	D	A	A	D	C	C	D	C	C
Approach Vol, veh/h		497			677			340			278	
Approach Delay, s/veh		20.6			11.8			32.8			36.0	
Approach LOS		C			B			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.0	16.8	8.2	53.0	13.7	15.1	10.9	50.3				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	12.0	19.0	6.0	29.0	15.0	16.0	10.0	25.0				
Max Q Clear Time (g_c+I1), s	6.6	5.8	3.6	7.4	7.9	7.8	5.8	7.6				
Green Ext Time (p_c), s	0.1	1.7	0.0	6.7	0.2	1.3	0.1	6.1				
Intersection Summary												
HCM 2010 Ctrl Delay				22.0								
HCM 2010 LOS				C								

HCM 2010 Signalized Intersection Summary

8: Sand Creek Rd & Heidorn Ranch Rd

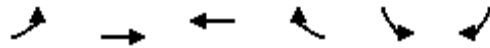
Cumulative AM With Project
12/9/2014

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Volume (veh/h)	53	515	638	238	203	39		
Number	7	4	8	18	1	16		
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		
Adj Sat Flow, veh/h/ln	186.3	186.3	186.3	190.0	186.3	186.3		
Adj Flow Rate, veh/h	53	515	638	238	203	39		
Adj No. of Lanes	1	2	2	0	1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	67	2501	1497	558	252	225		
Arrive On Green	0.08	1.00	0.59	0.59	0.14	0.14		
Sat Flow, veh/h	1774	3632	2618	941	1774	1583		
Grp Volume(v), veh/h	53	515	447	429	203	39		
Grp Sat Flow(s),veh/h/ln	1774	1770	1770	1697	1774	1583		
Q Serve(g_s), s	2.3	0.0	10.9	10.9	8.8	1.7		
Cycle Q Clear(g_c), s	2.3	0.0	10.9	10.9	8.8	1.7		
Prop In Lane	1.00			0.55	1.00	1.00		
Lane Grp Cap(c), veh/h	67	2501	1049	1006	252	225		
V/C Ratio(X)	0.79	0.21	0.43	0.43	0.81	0.17		
Avail Cap(c_a), veh/h	201	2501	1049	1006	492	440		
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.96	0.96	0.65	0.65	1.00	1.00		
Uniform Delay (d), s/veh	36.3	0.0	8.8	8.8	32.9	29.9		
Incr Delay (d2), s/veh	17.6	0.2	0.8	0.9	6.0	0.4		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	1.5	0.1	5.5	5.2	4.7	1.6		
LnGrp Delay(d),s/veh	53.9	0.2	9.6	9.6	38.9	30.3		
LnGrp LOS	D	A	A	A	D	C		
Approach Vol, veh/h		568	876		242			
Approach Delay, s/veh		5.2	9.6		37.5			
Approach LOS		A	A		D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				72.7		17.3	9.0	63.7
Change Period (Y+Rc), s				6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s				56.0		22.0	9.0	41.0
Max Q Clear Time (g_c+I1), s				2.0		10.8	4.3	12.9
Green Ext Time (p_c), s				12.0		0.5	0.0	10.3
Intersection Summary								
HCM 2010 Ctrl Delay			12.1					
HCM 2010 LOS			B					

HCM Signalized Intersection Capacity Analysis

9: Sand Creek Rd & SR 4 Eastbound

Cumulative AM With Project
12/9/2014



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	293	475	827	570	410	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	
Frt	1.00	1.00	1.00	0.85	0.97	
Flt Protected	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (prot)	1770	3539	3539	1583	3378	
Flt Permitted	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (perm)	1770	3539	3539	1583	3378	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	293	475	827	570	410	90
RTOR Reduction (vph)	0	0	0	332	22	0
Lane Group Flow (vph)	293	475	827	238	478	0
Turn Type	Prot	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	
Permitted Phases				8		
Actuated Green, G (s)	18.9	62.5	37.6	37.6	15.5	
Effective Green, g (s)	18.9	62.5	37.6	37.6	15.5	
Actuated g/C Ratio	0.21	0.69	0.42	0.42	0.17	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	371	2457	1478	661	581	
v/s Ratio Prot	c0.17	0.13	c0.23		c0.14	
v/s Ratio Perm				0.15		
v/c Ratio	0.79	0.19	0.56	0.36	0.82	
Uniform Delay, d1	33.7	4.9	19.9	18.0	35.9	
Progression Factor	1.00	1.00	1.23	4.10	1.00	
Incremental Delay, d2	10.7	0.0	1.1	1.1	9.2	
Delay (s)	44.3	4.9	25.6	74.7	45.2	
Level of Service	D	A	C	E	D	
Approach Delay (s)		19.9	45.7		45.2	
Approach LOS		B	D		D	

Intersection Summary

HCM 2000 Control Delay	38.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

10: SR 4 Westbound & Sand Creek Rd

Cumulative AM With Project
12/9/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	349	537	0	0	872	720	524	0	220	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0			
Lane Util. Factor	1.00	0.95			0.95	1.00	0.95	0.95	1.00			
Frt	1.00	1.00			1.00	0.85	1.00	1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95	0.95	1.00			
Satd. Flow (prot)	1770	3539			3539	1583	1681	1681	1583			
Flt Permitted	0.95	1.00			1.00	1.00	0.95	0.95	1.00			
Satd. Flow (perm)	1770	3539			3539	1583	1681	1681	1583			
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	349	537	0	0	872	720	524	0	220	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	360	0	0	178	0	0	0
Lane Group Flow (vph)	349	537	0	0	872	360	262	262	42	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Actuated Green, G (s)	20.5	61.0			34.5	34.5	17.0	17.0	17.0			
Effective Green, g (s)	20.5	61.0			34.5	34.5	17.0	17.0	17.0			
Actuated g/C Ratio	0.23	0.68			0.38	0.38	0.19	0.19	0.19			
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	403	2398			1356	606	317	317	299			
v/s Ratio Prot	c0.20	0.15			c0.25							
v/s Ratio Perm						0.23	c0.16	0.16	0.03			
v/c Ratio	0.87	0.22			0.64	0.59	0.83	0.83	0.14			
Uniform Delay, d1	33.4	5.5			22.7	22.2	35.1	35.1	30.4			
Progression Factor	0.76	0.58			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	15.9	0.2			2.4	4.3	16.0	16.0	0.2			
Delay (s)	41.2	3.4			25.1	26.4	51.1	51.1	30.6			
Level of Service	D	A			C	C	D	D	C			
Approach Delay (s)		18.3			25.7			45.0			0.0	
Approach LOS		B			C			D			A	
Intersection Summary												
HCM 2000 Control Delay			28.1									
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			93.4%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM 2010 Signalized Intersection Summary

1: Deer Valley Road & Lone Tree Way

Cumulative PM With Project
1/26/2015

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	110	1070	292	310	783	222	303	520	340	394	486	40
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0
Adj Flow Rate, veh/h	110	1070	292	310	783	222	303	520	340	394	486	40
Adj No. of Lanes	1	3	0	2	2	0	2	2	0	2	2	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	132	1334	364	355	993	281	357	550	359	444	971	80
Arrive On Green	0.07	0.67	0.67	0.10	0.73	0.73	0.10	0.27	0.27	0.13	0.29	0.29
Sat Flow, veh/h	1774	3977	1085	3442	2724	772	3442	2054	1341	3442	3313	272
Grp Volume(v), veh/h	110	912	450	310	509	496	303	448	412	394	259	267
Grp Sat Flow(s),veh/h/ln	1774	1695	1671	1721	1770	1726	1721	1770	1626	1721	1770	1815
Q Serve(g_s), s	8.9	28.0	28.0	13.0	26.8	26.8	12.6	36.2	36.3	16.4	17.7	17.8
Cycle Q Clear(g_c), s	8.9	28.0	28.0	13.0	26.8	26.8	12.6	36.2	36.3	16.4	17.7	17.8
Prop In Lane	1.00		0.65	1.00		0.45	1.00		0.82	1.00		0.15
Lane Grp Cap(c), veh/h	132	1138	561	355	645	629	357	474	435	444	519	532
V/C Ratio(X)	0.83	0.80	0.80	0.87	0.79	0.79	0.85	0.94	0.95	0.89	0.50	0.50
Avail Cap(c_a), veh/h	158	1138	561	377	645	629	471	485	445	495	519	532
HCM Platoon Ratio	1.00	2.00	2.00	1.00	2.00	2.00	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	66.7	20.6	20.6	64.5	16.2	16.2	64.3	52.4	52.4	62.6	42.7	42.8
Incr Delay (d2), s/veh	26.6	6.0	11.5	18.8	9.5	9.7	10.8	27.3	29.2	16.4	0.7	0.7
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	5.4	13.6	14.3	7.1	14.4	14.1	6.6	21.3	19.8	8.8	8.7	9.0
LnGrp Delay(d),s/veh	93.3	26.6	32.1	83.3	25.7	25.9	75.1	79.7	81.6	79.0	43.5	43.5
LnGrp LOS	F	C	C	F	C	C	E	E	F	E	D	D
Approach Vol, veh/h	1472			1315			1163			920		
Approach Delay, s/veh	33.2			39.3			79.2			58.7		
Approach LOS	C			D			E			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	24.8	45.1	21.1	59.0	21.1	48.8	16.9	63.2				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	21.0	40.0	16.0	49.0	20.0	41.0	13.0	52.0				
Max Q Clear Time (g_c+I1), s	18.4	38.3	15.0	30.0	14.6	19.8	10.9	28.8				
Green Ext Time (p_c), s	0.4	0.8	0.1	13.9	0.5	9.5	0.0	16.2				
Intersection Summary												
HCM 2010 Ctrl Delay	50.7											
HCM 2010 LOS	D											

HCM 2010 Signalized Intersection Summary

2: Hillcrest Avenue & Lone Tree Way

Cumulative PM With Project
12/9/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	330	1215	139	208	1109	319	77	157	145	515	176	140
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	186.3	186.3	190.0	186.3	186.3	186.3	186.3	186.3	190.0	186.3	186.3	186.3
Adj Flow Rate, veh/h	330	1215	139	208	1109	319	77	157	145	515	176	140
Adj No. of Lanes	1	3	0	1	3	1	1	2	0	2	2	1
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	362	1935	221	186	1622	505	99	214	184	567	805	360
Arrive On Green	0.20	0.42	0.42	0.21	0.64	0.64	0.06	0.12	0.12	0.16	0.23	0.23
Sat Flow, veh/h	1774	4630	530	1774	5085	1583	1774	1805	1553	3442	3539	1583
Grp Volume(v), veh/h	330	890	464	208	1109	319	77	154	148	515	176	140
Grp Sat Flow(s),veh/h/ln	1774	1695	1769	1774	1695	1583	1774	1770	1589	1721	1770	1583
Q Serve(g_s), s	22.5	25.6	25.7	13.0	17.3	15.1	5.3	10.4	11.2	18.2	5.0	9.3
Cycle Q Clear(g_c), s	22.5	25.6	25.7	13.0	17.3	15.1	5.3	10.4	11.2	18.2	5.0	9.3
Prop In Lane	1.00		0.30	1.00		1.00	1.00		0.98	1.00		1.00
Lane Grp Cap(c), veh/h	362	1417	740	186	1622	505	99	210	188	567	805	360
V/C Ratio(X)	0.91	0.63	0.63	1.12	0.68	0.63	0.78	0.73	0.79	0.91	0.22	0.39
Avail Cap(c_a), veh/h	516	1697	886	186	1622	505	387	429	385	584	805	360
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.90	0.90	0.90	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.2	28.4	28.4	48.9	18.4	18.0	57.7	52.7	53.1	50.8	38.9	40.6
Incr Delay (d2), s/veh	16.0	2.1	4.0	97.4	2.1	5.3	12.2	4.9	7.1	18.0	0.1	0.7
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	12.6	12.4	13.3	11.2	8.1	7.2	2.9	5.4	5.3	10.1	2.5	4.1
LnGrp Delay(d),s/veh	64.2	30.6	32.5	146.3	20.5	23.3	69.9	57.6	60.2	68.8	39.0	41.2
LnGrp LOS	E	C	C	F	C	C	E	E	E	E	D	D
Approach Vol, veh/h	1684				1636		379				831	
Approach Delay, s/veh	37.7				37.1		61.1				57.8	
Approach LOS	D				D		E				E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	26.4	20.7	19.0	83.9	12.9	34.2	31.3	71.6				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	21.0	30.0	13.0	62.0	27.0	24.0	36.0	39.0				
Max Q Clear Time (g_c+l1), s	20.2	13.2	15.0	27.7	7.3	11.3	24.5	19.3				
Green Ext Time (p_c), s	0.2	1.4	0.0	24.1	0.1	2.6	0.7	15.7				
Intersection Summary												
HCM 2010 Ctrl Delay	43.1											
HCM 2010 LOS	D											

HCM 2010 Signalized Intersection Summary

3: Heidorn Ranch Road/Fairside Way & Lone Tree Way

Cumulative PM With Project
12/9/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	1945	141	119	1508	20	178	10	109	30	10	20
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	186.3	186.3	186.3	190.0
Adj Flow Rate, veh/h	30	1945	141	119	1508	20	178	10	109	30	10	20
Adj No. of Lanes	1	3	0	1	3	0	2	1	1	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	38	3057	221	143	3571	47	230	158	134	38	22	44
Arrive On Green	0.03	0.84	0.84	0.16	1.00	1.00	0.07	0.08	0.08	0.02	0.04	0.04
Sat Flow, veh/h	1774	4842	349	1774	5172	69	3442	1863	1583	1774	556	1111
Grp Volume(v), veh/h	30	1359	727	119	988	540	178	10	109	30	0	30
Grp Sat Flow(s),veh/h/ln	1774	1695	1801	1774	1695	1851	1721	1863	1583	1774	0	1667
Q Serve(g_s), s	2.2	18.2	18.4	8.6	0.0	0.0	6.7	0.7	8.9	2.2	0.0	2.3
Cycle Q Clear(g_c), s	2.2	18.2	18.4	8.6	0.0	0.0	6.7	0.7	8.9	2.2	0.0	2.3
Prop In Lane	1.00		0.19	1.00		0.04	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	38	2140	1137	143	2341	1278	230	158	134	38	0	66
V/C Ratio(X)	0.79	0.64	0.64	0.83	0.42	0.42	0.77	0.06	0.81	0.79	0.00	0.46
Avail Cap(c_a), veh/h	94	2140	1137	269	2341	1278	287	254	216	135	0	215
HCM Platoon Ratio	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.58	0.58	0.58	0.83	0.83	0.83	0.98	0.98	0.98	1.00	0.00	1.00
Uniform Delay (d), s/veh	63.7	5.4	5.4	54.5	0.0	0.0	60.5	55.5	59.3	64.2	0.0	61.9
Incr Delay (d2), s/veh	18.8	0.8	1.6	10.0	0.5	0.9	9.7	0.2	11.2	29.4	0.0	4.9
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(50%),veh/ln	1.3	8.4	9.2	4.6	0.2	0.3	3.5	0.3	4.3	1.4	0.0	1.2
LnGrp Delay(d),s/veh	82.5	6.2	7.0	64.5	0.5	0.9	70.2	55.7	70.5	93.6	0.0	66.8
LnGrp LOS	F	A	A	E	A	A	E	E	E	F		E
Approach Vol, veh/h	2116				1647		297				60	
Approach Delay, s/veh	7.5				5.2		69.8				80.2	
Approach LOS	A				A		E				F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.8	17.2	16.6	107.4	14.8	11.2	8.8	115.2				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	10.0	18.0	20.0	78.0	11.0	17.0	7.0	91.0				
Max Q Clear Time (g_c+I1), s	4.2	10.9	10.6	20.4	8.7	4.3	4.2	2.0				
Green Ext Time (p_c), s	0.0	0.3	0.2	47.8	0.1	0.4	0.0	67.3				
Intersection Summary												
HCM 2010 Ctrl Delay			12.2									
HCM 2010 LOS			B									

HCM 2010 Signalized Intersection Summary

11: Hillcrest Ave & Project Access

Cumulative PM With Project

08/11/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	0	50	12	0	63	80	349	21	106	212	40
Future Volume (veh/h)	80	0	50	12	0	63	80	349	21	106	212	40
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	80	0	50	12	0	63	80	349	21	106	212	40
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	103	0	191	22	0	119	103	720	43	139	693	129
Arrive On Green	0.06	0.00	0.12	0.01	0.00	0.08	0.06	0.21	0.21	0.08	0.23	0.23
Sat Flow, veh/h	1774	0	1583	1774	0	1583	1774	3393	203	1774	2982	553
Grp Volume(v), veh/h	80	0	50	12	0	63	80	181	189	106	124	128
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1774	0	1583	1774	1770	1827	1774	1770	1765
Q Serve(g_s), s	1.9	0.0	1.2	0.3	0.0	1.6	1.9	3.7	3.8	2.4	2.4	2.5
Cycle Q Clear(g_c), s	1.9	0.0	1.2	0.3	0.0	1.6	1.9	3.7	3.8	2.4	2.4	2.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.11	1.00		0.31
Lane Grp Cap(c), veh/h	103	0	191	22	0	119	103	376	388	139	411	410
V/C Ratio(X)	0.78	0.00	0.26	0.54	0.00	0.53	0.78	0.48	0.49	0.77	0.30	0.31
Avail Cap(c_a), veh/h	511	0	989	256	0	761	511	808	834	639	935	933
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	19.3	0.0	16.6	20.4	0.0	18.5	19.3	14.4	14.4	18.8	13.2	13.2
Incr Delay (d2), s/veh	11.8	0.0	0.7	19.2	0.0	3.6	11.8	1.0	0.9	8.5	0.4	0.4
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	1.2	0.0	0.6	0.3	0.0	0.8	1.2	1.9	2.0	1.5	1.2	1.3
LnGrp Delay(d),s/veh	31.2	0.0	17.3	39.6	0.0	22.2	31.2	15.4	15.3	27.3	13.6	13.6
LnGrp LOS	C		B	D		C	C	B	B	C	B	B
Approach Vol, veh/h	130				75				450			
Approach Delay, s/veh	25.9				24.9				18.2			
Approach LOS	C				C				B			
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.3	14.8	6.5	11.0	8.4	15.7	8.4	9.1				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	15.0	19.0	6.0	26.0	12.0	22.0	12.0	20.0				
Max Q Clear Time (g_c+I1), s	4.4	5.8	2.3	3.2	3.9	4.5	3.9	3.6				
Green Ext Time (p_c), s	0.2	3.1	0.0	0.6	0.1	3.5	0.1	0.5				
Intersection Summary												
HCM 2010 Ctrl Delay	19.5											
HCM 2010 LOS	B											

HCM 2010 Signalized Intersection Summary

12: Heidorn Ranch Rd & Project Access

Cumulative PM With Project
08/11/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	0	96	110	0	40	164	213	40	40	95	119
Future Volume (veh/h)	69	0	96	110	0	40	164	213	40	40	95	119
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	69	0	96	110	0	40	164	213	40	40	95	119
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	91	0	173	143	0	219	215	730	135	62	280	251
Arrive On Green	0.05	0.00	0.11	0.08	0.00	0.14	0.12	0.24	0.24	0.03	0.16	0.16
Sat Flow, veh/h	1774	0	1583	1774	0	1583	1774	2984	551	1774	1770	1583
Grp Volume(v), veh/h	69	0	96	110	0	40	164	125	128	40	95	119
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1774	0	1583	1774	1770	1766	1774	1770	1583
Q Serve(g_s), s	1.7	0.0	2.6	2.7	0.0	1.0	4.0	2.6	2.7	1.0	2.2	3.1
Cycle Q Clear(g_c), s	1.7	0.0	2.6	2.7	0.0	1.0	4.0	2.6	2.7	1.0	2.2	3.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.31	1.00		1.00
Lane Grp Cap(c), veh/h	91	0	173	143	0	219	215	433	432	62	280	251
V/C Ratio(X)	0.76	0.00	0.56	0.77	0.00	0.18	0.76	0.29	0.30	0.65	0.34	0.47
Avail Cap(c_a), veh/h	353	0	946	392	0	981	510	900	898	235	626	560
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	21.2	0.0	19.1	20.4	0.0	17.2	19.2	13.9	13.9	21.5	16.9	17.3
Incr Delay (d2), s/veh	12.1	0.0	2.8	8.5	0.0	0.4	5.5	0.4	0.4	10.7	0.7	1.4
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	1.1	0.0	1.3	1.7	0.0	0.5	2.3	1.3	1.3	0.7	1.1	1.5
LnGrp Delay(d),s/veh	33.2	0.0	21.9	28.9	0.0	17.6	24.8	14.2	14.3	32.2	17.6	18.7
LnGrp LOS	C		C	C		B	C	B	B	C	B	B
Approach Vol, veh/h		165			150			417			254	
Approach Delay, s/veh		26.6			25.9			18.4			20.4	
Approach LOS		C			C			B			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.6	17.1	9.6	10.9	11.5	13.2	8.3	12.2				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	6.0	23.0	10.0	27.0	13.0	16.0	9.0	28.0				
Max Q Clear Time (g_c+I1), s	3.0	4.7	4.7	4.6	6.0	5.1	3.7	3.0				
Green Ext Time (p_c), s	0.0	2.6	0.1	0.7	0.2	2.1	0.0	0.8				
Intersection Summary												
HCM 2010 Ctrl Delay			21.4									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary
7: Hillcrest Ave & Sand Creek Rd

Cumulative PM With Project
12/9/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	168	1010	60	70	1106	192	80	90	180	116	30	128
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0
Adj Flow Rate, veh/h	168	1010	60	70	1106	192	80	90	180	116	30	128
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	184	1514	90	90	1185	205	103	257	230	143	297	266
Arrive On Green	0.10	0.89	0.89	0.03	0.79	0.79	0.06	0.15	0.15	0.08	0.17	0.17
Sat Flow, veh/h	1774	3395	202	1774	3018	522	1774	1770	1583	1774	1770	1583
Grp Volume(v), veh/h	168	526	544	70	647	651	80	90	180	116	30	128
Grp Sat Flow(s),veh/h/ln	1774	1770	1827	1774	1770	1771	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	8.1	6.9	6.9	3.4	25.2	25.8	3.9	4.0	9.5	5.6	1.2	6.3
Cycle Q Clear(g_c), s	8.1	6.9	6.9	3.4	25.2	25.8	3.9	4.0	9.5	5.6	1.2	6.3
Prop In Lane	1.00		0.11	1.00		0.29	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	184	789	815	90	695	696	103	257	230	143	297	266
V/C Ratio(X)	0.91	0.67	0.67	0.78	0.93	0.94	0.78	0.35	0.78	0.81	0.10	0.48
Avail Cap(c_a), veh/h	184	789	815	123	695	696	143	327	293	143	327	293
HCM Platoon Ratio	1.00	2.00	2.00	0.67	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.48	0.48	0.48	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.4	3.0	3.0	41.3	8.3	8.4	40.2	33.3	35.7	39.1	30.5	32.6
Incr Delay (d2), s/veh	41.9	4.4	4.3	9.8	12.0	12.5	16.3	0.8	10.2	27.9	0.1	1.3
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	6.1	3.8	3.9	1.9	13.7	13.9	2.4	2.0	4.8	3.9	0.6	2.9
LnGrp Delay(d),s/veh	80.3	7.4	7.3	51.1	20.3	20.9	56.5	34.1	45.9	67.0	30.6	33.9
LnGrp LOS	F	A	A	D	C	C	E	C	D	E	C	C
Approach Vol, veh/h	1238				1368		350				274	
Approach Delay, s/veh	17.2				22.2		45.3				47.6	
Approach LOS	B				C		D				D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	18.6	10.4	48.1	11.0	20.5	15.0	43.4				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	16.0	6.0	37.0	7.0	16.0	9.0	34.0				
Max Q Clear Time (g_c+l1), s	7.6	11.5	5.4	8.9	5.9	8.3	10.1	27.8				
Green Ext Time (p_c), s	0.0	1.1	0.0	20.1	0.0	1.6	0.0	5.5				
Intersection Summary												
HCM 2010 Ctrl Delay			24.9									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary 8: Sand Creek Rd & Heidorn Ranch Rd

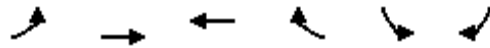
Cumulative PM With Project
12/9/2014

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Volume (veh/h)	140	1166	1282	277	215	86		
Number	7	4	8	18	1	16		
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		
Adj Sat Flow, veh/h/ln	186.3	186.3	186.3	190.0	186.3	186.3		
Adj Flow Rate, veh/h	140	1166	1282	277	215	86		
Adj No. of Lanes	1	2	2	0	1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	172	2536	1598	341	257	229		
Arrive On Green	0.13	1.00	1.00	0.55	0.14	0.14		
Sat Flow, veh/h	1774	3632	2997	619	1774	1583		
Grp Volume(v), veh/h	140	1166	775	784	215	86		
Grp Sat Flow(s),veh/h/ln	1774	1770	1770	1753	1774	1583		
Q Serve(g_s), s	6.6	0.0	0.0	19.5	10.2	4.3		
Cycle Q Clear(g_c), s	6.6	0.0	0.0	19.5	10.2	4.3		
Prop In Lane	1.00			0.35	1.00	1.00		
Lane Grp Cap(c), veh/h	172	2536	974	965	257	229		
V/C Ratio(X)	0.81	0.46	0.80	0.81	0.84	0.37		
Avail Cap(c_a), veh/h	205	2536	974	965	328	293		
HCM Platoon Ratio	1.33	2.00	2.00	1.00	1.00	1.00		
Upstream Filter(I)	0.73	0.73	0.74	0.74	1.00	1.00		
Uniform Delay (d), s/veh	36.9	0.0	0.0	4.6	36.0	33.5		
Incr Delay (d2), s/veh	14.3	0.4	5.1	5.7	13.8	1.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	3.9	0.2	1.4	10.2	6.0	3.9		
LnGrp Delay(d),s/veh	51.2	0.4	5.1	10.3	49.8	34.5		
LnGrp LOS	D	A	A	B	D	C		
Approach Vol, veh/h		1306	1559		301			
Approach Delay, s/veh		5.9	7.7		45.4			
Approach LOS		A	A		D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				71.5		18.5	14.4	57.1
Change Period (Y+Rc), s				6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s				62.0		16.0	10.0	46.0
Max Q Clear Time (g_c+I1), s				2.0		12.2	8.6	21.5
Green Ext Time (p_c), s				39.3		0.3	0.0	20.2
Intersection Summary								
HCM 2010 Ctrl Delay			10.5					
HCM 2010 LOS			B					

HCM Signalized Intersection Capacity Analysis

9: Sand Creek Rd & SR 4 Eastbound

Cumulative PM With Project
12/9/2014



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	498	863	973	280	820	526
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	
Frt	1.00	1.00	1.00	0.85	0.94	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1770	3539	3539	1583	3301	
Flt Permitted	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (perm)	1770	3539	3539	1583	3301	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	498	863	973	280	820	526
RTOR Reduction (vph)	0	0	0	205	125	0
Lane Group Flow (vph)	498	863	973	75	1221	0
Turn Type	Prot	NA	NA	Perm	Prot	
Protected Phases	7	4	8		6	
Permitted Phases				8		
Actuated Green, G (s)	21.0	51.0	24.0	24.0	27.0	
Effective Green, g (s)	21.0	51.0	24.0	24.0	27.0	
Actuated g/C Ratio	0.23	0.57	0.27	0.27	0.30	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	413	2005	943	422	990	
v/s Ratio Prot	c0.28	0.24	c0.27		c0.37	
v/s Ratio Perm				0.05		
v/c Ratio	1.21	0.43	1.03	0.18	1.23	
Uniform Delay, d1	34.5	11.2	33.0	25.4	31.5	
Progression Factor	1.00	1.00	1.11	2.97	1.00	
Incremental Delay, d2	113.5	0.1	33.5	0.7	113.7	
Delay (s)	148.0	11.3	70.1	76.1	145.2	
Level of Service	F	B	E	E	F	
Approach Delay (s)		61.3	71.5		145.2	
Approach LOS		E	E		F	

Intersection Summary

HCM 2000 Control Delay	93.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	109.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

10: SR 4 Westbound & Sand Creek Rd

Cumulative PM With Project
12/9/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Volume (vph)	409	1274	0	0	641	780	612	0	410	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0			
Lane Util. Factor	1.00	0.95			0.95	1.00	0.95	0.95	1.00			
Frt	1.00	1.00			1.00	0.85	1.00	1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95	0.95	1.00			
Satd. Flow (prot)	1770	3539			3539	1583	1681	1681	1583			
Flt Permitted	0.95	1.00			1.00	1.00	0.95	0.95	1.00			
Satd. Flow (perm)	1770	3539			3539	1583	1681	1681	1583			
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	409	1274	0	0	641	780	612	0	410	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	387	0	0	85	0	0	0
Lane Group Flow (vph)	409	1274	0	0	641	393	306	306	325	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Actuated Green, G (s)	22.4	58.2			29.8	29.8	19.8	19.8	19.8			
Effective Green, g (s)	22.4	58.2			29.8	29.8	19.8	19.8	19.8			
Actuated g/C Ratio	0.25	0.65			0.33	0.33	0.22	0.22	0.22			
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	440	2288			1171	524	369	369	348			
v/s Ratio Prot	c0.23	0.36			0.18							
v/s Ratio Perm						c0.25	0.18	0.18	c0.21			
v/c Ratio	0.93	0.56			0.55	0.75	0.83	0.83	0.93			
Uniform Delay, d1	33.0	8.8			24.6	26.8	33.5	33.5	34.5			
Progression Factor	0.97	0.56			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	17.1	0.6			1.8	9.5	14.2	14.2	31.5			
Delay (s)	49.3	5.5			26.4	36.3	47.7	47.7	66.0			
Level of Service	D	A			C	D	D	D	E			
Approach Delay (s)		16.1			31.9			55.0			0.0	
Approach LOS		B			C			E			A	
Intersection Summary												
HCM 2000 Control Delay			31.2		HCM 2000 Level of Service				C			
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			90.0		Sum of lost time (s)				18.0			
Intersection Capacity Utilization			102.9%		ICU Level of Service				G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Sand Creek Rd & SR 4 Eastbound

Cumulative AM With Project With Mitigation

12/9/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑	↑				↑↑		↑
Volume (vph)	0	475	293	0	827	570	0	0	0	410	0	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0				6.0	4.0	6.0
Lane Util. Factor		0.95	1.00		0.95	1.00				0.97	1.00	1.00
Frt		1.00	0.85		1.00	0.85				1.00	0.85	0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)		3539	1583		3539	1583				3433	0	1583
Flt Permitted		1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)		3539	1583		3539	1583				3433	0	1583
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	475	293	0	827	570	0	0	0	410	0	90
RTOR Reduction (vph)	0	0	92	0	0	179	0	0	0	0	9	66
Lane Group Flow (vph)	0	475	201	0	827	391	0	0	0	410	0	15
Turn Type		NA	Perm		NA	Perm				Prot		Perm
Protected Phases		4			8					6		
Permitted Phases			4			8						6
Actuated Green, G (s)		61.8	61.8		61.8	61.8				16.2	0.0	16.2
Effective Green, g (s)		61.8	61.8		61.8	61.8				16.2	0.0	16.2
Actuated g/C Ratio		0.69	0.69		0.69	0.69				0.18	0.00	0.18
Clearance Time (s)		6.0	6.0		6.0	6.0				6.0		6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0				3.0		3.0
Lane Grp Cap (vph)		2430	1086		2430	1086				617	0	284
v/s Ratio Prot		0.13			0.23					c0.12		
v/s Ratio Perm			0.13			c0.25						0.01
v/c Ratio		0.20	0.19		0.34	0.36				0.66	0.00	0.05
Uniform Delay, d1		5.1	5.1		5.8	5.9				34.4	45.0	30.5
Progression Factor		1.00	1.00		1.55	5.90				1.00	1.00	1.00
Incremental Delay, d2		0.0	0.1		0.3	0.7				2.7	0.0	0.1
Delay (s)		5.1	5.1		9.2	35.3				37.1	45.0	30.6
Level of Service		A	A		A	D				D	D	C
Approach Delay (s)		5.1			19.8			0.0			36.2	
Approach LOS		A			B			A			D	
Intersection Summary												
HCM 2000 Control Delay			18.7				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.42									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			42.9%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Sand Creek Rd & SR 4 Eastbound

Cumulative PM With Project With Mitigation

12/9/2014

											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL2	SBL	SBR	NWL	NWR
Lane Configurations		↑↑	↑		↑↑	↑	↑↑		↑		
Volume (vph)	0	863	498	0	973	280	820	0	526	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	4.0	6.0		
Lane Util. Factor		0.95	1.00		0.95	1.00	0.97	1.00	1.00		
Frt		1.00	0.85		1.00	0.85	1.00	0.85	0.85		
Flt Protected		1.00	1.00		1.00	1.00	0.95	1.00	1.00		
Satd. Flow (prot)		3539	1583		3539	1583	3433	0	1583		
Flt Permitted		1.00	1.00		1.00	1.00	0.95	1.00	1.00		
Satd. Flow (perm)		3539	1583		3539	1583	3433	0	1583		
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	863	498	0	973	280	820	0	526	0	0
RTOR Reduction (vph)	0	0	235	0	0	132	0	53	44	0	0
Lane Group Flow (vph)	0	863	263	0	973	148	820	0	429	0	0
Turn Type		NA	Perm		NA	Perm	Prot		Perm		
Protected Phases		4			8		6				
Permitted Phases			4			8			6		
Actuated Green, G (s)		47.6	47.6		47.6	47.6	30.4	0.0	30.4		
Effective Green, g (s)		47.6	47.6		47.6	47.6	30.4	0.0	30.4		
Actuated g/C Ratio		0.53	0.53		0.53	0.53	0.34	0.00	0.34		
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0		6.0		
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0		3.0		
Lane Grp Cap (vph)		1871	837		1871	837	1159	0	534		
v/s Ratio Prot		0.24			c0.27		0.24				
v/s Ratio Perm			0.17			0.09			c0.27		
v/c Ratio		0.46	0.31		0.52	0.18	0.71	0.00	0.80		
Uniform Delay, d1		13.2	12.0		13.8	11.0	25.9	45.0	27.1		
Progression Factor		1.00	1.00		1.37	3.60	1.00	1.00	1.00		
Incremental Delay, d2		0.2	0.2		0.8	0.3	2.0	0.0	8.5		
Delay (s)		13.4	12.2		19.6	40.1	27.9	45.0	35.6		
Level of Service		B	B		B	D	C	D	D		
Approach Delay (s)		13.0			24.2			31.3		0.0	
Approach LOS		B			C			C		A	
Intersection Summary											
HCM 2000 Control Delay		22.7			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio		0.63									
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization		69.5%			ICU Level of Service			C			
Analysis Period (min)		15									
c Critical Lane Group											

HCM 2010 Signalized Intersection Summary

1: Deer Valley Road & Lone Tree Way

Scenario 3a
Cumulative AM With Project - 2 Lane with Shift

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	1063	236	400	1056	385	459	598	187	330	600	50
Future Volume (veh/h)	90	1063	236	400	1056	385	459	598	187	330	600	50
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	90	1063	236	400	1056	385	459	598	187	330	600	50
Adj No. of Lanes	1	3	0	2	2	0	2	2	0	2	2	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	110	1499	333	455	1098	395	500	635	198	374	670	56
Arrive On Green	0.06	0.72	0.72	0.13	0.86	0.86	0.15	0.24	0.24	0.11	0.20	0.20
Sat Flow, veh/h	1774	4166	924	3442	2553	918	3442	2657	829	3442	3308	275
Grp Volume(v), veh/h	90	865	434	400	727	714	459	398	387	330	320	330
Grp Sat Flow(s),veh/h/ln	1774	1695	1700	1721	1770	1701	1721	1770	1716	1721	1770	1814
Q Serve(g_s), s	7.5	21.9	21.9	17.1	48.5	54.6	19.7	33.1	33.2	14.2	26.5	26.5
Cycle Q Clear(g_c), s	7.5	21.9	21.9	17.1	48.5	54.6	19.7	33.1	33.2	14.2	26.5	26.5
Prop In Lane	1.00		0.54	1.00		0.54	1.00		0.48	1.00		0.15
Lane Grp Cap(c), veh/h	110	1220	612	455	761	732	500	423	411	374	358	367
V/C Ratio(X)	0.82	0.71	0.71	0.88	0.96	0.98	0.92	0.94	0.94	0.88	0.89	0.90
Avail Cap(c_a), veh/h	130	1220	612	574	761	732	505	425	412	390	366	375
HCM Platoon Ratio	1.00	2.00	2.00	1.00	2.00	2.00	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	69.5	16.5	16.5	63.9	9.4	9.8	63.2	56.0	56.1	65.9	58.2	58.3
Incr Delay (d2), s/veh	28.1	3.5	6.8	12.2	23.5	27.8	21.8	29.0	30.2	20.0	23.1	23.1
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(50%),veh/ln	4.6	10.4	11.3	8.9	26.8	29.0	10.9	19.7	19.2	7.8	15.2	15.7
LnGrp Delay(d),s/veh	97.6	20.0	23.4	76.1	32.8	37.6	85.0	85.0	86.2	85.9	81.3	81.3
LnGrp LOS	F	C	C	E	C	D	F	F	F	F	F	F
Approach Vol, veh/h	1389				1841				1244		980	
Approach Delay, s/veh	26.1				44.1				85.4		82.9	
Approach LOS	C				D				F		F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	22.3	41.9	25.9	60.0	27.8	36.4	15.3	70.5				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	17.0	36.0	25.0	48.0	22.0	31.0	11.0	62.0				
Max Q Clear Time (g_c+I1), s	16.2	35.2	19.1	23.9	21.7	28.5	9.5	56.6				
Green Ext Time (p_c), s	0.1	0.6	0.7	19.0	0.1	1.8	0.0	4.9				
Intersection Summary												
HCM 2010 Ctrl Delay			55.9									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary

2: Hillcrest Avenue & Lone Tree Way

Scenario 3a
Cumulative AM With Project - 2 Lane with Shift

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	300	719	70	90	1089	341	246	459	194	354	175	300
Future Volume (veh/h)	300	719	70	90	1089	341	246	459	194	354	175	300
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	300	719	70	90	1089	341	246	459	194	354	175	300
Adj No. of Lanes	1	3	0	1	3	1	1	2	0	2	2	1
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	325	2151	208	109	1701	530	270	498	209	405	602	269
Arrive On Green	0.18	0.46	0.46	0.12	0.67	0.67	0.15	0.20	0.20	0.12	0.17	0.17
Sat Flow, veh/h	1774	4716	456	1774	5085	1583	1774	2432	1020	3442	3539	1583
Grp Volume(v), veh/h	300	516	273	90	1089	341	246	333	320	354	175	300
Grp Sat Flow(s),veh/h/ln	1774	1695	1782	1774	1695	1583	1774	1770	1683	1721	1770	1583
Q Serve(g_s), s	24.9	14.6	14.8	7.4	18.6	18.8	20.5	27.7	28.0	15.2	6.5	25.5
Cycle Q Clear(g_c), s	24.9	14.6	14.8	7.4	18.6	18.8	20.5	27.7	28.0	15.2	6.5	25.5
Prop In Lane	1.00		0.26	1.00		1.00	1.00		0.61	1.00		1.00
Lane Grp Cap(c), veh/h	325	1546	813	109	1701	530	270	362	344	405	602	269
V/C Ratio(X)	0.92	0.33	0.34	0.82	0.64	0.64	0.91	0.92	0.93	0.87	0.29	1.11
Avail Cap(c_a), veh/h	414	1546	813	154	1701	530	343	378	359	482	602	269
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.90	0.90	0.90	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.2	26.2	26.2	64.9	19.6	19.6	62.6	58.4	58.6	65.1	54.3	62.2
Incr Delay (d2), s/veh	22.8	0.6	1.1	19.4	1.7	5.4	23.8	26.7	29.5	14.4	0.3	89.0
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(50%),veh/ln	14.3	7.0	7.5	4.2	8.7	8.9	11.8	16.2	15.9	8.0	3.2	17.8
LnGrp Delay(d),s/veh	83.0	26.8	27.3	84.4	21.3	25.0	86.4	85.1	88.1	79.5	54.6	151.3
LnGrp LOS	F	C	C	F	C	C	F	F	F	E	D	F
Approach Vol, veh/h	1089				1520				899		829	
Approach Delay, s/veh	42.4				25.9				86.5		100.2	
Approach LOS	D				C				F		F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	23.6	36.7	15.3	74.4	28.8	31.5	33.5	56.2				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	21.0	32.0	13.0	60.0	29.0	24.0	35.0	38.0				
Max Q Clear Time (g_c+I1), s	17.2	30.0	9.4	16.8	22.5	27.5	26.9	20.8				
Green Ext Time (p_c), s	0.5	0.7	0.1	20.3	0.4	0.0	0.5	11.8				
Intersection Summary												
HCM 2010 Ctrl Delay	56.8											
HCM 2010 LOS	E											

HCM 2010 Signalized Intersection Summary

3: Heidorn Ranch Road/Fairside Way & Lone Tree Way

Scenario 3a
Cumulative AM With Project - 2 Lane with Shift

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	1377	6	85	1652	20	97	10	134	20	10	20
Future Volume (veh/h)	10	1377	6	85	1652	20	97	10	134	20	10	20
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	10	1377	6	85	1652	20	97	10	134	20	10	20
Adj No. of Lanes	1	3	0	1	3	0	2	1	1	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	12	3491	15	105	3730	45	142	184	157	25	40	80
Arrive On Green	0.01	1.00	1.00	0.12	1.00	1.00	0.04	0.10	0.10	0.01	0.07	0.07
Sat Flow, veh/h	1774	5226	23	1774	5179	63	3442	1863	1583	1774	556	1111
Grp Volume(v), veh/h	10	893	490	85	1081	591	97	10	134	20	0	30
Grp Sat Flow(s),veh/h/ln	1774	1695	1859	1774	1695	1852	1721	1863	1583	1774	0	1667
Q Serve(g_s), s	0.8	0.0	0.0	7.0	0.0	0.0	4.2	0.7	12.5	1.7	0.0	2.6
Cycle Q Clear(g_c), s	0.8	0.0	0.0	7.0	0.0	0.0	4.2	0.7	12.5	1.7	0.0	2.6
Prop In Lane	1.00		0.01	1.00		0.03	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	12	2265	1242	105	2442	1334	142	184	157	25	0	120
V/C Ratio(X)	0.83	0.39	0.39	0.81	0.44	0.44	0.68	0.05	0.85	0.81	0.00	0.25
Avail Cap(c_a), veh/h	59	2265	1242	248	2442	1334	298	286	243	95	0	200
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.86	0.86	0.86	0.86	0.86	0.86	0.98	0.98	0.98	1.00	0.00	1.00
Uniform Delay (d), s/veh	73.9	0.0	0.0	65.3	0.0	0.0	70.9	61.2	66.5	73.8	0.0	65.8
Incr Delay (d2), s/veh	69.7	0.4	0.8	12.0	0.5	0.9	5.6	0.1	15.9	44.3	0.0	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(50%),veh/ln	0.6	0.1	0.3	3.8	0.2	0.3	2.1	0.4	6.2	1.1	0.0	1.2
LnGrp Delay(d),s/veh	143.6	0.4	0.8	77.3	0.5	0.9	76.6	61.3	82.4	118.0	0.0	66.9
LnGrp LOS	F	A	A	E	A	A	E	E	F	F		E
Approach Vol, veh/h	1393			1757			241			50		
Approach Delay, s/veh	1.6			4.4			79.2			87.3		
Approach LOS	A			A			E			F		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.1	20.8	14.9	106.2	12.2	16.8	7.0	114.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	8.0	23.0	21.0	74.0	13.0	18.0	5.0	90.0				
Max Q Clear Time (g_c+I1), s	3.7	14.5	9.0	2.0	6.2	4.6	2.8	2.0				
Green Ext Time (p_c), s	0.0	0.4	0.1	45.5	0.1	0.5	0.0	51.0				
Intersection Summary												
HCM 2010 Ctrl Delay	9.7											
HCM 2010 LOS	A											

HCM 2010 Signalized Intersection Summary

11: Hillcrest Ave & Project Access

Scenario 3a
Cumulative AM With Project - 2 Lane with Shift

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	0	60	18	0	95	30	306	6	32	200	40
Future Volume (veh/h)	120	0	60	18	0	95	30	306	6	32	200	40
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	120	0	60	18	0	95	30	306	6	32	200	40
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	155	0	271	32	0	161	49	450	9	52	375	75
Arrive On Green	0.09	0.00	0.17	0.02	0.00	0.10	0.03	0.25	0.25	0.03	0.25	0.25
Sat Flow, veh/h	1774	0	1583	1774	0	1583	1774	1821	36	1774	1508	302
Grp Volume(v), veh/h	120	0	60	18	0	95	30	0	312	32	0	240
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1774	0	1583	1774	0	1856	1774	0	1810
Q Serve(g_s), s	3.0	0.0	1.5	0.5	0.0	2.6	0.8	0.0	6.8	0.8	0.0	5.2
Cycle Q Clear(g_c), s	3.0	0.0	1.5	0.5	0.0	2.6	0.8	0.0	6.8	0.8	0.0	5.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.02	1.00		0.17
Lane Grp Cap(c), veh/h	155	0	271	32	0	161	49	0	459	52	0	450
V/C Ratio(X)	0.78	0.00	0.22	0.57	0.00	0.59	0.61	0.00	0.68	0.62	0.00	0.53
Avail Cap(c_a), veh/h	316	0	564	316	0	564	158	0	744	158	0	725
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.1	0.0	16.0	21.9	0.0	19.3	21.6	0.0	15.3	21.6	0.0	14.6
Incr Delay (d2), s/veh	8.0	0.0	0.4	14.9	0.0	3.4	11.5	0.0	1.8	11.2	0.0	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(50%),veh/ln	1.8	0.0	0.7	0.4	0.0	1.3	0.5	0.0	3.7	0.6	0.0	2.7
LnGrp Delay(d),s/veh	28.1	0.0	16.4	36.7	0.0	22.6	33.1	0.0	17.1	32.8	0.0	15.6
LnGrp LOS	C		B	D		C	C		B	C		B
Approach Vol, veh/h	180				113				342		272	
Approach Delay, s/veh	24.2				24.9				18.5		17.6	
Approach LOS	C				C				B		B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.3	17.1	6.8	13.7	7.2	17.2	9.9	10.6				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	4.0	18.0	8.0	16.0	4.0	18.0	8.0	16.0				
Max Q Clear Time (g_c+I1), s	2.8	8.8	2.5	3.5	2.8	7.2	5.0	4.6				
Green Ext Time (p_c), s	0.0	2.3	0.0	0.6	0.0	2.5	0.1	0.6				
Intersection Summary												
HCM 2010 Ctrl Delay			20.2									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary

12: Heidorn Ranch Rd & Project Access

Scenario 3a
Cumulative AM With Project - 2 Lane with Shift

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	107	0	146	30	0	70	49	202	40	60	66	35
Future Volume (veh/h)	107	0	146	30	0	70	49	202	40	60	66	35
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	107	0	146	30	0	70	49	202	40	60	66	35
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	140	0	248	50	0	168	73	320	63	84	250	133
Arrive On Green	0.08	0.00	0.16	0.03	0.00	0.11	0.04	0.21	0.21	0.05	0.22	0.22
Sat Flow, veh/h	1774	0	1583	1774	0	1583	1774	1511	299	1774	1147	608
Grp Volume(v), veh/h	107	0	146	30	0	70	49	0	242	60	0	101
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1774	0	1583	1774	0	1810	1774	0	1755
Q Serve(g_s), s	2.6	0.0	3.7	0.7	0.0	1.8	1.2	0.0	5.3	1.4	0.0	2.1
Cycle Q Clear(g_c), s	2.6	0.0	3.7	0.7	0.0	1.8	1.2	0.0	5.3	1.4	0.0	2.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.17	1.00		0.35
Lane Grp Cap(c), veh/h	140	0	248	50	0	168	73	0	384	84	0	383
V/C Ratio(X)	0.77	0.00	0.59	0.60	0.00	0.42	0.67	0.00	0.63	0.71	0.00	0.26
Avail Cap(c_a), veh/h	575	0	916	205	0	586	246	0	1089	411	0	1219
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.5	0.0	16.9	20.8	0.0	18.1	20.4	0.0	15.5	20.3	0.0	14.0
Incr Delay (d2), s/veh	8.4	0.0	2.2	11.2	0.0	1.6	10.2	0.0	1.7	10.5	0.0	0.4
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	1.6	0.0	1.8	0.5	0.0	0.9	0.8	0.0	2.8	0.9	0.0	1.0
LnGrp Delay(d),s/veh	27.9	0.0	19.1	32.0	0.0	19.7	30.6	0.0	17.2	30.8	0.0	14.4
LnGrp LOS	C		B	C		B	C		B	C		B
Approach Vol, veh/h	253				100				291		161	
Approach Delay, s/veh	22.8				23.4				19.5		20.5	
Approach LOS	C				C				B		C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.1	15.2	7.2	12.8	7.8	15.4	9.4	10.6				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	10.0	26.0	5.0	25.0	6.0	30.0	14.0	16.0				
Max Q Clear Time (g_c+I1), s	3.4	7.3	2.7	5.7	3.2	4.1	4.6	3.8				
Green Ext Time (p_c), s	0.0	1.9	0.0	1.2	0.0	2.1	0.2	1.0				
Intersection Summary												
HCM 2010 Ctrl Delay			21.2									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary

7: Hillcrest Ave & Sand Creek Rd

Scenario 3a
Cumulative AM With Project - 2 Lane with Shift

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	94	304	16	32	400	128	150	120	70	115	30	133
Future Volume (veh/h)	94	304	16	32	400	128	150	120	70	115	30	133
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	94	304	16	32	400	128	150	120	70	115	30	133
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	120	894	47	42	630	202	182	161	94	144	37	165
Arrive On Green	0.07	0.51	0.51	0.05	0.93	0.93	0.10	0.15	0.15	0.08	0.12	0.12
Sat Flow, veh/h	1774	1754	92	1774	1353	433	1774	1105	644	1774	300	1329
Grp Volume(v), veh/h	94	0	320	32	0	528	150	0	190	115	0	163
Grp Sat Flow(s),veh/h/ln	1774	0	1846	1774	0	1786	1774	0	1749	1774	0	1628
Q Serve(g_s), s	5.2	0.0	10.3	1.8	0.0	5.0	8.3	0.0	10.4	6.4	0.0	9.7
Cycle Q Clear(g_c), s	5.2	0.0	10.3	1.8	0.0	5.0	8.3	0.0	10.4	6.4	0.0	9.7
Prop In Lane	1.00		0.05	1.00		0.24	1.00		0.37	1.00		0.82
Lane Grp Cap(c), veh/h	120	0	941	42	0	832	182	0	254	144	0	202
V/C Ratio(X)	0.78	0.00	0.34	0.77	0.00	0.63	0.82	0.00	0.75	0.80	0.00	0.81
Avail Cap(c_a), veh/h	248	0	941	124	0	832	266	0	297	231	0	244
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.72	0.00	0.72	1.00	0.00	1.00	0.97	0.00	0.97
Uniform Delay (d), s/veh	45.9	0.0	14.5	47.4	0.0	2.0	44.0	0.0	41.0	45.1	0.0	42.6
Incr Delay (d2), s/veh	10.5	0.0	1.0	18.7	0.0	2.7	12.5	0.0	8.4	9.4	0.0	14.9
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(50%),veh/ln	2.9	0.0	5.5	1.1	0.0	2.7	4.7	0.0	5.6	3.5	0.0	5.2
LnGrp Delay(d),s/veh	56.4	0.0	15.5	66.1	0.0	4.7	56.5	0.0	49.4	54.6	0.0	57.5
LnGrp LOS	E		B	E		A	E		D	D		E
Approach Vol, veh/h		414			560			340			278	
Approach Delay, s/veh		24.8			8.2			52.5			56.3	
Approach LOS		C			A			D			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.1	20.5	8.4	57.0	16.3	18.4	12.8	52.6				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	13.0	17.0	7.0	39.0	15.0	15.0	14.0	32.0				
Max Q Clear Time (g_c+I1), s	8.4	12.4	3.8	12.3	10.3	11.7	7.2	7.0				
Green Ext Time (p_c), s	0.1	0.9	0.0	6.1	0.1	0.6	0.1	6.0				
Intersection Summary												
HCM 2010 Ctrl Delay			30.4									
HCM 2010 LOS			C									
Notes												

HCM 2010 Signalized Intersection Summary

8: Sand Creek Rd & Heidorn Ranch Rd

Scenario 3a
Cumulative AM With Project - 2 Lane with Shift

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	53	368	496	238	203	39		
Future Volume (veh/h)	53	368	496	238	203	39		
Number	7	4	8	18	1	16		
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		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863		
Adj Flow Rate, veh/h	53	368	496	238	203	39		
Adj No. of Lanes	1	1	1	0	1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	68	1387	770	369	240	214		
Arrive On Green	0.08	1.00	0.65	0.65	0.14	0.14		
Sat Flow, veh/h	1774	1863	1191	571	1774	1583		
Grp Volume(v), veh/h	53	368	0	734	203	39		
Grp Sat Flow(s),veh/h/ln	1774	1863	0	1762	1774	1583		
Q Serve(g_s), s	2.9	0.0	0.0	25.2	11.2	2.2		
Cycle Q Clear(g_c), s	2.9	0.0	0.0	25.2	11.2	2.2		
Prop In Lane	1.00			0.32	1.00	1.00		
Lane Grp Cap(c), veh/h	68	1387	0	1139	240	214		
V/C Ratio(X)	0.78	0.27	0.00	0.64	0.84	0.18		
Avail Cap(c_a), veh/h	124	1387	0	1139	355	317		
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.91	0.91	0.00	0.65	1.00	1.00		
Uniform Delay (d), s/veh	45.8	0.0	0.0	10.7	42.2	38.3		
Incr Delay (d2), s/veh	16.3	0.4	0.0	1.8	11.5	0.4		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	1.7	0.2	0.0	12.6	6.2	2.0		
LnGrp Delay(d),s/veh	62.1	0.4	0.0	12.6	53.7	38.7		
LnGrp LOS	E	A		B	D	D		
Approach Vol, veh/h		421	734		242			
Approach Delay, s/veh		8.2	12.6		51.3			
Approach LOS		A	B		D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				80.5		19.5	9.8	70.6
Change Period (Y+Rc), s				6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s				68.0		20.0	7.0	55.0
Max Q Clear Time (g_c+I1), s				2.0		13.2	4.9	27.2
Green Ext Time (p_c), s				9.4		0.4	0.0	8.3
Intersection Summary								
HCM 2010 Ctrl Delay			17.9					
HCM 2010 LOS			B					

HCM 2010 Signalized Intersection Summary

9: Sand Creek Rd & SR 4 Eastbound

Scenario 3a
Cumulative AM With Project - 2 Lane with Shift

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	249	377	669	570	410	68		
Future Volume (veh/h)	249	377	669	570	410	68		
Number	7	4	8	18	1	16		
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		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	249	377	669	570	410	68		
Adj No. of Lanes	1	2	2	1	2	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	297	2441	1572	703	528	243		
Arrive On Green	0.17	0.69	0.44	0.44	0.15	0.15		
Sat Flow, veh/h	1774	3632	3632	1583	3442	1583		
Grp Volume(v), veh/h	249	377	669	570	410	68		
Grp Sat Flow(s),veh/h/ln	1774	1770	1770	1583	1721	1583		
Q Serve(g_s), s	10.4	2.8	9.9	23.9	8.8	2.9		
Cycle Q Clear(g_c), s	10.4	2.8	9.9	23.9	8.8	2.9		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	297	2441	1572	703	528	243		
V/C Ratio(X)	0.84	0.15	0.43	0.81	0.78	0.28		
Avail Cap(c_a), veh/h	487	2820	1572	703	764	352		
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	30.9	4.1	14.6	18.5	31.1	28.7		
Incr Delay (d2), s/veh	6.8	0.0	0.8	9.8	3.1	0.6		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	5.7	1.4	5.0	12.2	4.4	2.7		
LnGrp Delay(d),s/veh	37.6	4.2	15.4	28.3	34.3	29.3		
LnGrp LOS	D	A	B	C	C	C		
Approach Vol, veh/h		626	1239		478			
Approach Delay, s/veh		17.5	21.4		33.6			
Approach LOS		B	C		C			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				58.8		17.7	18.8	40.0
Change Period (Y+Rc), s				6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s				61.0		17.0	21.0	34.0
Max Q Clear Time (g_c+I1), s				4.8		10.8	12.4	25.9
Green Ext Time (p_c), s				13.7		1.0	0.5	5.3
Intersection Summary								
HCM 2010 Ctrl Delay			22.8					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary

10: SR 4 Westbound & Sand Creek Rd

Scenario 3a
Cumulative AM With Project - 2 Lane with Shift

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	271	517	0	0	764	720	474	0	220	0	0	0
Future Volume (veh/h)	271	517	0	0	764	720	474	0	220	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	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			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1863	1863	1863	1863			
Adj Flow Rate, veh/h	271	517	0	0	1102	495	474	0	220			
Adj No. of Lanes	2	3	0	0	2	1	2	0	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	351	3519	0	0	1950	829	620	0	277			
Arrive On Green	0.10	0.69	0.00	0.00	0.52	0.52	0.17	0.00	0.17			
Sat Flow, veh/h	3442	5253	0	0	3725	1583	3548	0	1583			
Grp Volume(v), veh/h	271	517	0	0	1102	495	474	0	220			
Grp Sat Flow(s),veh/h/ln	1721	1695	0	0	1863	1583	1774	0	1583			
Q Serve(g_s), s	6.9	3.1	0.0	0.0	18.0	19.5	11.5	0.0	12.0			
Cycle Q Clear(g_c), s	6.9	3.1	0.0	0.0	18.0	19.5	11.5	0.0	12.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	351	3519	0	0	1950	829	620	0	277			
V/C Ratio(X)	0.77	0.15	0.00	0.00	0.57	0.60	0.76	0.00	0.80			
Avail Cap(c_a), veh/h	459	3519	0	0	1950	829	867	0	387			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.90	0.90	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	39.4	4.8	0.0	0.0	14.5	14.9	35.4	0.0	35.6			
Incr Delay (d2), s/veh	5.3	0.1	0.0	0.0	1.2	3.2	2.7	0.0	7.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	3.5	1.5	0.0	0.0	9.5	9.3	5.8	0.0	5.8			
LnGrp Delay(d),s/veh	44.7	4.8	0.0	0.0	15.7	18.0	38.0	0.0	43.2			
LnGrp LOS	D	A			B	B	D		D			
Approach Vol, veh/h		788			1597			694				
Approach Delay, s/veh		18.6			16.4			39.7				
Approach LOS		B			B			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		21.7		68.3			15.2	53.1				
Change Period (Y+Rc), s		6.0		6.0			6.0	6.0				
Max Green Setting (Gmax), s		22.0		56.0			12.0	38.0				
Max Q Clear Time (g_c+I1), s		14.0		5.1			8.9	21.5				
Green Ext Time (p_c), s		1.7		23.0			0.3	11.8				
Intersection Summary												
HCM 2010 Ctrl Delay				22.2								
HCM 2010 LOS				C								
Notes												

HCM 2010 Signalized Intersection Summary

1: Deer Valley Road & Lone Tree Way

Scenario 3a
Cumulative PM With Project - 2 Lane with Shift

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	1151	292	310	891	242	332	571	374	390	470	40
Future Volume (veh/h)	110	1151	292	310	891	242	332	571	374	390	470	40
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	110	1151	292	310	891	242	332	571	374	390	470	40
Adj No. of Lanes	1	3	0	2	2	0	2	2	0	2	2	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	130	1392	353	353	1028	279	384	561	367	413	930	79
Arrive On Green	0.07	0.69	0.69	0.10	0.75	0.75	0.11	0.27	0.27	0.12	0.28	0.28
Sat Flow, veh/h	1774	4046	1026	3442	2754	747	3442	2052	1344	3442	3303	280
Grp Volume(v), veh/h	110	965	478	310	572	561	332	493	452	390	251	259
Grp Sat Flow(s),veh/h/ln	1774	1695	1682	1721	1770	1731	1721	1770	1626	1721	1770	1813
Q Serve(g_s), s	9.2	30.9	30.9	13.3	34.8	35.0	14.2	41.0	41.0	16.9	17.8	17.9
Cycle Q Clear(g_c), s	9.2	30.9	30.9	13.3	34.8	35.0	14.2	41.0	41.0	16.9	17.8	17.9
Prop In Lane	1.00		0.61	1.00		0.43	1.00		0.83	1.00		0.15
Lane Grp Cap(c), veh/h	130	1166	578	353	661	646	384	484	444	413	498	511
V/C Ratio(X)	0.85	0.83	0.83	0.88	0.87	0.87	0.86	1.02	1.02	0.94	0.50	0.51
Avail Cap(c_a), veh/h	130	1166	578	367	661	646	482	484	444	413	498	511
HCM Platoon Ratio	1.00	2.00	2.00	1.00	2.00	2.00	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	68.7	20.2	20.2	66.4	16.3	16.3	65.5	54.5	54.5	65.5	45.1	45.1
Incr Delay (d2), s/veh	37.3	6.8	12.8	20.1	14.3	14.7	12.6	45.6	47.4	30.5	0.8	0.8
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(50%),veh/ln	5.9	15.3	16.1	7.3	18.8	18.8	7.5	26.1	24.2	9.8	8.8	9.1
LnGrp Delay(d),s/veh	106.0	27.0	33.0	86.5	30.6	31.0	78.1	100.1	101.9	96.0	45.9	46.0
LnGrp LOS	F	C	C	F	C	C	E	F	F	F	D	D
Approach Vol, veh/h		1553			1443			1277			900	
Approach Delay, s/veh		34.4			42.8			95.0			67.6	
Approach LOS		C			D			F			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	24.0	47.0	21.4	57.6	22.7	48.3	17.0	62.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	18.0	41.0	16.0	51.0	21.0	38.0	11.0	56.0				
Max Q Clear Time (g_c+I1), s	18.9	43.0	15.3	32.9	16.2	19.9	11.2	37.0				
Green Ext Time (p_c), s	0.0	0.0	0.1	14.3	0.5	9.2	0.0	14.9				
Intersection Summary												
HCM 2010 Ctrl Delay				57.5								
HCM 2010 LOS				E								

HCM 2010 Signalized Intersection Summary

2: Hillcrest Avenue & Lone Tree Way

Scenario 3a
Cumulative PM With Project - 2 Lane with Shift

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	330	1324	136	222	1221	352	83	170	146	504	145	140
Future Volume (veh/h)	330	1324	136	222	1221	352	83	170	146	504	145	140
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	330	1324	136	222	1221	352	83	170	146	504	145	140
Adj No. of Lanes	1	3	0	1	3	1	1	2	0	2	2	1
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	355	2097	215	243	1953	608	103	174	140	559	700	313
Arrive On Green	0.20	0.45	0.45	0.27	0.77	0.77	0.06	0.09	0.09	0.16	0.20	0.20
Sat Flow, veh/h	1774	4687	481	1774	5085	1583	1774	1865	1503	3442	3539	1583
Grp Volume(v), veh/h	330	958	502	222	1221	352	83	161	155	504	145	140
Grp Sat Flow(s),veh/h/ln	1774	1695	1778	1774	1695	1583	1774	1770	1598	1721	1770	1583
Q Serve(g_s), s	27.4	32.6	32.6	18.2	16.1	13.9	6.9	13.6	14.0	21.6	5.1	11.7
Cycle Q Clear(g_c), s	27.4	32.6	32.6	18.2	16.1	13.9	6.9	13.6	14.0	21.6	5.1	11.7
Prop In Lane	1.00		0.27	1.00		1.00	1.00		0.94	1.00		1.00
Lane Grp Cap(c), veh/h	355	1517	795	243	1953	608	103	165	149	559	700	313
V/C Ratio(X)	0.93	0.63	0.63	0.92	0.63	0.58	0.81	0.97	1.04	0.90	0.21	0.45
Avail Cap(c_a), veh/h	438	1517	795	319	1953	608	154	165	149	642	700	313
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.90	0.90	0.90	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.0	31.9	31.9	53.6	12.6	12.3	69.8	67.8	68.0	61.6	50.3	52.9
Incr Delay (d2), s/veh	23.6	2.0	3.8	23.3	1.4	3.6	17.0	61.9	85.0	14.6	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	0.3	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.8	15.7	16.9	10.4	7.5	6.5	3.9	9.5	9.7	11.4	2.5	5.2
LnGrp Delay(d),s/veh	82.5	33.9	35.7	76.9	13.9	15.9	86.8	129.7	153.3	76.2	50.5	53.9
LnGrp LOS	F	C	D	E	B	B	F	F	F	E	D	D
Approach Vol, veh/h	1790			1795			399			789		
Approach Delay, s/veh	43.4			22.1			130.0			67.5		
Approach LOS	D			C			F			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	30.4	20.0	26.5	73.1	14.7	35.7	36.0	63.6				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	28.0	14.0	27.0	57.0	13.0	29.0	37.0	47.0				
Max Q Clear Time (g_c+I1), s	23.6	16.0	20.2	34.6	8.9	13.7	29.4	18.1				
Green Ext Time (p_c), s	0.8	0.0	0.3	18.5	0.1	2.7	0.6	22.9				
Intersection Summary												
HCM 2010 Ctrl Delay	46.6											
HCM 2010 LOS	D											

HCM 2010 Signalized Intersection Summary

3: Heidorn Ranch Road/Fairside Way & Lone Tree Way

Scenario 3a
Cumulative PM With Project - 2 Lane with Shift

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	2045	141	119	1667	20	178	10	109	30	10	20
Future Volume (veh/h)	30	2045	141	119	1667	20	178	10	109	30	10	20
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	30	2045	141	119	1667	20	178	10	109	30	10	20
Adj No. of Lanes	1	3	0	1	3	0	2	1	1	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	62	3278	225	160	3782	45	268	175	149	62	28	56
Arrive On Green	0.03	0.67	0.66	0.18	1.00	1.00	0.08	0.09	0.09	0.03	0.05	0.04
Sat Flow, veh/h	1774	4861	333	1774	5180	62	3442	1863	1583	1774	556	1111
Grp Volume(v), veh/h	30	1423	763	119	1091	596	178	10	109	30	0	30
Grp Sat Flow(s),veh/h/ln	1774	1695	1804	1774	1695	1852	1721	1863	1583	1774	0	1667
Q Serve(g_s), s	2.5	35.3	36.0	9.5	0.0	0.0	7.5	0.7	10.0	2.5	0.0	2.6
Cycle Q Clear(g_c), s	2.5	35.3	36.0	9.5	0.0	0.0	7.5	0.7	10.0	2.5	0.0	2.6
Prop In Lane	1.00		0.18	1.00		0.03	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	62	2286	1216	160	2475	1352	268	175	149	62	0	84
V/C Ratio(X)	0.49	0.62	0.63	0.74	0.44	0.44	0.66	0.06	0.73	0.49	0.00	0.36
Avail Cap(c_a), veh/h	71	2286	1216	237	2475	1352	344	186	158	71	0	84
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.62	0.62	0.62	0.85	0.85	0.85	0.99	0.99	0.99	1.00	0.00	1.00
Uniform Delay (d), s/veh	71.1	13.7	13.9	59.8	0.0	0.0	67.2	61.9	66.1	71.1	0.0	69.5
Incr Delay (d2), s/veh	3.6	0.8	1.5	5.8	0.5	0.9	3.1	0.1	14.9	5.9	0.0	2.5
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(50%),veh/ln	1.3	16.7	18.4	4.9	0.2	0.3	3.7	0.4	5.0	1.3	0.0	1.3
LnGrp Delay(d),s/veh	74.7	14.5	15.4	65.6	0.5	0.9	70.3	62.0	81.1	76.9	0.0	72.0
LnGrp LOS	E	B	B	E	A	A	E	E	F	E		E
Approach Vol, veh/h		2216			1806			297			60	
Approach Delay, s/veh		15.6			4.9			74.0			74.5	
Approach LOS		B			A			E			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.2	18.1	17.6	105.1	15.7	11.6	9.2	113.5				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	4.0	13.0	18.0	91.0	13.0	4.0	4.0	105.0				
Max Q Clear Time (g_c+I1), s	4.5	12.0	11.5	38.0	9.5	4.6	4.5	2.0				
Green Ext Time (p_c), s	0.0	0.0	0.1	46.8	0.2	0.0	0.0	81.8				
Intersection Summary												
HCM 2010 Ctrl Delay				16.0								
HCM 2010 LOS				B								

HCM 2010 Signalized Intersection Summary

11: Hillcrest Ave & Project Access

Scenario 3a
Cumulative PM With Project - 2 Lane with Shift

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	0	50	12	0	63	80	349	21	106	212	40
Future Volume (veh/h)	80	0	50	12	0	63	80	349	21	106	212	40
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	80	0	50	12	0	63	80	349	21	106	212	40
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	102	0	187	22	0	116	102	504	30	138	473	89
Arrive On Green	0.06	0.00	0.12	0.01	0.00	0.07	0.06	0.29	0.29	0.08	0.31	0.31
Sat Flow, veh/h	1774	0	1583	1774	0	1583	1774	1740	105	1774	1524	288
Grp Volume(v), veh/h	80	0	50	12	0	63	80	0	370	106	0	252
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1774	0	1583	1774	0	1844	1774	0	1812
Q Serve(g_s), s	2.1	0.0	1.4	0.3	0.0	1.8	2.1	0.0	8.5	2.8	0.0	5.3
Cycle Q Clear(g_c), s	2.1	0.0	1.4	0.3	0.0	1.8	2.1	0.0	8.5	2.8	0.0	5.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.06	1.00		0.16
Lane Grp Cap(c), veh/h	102	0	187	22	0	116	102	0	535	138	0	562
V/C Ratio(X)	0.79	0.00	0.27	0.55	0.00	0.54	0.79	0.00	0.69	0.77	0.00	0.45
Avail Cap(c_a), veh/h	334	0	827	148	0	662	334	0	964	445	0	1061
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.3	0.0	19.2	23.5	0.0	21.4	22.3	0.0	15.1	21.6	0.0	13.2
Incr Delay (d2), s/veh	12.5	0.0	0.8	19.7	0.0	3.9	12.5	0.0	1.6	8.6	0.0	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	1.4	0.0	0.6	0.3	0.0	0.9	1.4	0.0	4.6	1.7	0.0	2.7
LnGrp Delay(d),s/veh	34.8	0.0	20.0	43.2	0.0	25.3	34.8	0.0	16.7	30.2	0.0	13.8
LnGrp LOS	C		B	D		C	C		B	C		B
Approach Vol, veh/h	130				75				450			
Approach Delay, s/veh	29.1				28.2				19.9			
Approach LOS	C				C				B			
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.7	19.9	6.6	11.7	8.7	20.8	8.7	9.5				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	12.0	25.0	4.0	25.0	9.0	28.0	9.0	20.0				
Max Q Clear Time (g_c+I1), s	4.8	10.5	2.3	3.4	4.1	7.3	4.1	3.8				
Green Ext Time (p_c), s	0.1	3.3	0.0	0.6	0.1	3.8	0.1	0.5				
Intersection Summary												
HCM 2010 Ctrl Delay	21.3											
HCM 2010 LOS	C											

HCM 2010 Signalized Intersection Summary

12: Heidorn Ranch Rd & Project Access

Scenario 3a
Cumulative PM With Project - 2 Lane with Shift

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	0	96	110	0	40	164	213	40	60	95	119
Future Volume (veh/h)	69	0	96	110	0	40	164	213	40	60	95	119
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	69	0	96	110	0	40	164	213	40	60	95	119
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	90	0	164	140	0	209	190	394	74	82	149	187
Arrive On Green	0.05	0.00	0.10	0.08	0.00	0.13	0.11	0.26	0.26	0.05	0.20	0.20
Sat Flow, veh/h	1774	0	1583	1774	0	1583	1774	1526	287	1774	753	943
Grp Volume(v), veh/h	69	0	96	110	0	40	164	0	253	60	0	214
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1774	0	1583	1774	0	1812	1774	0	1696
Q Serve(g_s), s	1.8	0.0	2.7	2.9	0.0	1.1	4.3	0.0	5.6	1.6	0.0	5.4
Cycle Q Clear(g_c), s	1.8	0.0	2.7	2.9	0.0	1.1	4.3	0.0	5.6	1.6	0.0	5.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.16	1.00		0.56
Lane Grp Cap(c), veh/h	90	0	164	140	0	209	190	0	468	82	0	336
V/C Ratio(X)	0.77	0.00	0.59	0.79	0.00	0.19	0.87	0.00	0.54	0.73	0.00	0.64
Avail Cap(c_a), veh/h	152	0	541	152	0	541	190	0	619	190	0	580
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.9	0.0	20.0	21.2	0.0	18.1	20.6	0.0	15.0	22.0	0.0	17.2
Incr Delay (d2), s/veh	12.8	0.0	3.3	22.0	0.0	0.4	31.6	0.0	1.0	11.7	0.0	2.0
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(50%),veh/ln	1.2	0.0	1.3	2.2	0.0	0.5	3.7	0.0	2.9	1.0	0.0	2.7
LnGrp Delay(d),s/veh	34.7	0.0	23.3	43.2	0.0	18.5	52.2	0.0	15.9	33.7	0.0	19.2
LnGrp LOS	C		C	D		B	D		B	C		B
Approach Vol, veh/h	165				150				417		274	
Approach Delay, s/veh	28.1				36.6				30.2		22.4	
Approach LOS	C				D				C		C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.2	18.1	9.7	10.9	11.0	15.3	8.4	12.2				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	5.0	16.0	4.0	16.0	5.0	16.0	4.0	16.0				
Max Q Clear Time (g_c+I1), s	3.6	7.6	4.9	4.7	6.3	7.4	3.8	3.1				
Green Ext Time (p_c), s	0.0	1.8	0.0	0.5	0.0	1.8	0.0	0.6				
Intersection Summary												
HCM 2010 Ctrl Delay			28.7									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary

7: Hillcrest Ave & Sand Creek Rd

Scenario 3a
Cumulative PM With Project - 2 Lane with Shift

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	168	806	48	56	898	192	80	90	180	116	30	128
Future Volume (veh/h)	168	806	48	56	898	192	80	90	180	116	30	128
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	168	806	48	56	898	192	80	90	180	116	30	128
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	164	1071	64	96	859	184	123	77	154	123	43	183
Arrive On Green	0.09	0.92	0.60	0.11	1.00	1.00	0.07	0.14	0.12	0.07	0.14	0.12
Sat Flow, veh/h	1774	1741	104	1774	1488	318	1774	556	1111	1774	309	1320
Grp Volume(v), veh/h	168	0	854	56	0	1090	80	0	270	116	0	158
Grp Sat Flow(s),veh/h/ln	1774	0	1844	1774	0	1807	1774	0	1667	1774	0	1630
Q Serve(g_s), s	12.0	0.0	17.9	3.9	0.0	75.0	5.7	0.0	18.0	8.5	0.0	12.1
Cycle Q Clear(g_c), s	12.0	0.0	17.9	3.9	0.0	75.0	5.7	0.0	18.0	8.5	0.0	12.1
Prop In Lane	1.00		0.06	1.00		0.18	1.00		0.67	1.00		0.81
Lane Grp Cap(c), veh/h	164	0	1135	96	0	1042	123	0	231	123	0	226
V/C Ratio(X)	1.03	0.00	0.75	0.59	0.00	1.05	0.65	0.00	1.17	0.94	0.00	0.70
Avail Cap(c_a), veh/h	164	0	1135	96	0	1042	123	0	231	123	0	226
HCM Platoon Ratio	1.00	1.50	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.50	0.00	0.50	1.00	0.00	1.00	0.97	0.00	0.97
Uniform Delay (d), s/veh	59.0	0.0	3.2	56.6	0.0	0.0	59.0	0.0	56.7	60.3	0.0	54.2
Incr Delay (d2), s/veh	77.3	0.0	4.6	4.5	0.0	32.9	11.6	0.0	112.9	62.8	0.0	9.0
Initial Q Delay(d3),s/veh	0.3	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	9.4	0.0	9.6	2.0	0.0	9.5	3.2	0.0	15.5	6.3	0.0	6.0
LnGrp Delay(d),s/veh	136.6	0.0	7.9	61.2	0.0	32.9	70.5	0.0	169.5	123.0	0.0	63.2
LnGrp LOS	F		A	E		F	E		F	F		E
Approach Vol, veh/h	1022					1146		350		274		
Approach Delay, s/veh	29.0					34.2		146.9		88.5		
Approach LOS	C					C		F		F		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	22.0	11.0	84.0	13.0	22.0	16.0	79.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	16.0	5.0	78.0	7.0	16.0	10.0	73.0				
Max Q Clear Time (g_c+I1), s	10.5	20.0	5.9	19.9	7.7	14.1	14.0	77.0				
Green Ext Time (p_c), s	0.0	0.0	0.0	30.6	0.0	0.5	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			51.8									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary

8: Sand Creek Rd & Heidorn Ranch Rd

Scenario 3a
Cumulative PM With Project - 2 Lane with Shift

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	140	1069	976	277	215	86		
Future Volume (veh/h)	140	1069	976	277	215	86		
Number	7	4	8	18	1	16		
Initial Q (Qb), veh	0	27	27	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		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863		
Adj Flow Rate, veh/h	140	855	781	277	215	86		
Adj No. of Lanes	1	1	1	0	1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	136	1490	1013	240	246	219		
Arrive On Green	0.05	0.80	0.69	0.69	0.14	0.14		
Sat Flow, veh/h	1774	1863	1314	466	1774	1583		
Grp Volume(v), veh/h	140	855	0	1058	215	86		
Grp Sat Flow(s),veh/h/ln	1774	1863	0	1780	1774	1583		
Q Serve(g_s), s	10.0	22.1	0.0	58.6	15.4	6.4		
Cycle Q Clear(g_c), s	10.0	22.1	0.0	58.6	15.4	6.4		
Prop In Lane	1.00			0.26	1.00	1.00		
Lane Grp Cap(c), veh/h	136	1490	0	1247	246	219		
V/C Ratio(X)	1.03	0.57	0.00	0.85	0.88	0.39		
Avail Cap(c_a), veh/h	136	1490	0	1233	246	219		
HCM Platoon Ratio	0.67	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.57	0.57	0.00	0.81	0.85	0.85		
Uniform Delay (d), s/veh	61.6	6.2	0.0	17.8	54.9	51.0		
Incr Delay (d2), s/veh	65.0	0.9	0.0	6.0	24.4	1.0		
Initial Q Delay(d3),s/veh	0.3	5.5	0.0	22.2	0.0	0.0		
%ile BackOfQ(50%),veh/ln	7.4	20.8	0.0	46.8	9.3	5.8		
LnGrp Delay(d),s/veh	126.9	12.7	0.0	46.0	79.3	52.0		
LnGrp LOS	F	B		D	E	D		
Approach Vol, veh/h		995	1058		301			
Approach Delay, s/veh		28.7	46.0		71.5			
Approach LOS		C	D		E			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				108.0		22.0	14.0	94.0
Change Period (Y+Rc), s				6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s				102.0		16.0	8.0	88.0
Max Q Clear Time (g_c+I1), s				24.1		17.4	12.0	60.6
Green Ext Time (p_c), s				30.0		0.0	0.0	17.9
Intersection Summary								
HCM 2010 Ctrl Delay			42.0					
HCM 2010 LOS			D					

HCM 2010 Signalized Intersection Summary

9: Sand Creek Rd & SR 4 Eastbound

Scenario 3a
Cumulative PM With Project - 2 Lane with Shift

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	408	688	755	280	820	409		
Future Volume (veh/h)	408	688	755	280	820	409		
Number	7	4	8	18	1	16		
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		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	408	688	755	280	820	409		
Adj No. of Lanes	1	2	2	1	2	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	476	2090	983	440	952	403		
Arrive On Green	0.27	0.59	0.37	0.37	0.28	0.25		
Sat Flow, veh/h	1774	3632	3632	1583	3442	1583		
Grp Volume(v), veh/h	408	688	755	280	820	409		
Grp Sat Flow(s),veh/h/ln	1774	1770	1770	1583	1721	1583		
Q Serve(g_s), s	19.7	8.9	16.9	13.1	20.4	22.9		
Cycle Q Clear(g_c), s	19.7	8.9	16.9	13.1	20.4	22.9		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	476	2090	983	440	952	403		
V/C Ratio(X)	0.86	0.33	0.77	0.64	0.86	1.02		
Avail Cap(c_a), veh/h	532	2202	983	440	994	422		
HCM Platoon Ratio	1.00	1.00	1.33	1.33	1.00	1.00		
Upstream Filter(I)	0.97	0.97	0.92	0.92	1.00	1.00		
Uniform Delay (d), s/veh	31.3	9.4	25.8	24.6	30.9	33.5		
Incr Delay (d2), s/veh	11.8	0.1	5.3	6.3	7.6	47.6		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	11.2	4.3	8.9	6.4	10.7	22.8		
LnGrp Delay(d),s/veh	43.1	9.5	31.1	31.0	38.5	81.2		
LnGrp LOS	D	A	C	C	D	F		
Approach Vol, veh/h		1096	1035		1229			
Approach Delay, s/veh		22.0	31.1		52.7			
Approach LOS		C	C		D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				57.1		28.9	28.1	29.0
Change Period (Y+Rc), s				6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s				54.0		24.0	25.0	23.0
Max Q Clear Time (g_c+I1), s				10.9		22.4	21.7	18.9
Green Ext Time (p_c), s				16.2		0.5	0.5	3.2
Intersection Summary								
HCM 2010 Ctrl Delay			36.0					
HCM 2010 LOS			D					

HCM 2010 Signalized Intersection Summary

10: SR 4 Westbound & Sand Creek Rd

Scenario 3a
Cumulative PM With Project - 2 Lane with Shift

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	320	1188	0	0	547	780	488	0	410	0	0	0
Future Volume (veh/h)	320	1188	0	0	547	780	488	0	410	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	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			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1863	1863	1863	1863			
Adj Flow Rate, veh/h	320	1188	0	0	547	780	488	0	410			
Adj No. of Lanes	2	3	0	0	1	2	2	0	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	421	3221	0	0	869	1478	986	0	440			
Arrive On Green	0.12	0.63	0.00	0.00	0.47	0.47	0.28	0.00	0.28			
Sat Flow, veh/h	3442	5253	0	0	1863	3167	3548	0	1583			
Grp Volume(v), veh/h	320	1188	0	0	547	780	488	0	410			
Grp Sat Flow(s),veh/h/ln	1721	1695	0	0	1863	1583	1774	0	1583			
Q Serve(g_s), s	8.1	10.1	0.0	0.0	20.0	15.7	10.4	0.0	22.7			
Cycle Q Clear(g_c), s	8.1	10.1	0.0	0.0	20.0	15.7	10.4	0.0	22.7			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	421	3221	0	0	869	1478	986	0	440			
V/C Ratio(X)	0.76	0.37	0.00	0.00	0.63	0.53	0.50	0.00	0.93			
Avail Cap(c_a), veh/h	421	3221	0	0	869	1478	986	0	440			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.77	0.77	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	38.2	7.9	0.0	0.0	18.1	17.0	27.2	0.0	31.7			
Incr Delay (d2), s/veh	6.2	0.3	0.0	0.0	3.4	1.4	0.4	0.0	26.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.2	4.7	0.0	0.0	11.0	7.1	5.1	0.0	13.2			
LnGrp Delay(d),s/veh	44.4	8.1	0.0	0.0	21.6	18.3	27.6	0.0	58.5			
LnGrp LOS	D	A			C	B	C		E			
Approach Vol, veh/h		1508			1327			898				
Approach Delay, s/veh		15.8			19.7			41.7				
Approach LOS		B			B			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		29.0		61.0			15.0	46.0				
Change Period (Y+Rc), s		6.0		6.0			6.0	6.0				
Max Green Setting (Gmax), s		23.0		55.0			9.0	40.0				
Max Q Clear Time (g_c+I1), s		24.7		12.1			10.1	22.0				
Green Ext Time (p_c), s		0.0		25.9			0.0	14.0				
Intersection Summary												
HCM 2010 Ctrl Delay				23.4								
HCM 2010 LOS				C								
Notes												

HCM 2010 Signalized Intersection Summary

1: Deer Valley Road & Lone Tree Way

Scenario 3b
Cumulative AM With Project - No Hillcrest S/O Sand Creek

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	962	236	400	946	354	419	545	170	331	605	50
Future Volume (veh/h)	90	962	236	400	946	354	419	545	170	331	605	50
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	90	962	236	400	946	354	419	545	170	331	605	50
Adj No. of Lanes	1	3	0	2	2	0	2	2	0	2	2	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	110	1499	367	455	1106	411	466	615	191	375	678	56
Arrive On Green	0.06	0.73	0.73	0.13	0.88	0.88	0.14	0.23	0.23	0.11	0.20	0.20
Sat Flow, veh/h	1774	4079	998	3442	2527	939	3442	2660	827	3442	3311	273
Grp Volume(v), veh/h	90	799	399	400	660	640	419	362	353	331	323	332
Grp Sat Flow(s),veh/h/ln	1774	1695	1687	1721	1770	1697	1721	1770	1717	1721	1770	1815
Q Serve(g_s), s	7.5	17.7	17.8	17.1	27.5	28.6	18.0	29.6	29.8	14.2	26.6	26.7
Cycle Q Clear(g_c), s	7.5	17.7	17.8	17.1	27.5	28.6	18.0	29.6	29.8	14.2	26.6	26.7
Prop In Lane	1.00		0.59	1.00		0.55	1.00		0.48	1.00		0.15
Lane Grp Cap(c), veh/h	110	1246	620	455	774	743	466	409	397	375	362	371
V/C Ratio(X)	0.82	0.64	0.64	0.88	0.85	0.86	0.90	0.88	0.89	0.88	0.89	0.89
Avail Cap(c_a), veh/h	130	1246	620	574	774	743	505	425	412	390	366	375
HCM Platoon Ratio	1.00	2.00	2.00	1.00	2.00	2.00	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	69.5	14.9	14.9	63.9	7.0	7.0	63.8	55.7	55.8	65.9	58.0	58.1
Incr Delay (d2), s/veh	28.1	2.5	5.1	12.2	11.5	12.5	18.0	18.9	20.1	20.1	22.7	22.7
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	4.6	8.4	8.8	8.9	14.6	14.7	9.7	16.6	16.3	7.8	15.3	15.7
LnGrp Delay(d),s/veh	97.6	17.5	20.0	76.1	18.4	19.6	81.8	74.6	75.8	86.0	80.8	80.8
LnGrp LOS	F	B	C	E	B	B	F	E	E	F	F	F
Approach Vol, veh/h	1288			1700			1134			986		
Approach Delay, s/veh	23.9			32.4			77.6			82.5		
Approach LOS	C			C			E			F		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	22.3	40.7	25.9	61.1	26.3	36.7	15.3	71.6				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	17.0	36.0	25.0	48.0	22.0	31.0	11.0	62.0				
Max Q Clear Time (g_c+I1), s	16.2	31.8	19.1	19.8	20.0	28.7	9.5	30.6				
Green Ext Time (p_c), s	0.1	2.9	0.7	19.7	0.3	1.7	0.0	21.3				
Intersection Summary												
HCM 2010 Ctrl Delay	50.0											
HCM 2010 LOS	D											

HCM 2010 Signalized Intersection Summary

2: Hillcrest Avenue & Lone Tree Way

Scenario 3b
Cumulative AM With Project - No Hillcrest S/O Sand Creek

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	300	655	59	90	994	314	226	301	177	355	144	300
Future Volume (veh/h)	300	655	59	90	994	314	226	301	177	355	144	300
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	300	655	59	90	994	314	226	301	177	355	144	300
Adj No. of Lanes	1	3	0	1	3	1	1	2	0	2	2	1
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	326	2269	203	110	1808	563	250	394	226	409	566	253
Arrive On Green	0.18	0.48	0.48	0.12	0.71	0.71	0.14	0.18	0.18	0.12	0.16	0.16
Sat Flow, veh/h	1774	4753	425	1774	5085	1583	1774	2169	1244	3442	3539	1583
Grp Volume(v), veh/h	300	466	248	90	994	314	226	244	234	355	144	300
Grp Sat Flow(s),veh/h/ln	1774	1695	1788	1774	1695	1583	1774	1770	1643	1721	1770	1583
Q Serve(g_s), s	24.9	12.5	12.6	7.4	13.9	14.2	18.8	19.6	20.4	15.2	5.3	24.0
Cycle Q Clear(g_c), s	24.9	12.5	12.6	7.4	13.9	14.2	18.8	19.6	20.4	15.2	5.3	24.0
Prop In Lane	1.00		0.24	1.00		1.00	1.00		0.76	1.00		1.00
Lane Grp Cap(c), veh/h	326	1618	853	110	1808	563	250	322	299	409	566	253
V/C Ratio(X)	0.92	0.29	0.29	0.82	0.55	0.56	0.90	0.76	0.78	0.87	0.25	1.18
Avail Cap(c_a), veh/h	438	1618	853	177	1808	563	319	330	307	528	566	253
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.93	0.93	0.93	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.2	23.8	23.8	64.9	16.0	16.0	63.4	58.2	58.5	64.9	55.2	63.0
Incr Delay (d2), s/veh	20.7	0.4	0.9	13.6	1.1	3.7	23.8	9.5	12.1	11.7	0.2	115.6
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	14.1	5.9	6.4	4.1	6.4	6.6	10.9	10.5	10.3	7.9	2.6	18.6
LnGrp Delay(d),s/veh	80.8	24.2	24.7	78.5	17.1	19.7	87.3	67.8	70.6	76.6	55.4	178.6
LnGrp LOS	F	C	C	E	B	B	F	E	E	E	E	F
Approach Vol, veh/h	1014			1398			704			799		
Approach Delay, s/veh	41.1			21.6			75.0			111.1		
Approach LOS	D			C			E			F		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	23.8	33.3	15.3	77.6	27.1	30.0	33.5	59.3				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	23.0	28.0	15.0	60.0	27.0	24.0	37.0	38.0				
Max Q Clear Time (g_c+I1), s	17.2	22.4	9.4	14.6	20.8	26.0	26.9	16.2				
Green Ext Time (p_c), s	0.6	2.3	0.1	17.9	0.3	0.0	0.6	12.6				
Intersection Summary												
HCM 2010 Ctrl Delay	54.5											
HCM 2010 LOS	D											

HCM 2010 Signalized Intersection Summary

Scenario 3b

3: Heidorn Ranch Road/Fairside Way & Lone Tree Way Cumulative AM With Project - No Hillcrest S/O Sand Creek

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	1297	67	85	1522	20	97	10	134	8	10	20
Future Volume (veh/h)	10	1297	67	85	1522	20	97	10	134	8	10	20
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	10	1297	67	85	1522	20	97	10	134	8	10	20
Adj No. of Lanes	1	3	0	1	3	0	2	1	1	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	36	3425	177	126	3842	50	186	208	177	34	42	85
Arrive On Green	0.04	1.00	1.00	0.14	1.00	1.00	0.05	0.11	0.11	0.02	0.08	0.06
Sat Flow, veh/h	1774	4952	256	1774	5173	68	3442	1863	1583	1774	556	1111
Grp Volume(v), veh/h	10	888	476	85	997	545	97	10	134	8	0	30
Grp Sat Flow(s),veh/h/ln	1774	1695	1818	1774	1695	1851	1721	1863	1583	1774	0	1667
Q Serve(g_s), s	0.8	0.0	0.0	6.8	0.0	0.0	4.1	0.7	12.3	0.7	0.0	2.6
Cycle Q Clear(g_c), s	0.8	0.0	0.0	6.8	0.0	0.0	4.1	0.7	12.3	0.7	0.0	2.6
Prop In Lane	1.00		0.14	1.00		0.04	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	36	2345	1257	126	2518	1374	186	208	177	34	0	127
V/C Ratio(X)	0.28	0.38	0.38	0.67	0.40	0.40	0.52	0.05	0.76	0.24	0.00	0.24
Avail Cap(c_a), veh/h	83	2345	1257	260	2518	1374	321	335	285	83	0	222
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.89	0.89	0.89	0.87	0.87	0.87	0.99	0.99	0.99	1.00	0.00	1.00
Uniform Delay (d), s/veh	70.9	0.0	0.0	62.7	0.0	0.0	69.1	59.5	64.7	72.5	0.0	65.8
Incr Delay (d2), s/veh	3.7	0.4	0.8	5.3	0.4	0.7	2.2	0.1	6.4	3.6	0.0	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(50%),veh/ln	0.4	0.1	0.3	3.5	0.1	0.3	2.0	0.4	5.7	0.4	0.0	1.2
LnGrp Delay(d),s/veh	74.6	0.4	0.8	68.0	0.4	0.7	71.3	59.6	71.1	76.1	0.0	66.7
LnGrp LOS	E	A	A	E	A	A	E	E	E	E		E
Approach Vol, veh/h	1374		1627				241			38		
Approach Delay, s/veh	1.1		4.1				70.7			68.7		
Approach LOS	A		A				E			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.9	20.7	14.7	107.7	12.1	15.5	7.0	115.4				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	5.0	25.0	20.0	76.0	12.0	18.0	5.0	91.0				
Max Q Clear Time (g_c+I1), s	2.7	14.3	8.8	2.0	6.1	4.6	2.8	2.0				
Green Ext Time (p_c), s	0.0	0.4	0.1	42.7	0.1	0.5	0.0	46.8				
Intersection Summary												
HCM 2010 Ctrl Delay			8.5									
HCM 2010 LOS			A									

HCM 2010 Signalized Intersection Summary

11: Hillcrest Ave & Project Access

Scenario 3b
Cumulative AM With Project - No Hillcrest S/O Sand Creek

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	0	60	18	0	95	30	186	6	32	72	40
Future Volume (veh/h)	120	0	60	18	0	95	30	186	6	32	72	40
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	120	0	60	18	0	95	30	186	6	32	72	40
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	159	0	280	32	0	167	50	331	11	53	210	117
Arrive On Green	0.09	0.00	0.18	0.02	0.00	0.11	0.03	0.18	0.18	0.03	0.19	0.19
Sat Flow, veh/h	1774	0	1583	1774	0	1583	1774	1795	58	1774	1126	626
Grp Volume(v), veh/h	120	0	60	18	0	95	30	0	192	32	0	112
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1774	0	1583	1774	0	1853	1774	0	1752
Q Serve(g_s), s	2.7	0.0	1.3	0.4	0.0	2.3	0.7	0.0	3.8	0.7	0.0	2.3
Cycle Q Clear(g_c), s	2.7	0.0	1.3	0.4	0.0	2.3	0.7	0.0	3.8	0.7	0.0	2.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.03	1.00		0.36
Lane Grp Cap(c), veh/h	159	0	280	32	0	167	50	0	342	53	0	326
V/C Ratio(X)	0.75	0.00	0.21	0.56	0.00	0.57	0.60	0.00	0.56	0.60	0.00	0.34
Avail Cap(c_a), veh/h	786	0	1169	262	0	701	349	0	1185	393	0	1164
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.1	0.0	14.3	19.8	0.0	17.3	19.5	0.0	15.1	19.5	0.0	14.4
Incr Delay (d2), s/veh	7.1	0.0	0.4	14.4	0.0	3.0	10.9	0.0	1.4	10.6	0.0	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	1.6	0.0	0.6	0.3	0.0	1.1	0.5	0.0	2.1	0.5	0.0	1.1
LnGrp Delay(d),s/veh	25.1	0.0	14.7	34.2	0.0	20.3	30.4	0.0	16.5	30.1	0.0	15.0
LnGrp LOS	C		B	C		C	C		B	C		B
Approach Vol, veh/h	180				113				222		144	
Approach Delay, s/veh	21.7				22.5				18.4		18.4	
Approach LOS	C				C				B		B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.2	13.5	6.7	13.2	7.1	13.6	9.6	10.3				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	9.0	26.0	6.0	30.0	8.0	27.0	18.0	18.0				
Max Q Clear Time (g_c+I1), s	2.7	5.8	2.4	3.3	2.7	4.3	4.7	4.3				
Green Ext Time (p_c), s	0.0	1.7	0.0	0.9	0.0	1.7	0.2	0.7				
Intersection Summary												
HCM 2010 Ctrl Delay	20.0											
HCM 2010 LOS	B											

HCM 2010 Signalized Intersection Summary

12: Heidorn Ranch Rd & Project Access

Scenario 3b
Cumulative AM With Project - No Hillcrest S/O Sand Creek

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	107	0	146	30	0	70	49	202	40	60	66	35
Future Volume (veh/h)	107	0	146	30	0	70	49	202	40	60	66	35
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	107	0	146	30	0	70	49	202	40	60	66	35
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	136	0	244	50	0	167	73	304	60	85	238	126
Arrive On Green	0.08	0.00	0.15	0.03	0.00	0.11	0.04	0.20	0.20	0.05	0.21	0.21
Sat Flow, veh/h	1774	0	1583	1774	0	1583	1774	1511	299	1774	1147	608
Grp Volume(v), veh/h	107	0	146	30	0	70	49	0	242	60	0	101
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1774	0	1583	1774	0	1810	1774	0	1755
Q Serve(g_s), s	2.5	0.0	3.6	0.7	0.0	1.7	1.1	0.0	5.2	1.4	0.0	2.0
Cycle Q Clear(g_c), s	2.5	0.0	3.6	0.7	0.0	1.7	1.1	0.0	5.2	1.4	0.0	2.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.17	1.00		0.35
Lane Grp Cap(c), veh/h	136	0	244	50	0	167	73	0	364	85	0	365
V/C Ratio(X)	0.79	0.00	0.60	0.60	0.00	0.42	0.67	0.00	0.66	0.71	0.00	0.28
Avail Cap(c_a), veh/h	210	0	638	168	0	600	168	0	686	168	0	666
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.1	0.0	16.6	20.3	0.0	17.7	19.9	0.0	15.5	19.8	0.0	14.0
Incr Delay (d2), s/veh	10.3	0.0	2.4	11.1	0.0	1.7	9.9	0.0	2.1	10.2	0.0	0.4
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	1.6	0.0	1.7	0.5	0.0	0.8	0.8	0.0	2.8	0.9	0.0	1.0
LnGrp Delay(d),s/veh	29.5	0.0	19.0	31.4	0.0	19.3	29.9	0.0	17.6	30.0	0.0	14.5
LnGrp LOS	C		B	C		B	C		B	C		B
Approach Vol, veh/h	253				100				291		161	
Approach Delay, s/veh	23.4				22.9				19.7		20.3	
Approach LOS	C				C				B		C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.0	14.5	7.2	12.5	7.7	14.8	9.2	10.5				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	4.0	16.0	4.0	17.0	4.0	16.0	5.0	16.0				
Max Q Clear Time (g_c+I1), s	3.4	7.2	2.7	5.6	3.1	4.0	4.5	3.7				
Green Ext Time (p_c), s	0.0	1.3	0.0	0.9	0.0	1.6	0.0	1.0				
Intersection Summary												
HCM 2010 Ctrl Delay	21.4											
HCM 2010 LOS	C											

HCM 2010 Signalized Intersection Summary

7: Sand Creek Rd & Hillcrest Ave

Scenario 3b
Cumulative AM With Project - No Hillcrest S/O Sand Creek

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	94	383	509	128	60	90		
Future Volume (veh/h)	94	383	509	128	60	90		
Number	7	4	8	18	1	16		
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		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863		
Adj Flow Rate, veh/h	94	383	509	128	60	90		
Adj No. of Lanes	1	1	1	0	1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	121	1458	912	229	101	91		
Arrive On Green	0.07	0.78	0.63	0.63	0.06	0.06		
Sat Flow, veh/h	1774	1863	1437	361	1774	1583		
Grp Volume(v), veh/h	94	383	0	637	60	90		
Grp Sat Flow(s),veh/h/ln	1774	1863	0	1799	1774	1583		
Q Serve(g_s), s	3.9	4.2	0.0	15.0	2.5	4.3		
Cycle Q Clear(g_c), s	3.9	4.2	0.0	15.0	2.5	4.3		
Prop In Lane	1.00			0.20	1.00	1.00		
Lane Grp Cap(c), veh/h	121	1458	0	1142	101	91		
V/C Ratio(X)	0.78	0.26	0.00	0.56	0.59	0.99		
Avail Cap(c_a), veh/h	213	1458	0	1142	166	148		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	0.00	0.64	0.99	0.99		
Uniform Delay (d), s/veh	34.4	2.2	0.0	7.8	34.5	35.3		
Incr Delay (d2), s/veh	10.1	0.4	0.0	1.3	5.4	57.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	2.2	2.3	0.0	7.8	1.4	5.1		
LnGrp Delay(d),s/veh	44.5	2.7	0.0	9.0	39.9	92.5		
LnGrp LOS	D	A		A	D	F		
Approach Vol, veh/h		477	637		150			
Approach Delay, s/veh		10.9	9.0		71.5			
Approach LOS		B	A		E			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				64.7		10.3	11.1	53.6
Change Period (Y+Rc), s				6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s				56.0		7.0	9.0	41.0
Max Q Clear Time (g_c+I1), s				6.2		4.5	5.9	17.0
Green Ext Time (p_c), s				8.8		0.0	0.1	7.5
Intersection Summary								
HCM 2010 Ctrl Delay			17.1					
HCM 2010 LOS			B					

HCM 2010 Signalized Intersection Summary

8: Sand Creek Rd & Heidorn Ranch Rd

Scenario 3b
Cumulative AM With Project - No Hillcrest S/O Sand Creek

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	53	445	598	238	203	39		
Future Volume (veh/h)	53	445	598	238	203	39		
Number	7	4	8	18	1	16		
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		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863		
Adj Flow Rate, veh/h	53	445	598	238	203	39		
Adj No. of Lanes	1	1	1	0	1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	68	1388	821	327	239	213		
Arrive On Green	0.04	0.75	0.65	0.65	0.13	0.13		
Sat Flow, veh/h	1774	1863	1269	505	1774	1583		
Grp Volume(v), veh/h	53	445	0	836	203	39		
Grp Sat Flow(s),veh/h/ln	1774	1863	0	1774	1774	1583		
Q Serve(g_s), s	3.0	8.0	0.0	31.5	11.2	2.2		
Cycle Q Clear(g_c), s	3.0	8.0	0.0	31.5	11.2	2.2		
Prop In Lane	1.00			0.28	1.00	1.00		
Lane Grp Cap(c), veh/h	68	1388	0	1148	239	213		
V/C Ratio(X)	0.78	0.32	0.00	0.73	0.85	0.18		
Avail Cap(c_a), veh/h	89	1388	0	1148	319	285		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.97	0.97	0.00	0.74	1.00	1.00		
Uniform Delay (d), s/veh	47.7	4.3	0.0	11.8	42.3	38.4		
Incr Delay (d2), s/veh	26.7	0.6	0.0	3.0	14.9	0.4		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	2.0	4.3	0.0	16.1	6.5	2.0		
LnGrp Delay(d),s/veh	74.4	4.9	0.0	14.8	57.2	38.8		
LnGrp LOS	E	A		B	E	D		
Approach Vol, veh/h		498	836		242			
Approach Delay, s/veh		12.3	14.8		54.2			
Approach LOS		B	B		D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				80.5		19.5	9.8	70.7
Change Period (Y+Rc), s				6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s				70.0		18.0	5.0	59.0
Max Q Clear Time (g_c+I1), s				10.0		13.2	5.0	33.5
Green Ext Time (p_c), s				12.2		0.3	0.0	9.9
Intersection Summary								
HCM 2010 Ctrl Delay			20.1					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary

9: Sand Creek Rd & SR 4 Eastbound

Scenario 3b
Cumulative AM With Project - No Hillcrest S/O Sand Creek

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	229	328	797	570	410	80		
Future Volume (veh/h)	229	328	797	570	410	80		
Number	7	4	8	18	1	16		
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		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	229	328	797	570	410	80		
Adj No. of Lanes	1	2	2	1	2	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	269	2148	1376	616	498	229		
Arrive On Green	0.15	0.61	0.78	0.78	0.14	0.14		
Sat Flow, veh/h	1774	3632	3632	1583	3442	1583		
Grp Volume(v), veh/h	229	328	797	570	410	80		
Grp Sat Flow(s),veh/h/ln	1774	1770	1770	1583	1721	1583		
Q Serve(g_s), s	11.3	3.6	8.2	25.7	10.4	4.1		
Cycle Q Clear(g_c), s	11.3	3.6	8.2	25.7	10.4	4.1		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	269	2148	1376	616	498	229		
V/C Ratio(X)	0.85	0.15	0.58	0.93	0.82	0.35		
Avail Cap(c_a), veh/h	394	2399	1376	616	650	299		
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00		
Upstream Filter(I)	0.09	0.09	0.79	0.79	1.00	1.00		
Uniform Delay (d), s/veh	37.2	7.7	7.0	9.0	37.4	34.7		
Incr Delay (d2), s/veh	1.2	0.0	1.4	18.6	6.6	0.9		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	5.6	1.7	4.0	13.6	5.4	3.7		
LnGrp Delay(d),s/veh	38.4	7.7	8.4	27.6	44.0	35.6		
LnGrp LOS	D	A	A	C	D	D		
Approach Vol, veh/h		557	1367		490			
Approach Delay, s/veh		20.3	16.4		42.6			
Approach LOS		C	B		D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				60.6		19.0	19.6	41.0
Change Period (Y+Rc), s				6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s				61.0		17.0	20.0	35.0
Max Q Clear Time (g_c+I1), s				5.6		12.4	13.3	27.7
Green Ext Time (p_c), s				15.1		0.6	0.4	5.1
Intersection Summary								
HCM 2010 Ctrl Delay			22.6					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary

10: SR 4 Westbound & Sand Creek Rd

Scenario 3b
Cumulative AM With Project - No Hillcrest S/O Sand Creek

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	251	487	0	0	852	720	514	0	220	0	0	0
Future Volume (veh/h)	251	487	0	0	852	720	514	0	220	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	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			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1863	1863	1863	1863			
Adj Flow Rate, veh/h	251	487	0	0	1146	524	514	0	220			
Adj No. of Lanes	2	3	0	0	2	1	2	0	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	326	3488	0	0	1954	830	642	0	286			
Arrive On Green	0.09	0.69	0.00	0.00	0.52	0.52	0.18	0.00	0.18			
Sat Flow, veh/h	3442	5253	0	0	3725	1583	3548	0	1583			
Grp Volume(v), veh/h	251	487	0	0	1146	524	514	0	220			
Grp Sat Flow(s),veh/h/ln	1721	1695	0	0	1863	1583	1774	0	1583			
Q Serve(g_s), s	6.4	3.0	0.0	0.0	19.0	21.2	12.5	0.0	11.9			
Cycle Q Clear(g_c), s	6.4	3.0	0.0	0.0	19.0	21.2	12.5	0.0	11.9			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	326	3488	0	0	1954	830	642	0	286			
V/C Ratio(X)	0.77	0.14	0.00	0.00	0.59	0.63	0.80	0.00	0.77			
Avail Cap(c_a), veh/h	382	3488	0	0	1954	830	867	0	387			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.89	0.89	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	39.8	4.9	0.0	0.0	14.7	15.2	35.3	0.0	35.1			
Incr Delay (d2), s/veh	7.1	0.1	0.0	0.0	1.3	3.6	3.9	0.0	6.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	3.4	1.4	0.0	0.0	10.1	10.0	6.5	0.0	5.7			
LnGrp Delay(d),s/veh	46.8	5.0	0.0	0.0	16.0	18.8	39.2	0.0	41.4			
LnGrp LOS	D	A			B	B	D		D			
Approach Vol, veh/h		738			1670			734				
Approach Delay, s/veh		19.2			16.9			39.9				
Approach LOS		B			B			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		22.3		67.7			14.5	53.2				
Change Period (Y+Rc), s		6.0		6.0			6.0	6.0				
Max Green Setting (Gmax), s		22.0		56.0			10.0	40.0				
Max Q Clear Time (g_c+I1), s		14.5		5.0			8.4	23.2				
Green Ext Time (p_c), s		1.8		23.7			0.1	12.1				
Intersection Summary												
HCM 2010 Ctrl Delay				22.8								
HCM 2010 LOS				C								
Notes												

HCM 2010 Signalized Intersection Summary

1: Deer Valley Road & Lone Tree Way

Scenario 3b
Cumulative PM With Project - No Hillcrest S/O Sand Creek

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	1070	292	310	783	22	303	520	340	394	486	40
Future Volume (veh/h)	110	1070	292	310	783	22	303	520	340	394	486	40
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	110	1070	292	310	783	22	303	520	340	394	486	40
Adj No. of Lanes	1	3	0	2	2	0	2	2	0	2	2	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	132	1359	371	353	1301	37	355	549	359	441	969	80
Arrive On Green	0.07	0.68	0.68	0.10	0.74	0.74	0.10	0.27	0.27	0.13	0.29	0.29
Sat Flow, veh/h	1774	3977	1085	3442	3516	99	3442	2054	1341	3442	3313	272
Grp Volume(v), veh/h	110	912	450	310	394	411	303	448	412	394	259	267
Grp Sat Flow(s),veh/h/ln	1774	1695	1671	1721	1770	1845	1721	1770	1626	1721	1770	1815
Q Serve(g_s), s	9.2	27.7	27.7	13.3	15.7	15.7	13.0	37.2	37.3	16.9	18.2	18.3
Cycle Q Clear(g_c), s	9.2	27.7	27.7	13.3	15.7	15.7	13.0	37.2	37.3	16.9	18.2	18.3
Prop In Lane	1.00		0.65	1.00		0.05	1.00		0.82	1.00		0.15
Lane Grp Cap(c), veh/h	132	1158	571	353	655	683	355	473	435	441	518	531
V/C Ratio(X)	0.83	0.79	0.79	0.88	0.60	0.60	0.85	0.95	0.95	0.89	0.50	0.50
Avail Cap(c_a), veh/h	201	1158	571	367	655	683	459	484	444	482	518	531
HCM Platoon Ratio	1.00	2.00	2.00	1.00	2.00	2.00	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	68.5	20.0	20.0	66.4	14.3	14.3	66.2	53.9	53.9	64.4	44.0	44.0
Incr Delay (d2), s/veh	16.2	5.5	10.5	20.1	4.1	3.9	11.7	27.6	29.5	17.7	0.8	0.8
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(50%),veh/ln	5.1	13.5	14.2	7.3	8.2	8.5	6.8	21.8	20.3	9.1	9.0	9.3
LnGrp Delay(d),s/veh	84.7	25.5	30.6	86.5	18.4	18.2	77.9	81.5	83.5	82.1	44.7	44.8
LnGrp LOS	F	C	C	F	B	B	E	F	F	F	D	D
Approach Vol, veh/h		1472			1115			1163			920	
Approach Delay, s/veh		31.5			37.3			81.3			60.7	
Approach LOS		C			D			F			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.2	46.1	21.4	57.2	21.5	49.9	17.2	61.5				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	21.0	41.0	16.0	48.0	20.0	42.0	17.0	47.0				
Max Q Clear Time (g_c+I1), s	18.9	39.3	15.3	29.7	15.0	20.3	11.2	17.7				
Green Ext Time (p_c), s	0.3	0.8	0.1	12.5	0.5	9.6	0.1	17.1				
Intersection Summary												
HCM 2010 Ctrl Delay				51.0								
HCM 2010 LOS				D								

HCM 2010 Signalized Intersection Summary

2: Hillcrest Avenue & Lone Tree Way

Scenario 3b
Cumulative PM With Project - No Hillcrest S/O Sand Creek

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	330	1215	139	222	1104	319	77	67	145	515	115	140
Future Volume (veh/h)	330	1215	139	222	1104	319	77	67	145	515	115	140
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	330	1215	139	222	1104	319	77	67	145	515	115	140
Adj No. of Lanes	1	3	0	1	3	1	1	2	0	2	2	1
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	356	2201	252	243	2093	652	96	106	95	577	613	274
Arrive On Green	0.20	0.48	0.48	0.27	0.82	0.82	0.05	0.06	0.06	0.17	0.17	0.17
Sat Flow, veh/h	1774	4630	530	1774	5085	1583	1774	1770	1583	3442	3539	1583
Grp Volume(v), veh/h	330	890	464	222	1104	319	77	67	145	515	115	140
Grp Sat Flow(s),veh/h/ln	1774	1695	1769	1774	1695	1583	1774	1770	1583	1721	1770	1583
Q Serve(g_s), s	27.4	28.0	28.0	18.2	10.2	9.0	6.4	5.5	9.0	22.0	4.2	12.0
Cycle Q Clear(g_c), s	27.4	28.0	28.0	18.2	10.2	9.0	6.4	5.5	9.0	22.0	4.2	12.0
Prop In Lane	1.00		0.30	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	356	1612	841	243	2093	652	96	106	95	577	613	274
V/C Ratio(X)	0.93	0.55	0.55	0.91	0.53	0.49	0.80	0.63	1.53	0.89	0.19	0.51
Avail Cap(c_a), veh/h	485	1612	841	343	2093	652	154	106	95	711	637	285
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.8	28.0	28.0	53.6	8.7	8.6	70.1	68.9	70.5	61.1	53.0	56.2
Incr Delay (d2), s/veh	19.8	1.4	2.6	20.6	0.9	2.4	14.0	11.4	282.9	11.9	0.1	1.5
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(50%),veh/ln	15.4	13.4	14.3	10.3	4.7	4.2	3.5	3.1	11.4	11.4	2.1	5.4
LnGrp Delay(d),s/veh	78.6	29.3	30.6	74.2	9.6	11.0	84.1	80.3	353.4	73.0	53.1	57.7
LnGrp LOS	E	C	C	E	A	B	F	F	F	E	D	E
Approach Vol, veh/h	1684			1645			289			770		
Approach Delay, s/veh	39.3			18.6			218.3			67.2		
Approach LOS	D			B			F			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	31.1	15.0	26.6	77.3	14.1	32.0	36.1	67.7				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	31.0	9.0	29.0	57.0	13.0	27.0	41.0	45.0				
Max Q Clear Time (g_c+I1), s	24.0	11.0	20.2	30.0	8.4	14.0	29.4	12.2				
Green Ext Time (p_c), s	1.2	0.0	0.4	20.2	0.0	1.9	0.7	23.3				
Intersection Summary												
HCM 2010 Ctrl Delay	48.2											
HCM 2010 LOS	D											

HCM 2010 Signalized Intersection Summary

Scenario 3b

3: Heidorn Ranch Road/Fairside Way & Lone Tree Way Cumulative PM With Project - No Hillcrest S/O Sand Creek

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	1945	141	119	1508	20	178	10	109	30	10	20
Future Volume (veh/h)	30	1945	141	119	1508	20	178	10	109	30	10	20
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	30	1945	141	119	1508	20	178	10	109	30	10	20
Adj No. of Lanes	1	3	0	1	3	0	2	1	1	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	38	3215	232	140	3732	49	226	140	119	38	17	35
Arrive On Green	0.04	1.00	1.00	0.16	1.00	1.00	0.07	0.08	0.08	0.02	0.03	0.03
Sat Flow, veh/h	1774	4842	349	1774	5172	69	3442	1863	1583	1774	556	1111
Grp Volume(v), veh/h	30	1359	727	119	988	540	178	10	109	30	0	30
Grp Sat Flow(s),veh/h/ln	1774	1695	1801	1774	1695	1851	1721	1863	1583	1774	0	1667
Q Serve(g_s), s	2.5	0.0	0.0	9.8	0.0	0.0	7.6	0.7	10.3	2.5	0.0	2.7
Cycle Q Clear(g_c), s	2.5	0.0	0.0	9.8	0.0	0.0	7.6	0.7	10.3	2.5	0.0	2.7
Prop In Lane	1.00		0.19	1.00		0.04	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	38	2251	1196	140	2446	1335	226	140	119	38	0	52
V/C Ratio(X)	0.79	0.60	0.61	0.85	0.40	0.40	0.79	0.07	0.91	0.78	0.00	0.58
Avail Cap(c_a), veh/h	71	2251	1196	237	2446	1335	344	140	119	118	0	67
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.70	0.70	0.70	0.84	0.84	0.84	0.98	0.98	0.98	1.00	0.00	1.00
Uniform Delay (d), s/veh	71.4	0.0	0.0	62.3	0.0	0.0	69.0	64.5	68.9	73.0	0.0	71.7
Incr Delay (d2), s/veh	21.5	0.8	1.6	11.4	0.4	0.8	6.5	0.2	55.6	28.4	0.0	9.7
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	1.5	0.3	0.5	5.2	0.1	0.3	3.8	0.4	6.3	1.5	0.0	1.4
LnGrp Delay(d),s/veh	92.9	0.8	1.6	73.7	0.4	0.8	75.5	64.7	124.4	101.5	0.0	81.4
LnGrp LOS	F	A	A	E	A	A	E	E	F	F		F
Approach Vol, veh/h	2116					1647			297		60	
Approach Delay, s/veh	2.4					5.8			93.1		91.5	
Approach LOS	A					A			F		F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.2	17.3	17.9	105.6	15.9	10.7	9.2	114.2				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	10.0	11.0	20.0	85.0	15.0	6.0	6.0	99.0				
Max Q Clear Time (g_c+I1), s	4.5	12.3	11.8	2.0	9.6	4.7	4.5	2.0				
Green Ext Time (p_c), s	0.0	0.0	0.2	63.9	0.2	0.0	0.0	71.7				
Intersection Summary												
HCM 2010 Ctrl Delay	11.6											
HCM 2010 LOS	B											

HCM 2010 Signalized Intersection Summary

11: Hillcrest Ave & Project Access

Scenario 3b
Cumulative PM With Project - No Hillcrest S/O Sand Creek

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	0	50	12	0	63	80	259	21	106	118	40
Future Volume (veh/h)	80	0	50	12	0	63	80	259	21	106	118	40
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	80	0	50	12	0	63	80	259	21	106	118	40
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	102	0	190	22	0	119	102	395	32	138	337	114
Arrive On Green	0.06	0.00	0.12	0.01	0.00	0.08	0.06	0.23	0.23	0.08	0.25	0.25
Sat Flow, veh/h	1774	0	1583	1774	0	1583	1774	1701	138	1774	1332	451
Grp Volume(v), veh/h	80	0	50	12	0	63	80	0	280	106	0	158
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1774	0	1583	1774	0	1838	1774	0	1783
Q Serve(g_s), s	1.9	0.0	1.2	0.3	0.0	1.6	1.9	0.0	5.9	2.5	0.0	3.1
Cycle Q Clear(g_c), s	1.9	0.0	1.2	0.3	0.0	1.6	1.9	0.0	5.9	2.5	0.0	3.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.08	1.00		0.25
Lane Grp Cap(c), veh/h	102	0	190	22	0	119	102	0	427	138	0	451
V/C Ratio(X)	0.79	0.00	0.26	0.54	0.00	0.53	0.79	0.00	0.66	0.77	0.00	0.35
Avail Cap(c_a), veh/h	453	0	1030	165	0	773	453	0	854	577	0	953
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.0	0.0	17.2	21.1	0.0	19.2	20.0	0.0	15.0	19.5	0.0	13.2
Incr Delay (d2), s/veh	12.6	0.0	0.7	19.3	0.0	3.6	12.6	0.0	1.7	8.5	0.0	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(50%),veh/ln	1.3	0.0	0.6	0.3	0.0	0.8	1.3	0.0	3.2	1.6	0.0	1.6
LnGrp Delay(d),s/veh	32.6	0.0	17.9	40.4	0.0	22.8	32.6	0.0	16.7	28.0	0.0	13.6
LnGrp LOS	C		B	D		C	C		B	C		B
Approach Vol, veh/h	130				75				360		264	
Approach Delay, s/veh	27.0				25.6				20.2		19.4	
Approach LOS	C				C				C		B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.4	16.0	6.5	11.2	8.5	16.9	8.5	9.2				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	14.0	20.0	4.0	28.0	11.0	23.0	11.0	21.0				
Max Q Clear Time (g_c+I1), s	4.5	7.9	2.3	3.2	3.9	5.1	3.9	3.6				
Green Ext Time (p_c), s	0.2	2.1	0.0	0.6	0.1	2.4	0.1	0.5				
Intersection Summary												
HCM 2010 Ctrl Delay	21.5											
HCM 2010 LOS	C											

HCM 2010 Signalized Intersection Summary

12: Heidorn Ranch Rd & Project Access

Scenario 3b
Cumulative PM With Project - No Hillcrest S/O Sand Creek

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	0	96	110	0	40	164	213	40	40	95	119
Future Volume (veh/h)	69	0	96	110	0	40	164	213	40	40	95	119
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	69	0	96	110	0	40	164	213	40	40	95	119
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	90	0	164	140	0	209	190	412	77	61	149	187
Arrive On Green	0.05	0.00	0.10	0.08	0.00	0.13	0.11	0.27	0.27	0.03	0.20	0.20
Sat Flow, veh/h	1774	0	1583	1774	0	1583	1774	1526	287	1774	753	943
Grp Volume(v), veh/h	69	0	96	110	0	40	164	0	253	40	0	214
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1774	0	1583	1774	0	1812	1774	0	1696
Q Serve(g_s), s	1.8	0.0	2.7	2.9	0.0	1.1	4.3	0.0	5.5	1.0	0.0	5.4
Cycle Q Clear(g_c), s	1.8	0.0	2.7	2.9	0.0	1.1	4.3	0.0	5.5	1.0	0.0	5.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.16	1.00		0.56
Lane Grp Cap(c), veh/h	90	0	164	140	0	209	190	0	490	61	0	336
V/C Ratio(X)	0.77	0.00	0.59	0.79	0.00	0.19	0.87	0.00	0.52	0.65	0.00	0.64
Avail Cap(c_a), veh/h	152	0	541	152	0	541	190	0	619	190	0	580
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.9	0.0	20.0	21.2	0.0	18.1	20.6	0.0	14.5	22.3	0.0	17.2
Incr Delay (d2), s/veh	12.8	0.0	3.3	22.0	0.0	0.4	31.6	0.0	0.8	11.0	0.0	2.0
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(50%),veh/ln	1.2	0.0	1.3	2.2	0.0	0.5	3.7	0.0	2.9	0.7	0.0	2.7
LnGrp Delay(d),s/veh	34.7	0.0	23.3	43.2	0.0	18.5	52.2	0.0	15.3	33.3	0.0	19.2
LnGrp LOS	C		C	D		B	D		B	C		B
Approach Vol, veh/h	165				150				417		254	
Approach Delay, s/veh	28.1				36.6				29.8		21.5	
Approach LOS	C				D				C		C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.6	18.6	9.7	10.9	11.0	15.3	8.4	12.2				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	5.0	16.0	4.0	16.0	5.0	16.0	4.0	16.0				
Max Q Clear Time (g_c+I1), s	3.0	7.5	4.9	4.7	6.3	7.4	3.8	3.1				
Green Ext Time (p_c), s	0.0	1.8	0.0	0.5	0.0	1.8	0.0	0.6				
Intersection Summary												
HCM 2010 Ctrl Delay			28.4									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary

7: Sand Creek Rd & Hillcrest Ave

Scenario 3b
Cumulative PM With Project - No Hillcrest S/O Sand Creek

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	168	1010	1106	192	80	100		
Future Volume (veh/h)	168	1010	1106	192	80	100		
Number	7	4	8	18	1	16		
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		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863		
Adj Flow Rate, veh/h	168	1010	1106	192	80	100		
Adj No. of Lanes	1	1	1	0	1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	177	1575	1069	186	81	72		
Arrive On Green	0.10	0.85	0.92	0.92	0.05	0.05		
Sat Flow, veh/h	1774	1863	1547	269	1774	1583		
Grp Volume(v), veh/h	168	1010	0	1298	80	100		
Grp Sat Flow(s),veh/h/ln	1774	1863	0	1815	1774	1583		
Q Serve(g_s), s	10.4	20.1	0.0	76.0	5.0	5.0		
Cycle Q Clear(g_c), s	10.4	20.1	0.0	76.0	5.0	5.0		
Prop In Lane	1.00			0.15	1.00	1.00		
Lane Grp Cap(c), veh/h	177	1575	0	1254	81	72		
V/C Ratio(X)	0.95	0.64	0.00	1.03	0.99	1.39		
Avail Cap(c_a), veh/h	177	1575	0	1254	81	72		
HCM Platoon Ratio	1.00	1.00	1.33	1.33	1.00	1.00		
Upstream Filter(I)	1.00	1.00	0.00	0.09	0.99	0.99		
Uniform Delay (d), s/veh	49.2	2.9	0.0	4.5	52.5	52.5		
Incr Delay (d2), s/veh	52.2	2.0	0.0	18.9	96.9	239.7		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	7.7	10.7	0.0	39.3	4.6	9.1		
LnGrp Delay(d),s/veh	101.4	4.9	0.0	23.3	149.3	292.2		
LnGrp LOS	F	A		F	F	F		
Approach Vol, veh/h		1178	1298		180			
Approach Delay, s/veh		18.6	23.3		228.7			
Approach LOS		B	C		F			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				99.0		11.0	17.0	82.0
Change Period (Y+Rc), s				6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s				93.0		5.0	11.0	76.0
Max Q Clear Time (g_c+I1), s				22.1		7.0	12.4	78.0
Green Ext Time (p_c), s				49.0		0.0	0.0	0.0
Intersection Summary								
HCM 2010 Ctrl Delay			35.2					
HCM 2010 LOS			D					

HCM 2010 Signalized Intersection Summary

8: Sand Creek Rd & Heidorn Ranch Rd

Scenario 3b
Cumulative PM With Project - No Hillcrest S/O Sand Creek

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	140	986	1212	277	215	86		
Future Volume (veh/h)	140	986	1212	277	215	86		
Number	7	4	8	18	1	16		
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		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863		
Adj Flow Rate, veh/h	140	986	1212	277	215	86		
Adj No. of Lanes	1	1	1	0	1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	82	1462	1016	232	218	195		
Arrive On Green	0.05	0.78	0.69	0.69	0.12	0.12		
Sat Flow, veh/h	1774	1863	1468	336	1774	1583		
Grp Volume(v), veh/h	140	986	0	1489	215	86		
Grp Sat Flow(s),veh/h/ln	1774	1863	0	1804	1774	1583		
Q Serve(g_s), s	6.0	31.5	0.0	90.0	15.7	6.5		
Cycle Q Clear(g_c), s	6.0	31.5	0.0	90.0	15.7	6.5		
Prop In Lane	1.00			0.19	1.00	1.00		
Lane Grp Cap(c), veh/h	82	1462	0	1249	218	195		
V/C Ratio(X)	1.71	0.67	0.00	1.19	0.98	0.44		
Avail Cap(c_a), veh/h	82	1462	0	1249	218	195		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.69	0.69	0.00	0.74	0.84	0.84		
Uniform Delay (d), s/veh	62.0	6.4	0.0	20.0	56.9	52.9		
Incr Delay (d2), s/veh	352.6	1.7	0.0	92.8	51.5	1.3		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	11.0	16.6	0.0	76.2	10.8	5.9		
LnGrp Delay(d),s/veh	414.6	8.2	0.0	112.8	108.4	54.2		
LnGrp LOS	F	A		F	F	D		
Approach Vol, veh/h		1126	1489		301			
Approach Delay, s/veh		58.7	112.8		92.9			
Approach LOS		E	F		F			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				108.0		22.0	12.0	96.0
Change Period (Y+Rc), s				6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s				102.0		16.0	6.0	90.0
Max Q Clear Time (g_c+I1), s				33.5		17.7	8.0	92.0
Green Ext Time (p_c), s				56.4		0.0	0.0	0.0
Intersection Summary								
HCM 2010 Ctrl Delay			89.9					
HCM 2010 LOS			F					

HCM 2010 Signalized Intersection Summary

9: Sand Creek Rd & SR 4 Eastbound

Scenario 3b
Cumulative PM With Project - No Hillcrest S/O Sand Creek

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	458	548	933	280	820	496		
Future Volume (veh/h)	458	548	933	280	820	496		
Number	7	4	8	18	1	16		
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		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	458	548	933	280	820	496		
Adj No. of Lanes	1	2	2	1	2	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	473	2202	1022	457	841	387		
Arrive On Green	0.27	0.62	0.58	0.58	0.24	0.24		
Sat Flow, veh/h	1774	3632	3632	1583	3442	1583		
Grp Volume(v), veh/h	458	548	933	280	820	496		
Grp Sat Flow(s),veh/h/ln	1774	1770	1770	1583	1721	1583		
Q Serve(g_s), s	23.0	6.2	21.2	10.4	21.3	22.0		
Cycle Q Clear(g_c), s	23.0	6.2	21.2	10.4	21.3	22.0		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	473	2202	1022	457	841	387		
V/C Ratio(X)	0.97	0.25	0.91	0.61	0.97	1.28		
Avail Cap(c_a), veh/h	473	2202	1022	457	841	387		
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00		
Upstream Filter(I)	0.96	0.96	0.69	0.69	1.00	1.00		
Uniform Delay (d), s/veh	32.6	7.6	18.0	15.7	33.7	34.0		
Incr Delay (d2), s/veh	32.3	0.1	10.1	4.2	24.9	145.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	15.4	3.1	11.5	4.9	12.9	32.5		
LnGrp Delay(d),s/veh	65.0	7.7	28.0	19.9	58.6	179.2		
LnGrp LOS	E	A	C	B	E	F		
Approach Vol, veh/h		1006	1213		1316			
Approach Delay, s/veh		33.7	26.2		104.0			
Approach LOS		C	C		F			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				62.0		28.0	30.0	32.0
Change Period (Y+Rc), s				6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s				56.0		22.0	24.0	26.0
Max Q Clear Time (g_c+I1), s				8.2		24.0	25.0	23.2
Green Ext Time (p_c), s				17.5		0.0	0.0	2.3
Intersection Summary								
HCM 2010 Ctrl Delay			57.3					
HCM 2010 LOS			E					

HCM 2010 Signalized Intersection Summary

10: SR 4 Westbound & Sand Creek Rd

Scenario 3b
Cumulative PM With Project - No Hillcrest S/O Sand Creek

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	250	1118	0	0	621	780	592	0	410	0	0	0
Future Volume (veh/h)	250	1118	0	0	621	780	592	0	410	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	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			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1863	1863	1863	1863			
Adj Flow Rate, veh/h	250	1118	0	0	621	780	592	0	410			
Adj No. of Lanes	2	3	0	0	1	2	2	0	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	322	2931	0	0	775	1317	1030	0	460			
Arrive On Green	0.09	0.58	0.00	0.00	0.42	0.42	0.29	0.00	0.29			
Sat Flow, veh/h	3442	5253	0	0	1863	3167	3548	0	1583			
Grp Volume(v), veh/h	250	1118	0	0	621	780	592	0	410			
Grp Sat Flow(s),veh/h/ln	1721	1695	0	0	1863	1583	1774	0	1583			
Q Serve(g_s), s	6.4	10.7	0.0	0.0	26.3	17.2	12.8	0.0	22.3			
Cycle Q Clear(g_c), s	6.4	10.7	0.0	0.0	26.3	17.2	12.8	0.0	22.3			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	322	2931	0	0	775	1317	1030	0	460			
V/C Ratio(X)	0.78	0.38	0.00	0.00	0.80	0.59	0.57	0.00	0.89			
Avail Cap(c_a), veh/h	344	2931	0	0	775	1317	1143	0	510			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.67	0.67	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	39.9	10.4	0.0	0.0	23.0	20.4	27.2	0.0	30.6			
Incr Delay (d2), s/veh	6.9	0.3	0.0	0.0	8.6	2.0	0.6	0.0	16.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	3.3	5.0	0.0	0.0	15.3	7.8	6.3	0.0	11.8			
LnGrp Delay(d),s/veh	46.8	10.6	0.0	0.0	31.6	22.3	27.8	0.0	47.2			
LnGrp LOS	D	B			C	C	C		D			
Approach Vol, veh/h		1368			1401			1002				
Approach Delay, s/veh		17.2			26.4			35.7				
Approach LOS		B			C			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		32.1		57.9			14.4	43.4				
Change Period (Y+Rc), s		6.0		6.0			6.0	6.0				
Max Green Setting (Gmax), s		29.0		49.0			9.0	34.0				
Max Q Clear Time (g_c+I1), s		24.3		12.7			8.4	28.3				
Green Ext Time (p_c), s		1.8		23.4			0.1	5.1				
Intersection Summary												
HCM 2010 Ctrl Delay				25.6								
HCM 2010 LOS				C								
Notes												

HCM 2010 Signalized Intersection Summary

8: Sand Creek Rd & Heidorn Ranch Rd

Scenario 3b-With Mitigation
Cumulative PM With Project - No Hillcrest S/O Sand Creek

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	104	986	1212	277	215	86		
Future Volume (veh/h)	104	986	1212	277	215	86		
Number	7	4	8	18	1	16		
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		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	104	986	1212	277	215	86		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	109	1462	1261	1072	218	195		
Arrive On Green	0.06	0.78	0.68	0.68	0.12	0.12		
Sat Flow, veh/h	1774	1863	1863	1583	1774	1583		
Grp Volume(v), veh/h	104	986	1212	277	215	86		
Grp Sat Flow(s),veh/h/ln	1774	1863	1863	1583	1774	1583		
Q Serve(g_s), s	7.6	31.5	78.2	8.9	15.7	6.5		
Cycle Q Clear(g_c), s	7.6	31.5	78.2	8.9	15.7	6.5		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	109	1462	1261	1072	218	195		
V/C Ratio(X)	0.95	0.67	0.96	0.26	0.98	0.44		
Avail Cap(c_a), veh/h	109	1462	1261	1072	218	195		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.69	0.69	0.74	0.74	0.83	0.83		
Uniform Delay (d), s/veh	60.8	6.4	19.4	8.2	56.9	52.9		
Incr Delay (d2), s/veh	57.5	1.7	14.4	0.4	51.2	1.3		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	5.5	16.6	44.8	4.0	10.8	5.9		
LnGrp Delay(d),s/veh	118.3	8.2	33.8	8.7	108.1	54.2		
LnGrp LOS	F	A	C	A	F	D		
Approach Vol, veh/h		1090	1489		301			
Approach Delay, s/veh		18.7	29.2		92.7			
Approach LOS		B	C		F			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				108.0		22.0	14.0	94.0
Change Period (Y+Rc), s				6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s				102.0		16.0	8.0	88.0
Max Q Clear Time (g_c+I1), s				33.5		17.7	9.6	80.2
Green Ext Time (p_c), s				45.6		0.0	0.0	7.2
Intersection Summary								
HCM 2010 Ctrl Delay			31.8					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary

9: Sand Creek Rd & SR 4 Eastbound

Scenario 3b-With Mitigation
Cumulative PM With Project - No Hillcrest S/O Sand Creek

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑	↗				↗↗		↗
Traffic Volume (veh/h)	0	548	458	0	933	280	0	0	0	820	0	496
Future Volume (veh/h)	0	548	458	0	933	280	0	0	0	820	0	496
Number	7	4	14	3	8	18				1	6	16
Initial Q (Qb), veh	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
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1863	0	1863	1863				1863	0	1863
Adj Flow Rate, veh/h	0	548	458	0	933	280				820	0	496
Adj No. of Lanes	0	2	1	0	2	1				2	0	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Percent Heavy Veh, %	0	2	2	0	2	2				2	0	2
Cap, veh/h	0	1416	633	0	1416	633				1253	0	577
Arrive On Green	0.00	0.40	0.40	0.00	0.80	0.80				0.36	0.00	0.36
Sat Flow, veh/h	0	3632	1583	0	3632	1583				3442	0	1583
Grp Volume(v), veh/h	0	548	458	0	933	280				820	0	496
Grp Sat Flow(s),veh/h/ln	0	1770	1583	0	1770	1583				1721	0	1583
Q Serve(g_s), s	0.0	9.9	22.0	0.0	10.0	4.9				17.9	0.0	26.1
Cycle Q Clear(g_c), s	0.0	9.9	22.0	0.0	10.0	4.9				17.9	0.0	26.1
Prop In Lane	0.00		1.00	0.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1416	633	0	1416	633				1253	0	577
V/C Ratio(X)	0.00	0.39	0.72	0.00	0.66	0.44				0.65	0.00	0.86
Avail Cap(c_a), veh/h	0	1416	633	0	1416	633				1606	0	739
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.96	0.96	0.00	0.69	0.69				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	19.2	22.8	0.0	6.4	5.9				23.9	0.0	26.5
Incr Delay (d2), s/veh	0.0	0.2	3.9	0.0	1.7	1.5				0.6	0.0	8.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.8	10.2	0.0	4.7	2.3				8.5	0.0	12.6
LnGrp Delay(d),s/veh	0.0	19.3	26.7	0.0	8.1	7.4				24.5	0.0	34.7
LnGrp LOS		B	C		A	A				C		C
Approach Vol, veh/h		1006			1213						1316	
Approach Delay, s/veh		22.7			7.9						28.4	
Approach LOS		C			A						C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				42.0		38.8		42.0				
Change Period (Y+Rc), s				6.0		6.0		6.0				
Max Green Setting (Gmax), s				36.0		42.0		36.0				
Max Q Clear Time (g_c+I1), s				24.0		28.1		12.0				
Green Ext Time (p_c), s				9.1		4.7		15.1				
Intersection Summary												
HCM 2010 Ctrl Delay			19.7									
HCM 2010 LOS			B									

HCM 2010 Signalized Intersection Summary 1: Deer Valley Road & Lone Tree Way

Cumulative AM With Project 80% Growth SCR

08/11/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	962	236	400	946	354	419	545	170	331	605	50
Future Volume (veh/h)	90	962	236	400	946	354	419	545	170	331	605	50
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	90	962	236	400	946	354	419	545	170	331	605	50
Adj No. of Lanes	1	3	0	2	2	0	2	2	0	2	2	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	110	1499	367	455	1106	411	466	615	191	375	678	56
Arrive On Green	0.06	0.73	0.73	0.13	0.88	0.88	0.14	0.23	0.23	0.11	0.20	0.20
Sat Flow, veh/h	1774	4079	998	3442	2527	939	3442	2660	827	3442	3311	273
Grp Volume(v), veh/h	90	799	399	400	660	640	419	362	353	331	323	332
Grp Sat Flow(s),veh/h/ln	1774	1695	1687	1721	1770	1697	1721	1770	1717	1721	1770	1815
Q Serve(g_s), s	7.5	17.7	17.8	17.1	27.5	28.6	18.0	29.6	29.8	14.2	26.6	26.7
Cycle Q Clear(g_c), s	7.5	17.7	17.8	17.1	27.5	28.6	18.0	29.6	29.8	14.2	26.6	26.7
Prop In Lane	1.00		0.59	1.00		0.55	1.00		0.48	1.00		0.15
Lane Grp Cap(c), veh/h	110	1246	620	455	774	743	466	409	397	375	362	371
V/C Ratio(X)	0.82	0.64	0.64	0.88	0.85	0.86	0.90	0.88	0.89	0.88	0.89	0.89
Avail Cap(c_a), veh/h	130	1246	620	574	774	743	505	425	412	390	366	375
HCM Platoon Ratio	1.00	2.00	2.00	1.00	2.00	2.00	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	69.5	14.9	14.9	63.9	7.0	7.0	63.8	55.7	55.8	65.9	58.0	58.1
Incr Delay (d2), s/veh	28.1	2.5	5.1	12.2	11.5	12.5	18.0	18.9	20.1	20.1	22.7	22.7
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	4.6	8.4	8.8	8.9	14.6	14.7	9.7	16.6	16.3	7.8	15.3	15.7
LnGrp Delay(d),s/veh	97.6	17.5	20.0	76.1	18.4	19.6	81.8	74.6	75.8	86.0	80.8	80.8
LnGrp LOS	F	B	C	E	B	B	F	E	E	F	F	F
Approach Vol, veh/h	1288			1700			1134			986		
Approach Delay, s/veh	23.9			32.4			77.6			82.5		
Approach LOS	C			C			E			F		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	22.3	40.7	25.9	61.1	26.3	36.7	15.3	71.6				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	17.0	36.0	25.0	48.0	22.0	31.0	11.0	62.0				
Max Q Clear Time (g_c+I1), s	16.2	31.8	19.1	19.8	20.0	28.7	9.5	30.6				
Green Ext Time (p_c), s	0.1	2.9	0.7	19.7	0.3	1.7	0.0	21.3				
Intersection Summary												
HCM 2010 Ctrl Delay	50.0											
HCM 2010 LOS	D											

HCM 2010 Signalized Intersection Summary 2: Hillcrest Avenue & Lone Tree Way

Cumulative AM With Project 80% Growth SCR

08/11/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	300	655	59	82	994	314	226	421	177	355	174	300
Future Volume (veh/h)	300	655	59	82	994	314	226	421	177	355	174	300
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	300	655	59	82	994	314	226	421	177	355	174	300
Adj No. of Lanes	1	3	0	1	3	1	1	2	0	2	2	1
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	325	2199	197	101	1711	533	249	494	205	406	637	285
Arrive On Green	0.18	0.46	0.46	0.11	0.67	0.67	0.14	0.20	0.20	0.12	0.18	0.18
Sat Flow, veh/h	1774	4753	425	1774	5085	1583	1774	2439	1015	3442	3539	1583
Grp Volume(v), veh/h	300	466	248	82	994	314	226	304	294	355	174	300
Grp Sat Flow(s),veh/h/ln	1774	1695	1788	1774	1695	1583	1774	1770	1684	1721	1770	1583
Q Serve(g_s), s	24.9	12.8	13.0	6.8	15.7	16.1	18.8	24.8	25.3	15.2	6.4	27.0
Cycle Q Clear(g_c), s	24.9	12.8	13.0	6.8	15.7	16.1	18.8	24.8	25.3	15.2	6.4	27.0
Prop In Lane	1.00		0.24	1.00		1.00	1.00		0.60	1.00		1.00
Lane Grp Cap(c), veh/h	325	1569	827	101	1711	533	249	358	341	406	637	285
V/C Ratio(X)	0.92	0.30	0.30	0.81	0.58	0.59	0.91	0.85	0.86	0.87	0.27	1.05
Avail Cap(c_a), veh/h	414	1569	827	154	1711	533	296	366	348	482	637	285
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.92	0.92	0.92	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.2	25.1	25.1	65.7	18.9	18.9	63.5	57.6	57.8	65.1	53.0	61.5
Incr Delay (d2), s/veh	22.8	0.5	0.9	16.1	1.3	4.4	27.1	16.7	19.0	14.5	0.2	67.8
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(50%),veh/ln	14.3	6.1	6.6	3.8	7.4	7.5	11.1	13.8	13.6	8.1	3.1	17.2
LnGrp Delay(d),s/veh	83.0	25.6	26.1	81.8	20.2	23.3	90.6	74.3	76.8	79.5	53.3	129.3
LnGrp LOS	F	C	C	F	C	C	F	E	E	E	D	F
Approach Vol, veh/h	1014			1390			824			829		
Approach Delay, s/veh	42.7			24.5			79.7			92.0		
Approach LOS	D			C			E			F		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	23.7	36.4	14.5	75.4	27.1	33.0	33.5	56.5				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	21.0	31.0	13.0	61.0	25.0	27.0	35.0	39.0				
Max Q Clear Time (g_c+I1), s	17.2	27.3	8.8	15.0	20.8	29.0	26.9	18.1				
Green Ext Time (p_c), s	0.5	1.9	0.1	18.0	0.2	0.0	0.5	12.3				
Intersection Summary												
HCM 2010 Ctrl Delay	54.1											
HCM 2010 LOS	D											

HCM 2010 Signalized Intersection Summary Cumulative AM With Project 80% Growth SCR 3: Heidorn Ranch Road/Fairside Way & Lone Tree Way 08/11/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	1297	69	85	1522	20	97	10	134	20	10	20
Future Volume (veh/h)	10	1297	69	85	1522	20	97	10	134	20	10	20
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	10	1297	69	85	1522	20	97	10	134	20	10	20
Adj No. of Lanes	1	3	0	1	3	0	2	1	1	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	12	3302	176	105	3725	49	141	185	157	25	40	80
Arrive On Green	0.01	1.00	1.00	0.12	1.00	1.00	0.04	0.10	0.10	0.01	0.07	0.07
Sat Flow, veh/h	1774	4944	263	1774	5173	68	3442	1863	1583	1774	556	1111
Grp Volume(v), veh/h	10	889	477	85	997	545	97	10	134	20	0	30
Grp Sat Flow(s),veh/h/ln	1774	1695	1816	1774	1695	1851	1721	1863	1583	1774	0	1667
Q Serve(g_s), s	0.8	0.0	0.0	7.0	0.0	0.0	4.2	0.7	12.5	1.7	0.0	2.6
Cycle Q Clear(g_c), s	0.8	0.0	0.0	7.0	0.0	0.0	4.2	0.7	12.5	1.7	0.0	2.6
Prop In Lane	1.00		0.14	1.00		0.04	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	12	2264	1213	105	2441	1333	141	185	157	25	0	120
V/C Ratio(X)	0.83	0.39	0.39	0.81	0.41	0.41	0.69	0.05	0.85	0.81	0.00	0.25
Avail Cap(c_a), veh/h	59	2264	1213	237	2441	1333	275	298	253	118	0	244
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.87	0.87	0.87	0.86	0.86	0.86	0.98	0.98	0.98	1.00	0.00	1.00
Uniform Delay (d), s/veh	73.9	0.0	0.0	65.3	0.0	0.0	71.0	61.2	66.5	73.8	0.0	65.8
Incr Delay (d2), s/veh	70.5	0.4	0.8	12.0	0.4	0.8	5.7	0.1	14.1	44.2	0.0	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(50%),veh/ln	0.6	0.1	0.3	3.8	0.1	0.3	2.1	0.4	6.1	1.1	0.0	1.2
LnGrp Delay(d),s/veh	144.4	0.4	0.8	77.3	0.4	0.8	76.6	61.3	80.6	117.9	0.0	66.9
LnGrp LOS	F	A	A	E	A	A	E	E	F	F		E
Approach Vol, veh/h	1376					1627		241		50		
Approach Delay, s/veh	1.6					4.6		78.2		87.3		
Approach LOS	A					A		E		F		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.1	20.9	14.9	106.2	12.2	16.8	7.0	114.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	10.0	24.0	20.0	72.0	12.0	22.0	5.0	87.0				
Max Q Clear Time (g_c+I1), s	3.7	14.5	9.0	2.0	6.2	4.6	2.8	2.0				
Green Ext Time (p_c), s	0.0	0.4	0.1	41.5	0.1	0.5	0.0	45.9				
Intersection Summary												
HCM 2010 Ctrl Delay	10.0											
HCM 2010 LOS	A											

HCM 2010 Signalized Intersection Summary

11: Hillcrest Ave & Project Access

Cumulative AM With Project 80% Growth SCR

08/11/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	0	60	18	0	95	30	282	6	32	194	40
Future Volume (veh/h)	120	0	60	18	0	95	30	282	6	32	194	40
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	120	0	60	18	0	95	30	282	6	32	194	40
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	155	0	272	32	0	162	49	429	9	52	356	73
Arrive On Green	0.09	0.00	0.17	0.02	0.00	0.10	0.03	0.24	0.24	0.03	0.24	0.24
Sat Flow, veh/h	1774	0	1583	1774	0	1583	1774	1817	39	1774	1499	309
Grp Volume(v), veh/h	120	0	60	18	0	95	30	0	288	32	0	234
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1774	0	1583	1774	0	1856	1774	0	1808
Q Serve(g_s), s	2.9	0.0	1.4	0.4	0.0	2.5	0.7	0.0	6.2	0.8	0.0	5.0
Cycle Q Clear(g_c), s	2.9	0.0	1.4	0.4	0.0	2.5	0.7	0.0	6.2	0.8	0.0	5.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.02	1.00		0.17
Lane Grp Cap(c), veh/h	155	0	272	32	0	162	49	0	438	52	0	430
V/C Ratio(X)	0.78	0.00	0.22	0.57	0.00	0.59	0.61	0.00	0.66	0.61	0.00	0.54
Avail Cap(c_a), veh/h	322	0	575	161	0	575	161	0	758	161	0	739
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.7	0.0	15.7	21.5	0.0	18.9	21.2	0.0	15.2	21.1	0.0	14.7
Incr Delay (d2), s/veh	8.0	0.0	0.4	14.8	0.0	3.3	11.4	0.0	1.7	11.1	0.0	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(50%),veh/ln	1.8	0.0	0.6	0.3	0.0	1.3	0.5	0.0	3.3	0.5	0.0	2.6
LnGrp Delay(d),s/veh	27.7	0.0	16.1	36.2	0.0	22.2	32.5	0.0	16.9	32.2	0.0	15.8
LnGrp LOS	C		B	D		C	C		B	C		B
Approach Vol, veh/h	180			113			318			266		
Approach Delay, s/veh	23.9			24.4			18.4			17.8		
Approach LOS	C			C			B			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.3	16.4	6.8	13.6	7.2	16.5	9.8	10.5				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	4.0	18.0	4.0	16.0	4.0	18.0	8.0	16.0				
Max Q Clear Time (g_c+I1), s	2.8	8.2	2.4	3.4	2.7	7.0	4.9	4.5				
Green Ext Time (p_c), s	0.0	2.2	0.0	0.6	0.0	2.4	0.1	0.6				
Intersection Summary												
HCM 2010 Ctrl Delay	20.1											
HCM 2010 LOS	C											

HCM 2010 Signalized Intersection Summary
12: Heidorn Ranch Rd & Project Access

Cumulative AM With Project 80% Growth SCR

08/11/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	107	0	146	30	0	70	49	202	40	60	66	35
Future Volume (veh/h)	107	0	146	30	0	70	49	202	40	60	66	35
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	107	0	146	30	0	70	49	202	40	60	66	35
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	139	0	248	50	0	168	73	319	63	84	250	132
Arrive On Green	0.08	0.00	0.16	0.03	0.00	0.11	0.04	0.21	0.21	0.05	0.22	0.22
Sat Flow, veh/h	1774	0	1583	1774	0	1583	1774	1511	299	1774	1147	608
Grp Volume(v), veh/h	107	0	146	30	0	70	49	0	242	60	0	101
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1774	0	1583	1774	0	1810	1774	0	1755
Q Serve(g_s), s	2.5	0.0	3.7	0.7	0.0	1.8	1.2	0.0	5.2	1.4	0.0	2.1
Cycle Q Clear(g_c), s	2.5	0.0	3.7	0.7	0.0	1.8	1.2	0.0	5.2	1.4	0.0	2.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.17	1.00		0.35
Lane Grp Cap(c), veh/h	139	0	248	50	0	168	73	0	382	84	0	382
V/C Ratio(X)	0.77	0.00	0.59	0.60	0.00	0.42	0.67	0.00	0.63	0.71	0.00	0.26
Avail Cap(c_a), veh/h	535	0	881	206	0	588	247	0	1050	288	0	1059
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.5	0.0	16.9	20.7	0.0	18.0	20.4	0.0	15.5	20.2	0.0	14.0
Incr Delay (d2), s/veh	8.5	0.0	2.2	11.2	0.0	1.7	10.1	0.0	1.7	10.5	0.0	0.4
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	1.6	0.0	1.7	0.5	0.0	0.9	0.8	0.0	2.8	0.9	0.0	1.0
LnGrp Delay(d),s/veh	28.0	0.0	19.1	31.9	0.0	19.7	30.5	0.0	17.2	30.7	0.0	14.4
LnGrp LOS	C		B	C		B	C		B	C		B
Approach Vol, veh/h	253				100				291		161	
Approach Delay, s/veh	22.9				23.4				19.5		20.5	
Approach LOS	C				C				B		C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.1	15.1	7.2	12.7	7.8	15.4	9.4	10.6				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	25.0	5.0	24.0	6.0	26.0	13.0	16.0				
Max Q Clear Time (g_c+I1), s	3.4	7.2	2.7	5.7	3.2	4.1	4.5	3.8				
Green Ext Time (p_c), s	0.0	1.9	0.0	1.2	0.0	2.0	0.1	1.0				
Intersection Summary												
HCM 2010 Ctrl Delay			21.2									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary

7: Hillcrest Ave & Sand Creek Rd

Cumulative AM With Project 80% Growth SCR

08/11/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	94	304	16	32	400	128	150	120	70	115	30	133
Future Volume (veh/h)	94	304	16	32	400	128	150	120	70	115	30	133
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	94	304	16	32	400	128	120	96	56	115	24	133
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	120	875	46	43	617	197	150	143	83	144	31	172
Arrive On Green	0.07	0.50	0.50	0.03	0.61	0.61	0.08	0.13	0.13	0.08	0.13	0.13
Sat Flow, veh/h	1774	1754	92	1774	1353	433	1774	1105	644	1774	248	1373
Grp Volume(v), veh/h	94	0	320	32	0	528	120	0	152	115	0	157
Grp Sat Flow(s),veh/h/ln	1774	0	1846	1774	0	1786	1774	0	1749	1774	0	1620
Q Serve(g_s), s	4.7	0.0	9.5	1.6	0.0	17.3	6.0	0.0	7.5	5.7	0.0	8.4
Cycle Q Clear(g_c), s	4.7	0.0	9.5	1.6	0.0	17.3	6.0	0.0	7.5	5.7	0.0	8.4
Prop In Lane	1.00		0.05	1.00		0.24	1.00		0.37	1.00		0.85
Lane Grp Cap(c), veh/h	120	0	921	43	0	814	150	0	226	144	0	203
V/C Ratio(X)	0.78	0.00	0.35	0.74	0.00	0.65	0.80	0.00	0.67	0.80	0.00	0.77
Avail Cap(c_a), veh/h	158	0	921	99	0	814	197	0	350	158	0	288
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.72	0.00	0.72	1.00	0.00	1.00	0.97	0.00	0.97
Uniform Delay (d), s/veh	41.3	0.0	13.7	43.2	0.0	13.1	40.4	0.0	37.4	40.6	0.0	38.1
Incr Delay (d2), s/veh	17.1	0.0	1.0	16.0	0.0	2.9	15.6	0.0	3.5	22.3	0.0	7.8
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(50%),veh/ln	2.9	0.0	5.1	1.0	0.0	9.0	3.6	0.0	3.8	3.7	0.0	4.2
LnGrp Delay(d),s/veh	58.4	0.0	14.7	59.2	0.0	16.0	56.1	0.0	40.8	62.9	0.0	45.9
LnGrp LOS	E		B	E		B	E		D	E		D
Approach Vol, veh/h		414			560			272			272	
Approach Delay, s/veh		24.6			18.4			47.6			53.1	
Approach LOS		C			B			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.3	17.6	8.2	50.9	13.6	17.3	12.1	47.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	8.0	18.0	5.0	35.0	10.0	16.0	8.0	32.0				
Max Q Clear Time (g_c+I1), s	7.7	9.5	3.6	11.5	8.0	10.4	6.7	19.3				
Green Ext Time (p_c), s	0.0	1.2	0.0	5.9	0.1	0.8	0.0	4.5				
Intersection Summary												
HCM 2010 Ctrl Delay			31.6									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary 8: Sand Creek Rd & Heidorn Ranch Rd

Cumulative AM With Project 80% Growth SCR

08/11/2017

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	53	368	496	238	203	39		
Future Volume (veh/h)	53	368	496	238	203	39		
Number	7	4	8	18	1	16		
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		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863		
Adj Flow Rate, veh/h	53	368	496	238	203	39		
Adj No. of Lanes	1	1	1	0	1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	67	1360	745	357	242	216		
Arrive On Green	0.05	0.97	0.63	0.63	0.14	0.14		
Sat Flow, veh/h	1774	1863	1191	571	1774	1583		
Grp Volume(v), veh/h	53	368	0	734	203	39		
Grp Sat Flow(s),veh/h/ln	1774	1863	0	1762	1774	1583		
Q Serve(g_s), s	2.7	0.7	0.0	24.1	10.0	2.0		
Cycle Q Clear(g_c), s	2.7	0.7	0.0	24.1	10.0	2.0		
Prop In Lane	1.00			0.32	1.00	1.00		
Lane Grp Cap(c), veh/h	67	1360	0	1102	242	216		
V/C Ratio(X)	0.79	0.27	0.00	0.67	0.84	0.18		
Avail Cap(c_a), veh/h	99	1360	0	1102	315	281		
HCM Platoon Ratio	1.33	1.33	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.89	0.89	0.00	0.65	1.00	1.00		
Uniform Delay (d), s/veh	42.4	0.4	0.0	10.8	37.9	34.4		
Incr Delay (d2), s/veh	19.9	0.4	0.0	2.1	14.2	0.4		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	1.7	0.4	0.0	12.3	5.9	1.8		
LnGrp Delay(d),s/veh	62.3	0.8	0.0	12.9	52.1	34.8		
LnGrp LOS	E	A		B	D	C		
Approach Vol, veh/h		421	734		242			
Approach Delay, s/veh		8.5	12.9		49.3			
Approach LOS		A	B		D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				71.7		18.3	9.4	62.3
Change Period (Y+Rc), s				6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s				62.0		16.0	5.0	51.0
Max Q Clear Time (g_c+I1), s				2.7		12.0	4.7	26.1
Green Ext Time (p_c), s				9.4		0.3	0.0	8.0
Intersection Summary								
HCM 2010 Ctrl Delay			17.9					
HCM 2010 LOS			B					

HCM 2010 Signalized Intersection Summary 9: Sand Creek Rd & SR 4 Eastbound

Cumulative AM With Project 80% Growth SCR

08/11/2017

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	293	475	827	570	410	90		
Future Volume (veh/h)	293	475	827	570	410	90		
Number	7	4	8	18	1	16		
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		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	234	380	662	570	410	72		
Adj No. of Lanes	1	2	2	1	2	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	274	2158	1376	616	504	232		
Arrive On Green	0.15	0.61	0.78	0.78	0.15	0.15		
Sat Flow, veh/h	1774	3632	3632	1583	3442	1583		
Grp Volume(v), veh/h	234	380	662	570	410	72		
Grp Sat Flow(s),veh/h/ln	1774	1770	1770	1583	1721	1583		
Q Serve(g_s), s	11.6	4.2	6.0	25.7	10.4	3.7		
Cycle Q Clear(g_c), s	11.6	4.2	6.0	25.7	10.4	3.7		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	274	2158	1376	616	504	232		
V/C Ratio(X)	0.86	0.18	0.48	0.93	0.81	0.31		
Avail Cap(c_a), veh/h	394	2399	1376	616	650	299		
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00		
Upstream Filter(I)	0.09	0.09	0.75	0.75	1.00	1.00		
Uniform Delay (d), s/veh	37.1	7.7	6.8	9.0	37.2	34.3		
Incr Delay (d2), s/veh	1.2	0.0	0.9	17.9	6.1	0.8		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	5.7	2.1	2.9	13.5	5.4	3.4		
LnGrp Delay(d),s/veh	38.3	7.7	7.7	26.9	43.3	35.1		
LnGrp LOS	D	A	A	C	D	D		
Approach Vol, veh/h		614	1232		482			
Approach Delay, s/veh		19.4	16.6		42.1			
Approach LOS		B	B		D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				60.9		19.2	19.9	41.0
Change Period (Y+Rc), s				6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s				61.0		17.0	20.0	35.0
Max Q Clear Time (g_c+I1), s				6.2		12.4	13.6	27.7
Green Ext Time (p_c), s				13.6		0.8	0.4	4.9
Intersection Summary								
HCM 2010 Ctrl Delay			22.6					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary 10: SR 4 Westbound & Sand Creek Rd

Cumulative AM With Project 80% Growth SCR

08/11/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	349	537	0	0	872	720	524	0	220	0	0	0
Future Volume (veh/h)	349	537	0	0	872	720	524	0	220	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	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			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1863	1863	1863	1863			
Adj Flow Rate, veh/h	279	430	0	0	596	788	419	0	220			
Adj No. of Lanes	2	3	0	0	1	2	2	0	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	359	3547	0	0	981	1668	600	0	268			
Arrive On Green	0.10	0.70	0.00	0.00	0.53	0.53	0.17	0.00	0.17			
Sat Flow, veh/h	3442	5253	0	0	1863	3167	3548	0	1583			
Grp Volume(v), veh/h	279	430	0	0	596	788	419	0	220			
Grp Sat Flow(s),veh/h/ln	1721	1695	0	0	1863	1583	1774	0	1583			
Q Serve(g_s), s	7.1	2.5	0.0	0.0	20.0	14.1	10.0	0.0	12.1			
Cycle Q Clear(g_c), s	7.1	2.5	0.0	0.0	20.0	14.1	10.0	0.0	12.1			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	359	3547	0	0	981	1668	600	0	268			
V/C Ratio(X)	0.78	0.12	0.00	0.00	0.61	0.47	0.70	0.00	0.82			
Avail Cap(c_a), veh/h	459	3547	0	0	981	1668	749	0	334			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.90	0.90	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	39.3	4.5	0.0	0.0	14.8	13.4	35.2	0.0	36.1			
Incr Delay (d2), s/veh	5.7	0.1	0.0	0.0	2.8	1.0	2.1	0.0	12.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	3.7	1.2	0.0	0.0	11.0	6.4	5.1	0.0	6.2			
LnGrp Delay(d),s/veh	45.0	4.6	0.0	0.0	17.6	14.4	37.3	0.0	48.5			
LnGrp LOS	D	A			B	B	D		D			
Approach Vol, veh/h		709			1384			639				
Approach Delay, s/veh		20.5			15.8			41.2				
Approach LOS		C			B			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		21.2		68.8			15.4	53.4				
Change Period (Y+Rc), s		6.0		6.0			6.0	6.0				
Max Green Setting (Gmax), s		19.0		59.0			12.0	41.0				
Max Q Clear Time (g_c+I1), s		14.1		4.5			9.1	22.0				
Green Ext Time (p_c), s		1.2		16.1			0.3	10.6				
Intersection Summary												
HCM 2010 Ctrl Delay				22.9								
HCM 2010 LOS				C								
Notes												

HCM 2010 Signalized Intersection Summary

1: Deer Valley Road & Lone Tree Way

Scenario 3c
Cumulative PM With Project - 80% SCR

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	1070	292	310	783	222	303	520	340	394	486	40
Future Volume (veh/h)	110	1070	292	310	783	222	303	520	340	394	486	40
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	110	1070	292	310	783	222	303	520	340	394	486	40
Adj No. of Lanes	1	3	0	2	2	0	2	2	0	2	2	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	131	1369	373	353	1016	288	355	544	355	441	960	79
Arrive On Green	0.07	0.69	0.69	0.10	0.75	0.75	0.10	0.26	0.26	0.13	0.29	0.29
Sat Flow, veh/h	1774	3977	1085	3442	2724	772	3442	2054	1341	3442	3313	272
Grp Volume(v), veh/h	110	912	450	310	509	496	303	448	412	394	259	267
Grp Sat Flow(s),veh/h/ln	1774	1695	1671	1721	1770	1726	1721	1770	1626	1721	1770	1815
Q Serve(g_s), s	9.2	27.2	27.2	13.3	25.8	25.8	13.0	37.4	37.4	16.9	18.3	18.4
Cycle Q Clear(g_c), s	9.2	27.2	27.2	13.3	25.8	25.8	13.0	37.4	37.4	16.9	18.3	18.4
Prop In Lane	1.00		0.65	1.00		0.45	1.00		0.82	1.00		0.15
Lane Grp Cap(c), veh/h	131	1167	575	353	660	644	355	469	431	441	513	526
V/C Ratio(X)	0.84	0.78	0.78	0.88	0.77	0.77	0.85	0.96	0.96	0.89	0.50	0.51
Avail Cap(c_a), veh/h	154	1167	575	367	660	644	459	472	434	482	513	526
HCM Platoon Ratio	1.00	2.00	2.00	1.00	2.00	2.00	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	68.6	19.6	19.6	66.4	15.2	15.2	66.2	54.3	54.3	64.4	44.3	44.3
Incr Delay (d2), s/veh	28.2	5.2	10.2	20.1	8.5	8.7	11.7	30.3	32.3	17.7	0.8	0.8
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(50%),veh/ln	5.6	13.3	13.9	7.3	13.7	13.4	6.8	22.2	20.7	9.1	9.0	9.3
LnGrp Delay(d),s/veh	96.8	24.8	29.7	86.5	23.7	23.9	77.9	84.5	86.6	82.1	45.1	45.1
LnGrp LOS	F	C	C	F	C	C	E	F	F	F	D	D
Approach Vol, veh/h		1472			1315			1163			920	
Approach Delay, s/veh		31.7			38.6			83.5			60.9	
Approach LOS		C			D			F			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.2	45.7	21.4	57.6	21.5	49.5	17.1	61.9				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	21.0	40.0	16.0	49.0	20.0	41.0	13.0	52.0				
Max Q Clear Time (g_c+I1), s	18.9	39.4	15.3	29.2	15.0	20.4	11.2	27.8				
Green Ext Time (p_c), s	0.3	0.3	0.1	14.4	0.5	9.4	0.0	16.7				
Intersection Summary												
HCM 2010 Ctrl Delay				51.5								
HCM 2010 LOS				D								

HCM 2010 Signalized Intersection Summary

2: Hillcrest Avenue & Lone Tree Way

Scenario 3c
Cumulative PM With Project - 80% SCR

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	330	1215	139	208	1109	319	77	157	145	515	176	140
Future Volume (veh/h)	330	1215	139	208	1109	319	77	157	145	515	176	140
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	330	1215	139	208	1109	319	77	157	145	515	176	140
Adj No. of Lanes	1	3	0	1	3	1	1	2	0	2	2	1
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	355	2093	239	229	1938	604	96	168	145	569	724	324
Arrive On Green	0.20	0.45	0.45	0.26	0.76	0.76	0.05	0.09	0.09	0.17	0.20	0.20
Sat Flow, veh/h	1774	4630	530	1774	5085	1583	1774	1805	1553	3442	3539	1583
Grp Volume(v), veh/h	330	890	464	208	1109	319	77	154	148	515	176	140
Grp Sat Flow(s),veh/h/ln	1774	1695	1769	1774	1695	1583	1774	1770	1589	1721	1770	1583
Q Serve(g_s), s	27.4	29.2	29.2	17.0	13.8	12.0	6.4	12.9	14.0	22.0	6.2	11.6
Cycle Q Clear(g_c), s	27.4	29.2	29.2	17.0	13.8	12.0	6.4	12.9	14.0	22.0	6.2	11.6
Prop In Lane	1.00		0.30	1.00		1.00	1.00		0.98	1.00		1.00
Lane Grp Cap(c), veh/h	355	1533	800	229	1938	604	96	165	148	569	724	324
V/C Ratio(X)	0.93	0.58	0.58	0.91	0.57	0.53	0.80	0.93	1.00	0.90	0.24	0.43
Avail Cap(c_a), veh/h	438	1533	800	319	1938	604	154	165	148	642	724	324
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.90	0.90	0.90	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.0	30.5	30.5	54.8	12.7	12.5	70.1	67.5	68.0	61.4	50.0	52.1
Incr Delay (d2), s/veh	23.6	1.6	3.1	21.1	1.1	3.0	14.0	50.0	74.0	15.3	0.2	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(50%),veh/ln	15.8	14.1	15.0	9.7	6.3	5.6	3.5	8.6	9.2	11.7	3.1	5.2
LnGrp Delay(d),s/veh	82.5	32.1	33.6	75.8	13.8	15.4	84.1	117.5	142.0	76.7	50.1	53.0
LnGrp LOS	F	C	C	E	B	B	F	F	F	E	D	D
Approach Vol, veh/h	1684			1636			379			831		
Approach Delay, s/veh	42.4			22.0			120.3			67.1		
Approach LOS	D			C			F			E		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	30.8	20.0	25.4	73.8	14.1	36.7	36.0	63.2				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	28.0	14.0	27.0	57.0	13.0	29.0	37.0	47.0				
Max Q Clear Time (g_c+I1), s	24.0	16.0	19.0	31.2	8.4	13.6	29.4	15.8				
Green Ext Time (p_c), s	0.8	0.0	0.3	19.5	0.0	2.9	0.6	22.5				
Intersection Summary												
HCM 2010 Ctrl Delay	46.1											
HCM 2010 LOS	D											

HCM 2010 Signalized Intersection Summary

3: Heidorn Ranch Road/Fairside Way & Lone Tree Way

Scenario 3c
Cumulative PM With Project - 80% SCR

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	1945	141	119	1508	20	178	10	109	30	10	20
Future Volume (veh/h)	30	1945	141	119	1508	20	178	10	109	30	10	20
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	30	1945	141	119	1508	20	178	10	109	30	10	20
Adj No. of Lanes	1	3	0	1	3	0	2	1	1	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	38	3222	233	141	3742	50	225	137	116	38	16	33
Arrive On Green	0.04	1.00	1.00	0.16	1.00	1.00	0.07	0.07	0.07	0.02	0.03	0.03
Sat Flow, veh/h	1774	4842	349	1774	5172	69	3442	1863	1583	1774	556	1111
Grp Volume(v), veh/h	30	1359	727	119	988	540	178	10	109	30	0	30
Grp Sat Flow(s),veh/h/ln	1774	1695	1801	1774	1695	1851	1721	1863	1583	1774	0	1667
Q Serve(g_s), s	2.5	0.0	0.0	9.8	0.0	0.0	7.6	0.8	10.3	2.5	0.0	2.7
Cycle Q Clear(g_c), s	2.5	0.0	0.0	9.8	0.0	0.0	7.6	0.8	10.3	2.5	0.0	2.7
Prop In Lane	1.00		0.19	1.00		0.04	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	38	2256	1199	141	2453	1339	225	137	116	38	0	49
V/C Ratio(X)	0.78	0.60	0.61	0.84	0.40	0.40	0.79	0.07	0.94	0.79	0.00	0.61
Avail Cap(c_a), veh/h	248	2256	1199	367	2453	1339	298	137	116	71	0	49
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.67	0.67	0.67	0.83	0.83	0.83	0.98	0.98	0.98	1.00	0.00	1.00
Uniform Delay (d), s/veh	71.4	0.0	0.0	62.1	0.0	0.0	69.1	64.8	69.2	73.0	0.0	71.9
Incr Delay (d2), s/veh	20.2	0.8	1.5	10.6	0.4	0.8	9.9	0.2	63.7	28.7	0.0	19.8
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(50%),veh/ln	1.4	0.3	0.5	5.2	0.1	0.3	3.9	0.4	6.6	1.5	0.0	1.5
LnGrp Delay(d),s/veh	91.7	0.8	1.5	72.8	0.4	0.8	79.0	65.0	132.8	101.7	0.0	91.8
LnGrp LOS	F	A	A	E	A	A	E	E	F	F		F
Approach Vol, veh/h	2116				1647		297				60	
Approach Delay, s/veh	2.3				5.8		98.3				96.7	
Approach LOS	A				A		F				F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.2	17.0	17.9	105.8	15.8	10.4	9.2	114.5				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	6.0	11.0	31.0	78.0	13.0	4.0	21.0	88.0				
Max Q Clear Time (g_c+I1), s	4.5	12.3	11.8	2.0	9.6	4.7	4.5	2.0				
Green Ext Time (p_c), s	0.0	0.0	0.3	59.7	0.2	0.0	0.0	65.6				
Intersection Summary												
HCM 2010 Ctrl Delay	12.0											
HCM 2010 LOS	B											

HCM 2010 Signalized Intersection Summary

11: Hillcrest Ave & Project Access

Scenario 3c
Cumulative PM With Project - 80% SCR

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	0	50	12	0	63	80	331	21	106	206	40
Future Volume (veh/h)	80	0	50	12	0	63	80	331	21	106	206	40
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	80	0	50	12	0	63	80	331	21	106	206	40
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	102	0	188	22	0	116	102	487	31	138	458	89
Arrive On Green	0.06	0.00	0.12	0.01	0.00	0.07	0.06	0.28	0.28	0.08	0.30	0.30
Sat Flow, veh/h	1774	0	1583	1774	0	1583	1774	1733	110	1774	1516	294
Grp Volume(v), veh/h	80	0	50	12	0	63	80	0	352	106	0	246
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1774	0	1583	1774	0	1843	1774	0	1811
Q Serve(g_s), s	2.1	0.0	1.4	0.3	0.0	1.8	2.1	0.0	8.0	2.8	0.0	5.2
Cycle Q Clear(g_c), s	2.1	0.0	1.4	0.3	0.0	1.8	2.1	0.0	8.0	2.8	0.0	5.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.06	1.00		0.16
Lane Grp Cap(c), veh/h	102	0	188	22	0	116	102	0	518	138	0	546
V/C Ratio(X)	0.79	0.00	0.27	0.55	0.00	0.54	0.79	0.00	0.68	0.77	0.00	0.45
Avail Cap(c_a), veh/h	339	0	841	151	0	673	339	0	980	453	0	1078
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.9	0.0	18.9	23.1	0.0	21.0	21.9	0.0	15.0	21.3	0.0	13.3
Incr Delay (d2), s/veh	12.6	0.0	0.8	19.6	0.0	3.9	12.6	0.0	1.6	8.6	0.0	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	1.4	0.0	0.6	0.3	0.0	0.9	1.4	0.0	4.2	1.7	0.0	2.6
LnGrp Delay(d),s/veh	34.4	0.0	19.6	42.7	0.0	24.9	34.4	0.0	16.6	29.9	0.0	13.9
LnGrp LOS	C		B	D		C	C		B	C		B
Approach Vol, veh/h	130				75				432		352	
Approach Delay, s/veh	28.7				27.7				19.9		18.7	
Approach LOS	C				C				B		B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.7	19.2	6.6	11.6	8.7	20.2	8.7	9.5				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	12.0	25.0	4.0	25.0	9.0	28.0	9.0	20.0				
Max Q Clear Time (g_c+I1), s	4.8	10.0	2.3	3.4	4.1	7.2	4.1	3.8				
Green Ext Time (p_c), s	0.1	3.2	0.0	0.6	0.1	3.7	0.1	0.5				
Intersection Summary												
HCM 2010 Ctrl Delay	21.2											
HCM 2010 LOS	C											

HCM 2010 Signalized Intersection Summary

12: Heidorn Ranch Rd & Project Access

Scenario 3c
Cumulative PM With Project - 80% SCR

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	0	96	110	0	40	164	213	40	60	95	119
Future Volume (veh/h)	69	0	96	110	0	40	164	213	40	60	95	119
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	69	0	96	110	0	40	164	213	40	60	95	119
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	90	0	164	140	0	209	190	394	74	82	149	187
Arrive On Green	0.05	0.00	0.10	0.08	0.00	0.13	0.11	0.26	0.26	0.05	0.20	0.20
Sat Flow, veh/h	1774	0	1583	1774	0	1583	1774	1526	287	1774	753	943
Grp Volume(v), veh/h	69	0	96	110	0	40	164	0	253	60	0	214
Grp Sat Flow(s),veh/h/ln	1774	0	1583	1774	0	1583	1774	0	1812	1774	0	1696
Q Serve(g_s), s	1.8	0.0	2.7	2.9	0.0	1.1	4.3	0.0	5.6	1.6	0.0	5.4
Cycle Q Clear(g_c), s	1.8	0.0	2.7	2.9	0.0	1.1	4.3	0.0	5.6	1.6	0.0	5.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.16	1.00		0.56
Lane Grp Cap(c), veh/h	90	0	164	140	0	209	190	0	468	82	0	336
V/C Ratio(X)	0.77	0.00	0.59	0.79	0.00	0.19	0.87	0.00	0.54	0.73	0.00	0.64
Avail Cap(c_a), veh/h	152	0	541	152	0	541	190	0	658	152	0	580
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.9	0.0	20.0	21.2	0.0	18.1	20.6	0.0	15.0	22.0	0.0	17.2
Incr Delay (d2), s/veh	12.8	0.0	3.3	22.0	0.0	0.4	31.6	0.0	1.0	11.7	0.0	2.0
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(50%),veh/ln	1.2	0.0	1.3	2.2	0.0	0.5	3.7	0.0	2.9	1.0	0.0	2.7
LnGrp Delay(d),s/veh	34.7	0.0	23.3	43.2	0.0	18.5	52.2	0.0	15.9	33.7	0.0	19.2
LnGrp LOS	C		C	D		B	D		B	C		B
Approach Vol, veh/h	165					150		417		274		
Approach Delay, s/veh	28.1					36.6		30.2		22.4		
Approach LOS	C					D		C		C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.2	18.1	9.7	10.9	11.0	15.3	8.4	12.2				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	4.0	17.0	4.0	16.0	5.0	16.0	4.0	16.0				
Max Q Clear Time (g_c+I1), s	3.6	7.6	4.9	4.7	6.3	7.4	3.8	3.1				
Green Ext Time (p_c), s	0.0	1.9	0.0	0.5	0.0	1.8	0.0	0.6				
Intersection Summary												
HCM 2010 Ctrl Delay	28.7											
HCM 2010 LOS	C											

HCM 2010 Signalized Intersection Summary

7: Hillcrest Ave & Sand Creek Rd

Scenario 3c
Cumulative PM With Project - 80% SCR

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	168	806	48	56	898	192	64	72	144	116	24	128
Future Volume (veh/h)	168	806	48	56	898	192	64	72	144	116	24	128
Number	7	4	14	3	8	18	5	2	12	1	6	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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	168	806	48	56	898	192	64	72	144	116	24	128
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour 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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	152	1061	63	72	840	180	82	67	135	101	34	181
Arrive On Green	0.09	1.00	1.00	0.04	1.00	1.00	0.05	0.12	0.12	0.06	0.13	0.13
Sat Flow, veh/h	1774	1741	104	1774	1488	318	1774	556	1111	1774	256	1366
Grp Volume(v), veh/h	168	0	854	56	0	1090	64	0	216	116	0	152
Grp Sat Flow(s),veh/h/ln	1774	0	1844	1774	0	1807	1774	0	1667	1774	0	1622
Q Serve(g_s), s	12.0	0.0	0.0	4.4	0.0	72.4	5.0	0.0	17.0	8.0	0.0	12.6
Cycle Q Clear(g_c), s	12.0	0.0	0.0	4.4	0.0	72.4	5.0	0.0	17.0	8.0	0.0	12.6
Prop In Lane	1.00		0.06	1.00		0.18	1.00		0.67	1.00		0.84
Lane Grp Cap(c), veh/h	152	0	1124	72	0	1019	82	0	202	101	0	215
V/C Ratio(X)	1.10	0.00	0.76	0.78	0.00	1.07	0.78	0.00	1.07	1.14	0.00	0.71
Avail Cap(c_a), veh/h	152	0	1124	165	0	1019	114	0	202	101	0	215
HCM Platoon Ratio	1.00	2.00	2.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.38	0.00	0.38	1.00	0.00	1.00	0.97	0.00	0.97
Uniform Delay (d), s/veh	64.0	0.0	0.0	66.5	0.0	0.0	66.1	0.0	61.5	66.0	0.0	58.1
Incr Delay (d2), s/veh	103.8	0.0	4.9	6.6	0.0	39.3	20.7	0.0	82.2	132.0	0.0	9.8
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(50%),veh/ln	10.3	0.0	1.5	2.3	0.0	11.1	2.9	0.0	12.4	7.6	0.0	6.2
LnGrp Delay(d),s/veh	167.8	0.0	4.9	73.2	0.0	39.3	86.8	0.0	143.7	198.0	0.0	67.9
LnGrp LOS	F		A	E		F	F		F	F		E
Approach Vol, veh/h	1022			1146			280			268		
Approach Delay, s/veh	31.6			41.0			130.7			124.2		
Approach LOS	C			D			F			F		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.0	23.0	11.7	91.3	12.4	24.6	18.0	85.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	8.0	17.0	13.0	78.0	9.0	16.0	12.0	79.0				
Max Q Clear Time (g_c+I1), s	10.0	19.0	6.4	2.0	7.0	14.6	14.0	74.4				
Green Ext Time (p_c), s	0.0	0.0	0.0	34.4	0.0	0.3	0.0	4.1				
Intersection Summary												
HCM 2010 Ctrl Delay	54.9											
HCM 2010 LOS	D											
Notes												

HCM 2010 Signalized Intersection Summary

8: Sand Creek Rd & Heidorn Ranch Rd

Scenario 3c
Cumulative PM With Project - 80% SCR

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	140	1069	976	277	215	86		
Future Volume (veh/h)	140	1069	976	277	215	86		
Number	7	4	8	18	1	16		
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		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863		
Adj Flow Rate, veh/h	140	855	781	277	215	86		
Adj No. of Lanes	1	1	1	0	1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	136	1438	853	302	241	215		
Arrive On Green	0.08	0.77	0.65	0.65	0.14	0.14		
Sat Flow, veh/h	1774	1863	1314	466	1774	1583		
Grp Volume(v), veh/h	140	855	0	1058	215	86		
Grp Sat Flow(s),veh/h/ln	1774	1863	0	1780	1774	1583		
Q Serve(g_s), s	10.0	25.2	0.0	66.8	15.5	6.5		
Cycle Q Clear(g_c), s	10.0	25.2	0.0	66.8	15.5	6.5		
Prop In Lane	1.00			0.26	1.00	1.00		
Lane Grp Cap(c), veh/h	136	1438	0	1155	241	215		
V/C Ratio(X)	1.03	0.59	0.00	0.92	0.89	0.40		
Avail Cap(c_a), veh/h	136	1438	0	1155	259	231		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.48	0.48	0.00	0.74	0.85	0.85		
Uniform Delay (d), s/veh	60.0	6.2	0.0	19.8	55.2	51.3		
Incr Delay (d2), s/veh	60.4	0.9	0.0	10.0	25.3	1.0		
Initial Q Delay(d3),s/veh	0.3	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	7.2	13.2	0.0	35.8	9.3	5.8		
LnGrp Delay(d),s/veh	120.7	7.1	0.0	29.7	80.5	52.4		
LnGrp LOS	F	A		C	F	D		
Approach Vol, veh/h		995	1058		301			
Approach Delay, s/veh		23.1	29.7		72.5			
Approach LOS		C	C		E			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				106.4		23.6	16.0	90.4
Change Period (Y+Rc), s				6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s				99.0		19.0	10.0	83.0
Max Q Clear Time (g_c+I1), s				27.2		17.5	12.0	68.8
Green Ext Time (p_c), s				29.3		0.2	0.0	10.9
Intersection Summary								
HCM 2010 Ctrl Delay			32.4					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary 9: Sand Creek Rd & SR 4 Eastbound

Scenario 3c
Cumulative PM With Project - 80% SCR

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	498	863	973	280	820	526		
Future Volume (veh/h)	498	863	973	280	820	526		
Number	7	4	8	18	1	16		
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		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863		
Adj Flow Rate, veh/h	398	690	778	280	820	421		
Adj No. of Lanes	1	2	2	1	2	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	434	2045	944	422	918	422		
Arrive On Green	0.24	0.58	0.53	0.53	0.27	0.27		
Sat Flow, veh/h	1774	3632	3632	1583	3442	1583		
Grp Volume(v), veh/h	398	690	778	280	820	421		
Grp Sat Flow(s),veh/h/ln	1774	1770	1770	1583	1721	1583		
Q Serve(g_s), s	19.7	9.2	16.5	11.5	20.6	23.9		
Cycle Q Clear(g_c), s	19.7	9.2	16.5	11.5	20.6	23.9		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	434	2045	944	422	918	422		
V/C Ratio(X)	0.92	0.34	0.82	0.66	0.89	1.00		
Avail Cap(c_a), veh/h	473	2124	944	422	918	422		
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00		
Upstream Filter(I)	0.84	0.84	0.75	0.75	1.00	1.00		
Uniform Delay (d), s/veh	33.1	10.0	19.2	18.1	31.8	33.0		
Incr Delay (d2), s/veh	19.3	0.1	6.2	6.0	11.1	43.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	11.9	4.4	8.6	5.5	11.2	23.2		
LnGrp Delay(d),s/veh	52.4	10.0	25.5	24.1	42.9	76.0		
LnGrp LOS	D	B	C	C	D	E		
Approach Vol, veh/h		1088	1058		1241			
Approach Delay, s/veh		25.5	25.1		54.1			
Approach LOS		C	C		D			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				58.0		30.0	28.0	30.0
Change Period (Y+Rc), s				6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s				54.0		24.0	24.0	24.0
Max Q Clear Time (g_c+I1), s				11.2		25.9	21.7	18.5
Green Ext Time (p_c), s				16.5		0.0	0.3	4.3
Intersection Summary								
HCM 2010 Ctrl Delay			35.9					
HCM 2010 LOS			D					

HCM 2010 Signalized Intersection Summary

10: SR 4 Westbound & Sand Creek Rd

Scenario 3c
Cumulative PM With Project - 80% SCR

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	409	1274	0	0	641	780	612	0	410	0	0	0
Future Volume (veh/h)	409	1274	0	0	641	780	612	0	410	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	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			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1863	1863	1863	1863			
Adj Flow Rate, veh/h	327	1019	0	0	513	780	490	0	410			
Adj No. of Lanes	2	3	0	0	1	2	2	0	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	403	2939	0	0	734	1248	1024	0	457			
Arrive On Green	0.12	0.58	0.00	0.00	0.39	0.39	0.29	0.00	0.29			
Sat Flow, veh/h	3442	5253	0	0	1863	3167	3548	0	1583			
Grp Volume(v), veh/h	327	1019	0	0	513	780	490	0	410			
Grp Sat Flow(s),veh/h/ln	1721	1695	0	0	1863	1583	1774	0	1583			
Q Serve(g_s), s	8.3	9.5	0.0	0.0	20.7	17.8	10.3	0.0	22.4			
Cycle Q Clear(g_c), s	8.3	9.5	0.0	0.0	20.7	17.8	10.3	0.0	22.4			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	403	2939	0	0	734	1248	1024	0	457			
V/C Ratio(X)	0.81	0.35	0.00	0.00	0.70	0.63	0.48	0.00	0.90			
Avail Cap(c_a), veh/h	459	2939	0	0	734	1248	1143	0	510			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.72	0.72	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	38.8	10.0	0.0	0.0	22.8	21.9	26.4	0.0	30.7			
Incr Delay (d2), s/veh	7.0	0.2	0.0	0.0	5.5	2.4	0.3	0.0	17.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.3	4.5	0.0	0.0	11.7	8.2	5.1	0.0	12.0			
LnGrp Delay(d),s/veh	45.8	10.3	0.0	0.0	28.3	24.3	26.8	0.0	48.0			
LnGrp LOS	D	B			C	C	C		D			
Approach Vol, veh/h		1346			1293			900				
Approach Delay, s/veh		18.9			25.9			36.4				
Approach LOS		B			C			D				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		32.0		58.0			16.5	41.5				
Change Period (Y+Rc), s		6.0		6.0			6.0	6.0				
Max Green Setting (Gmax), s		29.0		49.0			12.0	31.0				
Max Q Clear Time (g_c+I1), s		24.4		11.5			10.3	22.7				
Green Ext Time (p_c), s		1.6		21.2			0.2	6.9				
Intersection Summary												
HCM 2010 Ctrl Delay				25.9								
HCM 2010 LOS				C								
Notes												