

March 30, 2021

Mr. Brian Hardy
Richland Communities
3161 Michelson Drive, Suite 425
Irvine, CA 92612

SUBJECT: RENAISSANCE RANCH SPECIFIC PLAN (SP00333A01) FOCUSED TRAFFIC ASSESSMENT

Dear Mr. Brian Hardy:

The firm of Urban Crossroads, Inc. is pleased to submit this letter documenting the traffic assessment results in support of the proposed Renaissance Ranch Specific Plan development (**Project**) Addendum, which is located east of Horsethief Canyon Road and south of the I-15 Freeway in the County of Riverside. Specifically, the purpose of this focused traffic assessment is to determine the changes to the operational and storage needs at the intersection of Horsethief Canyon Road and Street A if it were to align with a future access into the adjacent Horsethief Canyon Residential development on the west side of Horsethief Canyon Road (Tentative Tract Map No. 37007).

SUMMARY OF FINDINGS

Traffic volumes for the intersection of Horsethief Canyon Road at Street A have been modified to reflect ingress and egress traffic from the west leg from TTM No. 37007, thereby creating a 4-leg intersection at the intersection of Horsethief Canyon Road at Street A. No other changes were made to background traffic or Project traffic. The operations and queuing analyses at this intersection were evaluated for both near-term (Existing plus Ambient Growth plus Project plus Cumulative or EAPC) traffic conditions and long-range (Horizon Year) traffic conditions. The purpose of this focused traffic assessment is to determine if there are any changes to the intersection traffic control, lane geometrics, or storage needs at the 4-leg intersection of Horsethief Canyon Road at Street A in comparison to the recommendations found in the Renaissance Ranch Specific Plan (SP00333A01) Traffic Analysis (dated February 18, 2021, referred to as **2021 Traffic Study**).

Based on the peak hour intersection operations analysis for EAPC (2025) traffic conditions, additional improvements at Horsethief Canyon Road and Street A are not needed to maintain acceptable peak hour operations beyond those that were identified in the 2021 Traffic Study, with the exception of the lanes needed to accommodate site access to TTM No. 37007. However, for Horizon Year (2040) traffic conditions, the installation of a traffic signal in conjunction with the lanes needed to accommodate site access to TTM No. 37007 are needed to maintain acceptable peak hour operations. The Project is not responsible for the lane improvements needed to accommodate site access to TTM No. 37007, however, fair share contribution is recommended towards other intersection improvements, included the future traffic signal. The Project's fair share at the intersection of Horsethief Canyon Road and Street A is 31.9% (down from the 33.7% in the 2021 Traffic Study). The westbound left turn lane at the

intersection of Horsethief Canyon Road and Temescal Canyon Road should accommodate 340-feet of storage (increase from 325-feet of storage as identified in the 2021 Traffic Study).

EAPC (2025) INTERSECTION OPERATIONS ANALYSIS

Traffic volumes at the intersection of Horsethief Canyon Road and Street A have been modified to reflect ingress and egress traffic for the west leg (from TTM No. 37007). No other changes were made to the background or Project traffic volumes at the intersection for EAPC (2025) traffic conditions. Peak hour intersection operations analysis results are summarized on Table 1 for EAPC (2025) traffic conditions (see Attachment A for analysis worksheets). As shown on Table 1, the intersection of Horsethief Canyon Road at Street A is anticipated to operate at an unacceptable level of service (LOS) during the peak hours. Table 2 shows that acceptable peak hour operations can be maintained at this intersection with the improvements and intersections control previously identified in the 2021 Traffic Study, with the exception of those lanes needed to accommodate site access for TTM No. 37007. Analysis worksheets, with improvements, are included in Attachment B.

HORIZON YEAR (2040) INTERSECTION OPERATIONS ANALYSIS

Horizon Year (2040) With Project traffic forecasts were obtained from the 2021 Traffic Study and traffic for TTM No. 37007 was modified at the intersection of Horsethief Canyon Road and Street A. Peak hour intersection operations analysis results are summarized on Table 3 for Horizon Year (2040) With Project traffic conditions (see Attachment C for analysis worksheets). As shown on Table 3, the intersection of Horsethief Canyon Road at Street A is anticipated to operate at an unacceptable LOS during the peak hours. Table 4 shows that acceptable peak hour operations can be maintained at this intersection with the installation of a traffic signal and lanes needed to accommodate site access for TTM No. 37007. The intersection of Horsethief Canyon Road and Street A warranted a traffic signal under EAP (2025) traffic conditions in the 2021 Traffic Study but is not needed for operational purposes until Horizon Year (2040) traffic conditions. Analysis worksheets, with improvements, are included in Attachment D.

Project fair share calculations shown on Table 5 shows a decrease in fair share contribution at the intersection of Horsethief Canyon Road and Street A from 33.7% in the 2021 Traffic Study down to 31.9%. Table 6 shows the updated fair share percentage for the intersection of Horsethief Canyon Road at Street A in addition to the long-range improvement need for a traffic signal. Lane improvements needed to accommodate site access for TTM No. 37007 are also reflected on Table 6, but fair share is not applicable as these are improvements to be constructed by TTM No. 37007.

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SITE ACCESS QUEUING ANALYSIS

A peak hour queuing analysis has also been conducted for Horizon Year (2040) With Project traffic conditions in order ensure adequate turn pocket storage lengths. Analysis results are summarized in Table 7 and queuing analysis worksheets are included in Attachment E. As shown, the westbound left turn storage at Horsethief Canyon Road and Temescal Canyon Road is recommended to accommodate 340-feet of storage (increased from 325-feet of storage in the 2021 Traffic Study). All other recommendations are consistent with the 2021 Traffic Study.

If you have any questions, please contact me directly at (949) 861-0177.

Respectfully submitted,



Charlene So, PE
Associate Principal

Table 1

Intersection Analysis for EAPC (2025) Conditions

#	Intersection	Traffic Control ²	EAPC (2025)			
			Delay ¹ (secs.)		Level of Service	
			AM	PM	AM	PM
1	Temescal Canyon Rd. & Indian Truck Tr.	TS	43.9	61.1	D	E
2	I-15 NB Ramps & Indian Truck Tr.	TS	40.2	43.3	D	D
3	I-15 SB Ramps & Indian Truck Tr.	TS	28.9	22.2	C	C
4	De Palma Rd. & Indian Truck Tr.	TS	64.1	116.2	E	F
5	Horsethief Canyon Rd. & Temescal Canyon Rd.	CSS	> 100.0	> 100.0	F	F
6	Horsethief Canyon Rd. & De Palma Rd.	AWS	34.1	> 100.0	D	F
7	Horsethief Canyon Rd. & Street A	CSS	> 100.0	> 100.0	F	F
8	Bolo Ct. & Hostettler Rd.	CSS	9.6	10.5	A	B
9	Temescal Canyon Rd. & Hostettler Rd.	CSS	11.3	11.1	B	B
10	Lake St. & I-15 NB Ramps	TS	54.3	52.7	D	D
11	Lake St. & I-15 SB Ramps	TS	88.5	> 200.0	F	F
12	Lake St. & Temescal Canyon Rd.	TS	154.0	> 200.0	F	F

* **BOLD** = Level of Service (LOS) does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).
¹ Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.
² CSS = Cross-street Stop; AWS = All-Way Stop; TS = Traffic Signal; **CSS** = Improvement

Table 2

Intersection Analysis for EAPC (2025) Conditions With Improvements

#	Intersection	Traffic Control ³	Intersection Approach Lanes ¹												Delay ² (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound			AM	PM	AM	PM
			L	T	R	L	T	R	L	T	R	L	T	R				
1	Temescal Canyon Rd. & Indian Truck Tr.																	
	- Without Improvements	TS	1	1	0	0	1	1	2	0	1	0	0	0	43.9	61.1	D	E
	- With Improvements	TS	1	1	0	0	1	<u>1</u> >	2	0	1	0	0	0	18.5	25.0	B	C
4	De Palma Rd. & Indian Truck Tr.																	
	- Without Improvements	TS	1	2	1>	2	2	0	0	1	0	1	1	1	64.1	116.2	E	F
	- With Improvements ⁴	TS	1	2	1>	2	2	0	0	1	0	1	1	<u>2</u> >	15.5	42.3	B	D
5	Horsethief Canyon Rd. & Temescal Canyon Rd.																	
	- Without Improvements	CSS	1	0	d	0	0	0	0	1	0	0	1	0	>100.0	>100.0	F	F
	- With Improvements	TS	<u>2</u>	0	<u>1</u>	0	0	0	0	<u>2</u>	0	<u>2</u>	<u>2</u>	0	12.8	24.3	B	C
6	Horsethief Canyon Rd. & De Palma Rd.																	
	- Without Improvements	AWS	1	1	0	0	1	0	0	1	0	0	0	0	34.1	>100.0	D	F
	- With Improvements	TS	1	<u>2</u>	0	0	<u>2</u>	0	<u>1</u>	0	<u>1</u>	0	0	0	26.0	18.6	C	C
7	Horsethief Canyon Rd. & Street A																	
	- Without Improvements					Future Intersection						>100.0	>100.0	F	F			
	- With Improvements	CSS	<u>1</u>	<u>2</u>	0	<u>1</u>	<u>2</u>	0	0	<u>1</u>	0	0	<u>1</u>	0	33.5	34.8	D	D
11	Lake St. & I-15 SB Ramps																	
	- Without Improvements	TS	0	1	1	1	1	0	0	1	1	0	0	0	88.5	>200.0	F	F
	- With Improvements	TS	0	<u>2</u>	1	1	<u>2</u>	0	0	1	1	0	0	0	36.8	28.1	D	C
12	Lake St. & Temescal Canyon Rd.																	
	- Without Improvements	TS	1	1	0	0	1	0	1	0	1	0	0	0	154.0	>200.0	F	F
	- With Improvements	TS	<u>2</u>	<u>2</u>	0	0	<u>2</u>	0	<u>2</u>	0	1	0	0	0	21.4	39.9	C	D

¹ When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; > = Right-Turn Overlap Phasing; 1 = Improvement

² Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

³ CSS = Cross-street Stop; AWS = All-Way Stop; TS = Traffic Signal; CSS = Improvement

⁴ Improvement includes restriping the westbound approach to provide one left turn lane, one shared left-through lane, and dual right turn lanes.

Table 3

Intersection Analysis for Horizon Year (2040) Conditions

#	Intersection	Traffic Control ²	2040 Without Project				2040 With Project			
			Delay ¹ (secs.)		Level of Service		Delay ¹ (secs.)		Level of Service	
			AM	PM	AM	PM	AM	PM	AM	PM
1	Temescal Canyon Rd. & Indian Truck Tr.	TS	61.2	64.7	E	E	80.5	82.5	F	F
2	I-15 NB Ramps & Indian Truck Tr.	TS	43.0	48.3	D	D	43.6	52.2	D	D
3	I-15 SB Ramps & Indian Truck Tr.	TS	30.7	23.1	C	C	46.9	23.6	D	C
4	De Palma Rd. & Indian Truck Tr.	TS	71.1	143.0	E	F	71.3	143.2	E	F
5	Horsethief Canyon Rd. & Temescal Canyon Rd.	CSS	> 100.0	> 100.0	F	F	> 100.0	> 100.0	F	F
6	Horsethief Canyon Rd. & De Palma Rd.	AWS	33.4	> 200.0	D	F	> 100.0	> 100.0	F	F
7	Horsethief Canyon Rd. & Street A	<u>CSS</u>	Future Intersection				> 100.0	> 100.0	F	F
8	Bolo Ct. & Hostettler Rd.	CSS	9.7	10.8	A	B	10.4	12.1	B	B
9	Temescal Canyon Rd. & Hostettler Rd.	CSS	11.9	11.5	B	B	13.0	14.0	B	B
10	Lake St. & I-15 NB Ramps	TS	61.9	53.3	E	D	76.9	54.8	E	D
11	Lake St. & I-15 SB Ramps	TS	105.2	> 200.0	F	F	105.4	> 200.0	F	F
12	Lake St. & Temescal Canyon Rd.	TS	> 200.0	> 200.0	F	F	> 200.0	> 200.0	F	F

* **BOLD** = Level of Service (LOS) does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

¹ Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

² CSS = Cross-street Stop; AWS = All-Way Stop; TS = Traffic Signal; CSS = Improvement

Table 4

Intersection Analysis for Horizon Year (2040) Conditions With Improvements

#	Intersection	Traffic Control ³	Intersection Approach Lanes ¹												Delay ² (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound			AM	PM	AM	PM
			L	T	R	L	T	R	L	T	R	L	T	R				
1	Temescal Canyon Rd. & Indian Truck Tr.																	
	- Without Project	TS	1	1	0	0	1	<u>1</u> >	2	0	1	0	0	0	24.0	31.0	C	C
	- With Project	TS	1	1	0	0	1	<u>1</u> >	2	0	1	0	0	0	25.7	42.3	C	D
4	De Palma Rd. & Indian Truck Tr.																	
	- Without Project ⁴	TS	1	2	1>	2	2	0	0	1	0	1	1	<u>2</u> >	16.2	50.2	B	D
	- With Project ⁴	TS	1	2	1>	2	2	0	0	1	0	1	1	<u>2</u> >	16.4	51.0	B	D
5	Horsethief Canyon Rd. & Temescal Canyon Rd.																	
	- Without Project	<u>TS</u>	<u>2</u>	0	<u>1</u>	0	0	0	0	<u>2</u>	0	<u>2</u>	<u>2</u>	0	13.5	38.0	B	D
	- With Project	<u>TS</u>	<u>2</u>	0	<u>1</u>	0	0	0	0	<u>2</u>	0	<u>2</u>	<u>2</u>	0	17.6	54.7	B	D
6	Horsethief Canyon Rd. & De Palma Rd.																	
	- Without Project	<u>TS</u>	1	<u>2</u>	0	0	<u>2</u>	0	<u>1</u>	0	<u>1</u>	0	0	0	27.7	38.3	C	D
	- With Project	<u>TS</u>	1	<u>2</u>	0	0	<u>2</u>	0	<u>1</u>	0	<u>1</u>	0	0	0	30.5	45.8	C	D
7	Horsethief Canyon Rd. & Street A																	
	- Without Project					Future Intersection												
	- With Project	<u>TS</u>	<u>1</u>	<u>2</u>	0	<u>1</u>	<u>2</u>	0	0	<u>1</u>	0	0	<u>1</u>	0	16.0	34.0	B	C
10	Lake St. & I-15 NB Ramps																	
	- Without Project	TS	<u>2</u>	1	0	0	1	0	0	0	0	1	1	0	51.3	50.5	D	D
	- With Project	TS	<u>2</u>	1	0	0	1	0	0	0	0	1	1	0	51.6	50.9	D	D
11	Lake St. & I-15 SB Ramps																	
	- Without Project	TS	0	<u>2</u>	1	1	<u>2</u>	0	0	1	1	0	0	0	45.5	37.0	D	D
	- With Project	TS	0	<u>2</u>	1	1	<u>2</u>	0	0	1	1	0	0	0	45.2	54.4	D	D
12	Lake St. & Temescal Canyon Rd.																	
	- Without Project	TS	<u>2</u>	<u>3</u>	0	0	<u>3</u>	0	<u>2</u>	0	1	0	0	0	37.7	48.6	D	D
	- With Project	TS	<u>2</u>	<u>3</u>	0	0	<u>3</u>	0	<u>2</u>	0	1	0	0	0	48.0	53.9	D	D

¹ When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; > = Right-Turn Overlap Phasing; 1 = Improvement

² Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

³ CSS = Cross-street Stop; AWS = All-Way Stop; TS = Traffic Signal; CS = Improvement

⁴ Improvement includes restriping the westbound approach to provide one left turn lane, one shared left-through lane, and dual right turn lanes.

Table 5

Project Fair Share Calculations for Intersection

#	Intersection	Existing	Project	2040 With Project Volume	Total New Traffic	Project % of New Traffic	
1	Temescal Canyon Rd. & Indian Truck Tr.	AM:	747	222	2,608	1,861	11.93%
		PM:	386	237	2,668	2,282	10.39%
4	De Palma Rd. & Indian Truck Tr.	AM:	1,149	78	2,639	1,490	5.23%
		PM:	1,418	90	3,495	2,077	4.33%
5	Horsethief Canyon Rd. & Temescal Canyon Rd.	AM:	486	356	3,179	2,693	13.22%
		PM:	453	384	3,843	3,390	11.33%
6	Horsethief Canyon Rd. & De Palma Rd.	AM:	623	432	1,981	1,358	31.81%
		PM:	774	473	3,767	2,993	15.80%
7	Horsethief Canyon Rd. & Street A	AM:	575	451	1,989	1,414	31.90%
		PM:	732	495	3,658	2,926	16.92%

BOLD = Denotes highest fair share percentage.

Table 6
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Summary of Improvements

#	Intersection	Jurisdiction	Existing (2020)	EAP (2025)	EAPC (2025)	Horizon Year (2040) Without Project	Horizon Year (2040) With Project	Improvements in City DIF or County TUMF? ¹	Project Responsibility ²	Fair Share % ³
1	Temescal Canyon Rd. & Indian Truck Tr.	County of Riverside	None	None	Modify the traffic signal to implement overlap phasing for the SB right turn lane	Same	Same	No	Fair Share	11.9%
4	De Palma Rd. & Indian Truck Tr.	County of Riverside	None	None	Restripe the WB approach to provide one left turn lane, one shared left-through lane, and dual right turn lanes	Same	Same	No	Fair Share	5.2%
					Modify the traffic signal to implement overlap phasing for the WB right turn lanes	Same	Same	No	Fair Share	
5	Horsethief Canyon Rd. & Temescal Canyon Rd.	County of Riverside	None	None	Install a Traffic Signal	Same	Same	Yes (DIF)	Fees	13.2%
					Add 2nd NB left turn lane	Same	Same	No	Fair Share	
					Stripe the NB right turn defacto lane	Same	Same	No	Fair Share	
					Add 2nd EB through lane	Same	Same	Yes (TUMF)	Fees	
					Add 2nd WB left turn lane	Same	Same	No	Fair Share	
Add 2nd WB through lane	Same	Same	Yes (TUMF)	Fees						
6	Horsethief Canyon Rd. & De Palma Rd.	County of Riverside	None	None	Install a Traffic Signal	Same	Same	Yes (DIF)	Fees	31.8%
					Add 2nd NB through lane	Same	Same	No	Fair Share	
					Add 2nd SB through lane	Same	Same	No	Fair Share	
					Add EB left turn lane	Same	Same	No	Fair Share	
7	Horsethief Canyon Rd. & Street A	County of Riverside	None	Install a stop control on the WB approach Add WB shared left-right turn lane	Same	Not Applicable	Same as EAP (2025)	No	Construct	31.9%
					Same	Not Applicable	Same as EAP (2025)	No	Construct	
					Add 2nd NB through lane	Not Applicable	Same as EAPC (2025)	No	Fair Share	
					Add 2nd SB through lane	Not Applicable	Same as EAPC (2025)	No	Fair Share	
					Add NB left turn lane (TTM 37007)	Same	Same as EAPC (2025)	No	N/A	
					Add EB shared left-right turn lane (TTM 37007)	Same	Same as EAPC (2025)	No	N/A	
				Install a Traffic Signal	Same	Same as EAPC (2025)	No	Fair Share		
10	Lake St. & I-15 NB Ramps	Lake Elsinore	None	None	None	Add 2nd NB left turn lane	Same	Yes (TUMF)	Fees	--

Table 6
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Summary of Improvements

#	Intersection	Jurisdiction	Existing (2020)	EAP (2025)	EAPC (2025)	Horizon Year (2040) Without Project	Horizon Year (2040) With Project	Improvements in City DIF or County TUMF? ¹	Project Responsibility ²	Fair Share % ³
11	Lake St. & I-15 SB Ramps	Lake Elsinore	None	None	Add 2nd NB through lane Add 2nd SB through lane	Same Same	Same Same	Yes (TUMF) Yes (TUMF)	Fees Fees	--
12	Lake St. & Temescal Canyon Rd.	Lake Elsinore	None	None	Add 2nd NB left turn lane Add 2nd NB through lane Add 2nd SB through lane Add 2nd EB left turn lane Add 3rd NB through lane Add 3rd SB through lane	Same Same Same Same Same Same	Same Same Same Same Same Same	Yes (TUMF) Yes (TUMF) Yes (TUMF) Yes (TUMF) Yes (TUMF) Yes (TUMF)	Fees Fees Fees Fees Fees Fees	--

¹ Improvements included in County of Riverside DIF or County TUMF programs for local and regional components.

² Identifies the Project's responsibility to construct an improvement or contribute fair share or fee payment towards the implementation of the improvement shown.

³ Program improvements constructed by project may be eligible for fee credit, at discretion of City. See Table 8-1 for Fair Share Calculations.

Table 7

Peak Hour Queuing Summary for Horsethief Canyon Road

Intersection	Movement ¹	Available Stacking Distance (Feet) ^{1,2}	Horizon Year (2040) With Project			
			95th Percentile Queue (Feet)		Acceptable? ¹	
			AM Peak Hour	PM Peak Hour	AM	PM
Horsethief Canyon Rd. & Temescal Canyon Rd.	WBL	340	178	338	Yes	Yes
	NBL	Trap	236	793	Yes	Yes
	NBR	125	118	113	Yes	Yes
Horsethief Canyon Rd. & De Palma Rd.	EBL	Trap	66	538	Yes	Yes
	EBR	150	115	151	Yes	Yes
	NBL	250	241	241	Yes	Yes
Horsethief Canyon Rd. & Street A	NBL	TWLTL	16	66	Yes	Yes
	SBL	TWLTL	216	170	Yes	Yes

BOLD = 95th percentile queue exceeds the available storage.

¹ **NBR** = Improvement

² Trap = Trap Lane; TWLTL = Two-way left-turn lane

ATTACHMENT A: EAPC (2025) INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

Intersection												
Int Delay, s/veh	13.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	39	0	13	4	0	98	4	670	15	334	171	13
Future Vol, veh/h	39	0	13	4	0	98	4	670	15	334	171	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	41	0	14	4	0	103	4	705	16	352	180	14

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1664	1620	187	1619	1619	713	194	0	0	721	0	0
Stage 1	891	891	-	721	721	-	-	-	-	-	-	-
Stage 2	773	729	-	898	898	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	78	104	860	84	104	435	1391	-	-	890	-	-
Stage 1	340	363	-	422	435	-	-	-	-	-	-	-
Stage 2	395	431	-	337	361	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	~ 41	63	860	57	63	435	1391	-	-	890	-	-
Mov Cap-2 Maneuver	~ 41	63	-	144	155	-	-	-	-	-	-	-
Stage 1	339	219	-	421	434	-	-	-	-	-	-	-
Stage 2	300	430	-	200	218	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	249.1	17.1	0	7.5
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1391	-	-	54	403	890	-
HCM Lane V/C Ratio	0.003	-	-	1.014	0.266	0.395	-
HCM Control Delay (s)	7.6	-	-	249.1	17.1	11.7	-
HCM Lane LOS	A	-	-	F	C	B	-
HCM 95th %tile Q(veh)	0	-	-	4.6	1.1	1.9	-

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

Intersection												
Int Delay, s/veh	69.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	26	0	9	16	0	344	14	555	6	129	1440	43
Future Vol, veh/h	26	0	9	16	0	344	14	555	6	129	1440	43
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	27	0	9	17	0	362	15	584	6	136	1516	45

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	2609	2431	1539	2432	2450	587	1561	0	0	590	0	0
Stage 1	1811	1811	-	617	617	-	-	-	-	-	-	-
Stage 2	798	620	-	1815	1833	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	~ 17	32	144	22	31	513	429	-	-	995	-	-
Stage 1	102	131	-	481	484	-	-	-	-	-	-	-
Stage 2	382	483	-	101	128	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	~ 4	27	144	18	26	513	429	-	-	995	-	-
Mov Cap-2 Maneuver	~ 4	27	-	56	78	-	-	-	-	-	-	-
Stage 1	98	113	-	464	467	-	-	-	-	-	-	-
Stage 2	108	466	-	81	110	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, \$	4265.2	82.3	0.3	0.7
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	429	-	-	5	376	995	-	-
HCM Lane V/C Ratio	0.034	-	-	7.368	1.008	0.136	-	-
HCM Control Delay (s)	13.7	-	-	\$ 4265.2	82.3	9.2	-	-
HCM Lane LOS	B	-	-	F	F	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	6.2	12.1	0.5	-	-

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

**ATTACHMENT B: EAPC (2025) INTERSECTION OPERATIONS ANALYSIS WORKSHEETS, WITH
IMPROVEMENTS**

Intersection												
Int Delay, s/veh	5.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	39	0	13	4	0	98	4	670	15	334	171	13
Future Vol, veh/h	39	0	13	4	0	98	4	670	15	334	171	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	41	0	14	4	0	103	4	705	16	352	180	14

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1252	1620	97	1515	1619	361	194	0	0	721	0	0
Stage 1	891	891	-	721	721	-	-	-	-	-	-	-
Stage 2	361	729	-	794	898	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	147	111	*1029	92	111	641	1507	-	-	890	-	-
Stage 1	345	391	-	389	435	-	-	-	-	-	-	-
Stage 2	636	431	-	397	388	-	-	-	-	-	-	-
Platoon blocked, %	1	1	1	1	1	1	1	-	-	-	-	-
Mov Cap-1 Maneuver	85	67	*1029	62	67	641	1507	-	-	890	-	-
Mov Cap-2 Maneuver	141	71	-	159	165	-	-	-	-	-	-	-
Stage 1	344	236	-	388	434	-	-	-	-	-	-	-
Stage 2	532	430	-	237	235	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	33.5	12.7	0	7.5
HCM LOS	D	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1507	-	-	180	573	890	-
HCM Lane V/C Ratio	0.003	-	-	0.304	0.187	0.395	-
HCM Control Delay (s)	7.4	-	-	33.5	12.7	11.7	-
HCM Lane LOS	A	-	-	D	B	B	-
HCM 95th %tile Q(veh)	0	-	-	1.2	0.7	1.9	-

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

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	26	0	9	16	0	344	14	555	6	129	1440	43
Future Vol, veh/h	26	0	9	16	0	344	14	555	6	129	1440	43
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	27	0	9	17	0	362	15	584	6	136	1516	45

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	2133	2431	781	1647	2450	295	1561	0	0	590	0	0
Stage 1	1811	1811	-	617	617	-	-	-	-	-	-	-
Stage 2	322	620	-	1030	1833	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	84	40	*479	*452	38	749	*719	-	-	995	-	-
Stage 1	305	296	-	*449	484	-	-	-	-	-	-	-
Stage 2	670	483	-	*452	281	-	-	-	-	-	-	-
Platoon blocked, %	1	1	1	1	1	1	-	-	-	-	-	-
Mov Cap-1 Maneuver	38	34	*479	*390	32	749	*719	-	-	995	-	-
Mov Cap-2 Maneuver	127	148	-	*317	153	-	-	-	-	-	-	-
Stage 1	298	255	-	*440	474	-	-	-	-	-	-	-
Stage 2	339	473	-	*382	243	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	34.8	15.8	0.2	0.7
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	* 719	-	-	157	706	995	-
HCM Lane V/C Ratio	0.02	-	-	0.235	0.537	0.136	-
HCM Control Delay (s)	10.1	-	-	34.8	15.8	9.2	-
HCM Lane LOS	B	-	-	D	C	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.9	3.2	0.5	-

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

**ATTACHMENT C: HORIZON YEAR (2040) WITH PROJECT INTERSECTION OPERATIONS
ANALYSIS WORKSHEETS**

Intersection												
Int Delay, s/veh	61.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	43	0	14	4	0	98	4	892	15	334	570	14
Future Vol, veh/h	43	0	14	4	0	98	4	892	15	334	570	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	45	0	15	4	0	103	4	939	16	352	600	15

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	2319	2275	608	2274	2274	947	615	0	0	955	0	0
Stage 1	1312	1312	-	955	955	-	-	-	-	-	-	-
Stage 2	1007	963	-	1319	1319	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	~ 27	41	499	29	41	319	974	-	-	728	-	-
Stage 1	197	230	-	313	339	-	-	-	-	-	-	-
Stage 2	293	337	-	195	229	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	~ 11	21	499	17	21	319	974	-	-	728	-	-
Mov Cap-2 Maneuver	~ 11	21	-	71	85	-	-	-	-	-	-	-
Stage 1	196	119	-	312	338	-	-	-	-	-	-	-
Stage 2	197	336	-	98	118	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, \$ 2022.4			25.5		0		5.3	
HCM LOS	F		D					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	974	-	-	14	281	728	-	-
HCM Lane V/C Ratio	0.004	-	-	4.286	0.382	0.483	-	-
HCM Control Delay (s)	8.7	-	-	\$ 2022.4	25.5	14.5	-	-
HCM Lane LOS	A	-	-	F	D	B	-	-
HCM 95th %tile Q(veh)	0	-	-	8.4	1.7	2.7	-	-

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

Intersection												
Int Delay, s/veh	94.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	29	0	10	16	0	344	15	1058	6	129	2004	47
Future Vol, veh/h	29	0	10	16	0	344	15	1058	6	129	2004	47
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	31	0	11	17	0	362	16	1114	6	136	2109	49

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	3736	3558	2134	3560	3579	1117	2158	0	0	1120	0	0
Stage 1	2406	2406	-	1149	1149	-	-	-	-	-	-	-
Stage 2	1330	1152	-	2411	2430	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	~ 2	6	63	~ 3	6	~ 255	252	-	-	631	-	-
Stage 1	45	65	-	244	275	-	-	-	-	-	-	-
Stage 2	193	275	-	45	64	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	4	63	~ 2	4	~ 255	252	-	-	631	-	-
Mov Cap-2 Maneuver	-	4	-	~ 11	28	-	-	-	-	-	-	-
Stage 1	42	51	-	229	258	-	-	-	-	-	-	-
Stage 2	-	258	-	29	50	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s		\$ 956	0.3	0.7
HCM LOS	-	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	252	-	-	-	128	631	-
HCM Lane V/C Ratio	0.063	-	-	-	2.961	0.215	-
HCM Control Delay (s)	20.2	-	-	-	\$ 956	12.3	-
HCM Lane LOS	C	-	-	-	F	B	-
HCM 95th %tile Q(veh)	0.2	-	-	-	35.4	0.8	-

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

**ATTACHMENT D: HORIZON YEAR (2040) WITH PROJECT INTERSECTION OPERATIONS
ANALYSIS WORKSHEETS, WITH IMPROVEMENTS**

Timings
7: Horsethief Canyon Rd./Horsethief Rd. & Street A

Renaissance Ranch (JN: 13266)

03/30/2021

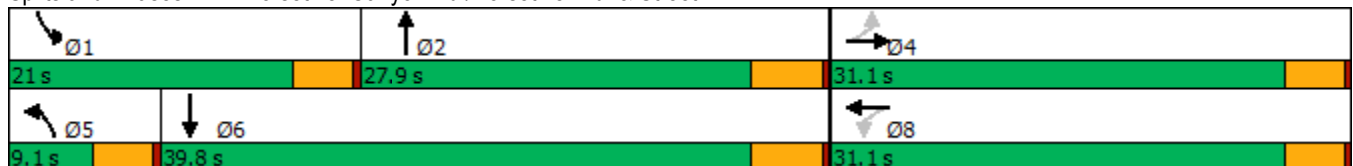


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕		↕	↙	↕	↙	↕
Traffic Volume (vph)	43	0	4	0	4	892	334	570
Future Volume (vph)	43	0	4	0	4	892	334	570
Turn Type	Perm	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	31.1	31.1	31.1	31.1	9.1	26.7	9.1	26.7
Total Split (s)	31.1	31.1	31.1	31.1	9.1	27.9	21.0	39.8
Total Split (%)	38.9%	38.9%	38.9%	38.9%	11.4%	34.9%	26.3%	49.8%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	4.2	3.6	4.2
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.1		4.1	4.1	4.7	4.1	4.7
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)		13.2		13.2	5.3	22.3	16.7	43.4
Actuated g/C Ratio		0.22		0.22	0.09	0.36	0.27	0.71
v/c Ratio		0.15		0.23	0.03	0.73	0.72	0.24
Control Delay		0.7		3.9	32.0	23.7	34.2	6.8
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		0.7		3.9	32.0	23.7	34.2	6.8
LOS		A		A	C	C	C	A
Approach Delay		0.7		3.9		23.7		16.8
Approach LOS		A		A		C		B

Intersection Summary

Cycle Length: 80	
Actuated Cycle Length: 61.3	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 18.8	Intersection LOS: B
Intersection Capacity Utilization 64.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: Horsethief Canyon Rd./Horsethief Rd. & Street A



HCM 6th Signalized Intersection Summary
 7: Horsethief Canyon Rd./Horsethief Rd. & Street A

Renaissance Ranch (JN: 13266)
 03/30/2021



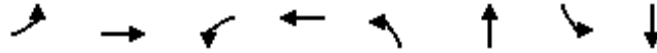
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (veh/h)	43	0	14	4	0	98	4	892	15	334	570	14
Future Volume (veh/h)	43	0	14	4	0	98	4	892	15	334	570	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	45	0	15	4	0	103	4	939	16	352	600	15
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	303	17	67	75	7	271	10	1255	21	421	2061	51
Arrive On Green	0.17	0.00	0.17	0.17	0.00	0.17	0.01	0.35	0.35	0.23	0.57	0.57
Sat Flow, veh/h	1046	100	382	21	39	1553	1810	3632	62	1810	3599	90
Grp Volume(v), veh/h	60	0	0	107	0	0	4	467	488	352	301	314
Grp Sat Flow(s),veh/h/ln	1527	0	0	1613	0	0	1810	1805	1889	1810	1805	1884
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.1	11.9	11.9	9.7	4.5	4.5
Cycle Q Clear(g_c), s	1.5	0.0	0.0	3.0	0.0	0.0	0.1	11.9	11.9	9.7	4.5	4.5
Prop In Lane	0.75		0.25	0.04		0.96	1.00		0.03	1.00		0.05
Lane Grp Cap(c), veh/h	387	0	0	353	0	0	10	624	653	421	1034	1079
V/C Ratio(X)	0.15	0.00	0.00	0.30	0.00	0.00	0.41	0.75	0.75	0.84	0.29	0.29
Avail Cap(c_a), veh/h	859	0	0	903	0	0	173	803	840	586	1214	1267
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	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.4	0.0	0.0	19.0	0.0	0.0	25.9	15.1	15.1	19.1	5.7	5.7
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.5	0.0	0.0	25.2	2.9	2.7	7.4	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	1.1	0.0	0.0	0.1	4.6	4.8	4.5	1.2	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.6	0.0	0.0	19.5	0.0	0.0	51.1	17.9	17.8	26.5	5.9	5.9
LnGrp LOS	B	A	A	B	A	A	D	B	B	C	A	A
Approach Vol, veh/h		60			107			959				967
Approach Delay, s/veh		18.6			19.5			18.0				13.4
Approach LOS		B			B			B				B
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	16.2	22.7		13.2	4.4	34.6		13.2				
Change Period (Y+Rc), s	4.1	4.7		4.1	4.1	4.7		4.1				
Max Green Setting (Gmax), s	16.9	23.2		27.0	5.0	35.1		27.0				
Max Q Clear Time (g_c+I1), s	11.7	13.9		3.5	2.1	6.5		5.0				
Green Ext Time (p_c), s	0.5	4.1		0.3	0.0	4.0		0.6				

Intersection Summary

HCM 6th Ctrl Delay	16.0
HCM 6th LOS	B

Timings
7: Horsethief Canyon Rd./Horsethief Rd. & Street A

Renaissance Ranch (JN 13266)
03/30/2021

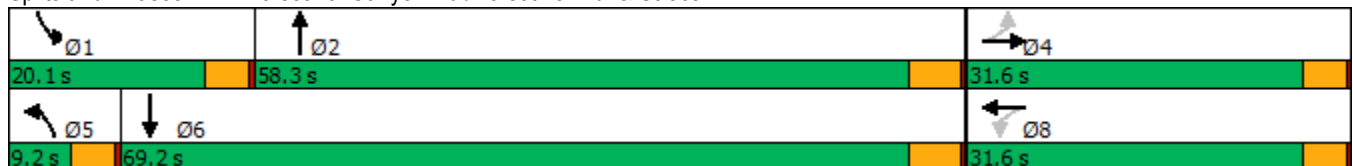


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕		↕	↗	↕	↗	↕
Traffic Volume (vph)	29	0	16	0	15	1058	129	2004
Future Volume (vph)	29	0	16	0	15	1058	129	2004
Turn Type	Perm	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	31.1	31.1	31.1	31.1	9.1	26.7	9.1	26.7
Total Split (s)	31.6	31.6	31.6	31.6	9.2	58.3	20.1	69.2
Total Split (%)	28.7%	28.7%	28.7%	28.7%	8.4%	53.0%	18.3%	62.9%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	4.2	3.6	4.2
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.1		4.1	4.1	4.7	4.1	4.7
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)		15.6		15.6	5.2	52.6	11.8	65.3
Actuated g/C Ratio		0.17		0.17	0.06	0.56	0.13	0.70
v/c Ratio		0.21		0.80	0.16	0.55	0.59	0.85
Control Delay		2.4		27.2	50.8	15.6	50.9	17.7
Queue Delay		0.0		0.0	0.0	0.0	0.0	1.7
Total Delay		2.4		27.2	50.8	15.6	50.9	19.4
LOS		A		C	D	B	D	B
Approach Delay		2.4		27.2		16.1		21.3
Approach LOS		A		C		B		C

Intersection Summary

Cycle Length: 110
 Actuated Cycle Length: 93.1
 Natural Cycle: 110
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 20.1
 Intersection LOS: C
 Intersection Capacity Utilization 93.7%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 7: Horsethief Canyon Rd./Horsethief Rd. & Street A



HCM 6th Signalized Intersection Summary
 7: Horsethief Canyon Rd./Horsethief Rd. & Street A

Renaissance Ranch (JN 13266)

03/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↕		↗	↕	↗
Traffic Volume (veh/h)	29	0	10	16	0	344	15	1058	6	129	2004	47
Future Volume (veh/h)	29	0	10	16	0	344	15	1058	6	129	2004	47
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	31	0	11	17	0	362	16	1114	6	136	2109	49
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	147	9	34	45	9	388	32	1964	11	167	2194	51
Arrive On Green	0.25	0.00	0.25	0.25	0.00	0.25	0.02	0.53	0.53	0.09	0.61	0.61
Sat Flow, veh/h	347	36	136	36	36	1539	1810	3682	20	1810	3607	83
Grp Volume(v), veh/h	42	0	0	379	0	0	16	546	574	136	1051	1107
Grp Sat Flow(s),veh/h/ln	519	0	0	1611	0	0	1810	1805	1896	1810	1805	1885
Q Serve(g_s), s	0.0	0.0	0.0	11.0	0.0	0.0	0.9	21.4	21.4	7.8	57.7	58.8
Cycle Q Clear(g_c), s	6.2	0.0	0.0	24.3	0.0	0.0	0.9	21.4	21.4	7.8	57.7	58.8
Prop In Lane	0.74		0.26	0.04		0.96	1.00		0.01	1.00		0.04
Lane Grp Cap(c), veh/h	190	0	0	441	0	0	32	963	1012	167	1098	1147
V/C Ratio(X)	0.22	0.00	0.00	0.86	0.00	0.00	0.50	0.57	0.57	0.81	0.96	0.97
Avail Cap(c_a), veh/h	200	0	0	455	0	0	87	963	1012	274	1102	1151
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	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.3	0.0	0.0	38.6	0.0	0.0	51.4	16.5	16.5	47.0	19.4	19.6
Incr Delay (d2), s/veh	0.6	0.0	0.0	14.8	0.0	0.0	11.5	0.8	0.7	9.1	17.8	18.7
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	0.9	0.0	0.0	11.3	0.0	0.0	0.5	8.7	9.1	3.9	27.1	29.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.8	0.0	0.0	53.5	0.0	0.0	62.9	17.3	17.2	56.2	37.2	38.3
LnGrp LOS	C	A	A	D	A	A	E	B	B	E	D	D
Approach Vol, veh/h		42			379			1136			2294	
Approach Delay, s/veh		31.8			53.5			17.9			38.8	
Approach LOS		C			D			B			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.9	61.1		30.7	6.0	69.0		30.7				
Change Period (Y+Rc), s	4.1	4.7		4.1	4.1	4.7		4.1				
Max Green Setting (Gmax), s	16.0	53.6		27.5	5.1	64.5		27.5				
Max Q Clear Time (g_c+I1), s	9.8	23.4		8.2	2.9	60.8		26.3				
Green Ext Time (p_c), s	0.2	8.9		0.2	0.0	3.4		0.3				

Intersection Summary

HCM 6th Ctrl Delay	34.0
HCM 6th LOS	C

ATTACHMENT E: HORIZON YEAR (2040) WITH PROJECT QUEUING ANALYSIS WORKSHEETS

Queuing and Blocking Report

Horizon Year (2040) With Project Conditions With Improvements - AM Peak Hour

03/30/2021

Intersection: 5: Horsethief Rd. & Temescal Canyon Rd.

Movement	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	TR	L	L	T	T	L	L	R
Maximum Queue (ft)	305	317	171	202	116	101	211	279	100
Average Queue (ft)	181	186	86	119	45	32	96	130	90
95th Queue (ft)	267	282	154	178	94	72	168	236	118
Link Distance (ft)	1018	1018			694	694	763	763	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			200	200					50
Storage Blk Time (%)				0			36	20	
Queuing Penalty (veh)				1			115	35	

Intersection: 6: Horsethief Rd. & De Palma Rd.

Movement	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	R	L	T	T	T	TR
Maximum Queue (ft)	77	132	210	454	394	251	240
Average Queue (ft)	30	65	188	166	99	114	113
95th Queue (ft)	66	115	241	421	278	216	207
Link Distance (ft)	1140			670	670	763	763
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		100	150				
Storage Blk Time (%)	0	2	31	0			
Queuing Penalty (veh)	0	1	97	0			

Intersection: 7: Horsethief Canyon Rd./Horsethief Rd. & Street A

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	TR
Maximum Queue (ft)	70	97	31	302	255	199	322	220
Average Queue (ft)	30	40	3	173	133	141	92	77
95th Queue (ft)	63	73	16	267	221	216	256	166
Link Distance (ft)	354	459		818	818		670	670
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			100			100		
Storage Blk Time (%)				25		20	1	
Queuing Penalty (veh)				1		58	4	

Queuing and Blocking Report

Horizon Year (2040) With Project Conditions With Improvements - AM Peak Hour

03/30/2021

Intersection: 8: Bolo Ct. & Hostettler Rd.

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	44	8	47
Average Queue (ft)	5	0	22
95th Queue (ft)	24	4	43
Link Distance (ft)	501	648	449
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 312

Queuing and Blocking Report

Horizon Year (2040) With Project Conditions With Improvements - PM Peak Hour

03/30/2021

Intersection: 5: Horsethief Rd. & Temescal Canyon Rd.

Movement	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	TR	L	L	T	T	L	L	R
Maximum Queue (ft)	1033	1033	250	300	621	399	770	770	100
Average Queue (ft)	1033	1033	226	275	260	81	422	474	98
95th Queue (ft)	1033	1033	288	338	673	291	747	793	113
Link Distance (ft)	1018	1018			694	694	767	767	
Upstream Blk Time (%)	78	97			3	0	1	3	
Queuing Penalty (veh)	0	0			0	0	9	19	
Storage Bay Dist (ft)			200	200					50
Storage Blk Time (%)			5	31			65	26	
Queuing Penalty (veh)			7	43			286	100	

Intersection: 6: Horsethief Rd. & De Palma Rd.

Movement	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	R	L	T	T	T	TR
Maximum Queue (ft)	518	150	210	512	488	787	798
Average Queue (ft)	516	150	187	253	243	634	660
95th Queue (ft)	538	151	241	443	404	880	890
Link Distance (ft)	503			651	651	767	767
Upstream Blk Time (%)	64			0	0	3	6
Queuing Penalty (veh)	0			0	0	22	46
Storage Bay Dist (ft)		100	150				
Storage Blk Time (%)	7	66	29	6			
Queuing Penalty (veh)	53	97	154	23			

Intersection: 7: Horsethief Canyon Rd./Horsethief Rd. & Street A

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	TR
Maximum Queue (ft)	69	259	110	312	289	199	482	498
Average Queue (ft)	26	120	17	192	158	86	216	234
95th Queue (ft)	61	213	66	284	262	170	426	443
Link Distance (ft)	370	623		798	798		651	651
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			100			100		
Storage Blk Time (%)				24		7	13	
Queuing Penalty (veh)				4		67	17	

Queuing and Blocking Report

Horizon Year (2040) With Project Conditions With Improvements - PM Peak Hour

03/30/2021

Intersection: 8: Bolo Ct. & Hostettler Rd.

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	33	6	18	78
Average Queue (ft)	3	0	1	45
95th Queue (ft)	19	4	11	69
Link Distance (ft)	510	687	159	196
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 945