

TRAFFIC IMPACT ANALYSIS

FOR

HACIENDA CAR WASH

IN

ROCKWALL, TEXAS

Prepared for:

HACIENDA CAR WASH

Prepared By:

G.T. (Tom) Walton, P.E.
Consulting Traffic Engineer

FEBRUARY 2019

TRAFFIC IMPACT ANALYSIS

FOR

HACIENDA CAR WASH

IN

ROCKWALL, TEXAS

Prepared for:

HACIENDA CAR WASH

Prepared By:

G.T. (Tom) Walton, P.E.
Consulting Traffic Engineer



G.T. Walton
2/4/19

FEBRUARY 2019

Executive Summary

Hacienda Car Wash is planning to build a new facility in the City of Rockwall Texas. The project is along the east side of Ridge Rd, FM 740, between the Yellow Jacket Ln intersection and the White Hills Ln. intersection. The development will have one drive.

In order to obtain approval of the plans for the new development by the City of Rockwall, a Traffic Impact Analysis (TIA) must be completed. This TIA investigates the traffic operations on the roadway and intersections near the site.

Traffic counts were conducted on Ridge Rd and at the intersections of Ridge at Yellow Jacket Ln and Ridge at White Hills Ln.. Existing conditions were analyzed to determine the level of congestion on the roadway and the intersections. Due to the fact that the development is expected to take 1 year to develop, the traffic volumes for the year 2020 were calculated.

Trip generation calculations were completed for the proposed development to determine the amount of traffic increase the development will create. The increase in traffic was applied to the roadway, the drive and the intersections and the resulting traffic congestion situation analyzed.

The Traffic Impact Analysis investigations produced the following results:

- Ridge Rd.FM740 and all of the movements at the drive serving the Hacienda Car Wash and the two intersections at buildout of the project were found to operate at “stable flow” LOS C conditions or better.
- Comparison of projected northbound right turning movements at the driveway with the TxDOT thresholds for roadways like Ridge Rd indicates that the expected volumes are well below the threshold levels to indicate the need for separate right turn lanes. Therefore no new separate right turn lane is needed.

INTRODUCTION

Hacienda Car Wash is the owner of the HACIENDA CAR WASH in the City of Rockwall Texas. The entire project is along the east side of Ridge Rd, FM 740 between the Yellow Jacket Ln intersection and the White Hills Dr intersection. FM 740 is a TxDOT roadway. The plan for the development contains 2.008 acres of land and a 4396 sq ft car wash. The City staff has required that a Traffic Impact Analysis (TIA) be completed as part of the submittal of plans for the HACIENDA CAR WASH. G.T. (Tom) Walton, P.E. Consulting Traffic Engineer has been hired to conduct the needed study.

PURPOSE

The following study will evaluate the traffic situation on the existing roadway and the intersection of the car wash driveway and the intersections of Yellow Jacket Ln and White Hills Ln with Ridge Rd. It will impose the traffic created by the proposed development on the existing roadway and intersections to determine the effect the new traffic will have on the operation of the existing roadway and if any roadway improvements are needed to accommodate the traffic additions. Any problems identified will be addressed and mitigation steps recommended.

SCOPE

All access to the new Hacienda Car Wash will be from and to Ridge Rd. One 36 ft wide two way drive will be built to provide access and will be located opposite a median opening for a one way left turn lane for southbound traffic. Development will contain commercial zoning with a 4396 sq ft car wash. The location of the site is shown in FIGURE I.

The analysis will include the study of existing conditions on Ridge Rd adjacent to the development. The build out of the entire project will occur in 2020. The traffic volumes on Ridge Rd, FM 740 and at the intersections of Ridge at Yellow Jacket and White Hills at Ridge will be counted. Existing conditions on Ridge Rd and at the intersections will be analyzed. The amount of new traffic to be created by the car wash will be calculated. The traffic volume conditions will be grown to those expected in 2020 and the new trips created by the development will be added to the 2020 traffic and the conditions at completion analyzed. This analysis will include PM Peak conditions. The analysis will be done for the PM peak hour generation rates during the peak traffic hour on the roadway.

METHODOLOGY

The methodology for the study will include the following steps;

- definition of the roadways and intersections under consideration,
- counting of the existing traffic volumes on the subject roadway and intersections,

- the analysis of existing traffic conditions on the subject roadway and intersections,
- the generation of traffic from the proposed development,
- the distribution of site traffic to the roadway
- growth of the roadway and intersection traffic to the 2020 conditions
- the analysis of build out traffic conditions, including site traffic
- comparison of turning traffic at the intersections with the TxDOT turn lane criteria
- the identification of any problems caused by the new development and
- the recommendation of mitigation efforts to deal with identified problems.

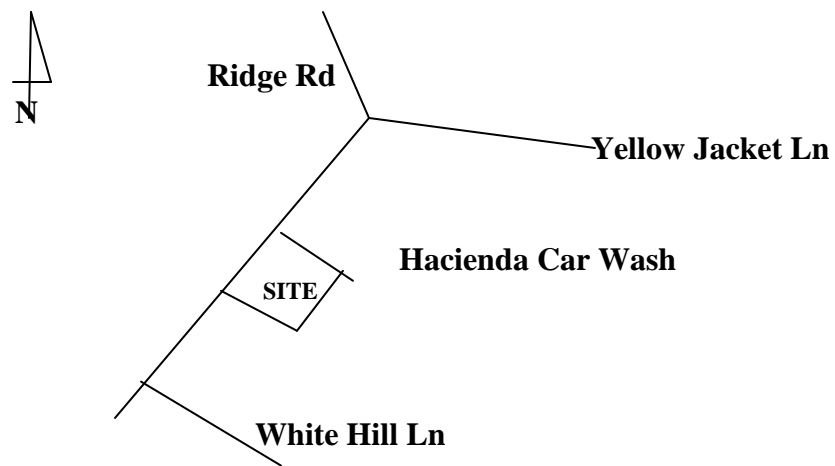


FIGURE I

AREA ROADWAYS AND INTERSECTIONS

Ridge Rd.FM740 is a four lane divided concrete north-south roadway with a wide median and a 45 MPH speed limit. A one way left turn lane is provided at the location of the new driveway.

The new driveway will have two 18ft wide lanes, one inbound and one outbound lane.

At the intersection of Ridge Rd and Yellow Jacket Ln there are two thru lanes in each direction on Ridge Rd. There are two separate left turn lanes for south bound to east bound traffic. There is a separate right turn lane for northbound traffic. There are three lanes westbound on Yellow Jacket approaching the intersection, a separate right turn lane, a separate left turn lane and a center lane that is optional either right or left turn.

The intersection of Ridge Rd at White Hills Dr has one left turn lane and one right turn lane westbound. There are two through lanes and one separate left turn lane northbound and two through lanes and a separate left turn lane southbound.

EXISTING TRAFFIC VOLUMES

The existing traffic volumes on Ridge Rd FM 740 were measured by making two directional 24 hour machine counts on Ridge Rd midway between the Yellow Jacket intersection and the White Hills Ln intersection. AM and PM Peak Hour manual counts were done at the Ridge at Yellow Jacket intersection and at the Ridge at White Hills intersection. The details of the traffic counts are given in Appendix A.

EXISTING TRAFFIC CONDITIONS

The quality and safety of the operation of traffic is measured by quantifying the level of congestion that drivers are experiencing. The term that is used to describe traffic conditions is Level of Service (LOS). In Traffic Engineering analysis, LOS on a section of roadway is calculated by comparing the volume of traffic measured on the road to the capacity of the roadway. LOS is described by alphabetic designations. LOS ranges from A to F. The various levels are as follows:

- Volume/Capacity ratio is ≤ 0.25 is LOS "A" or "B"
- Volume/Capacity ratio is $0.25 < x, \leq 0.40$ is LOS "C"
- Volume/Capacity ratio is $0.40 < x, \leq 0.75$ is LOS "D"
- Volume/Capacity ratio is $0.75 < x, \leq 1.0$ is LOS "E"
- Volume/Capacity Ratio is > 1.0 is LOS "F"

LOS A or B are referred to as "Free" flow conditions, LOS C is "Stable" flow, LOS D is "Forced" flow, LOS E is "Capacity" flow and LOS F is "Failure" conditions.

The existing traffic volume count information was used with the HCS + software which uses the Highway Capacity Manual methodology to analyze the operation of roadway links and intersections. A two way link analysis was conducted on the existing Ridge Rd FM 740 for both the AM and PM Peak Hour conditions. A signalized intersection analysis was also done at each of the intersections.

The results of the analyses of existing conditions are as follows:

- The roadway link analysis

Link	LOS	
	North B	South B
Ridge Rd south of Yellow Jacket AM	A	A
Ridge Rd south of Yellow Jacket PM	B	A

- Signalized intersection analysis

Intersection	Approach LOS			
	East b	West b	North b	South b
Ridge at White Hills AM		C	B	B
Ridge at White Hills PM		C	B	B
Ridge at Yellow Jacket AM		C	C	B
Ridge at Yellow Jacket PM		C	C	B

The details of the existing conditions analyses are given in Appendix B.

SITE TRAFFIC GENERATION

The amount of traffic that a development will generate can be calculated for an average day or for the peak traffic periods of a day. The number of vehicle trips generated or trip generation will be used to project the effect that the new development will have on the serving roadways. The amount of traffic generated during both the AM and PM Peak Hour will be considered.

Trip generation information is found in Trip Generation published by the Institute of Transportation Engineers. This is a standard reference to determine the trip generation characteristics of particular land use types and densities. Rates are established for specific land use types including residential, office, commercial, industrial and institutional. Trip generation rates are given for a number of development measurement units and at various times of day and days of the week. The percentage of the generated traffic that enters and leaves the site is also indicated. For residential development the dwelling unit (DU) is the measurement unit while 1,000 square feet of gross floor area is used for office, commercial, industrial and retail uses.

As was noted above, Hacienda Car Wash will contain 4396 sq ft of Car Wash space. The Trip Generation category that best describes the development is Automated Car Wash. There is little activity at such a facility therefore no information is available for the AM Peak condition. The PM Peak Hour rate is 14.12 trips per 1000 sq ft with 50% entering and 50 % exiting the site. A copy of the page from Trip Generation is given in Appendix C.

The total traffic to be expected from the development during the PM Peak Hour is as follows:

Site	Peak Hour	Rate	Size	Trips	Enter	Exit
Hacienda	PM	14.12/K	4396	62	31	31

TRAFFIC DISTRIBUTION

The distribution of traffic moving to and from a proposed development is based upon the type of development and the distribution of attractors around the site. All of the traffic entering and leaving The Hacienda Car Wash will use Ridge Rd FM 740. This fact will be used to assign the projected traffic for the link analysis and intersection analysis on Ridge Rd.

Based upon information provided by the City of Rockwall staff and the owner of the development, 50% of the site traffic will go to and from the north and 50% to and from the south. Due to the existence of the southbound left turn lane the entering traffic will be 50% from the north and 50% from the south. 100% of the exiting traffic will turn right to go north.

The distribution of the site traffic to the proposed drive and the percentages at the drive is shown in FIGURE II

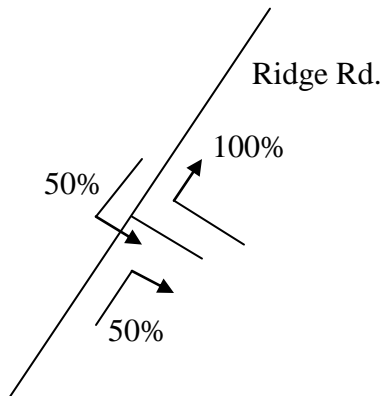


FIGURE II

Applying the distribution percentages in Figures II with the trip generation information for the peak period yields turning movement volumes shown in FIGURE III

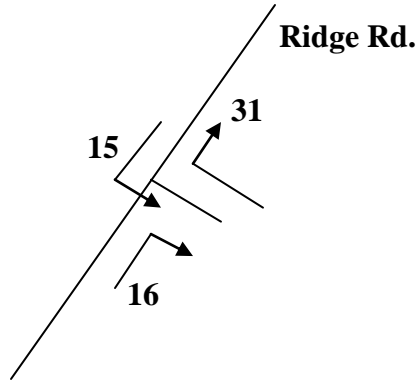


FIGURE III

FUTURE BUILDOUT TRAFFIC CONDITIONS

Analysis of future conditions created by the new development will involve the addition of the site generated traffic to the traffic existing on the roadways at the time of build-out of the development. Due to the fact that it is expected to take one year to build out, the existing traffic on the roadways will be grown by an agreed upon growth rate for the area. Discussion with the City’s Planning staff produced an expected growth rate of 4% per year. Therefore, the background traffic volumes on Ridge Rd and at the intersections in 2020 at the completion of the development will be 4% higher than at present.

The effect of the development on the operation of Ridge Rd is determined by adding the traffic from the development to the Ridge Rd traffic grown to 2020 conditions and analyzing the result. The results of the analysis are as follows.

Link	LOS	
	North B	South B
Ridge Rd south of Yellow Jacket AM	A	B
Ridge Rd south of Yellow Jacket PM	A	A

The operation of the drive onto Ridge Rd from Hacienda Car Wash was analyzed by using the turning movement volumes given in Figure III and the Ridge Rd volumes grown to 2020 conditions. The results of the analysis are as follows.

Unsignalized intersection analysis;

Intersection		Approach LOS		
		North B	South B	West B
Hacienda at Ridge Rd	PM	B	B	B

The operation of the two signalized intersections under buildout conditions was analyzed by growing the intersection volumes to 2020 conditions and adding the Hacienda traffic during the PM peak. The results of these analyses are as follows:

Intersection		Approach LOS			
		East b	West b	North b	South b
Ridge at Yellow Jacket	AM		C	C	B
Ridge at Yellow Jacket	PM		C	C	B
Ridge at White Hills	AM		C	B	B
Ridge at White Hills	PM		C	B	C

The details of the link analysis, the driveway analysis and the signalized intersection analysis for buildout conditions are given in Appendix D.

TXDOT ACCESS MANAGEMENT CRITERIA

The Texas Department of Transportation (TxDOT) Access Management Manual provides criteria concerning the need to provide a separate right turn lane when building a driveway or street intersection with a TxDOT roadway. The thresholds for the need for these lanes is given in Table 2-3 of the Access Management Manual. The thresholds depend upon the volume of right turning traffic and the speed of the roadway.

For a roadway with a speed of 45 MPH or more the threshold for the need for a right turn lane is over 50 vehicles per hour during the peak hour.

CONCLUSIONS

The analyses above indicate that the approaches to the new driveway for the Hacienda Car Wash will operate at a Level Of Service “B”. Analysis of the link and the two existing signalized intersections on Ridge Rd indicates that all movements will operate at

LOS C or better. This includes with the addition of the increase in traffic caused by the proposed Hacienda Car Wash. No congestion problems were indicated on any approach.

The driveway traffic movement volume information projected indicates that the northbound right turn movements into the new drive are a maximum of 16 vehicles per hour which is well below the threshold volume of 50 vehicles per hour used to justify the addition of separate right turn lanes in the TxDOT Access Management Manual. Therefore no separate right turn lane construction is indicated.

RECOMMENDATIONS

No improvements are needed to the geometry of the driveway for Hacienda Car Wash beyond those included in the plan for the development.

APPENDIX A

Traffic Counts

Accurate Counts
 Traffic Data Services
 SPEED SUMMARY
 TUE 01/29/2019

Site Reference: 000001291913
 Site ID: 000001291913
 Location: Ridge-Yellow Jacket-White Hills
 Direction: NORTH
 Lane: 1

File: D0129001.prn
 City: Rockwall
 County:

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
13:00	1	6	14	15	61	232	436	162	19	3	0	0	0	0	949
14:00	0	3	7	19	51	247	417	152	22	1	0	0	0	0	919
15:00	1	3	13	11	40	177	409	218	30	4	0	0	0	0	936
16:00	1	3	14	32	63	207	420	237	38	6	0	0	0	0	1021
17:00	0	4	5	15	66	196	522	330	35	0	1	0	0	0	1174
18:00	0	6	7	11	103	302	501	312	39	2	0	0	0	0	1283
19:00	0	2	9	13	56	234	532	185	18	6	2	0	0	0	1057
20:00	0	0	1	3	38	160	313	176	31	2	1	0	0	0	725
21:00	0	0	0	1	14	70	241	134	25	1	0	0	0	0	486
22:00	1	0	1	0	8	124	151	63	12	2	0	0	0	0	362
23:00	0	0	0	1	4	62	101	36	10	1	0	0	0	0	215
24:00	0	0	0	0	7	22	47	28	3	2	0	0	0	0	109
01:00	0	0	0	0	1	15	21	17	0	0	0	0	0	0	54
02:00	0	0	0	0	2	10	18	7	1	0	1	0	0	0	39
03:00	0	0	0	1	0	4	4	3	0	0	0	0	0	0	12
04:00	0	0	0	0	2	5	11	4	0	0	0	0	0	0	22
05:00	0	0	0	0	2	4	18	11	3	0	0	0	0	0	38
06:00	0	0	0	0	2	4	18	11	3	0	0	0	0	0	121
07:00	0	0	0	0	4	12	61	34	9	1	0	0	0	0	294
08:00	0	0	0	2	1	27	102	117	40	5	0	0	0	0	593
09:00	0	1	1	4	19	103	241	180	37	0	0	0	0	1	752
10:00	0	5	8	20	74	182	299	151	12	0	0	0	0	0	740
11:00	0	3	9	20	63	188	297	134	24	2	0	0	0	0	738
12:00	2	1	3	10	39	193	313	150	26	1	0	0	0	0	895
12:00	0	3	8	12	65	190	433	166	16	2	0	0	0	0	895
DAY TOTAL	6	40	100	190	783	2966	5908	3007	450	46	5	2	0	1	13504
PERCENTS	0.1%	0.3%	0.8%	1.5%	5.8%	22.0%	43.7%	22.2%	3.3%	0.3%	0.0%	0.0%	0.0%	0.0%	100%

Statistical Information...

15th Percentile Speed
31.5 Mph

Median Speed
37.3 Mph

10 MPH Pace Speed
35MPH to 45MPH
8915 vehicles in pace
Representing 66.0% of the total vehicles

85th Percentile Speed
42.5 Mph

Average Speed
36.9 Mph

Vehicles > 65 MPH
1
7.4%

Accurate Counts
 Traffic Data Services
 SPEED SUMMARY
 TUE 01/29/2019

Site Reference: 000001291913
 Site ID: 000001291913
 Location: Ridge-Yellow Jacket-White Hills
 Direction: SOUTH
 Lane: 2

File: D0129001.prn
 City: Rockwall
 County:

TIME	10	15	20	25	30	35	40	45	50	55	60	65	70	71+	Total
13:00	1	0	0	3	22	95	224	262	157	40	0	0	0	0	804
14:00	0	0	0	4	24	104	207	273	152	37	6	0	0	1	808
15:00	0	0	0	4	28	68	216	293	149	28	2	1	0	0	789
16:00	0	0	1	1	30	123	180	279	131	30	3	0	0	1	779
17:00	0	0	0	5	17	132	242	303	177	40	3	0	0	0	919
18:00	0	1	0	3	21	158	285	316	148	36	5	0	0	0	973
19:00	0	0	0	1	18	97	262	282	137	17	0	0	0	0	814
20:00	0	0	0	1	11	70	133	195	81	12	2	1	0	0	506
21:00	0	0	0	0	6	47	107	156	67	15	4	0	0	0	404
22:00	0	0	0	1	4	28	71	81	43	3	0	0	0	0	231
23:00	0	0	0	2	2	12	30	54	17	7	1	0	0	0	125
24:00	0	0	0	0	1	5	14	17	7	4	0	0	0	0	48
01:00	0	0	0	0	1	2	11	13	8	2	0	1	0	0	38
02:00	0	0	0	0	0	2	6	9	2	2	0	0	0	0	21
03:00	0	0	0	0	4	1	3	10	0	1	0	0	0	0	19
04:00	0	0	0	0	0	1	7	9	4	3	1	0	0	0	25
05:00	0	0	0	0	0	2	13	34	13	6	1	0	0	0	69
06:00	0	0	0	0	1	5	23	96	74	28	4	0	1	0	232
07:00	0	0	0	0	7	29	72	187	137	46	6	1	0	0	485
08:00	2	0	0	0	8	68	150	266	225	67	5	0	0	0	791
09:00	0	0	6	4	17	76	176	250	167	48	7	2	1	0	754
10:00	0	0	0	2	21	94	187	265	150	35	3	0	0	0	757
11:00	0	0	1	3	17	86	212	276	131	30	5	0	0	0	761
12:00	0	0	0	4	26	101	264	287	128	35	6	0	0	0	851
DAY TOTAL	3	1	8	38	286	1406	3095	4213	2305	572	64	7	3	2	12003
PERCENTS	0.1%	0.1%	0.1%	0.4%	2.4%	11.8%	25.7%	35.0%	19.2%	4.7%	0.5%	0.0%	0.0%	0.0%	100%

Statistical Information...

15th Percentile Speed
35.1 Mph

Median Speed
41.4 Mph

10 MPH Pace Speed
35MPH to 45MPH
7308 vehicles in pace
Representing 60.8% of the total vehicles

85th Percentile Speed
47.5 Mph

Average Speed
41.1 Mph

Vehicles > 65 MPH
5
4.1%

Accurate Counts
Traffic Data Collection Services
(214) 681-6468

Location:Ridge @ White Hills
Weather:Cool
Counted By:DS

File Name : Ridge at White Hills
Site Code : 00022222
Start Date : 1/31/2019
Page No : 1

Groups Printed- Unshifted

Start Time	RIDGE Southbound					WHITE HILLS Westbound					RIDGE Northbound					WHITE HILLS Eastbound					Int. Total	
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total		
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0			
07:00	43	132	0	0	175	2	0	11	0	13	0	137	20	0	157	0	0	1	0	0	1	346
07:15	50	165	0	0	215	1	0	13	0	14	4	149	15	0	168	0	0	0	0	0	0	397
07:30	34	188	0	0	222	3	0	8	0	11	2	160	25	0	187	0	0	0	0	0	0	420
07:45	38	174	0	0	212	7	1	8	0	16	1	194	38	0	233	0	0	0	0	0	0	461
Total	165	659	0	0	824	13	1	40	0	54	7	640	98	0	745	0	0	1	0	0	1	1624
08:00	34	182	0	0	216	7	0	26	0	33	2	222	48	0	272	0	0	0	0	0	0	521
08:15	22	189	0	0	211	6	1	35	0	42	0	165	28	0	193	0	0	0	0	0	0	446
08:30	26	200	0	0	226	3	0	26	0	29	0	199	34	0	233	0	0	0	0	0	0	488
08:45	24	190	0	0	214	3	0	16	0	19	0	186	26	0	212	0	0	0	0	0	0	445
Total	106	761	0	0	867	19	1	103	0	123	2	772	136	0	910	0	0	0	0	0	0	1900

*** BREAK ***

16:00	23	201	0	0	224	14	2	32	0	48	0	234	57	0	291	0	0	0	0	0	0	563
16:15	24	208	0	0	232	15	0	46	0	61	3	273	42	0	318	0	0	0	0	0	0	611
16:30	18	218	0	0	236	18	0	29	0	47	0	299	56	0	355	0	0	0	0	0	0	638
16:45	28	224	0	0	252	16	0	40	0	56	1	309	42	0	352	0	0	1	0	1	0	661
Total	93	851	0	0	944	63	2	147	0	212	4	1115	197	0	1316	0	0	1	0	1	1	2473
17:00	25	228	0	0	253	16	1	31	0	48	1	307	55	0	363	0	0	2	0	2	0	666
17:15	30	213	0	0	243	16	0	35	0	51	1	260	44	0	305	0	0	3	0	3	0	602
17:30	17	240	0	0	257	12	0	32	0	44	0	339	39	0	378	0	0	0	0	0	0	679
17:45	28	241	0	0	269	11	0	30	0	41	1	274	42	0	317	0	0	0	0	0	0	627
Total	100	922	0	0	1022	55	1	128	0	184	3	1180	180	0	1363	0	0	5	0	5	0	2574
Grand Total	464	3193	0	0	3657	150	5	418	0	573	16	3707	611	0	4334	0	0	7	0	7	0	8571
Apprch %	12.7	87.3	0.0	0.0		26.2	0.9	72.9	0.0		0.4	85.5	14.1	0.0		0.0	0.0	100.	0	0.0	0.0	
Total %	5.4	37.3	0.0	0.0	42.7	1.8	0.1	4.9	0.0	6.7	0.2	43.3	7.1	0.0	50.6	0.0	0.0	0.1	0.0	0.1	0.0	0.1

Start Time	RIDGE Southbound					WHITE HILLS Westbound					RIDGE Northbound					WHITE HILLS Eastbound					Int. Total	
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total		
Peak Hour From 07:00 to 11:45 - Peak 1 of 1																						
Intersection	07:45																					
Volume	120	745	0	0	865	23	2	95	0	120	3	780	148	0	931	0	0	0	0	0	1916	
Percent	13.9	86.1	0.0	0.0		19.2	1.7	79.2	0.0		0.3	83.8	15.9	0.0		0.0	0.0	0.0	0.0			
Volume	34	182	0	0	216	7	0	26	0	33	2	222	48	0	272	0	0	0	0	0	0.919	
Peak Factor	0.957					0.714					0.856					6:45:00 AM						
High Int.	08:30					08:15	6	1	35	0	42	2	222	48	0	272						
Volume	26	200	0	0	226																	
Peak Factor	0.957																					
Peak Hour From 12:00 to 17:45 - Peak 1 of 1																						
Intersection	16:45																					
Volume	100	905	0	0	1005	60	1	138	0	199	3	1215	180	0	1398	0	0	6	0	6	2608	
Percent	10.0	90.0	0.0	0.0		30.2	0.5	69.3	0.0		0.2	86.9	12.9	0.0		0.0	0.0	100.	0	0.0		
Volume	17	240	0	0	257	12	0	32	0	44	0	339	39	0	378	0	0	0	0	0	679	
Peak Factor	0.978					0.888					0.925					17:15						
High Int.	17:30					16:45	16	0	40	0	56	0	339	39	0	378	0	0	3	0	3	0.960
Volume	17	240	0	0	257																	
Peak Factor	0.978					0.888					0.925					17:15						

Accurate Counts
Traffic Data Collection Services
(214) 681-6468

Location:Ridge @ Yellow Jacket
Weather:Cool
Counted By:PI

File Name : Ridge at Yellow Jacket 2019
Site Code : 00000000
Start Date : 1/31/2019
Page No : 1

Groups Printed- Unshifted

Start Time	RIDGE Southbound					YELLOW JACKET Westbound					RIDGE Northbound					YELLOW JACKET Eastbound					Int. Total					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total						
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
07:00	8	180	0	0	188	8	0	8	0	16	0	114	24	0	138	0	0	0	0	0	0	0	0	0	0	342
07:15	12	204	0	0	216	11	0	15	0	26	0	144	18	0	162	0	0	0	0	0	0	0	0	0	0	404
07:30	28	212	0	0	240	15	0	12	0	27	0	140	37	0	177	0	0	0	0	0	0	0	0	0	0	444
07:45	110	203	0	0	313	15	0	17	0	32	0	139	68	0	207	0	0	0	0	0	0	0	0	0	0	552
Total	158	799	0	0	957	49	0	52	0	101	0	537	147	0	684	0	0	0	0	0	0	0	0	0	0	1742
08:00	111	215	0	0	326	29	0	22	0	51	0	163	100	0	263	0	0	0	0	0	0	0	0	0	0	640
08:15	171	220	0	0	391	15	0	29	0	44	0	135	70	0	205	0	0	0	0	0	0	0	0	0	0	640
08:30	43	212	0	0	255	21	0	31	0	52	0	166	71	0	237	0	0	0	0	0	0	0	0	0	0	544
08:45	19	199	0	0	218	10	0	14	0	24	0	208	59	0	267	0	0	0	0	0	0	0	0	0	0	509
Total	344	846	0	0	1190	75	0	96	0	171	0	672	300	0	972	0	0	0	0	0	0	0	0	0	0	2333

*** BREAK ***

16:00	45	180	0	0	225	42	0	135	0	177	0	214	47	0	261	0	0	0	0	0	0	0	0	0	0	663
16:15	20	236	0	0	256	29	0	57	0	86	0	283	77	0	360	0	0	0	0	0	0	0	0	0	0	702
16:30	23	200	0	0	223	29	0	29	0	58	0	249	87	0	336	0	0	0	0	0	0	0	0	0	0	617
16:45	22	256	0	0	278	22	0	25	0	47	0	303	81	0	384	0	0	0	0	0	0	0	0	0	0	709
Total	110	872	0	0	982	122	0	246	0	368	0	1049	292	0	1341	0	0	0	0	0	0	0	0	0	0	2691
17:00	28	233	0	0	261	36	0	46	0	82	0	260	79	0	339	0	0	0	0	0	0	0	0	0	0	682
17:15	24	229	0	0	253	34	0	52	0	86	0	249	87	0	336	0	0	0	0	0	0	0	0	0	0	675
17:30	26	260	0	0	286	28	0	47	0	75	0	286	76	0	362	0	0	0	0	0	0	0	0	0	0	723
17:45	9	236	0	0	245	32	0	39	0	71	0	263	78	0	341	0	0	0	0	0	0	0	0	0	0	657
Total	87	958	0	0	1045	130	0	184	0	314	0	1058	320	0	1378	0	0	0	0	0	0	0	0	0	0	2737
Grand Total	699	3475	0	0	4174	376	0	578	0	954	0	3316	1059	0	4375	0	0	0	0	0	0	0	0	0	0	9503
Approch %	16.7	83.3	0.0	0.0		4.0	0.0	60.6	0.0	10.0	0.0	75.8	24.2	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total %	7.4	36.6	0.0	0.0	43.9	4.0	0.0	6.1	0.0	10.0	0.0	34.9	11.1	0.0	46.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

Start Time	RIDGE Southbound					YELLOW JACKET Westbound					RIDGE Northbound					YELLOW JACKET Eastbound					Int. Total					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total						
Peak Hour From 07:00 to 11:45 - Peak 1 of 1																										
Intersection	07:45																									
Volume	435	850	0	0	1285	80	0	99	0	179	0	603	309	0	912	0	0	0	0	0	0	0	0	0	0	2376
Percent	33.9	66.1	0.0	0.0		44.7	0.0	55.3	0.0		0.0	66.1	33.9	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0		
08:15	171	220	0	0	391	15	0	29	0	44	0	135	70	0	205	0	0	0	0	0	0	0	0	0	0	640
Volume																								0.928		
Peak Factor																										
High Int.	08:15					08:30					08:00					6:45:00 AM										
Volume	171	220	0	0	391	21	0	31	0	52	0	163	100	0	263	0	0	0	0	0	0	0	0	0	0	
Peak Factor	0.822					0.861					0.867															
Peak Hour From 12:00 to 17:45 - Peak 1 of 1																										
Intersection	16:45																									
Volume	100	978	0	0	1078	120	0	170	0	290	0	1098	323	0	1421	0	0	0	0	0	0	0	0	0	0	2789
Percent	9.3	90.7	0.0	0.0		41.4	0.0	58.6	0.0		0.0	77.3	22.7	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0		
17:30	26	260	0	0	286	28	0	47	0	75	0	286	76	0	362	0	0	0	0	0	0	0	0	0	0	723
Volume																								0.964		
Peak Factor																										
High Int.	17:30					16:45																				
Volume	26	260	0	0	286	34	0	52	0	86	0	303	81	0	384	0	0	0	0	0	0	0	0	0	0	
Peak Factor	0.942					0.843					0.925															

APPENDIX B

Current Traffic Conditions

HCS+: Multilane Highways Release 5.3

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst: Tom Walton
Agency/Co: City of Rockwall
Date: 2/2/2019
Analysis Period: AM Peak Hour
Highway: Ridge Rd FM740
From/To: Yellowjacket to White Hills
Jurisdiction: TxDOT
Analysis Year: 2019
Project ID: Hacienda Car Wash Ridge Existing AM

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	0		0	
Median type				
Free-flow speed:	Measured		Measured	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	0.0	mph	0.0	mph
Free-flow speed	60.0	mph	60.0	mph

VOLUME

Direction	1		2	
Volume, V	752	vph	791	vph
Peak-hour factor, PHF	0.90		0.90	
Peak 15-minute volume, v15	209		220	
Trucks and buses	0	%	0	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fhv	1.000		1.000	
Flow rate, vp	417	pcphpl	439	pcphpl

RESULTS

	Direction	1		2	
Flow rate, vp		417	pcphpl	439	pcphpl
Free-flow speed, FFS		60.0	mph	60.0	mph
Avg. passenger-car travel speed, S		60.0	mph	60.0	mph
Level of service, LOS		A		A	
Density, D		6.9	pc/mi/ln	7.3	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Multilane Highways Release 5.3

Phone:
E-mail:

Fax:

OPERATIONAL ANALYSIS

Analyst: Tom Walton
 Agency/Co: City of Rockwall
 Date: 2/2/2019
 Analysis Period: PM Peak Hour
 Highway: Ridge Rd FM740
 From/To: Yellowjacket to White Hills
 Jurisdiction: TxDOT
 Analysis Year: 2019
 Project ID: Hacienda Car Wash Ridge Existing PM

FREE-FLOW SPEED

	Direction		1		2	
Lane width			12.0	ft	12.0	ft
Lateral clearance:						
Right edge			6.0	ft	6.0	ft
Left edge			6.0	ft	6.0	ft
Total lateral clearance			12.0	ft	12.0	ft
Access points per mile			0		0	
Median type						
Free-flow speed:			Measured		Measured	
FFS or BFFS			60.0	mph	60.0	mph
Lane width adjustment, FLW			0.0	mph	0.0	mph
Lateral clearance adjustment, FLC			0.0	mph	0.0	mph
Median type adjustment, FM			0.0	mph	0.0	mph
Access points adjustment, FA			0.0	mph	0.0	mph
Free-flow speed			60.0	mph	60.0	mph

VOLUME

	Direction		1		2	
Volume, V			1283	vph	973	vph
Peak-hour factor, PHF			0.90		0.90	
Peak 15-minute volume, v15			356		270	
Trucks and buses			0	%	0	%
Recreational vehicles			0	%	0	%
Terrain type			Level		Level	
Grade			0.00	%	0.00	%
Segment length			0.00	mi	0.00	mi
Number of lanes			2		2	
Driver population adjustment, fP			1.00		1.00	
Trucks and buses PCE, ET			1.5		1.5	
Recreational vehicles PCE, ER			1.2		1.2	
Heavy vehicle adjustment, fHV			1.000		1.000	
Flow rate, vp			712	pcphpl	540	pcphpl

RESULTS

	Direction	1		2	
Flow rate, vp		712	pcphpl	540	pcphpl
Free-flow speed, FFS		60.0	mph	60.0	mph
Avg. passenger-car travel speed, S		60.0	mph	60.0	mph
Level of service, LOS		B		A	
Density, D		11.9	pc/mi/ln	9.0	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Signalized Intersections Release 5.3

Analyst: Tom Walton Inter.: Ridge Rd at Yellow Jacket Ln
 Agency: City of Rockwall Area Type: All other areas
 Date: 2/2/2019 Jurisd: TXDOT
 Period: AM Peak Hour Year : 2019
 Project ID: Hacienda Car Wash Existing AM
 E/W St: Yellow Jacket Ln N/S St:

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	0	0	1	1	1	0	2	1	2	2	0
LGConfig				L	LTR	R		LT	R	L	T	
Volume				80	0	99		603	309	435	850	
Lane Width				12.0	12.0	12.0		12.0	12.0	12.0	12.0	
RTOR Vol						0			0			

Duration	0.25	Area Type:	All other areas					
Signal Operations								
Phase Combination	1	2	3	4	5	6	7	8
EB Left					NB Left			P
Thru					Thru			P
Right					Right			P
Peds					Peds			
WB Left		P			SB Left	P		P
Thru		P			Thru	P		P
Right		P			Right	P		P
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green		30.0				20.0		35.0
Yellow		4.0				4.0		4.0
All Red		1.0				1.0		1.0
Cycle Length: 100.0 secs								

Intersection Performance Summary

Appr/Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group	Approach	
			v/c	g/C		Delay LOS	Delay LOS
Eastbound							
Westbound							
L	542	1805	0.16	0.30	26.4 C		
LTR	570	1900	0.00	0.30	24.5 C	26.9	C
R	485	1615	0.23	0.30	27.4 C		
Northbound							
LT				0.35			
R	565	1615	0.61	0.35	31.6 C		
Southbound							
L	1061	3505	0.46	0.60	12.5 B		
T	2171	3618	0.43	0.60	11.5 B	11.8	B
Intersection Delay =			(sec/veh)		Intersection LOS =		

HCS+: Signalized Intersections Release 5.3

Analyst: Tom Walton
 Agency: City of Rockwall
 Date: 2/2/2019
 Period: PM Peak Hour
 Project ID: Hacienda Car Wash Existing PM
 E/W St: Yellow Jacket Ln

Inter.: Ridge Rd at Yellow Jacket Ln
 Area Type: All other areas
 Jurisd: TxDOT
 Year : 2019
 N/S St: Ridge Rd

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	0	0	1	1	1	0	2	1	2	2	0
LGConfig				L	LTR	R		LT	R	L	T	
Volume				120	0	170		1098	323	100	978	
Lane Width				12.0	12.0	12.0		12.0	12.0	12.0	12.0	
RTOR Vol						0			0			

Phase Combination	Area Type: All other areas							
	Signal Operations							
	1	2	3	4	5	6	7	8
EB Left					NB Left	P		
Thru					Thru	P		
Right					Right	P		
Peds					Peds			
WB Left	P				SB Left	P	P	
Thru	P				Thru	P	P	
Right	P				Right	P	P	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green		30.0				20.0	35.0	
Yellow		4.0				4.0	4.0	
All Red		1.0				1.0	1.0	
						Cycle Length: 100.0		secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay LOS	Delay LOS		

Eastbound

Westbound

L	542	1805	0.25	0.30	27.5	C		
LTR	570	1900	0.00	0.30	24.5	C	29.0	C
R	485	1615	0.39	0.30	30.1	C		

Northbound

LT				0.35				
R	565	1615	0.64	0.35	32.5	C		
Southbound								
L	1419	3505	0.08	0.60	14.9	B		
T	2171	3618	0.50	0.60	12.3	B	12.5	B

Intersection Delay = (sec/veh) Intersection LOS =

HCS+: Signalized Intersections Release 5.3

Analyst: Inter.: Ridge Rd at White Hills Ln
 Agency: City of Rockwall Area Type: All other areas
 Date: 2/2/2019 Jurisd: TxDOT
 Period: AM Peak Hour Year : 2019
 Project ID: Hacienda Car Wash Existing AM
 E/W St: White Hills Ln N/S St: Ridge Rd

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	0	0	0	1	1	1	2	0	1	2	0
LGConfig					LT	R	L	TR		L	T	
Volume				24	0	96	3	780	148	120	745	
Lane Width					12.0	12.0	12.0	12.0		12.0	12.0	
RTOR Vol						0			0			

Duration	0.25	Area Type:	All other areas					
Signal Operations								
Phase Combination	1	2	3	4	5	6	7	8
EB Left					NB Left	P		
Thru					Thru	P		
Right					Right	P		
Peds					Peds			
WB Left	P				SB Left	P		
Thru	P				Thru	P		
Right	P				Right	P		
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	25.0					55.0		
Yellow	4.0					4.0		
All Red	1.0					1.0		
Cycle Length: 90.0 secs								

Intersection Performance Summary							
Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group	Approach	
			v/c	g/C		Delay LOS	Delay LOS

Eastbound

Westbound

LT	503	1810	0.05	0.28	24.0	C	25.9	C
R	449	1615	0.24	0.28	26.4	C		
Northbound								
L	351	574	0.01	0.61	6.9	A		
TR	2158	3531	0.48	0.61	10.4	B	10.4	B
Southbound								
L	264	432	0.50	0.61	16.6	B		
T	2211	3618	0.37	0.61	9.3	A	10.3	B

Intersection Delay = 11.3 (sec/veh) Intersection LOS = B

HCS+: Signalized Intersections Release 5.3

Analyst: Tom Walton
 Agency: City of Rockwall
 Date: 2/2/2019
 Period: PM Peak Hour
 Project ID: Hacienda Car Wash Existing PM
 E/W St: White Hills Ln

Inter.: Ridge Rd at White Hills Ln
 Area Type: All other areas
 Jurisd: TxDOT
 Year : 2019
 N/S St: Ridge Rd

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	0	0	0	1	1	1	2	0	1	2	0
LGConfig					LT	R	L	TR		L	T	
Volume				60	0	139	3	1215	180	100	905	
Lane Width					12.0	12.0	12.0	12.0		12.0	12.0	
RTOR Vol						0			0			

Duration	0.25	Area Type:	All other areas						
Phase Combination		Signal Operations							
1	2	3	4	5	6	7	8		
EB Left				NB Left	P				
Thru				Thru	P				
Right				Right	P				
Peds				Peds					
WB Left	P			SB Left	P				
Thru	P			Thru	P				
Right	P			Right	P				
Peds				Peds					
NB Right				EB Right					
SB Right				WB Right					
Green	25.0				55.0				
Yellow	4.0				4.0				
All Red	1.0				1.0				
Cycle Length: 90.0 secs									

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
Westbound								
LT	503	1810	0.13	0.28	24.9	C	27.1	C
R	449	1615	0.34	0.28	28.0	C		
Northbound								
L	274	448	0.01	0.61	6.9	A		
TR	2168	3548	0.71	0.61	14.1	B	14.1	B
Southbound								
L	109	178	1.02	0.61	108.7	F		
T	2211	3618	0.45	0.61	10.1	B	19.9	B

Intersection Delay = 17.3 (sec/veh) Intersection LOS = B

APPENDIX C

Trip Generation Sheets

Land Use: 948 Automated Car Wash

Independent Variables with One Observation

The following trip generation data are for independent variables with only one observation. This information is shown in this table only; there are no related plots for these data.

Users are cautioned to use data with care because of the small sample size.

<u>Independent Variable</u>	<u>Trip Generation Rate</u>	<u>Size of Independent Variable</u>	<u>Number of Studies</u>	<u>Directional Distribution</u>
1,000 Square Feet Gross Floor Area				
Weekday P.M. Peak Hour of Adjacent Street Traffic	14.12	2	1	50% entering, 50% exiting
Saturday Peak Hour of Generator	14.12	2	1	50% entering, 50% exiting
Wash Stalls				
Saturday Peak Hour of Generator	41	1	1	46% entering, 54% exiting

APPENDIX D

Buildout Analysis

HCS+: Multilane Highways Release 5.3

Phone:
E-mail:

Fax:

OPERATIONAL ANALYSIS

Analyst: Tom Walton
 Agency/Co: City of Rockwall
 Date: 2/2/2019
 Analysis Period: AM Peak Hour
 Highway: Ridge Rd FM740
 From/To: Yellowjacket to White Hills
 Jurisdiction: TxDOT
 Analysis Year: 2020
 Project ID: Hacienda Car Wash Ridge Buildout AM

FREE-FLOW SPEED

	Direction	1		2	
Lane width		12.0	ft	12.0	ft
Lateral clearance:					
Right edge		6.0	ft	6.0	ft
Left edge		6.0	ft	6.0	ft
Total lateral clearance		12.0	ft	12.0	ft
Access points per mile		0		0	
Median type					
Free-flow speed:		Measured		Measured	
FFS or BFFS		60.0	mph	60.0	mph
Lane width adjustment, FLW		0.0	mph	0.0	mph
Lateral clearance adjustment, FLC		0.0	mph	0.0	mph
Median type adjustment, FM		0.0	mph	0.0	mph
Access points adjustment, FA		0.0	mph	0.0	mph
Free-flow speed		60.0	mph	60.0	mph

VOLUME

	Direction	1		2	
Volume, v		782	vph	823	vph
Peak-hour factor, PHF		0.90		0.90	
Peak 15-minute volume, v15		217		229	
Trucks and buses		0	%	0	%
Recreational vehicles		0	%	0	%
Terrain type		Level		Level	
Grade		0.00	%	0.00	%
Segment length		0.00	mi	0.00	mi
Number of lanes		2		2	
Driver population adjustment, fP		1.00		1.00	
Trucks and buses PCE, ET		1.5		1.5	
Recreational vehicles PCE, ER		1.2		1.2	
Heavy vehicle adjustment, fHV		1.000		1.000	
Flow rate, vp		434	pcphpl	457	pcphpl

RESULTS

	Direction				
	1		2		
Flow rate, vp	434		457		pcphpl
Free-flow speed, FFS	60.0	pcphpl	60.0	mph	pcphpl
Avg. passenger-car travel speed, S	60.0	mph	60.0	mph	mph
Level of service, LOS	A		A		mph
Density, D	7.2	pc/mi/ln	7.6	pc/mi/ln	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Multilane Highways Release 5.3

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst: Tom Walton
Agency/Co: City of Rockwall
Date: 2/2/2019
Analysis Period: PM Peak Hour
Highway: Ridge Rd FM740
From/To: Yellowjacket to White Hills
Jurisdiction: TxDOT
Analysis Year: 2020
Project ID: Hacienda Car Wash Ridge Buildout PM

FREE-FLOW SPEED

	Direction		1		2	
Lane width			12.0	ft	12.0	ft
Lateral clearance:						
Right edge			6.0	ft	6.0	ft
Left edge			6.0	ft	6.0	ft
Total lateral clearance			12.0	ft	12.0	ft
Access points per mile			0		0	
Median type						
Free-flow speed:			Measured		Measured	
FFS or BFFS			60.0	mph	60.0	mph
Lane width adjustment, FLW			0.0	mph	0.0	mph
Lateral clearance adjustment, FLC			0.0	mph	0.0	mph
Median type adjustment, FM			0.0	mph	0.0	mph
Access points adjustment, FA			0.0	mph	0.0	mph
Free-flow speed			60.0	mph	60.0	mph

VOLUME

	Direction		1		2	
Volume, V			1381	vph	1043	vph
Peak-hour factor, PHF			0.90		0.90	
Peak 15-minute volume, v15			384		290	
Trucks and buses			0	%	0	%
Recreational vehicles			0	%	0	%
Terrain type			Level		Level	
Grade			0.00	%	0.00	%
Segment length			0.00	mi	0.00	mi
Number of lanes			2		2	
Driver population adjustment, fP			1.00		1.00	
Trucks and buses PCE, ET			1.5		1.5	
Recreational vehicles PCE, ER			1.2		1.2	
Heavy vehicle adjustment, fHV			1.000		1.000	
Flow rate, vp			767	pcphpl	579	pcphpl

RESULTS

	Direction	1		2	
Flow rate, vp		767		579	pcphpl
Free-flow speed, FFS		60.0	pcphpl	60.0	pcphpl
Avg. passenger-car travel speed, s		60.0	mph	60.0	mph
Level of service, LOS		B	mph	60.0	mph
Density, D		12.8		A	
			pc/mi/ln	9.6	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

HCS+: Unsignalized Intersections Release 5.3

TWO-WAY STOP CONTROL SUMMARY

Analyst: Tom Walton
 Agency/Co.: City of Rockwall
 Date Performed: 2/2/2019
 Analysis Time Period: PM Peak Hour
 Intersection: Ridge Rd at Hacienda drive
 Jurisdiction: TxDOT
 Units: U. S. Customary
 Analysis Year: 2021
 Project ID: Hacienda Car Wash Buildout PM
 East/West Street: Hacienda Drive
 North/South Street: Ridge Rd FM 740
 Intersection Orientation: NS
 Study period (hrs): 0.25

Major Street:	Approach Movement	Vehicle Volumes and Adjustments					
		Northbound			Southbound		
		1	2	3	4	5	6
		L	T	R	L	T	R
Volume			1334	16	15	1012	
Peak-Hour Factor, PHF			1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR			1334	16	15	1012	
Percent Heavy Vehicles			--	--	0	--	--
Median Type/Storage			Raised curb		/ 1		
RT Channelized?							
Lanes			2	0		1	2
Configuration			T	TR		L	T
Upstream Signal?			No			No	

Minor Street:	Approach Movement	Vehicle Volumes and Adjustments					
		Westbound			Eastbound		
		7	8	9	10	11	12
		L	T	R	L	T	R
Volume				31			
Peak Hour Factor, PHF				1.00			
Hourly Flow Rate, HFR				31			
Percent Heavy Vehicles				0			
Percent Grade (%)			0			0	
Flared Approach: Exists?/Storage					/		/
Lanes				1			
Configuration				R			

Approach	Delay, Queue Length, and Level of Service							
	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		L			R			
v (vph)		15			31			
C(m) (vph)		516			457			
v/c		0.03			0.07			
95% queue length		0.09			0.22			
Control Delay		12.2			13.4			
LOS		B			B			
Approach Delay				13.4				
Approach LOS				B				

HCS+: Signalized Intersections Release 5.3

Analyst: Tom Walton
 Agency: City of Rockwall
 Date: 2/2/2019
 Period: AM Peak Hour
 Project ID: Hacienda Car Wash Buildout AM
 E/W St: Yellow Jacket Ln
 Inter.: Ridge Rd at Yellow Jacket Ln
 Area Type: All other areas
 Jurisd: TxDOT
 Year : 2020
 N/S St: Ridge Rd

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	0	0	1	1	1	0	2	1	2	2	0
LGConfig				L	LTR	R		LT	R	L	T	
Volume				83	0	103	0	627	321	452	884	
Lane Width				12.0	12.0	12.0		12.0	12.0	12.0	12.0	
RTOR Vol						0			0			

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left					NB Left	P		
Thru					Thru	P		
Right					Right	P		
Peds					Peds			
WB Left	P				SB Left	P	P	
Thru	P				Thru	P	P	
Right	P				Right	P	P	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	30.0					20.0	35.0	
Yellow	4.0					4.0	4.0	
All Red	1.0					1.0	1.0	

Cycle Length: 100.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group	Approach	
			v/c	g/C		Delay	LOS

Eastbound

Westbound

L	542	1805	0.17	0.30	26.5	C	
LTR	570	1900	0.00	0.30	24.5	C	27.0 C
R	485	1615	0.24	0.30	27.5	C	

Northbound

LT	1266	3618	0.55	0.35	27.9	C	29.4 C
R	565	1615	0.63	0.35	32.4	C	

Southbound

L	1071	3505	0.47	0.60	12.8	B	
T	2171	3618	0.45	0.60	11.7	B	12.1 B

Intersection Delay = 19.9 (sec/veh) Intersection LOS = B

HCS+: Signalized Intersections Release 5.3

Analyst: Tom Walton
 Agency: City of Rockwall
 Date: 2/2/2019
 Period: PM Peak Hour
 Project ID: Hacienda Car Wash Buildout PM
 E/W St: Yellow Jacket Ln
 Inter.: Ridge Rd at Yellow Jacket Ln
 Area Type: All other areas
 Jurisd: TxDOT
 Year : 2020
 N/S St: Ridge Rd

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	0	0	1	1	1	0	2	1	2	2	0
LGConfig				L	LTR	R		LT	R	L	T	
Volume				125	0	177	0	1158	336	104	1017	
Lane Width				12.0	12.0	12.0		12.0	12.0	12.0	12.0	
RTOR Vol						0			0			

Duration 0.25 Area Type: All other areas

Phase Combination	Signal Operations							
	1	2	3	4	5	6	7	8
EB Left					NB Left	P		
Thru					Thru	P		
Right					Right	P		
Peds					Peds			
WB Left	P				SB Left	P	P	
Thru	P				Thru	P	P	
Right	P				Right	P	P	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	30.0				15.0	50.0		
Yellow	4.0				4.0	4.0		
All Red	1.0				1.0	1.0		

Cycle Length: 110.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group	Adj Sat Flow Rate (s)	Ratios		Lane Group	Approach	
	Capacity		v/c	g/C	Delay LOS	Delay LOS	
Eastbound							
Westbound							
L	492	1805	0.28	0.27	33.0	C	
LTR	518	1900	0.00	0.27	29.1	C	35.0- C
R	440	1615	0.45	0.27	36.4	D	
Northbound							
LT	1645	3618	0.78	0.45	29.2	C	28.0 C
R	734	1615	0.51	0.45	23.8	C	
Southbound							
L	1056	3505	0.11	0.64	13.9	B	
T	2302	3618	0.49	0.64	11.3	B	11.6 B

Intersection Delay = 22.4 (sec/veh) Intersection LOS = C

HCS+: Signalized Intersections Release 5.3

Analyst: Inter.: Ridge Rd at White Hills Ln
 Agency: City of Rockwall Area Type: All other areas
 Date: 2/2/2019 Jurisd: TxDOT
 Period: AM Peak Hour Year : 2020
 Project ID: Hacienda Car Wash Buildout AM
 E/W St: White Hills Ln N/S St: Ridge Rd

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	0	0	0	1	1	1	2	0	1	2	0
LGConfig					LT	R	L	TR		L	T	
Volume				25	0	100	3	811	154	125	775	
Lane Width					12.0	12.0	12.0	12.0		12.0	12.0	
RTCR Vol						0			0			

Duration 0.25 Area Type: All other areas

Phase Combination	Signal Operations							
	1	2	3	4	5	6	7	8
EB Left					NB Left	P		
Thru					Thru	P		
Right					Right	P		
Peds					Peds			
WB Left	P				SB Left	P		
Thru	P				Thru	P		
Right	P				Right	P		
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	25.0				55.0			
Yellow	4.0				4.0			
All Red	1.0				1.0			

Cycle Length: 90.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group	Approach	
			v/c	g/C	Delay	LOS	Delay
					LOS		LOS
Eastbound							
Westbound							
LT	503	1810	0.06	0.28	24.1	C	26.0 C
R	449	1615	0.25	0.28	26.5	C	
Northbound							
L	335	549	0.01	0.61	6.9	A	
TR	2158	3531	0.50	0.61	10.6	B	10.6 B
Southbound							
L	249	407	0.56	0.61	19.1	B	
T	2211	3618	0.39	0.61	9.4	A	10.8 B

Intersection Delay = 11.6 (sec/veh) Intersection LOS = B

HCS+: Signalized Intersections Release 5.3

Analyst: Tom Walton
 Agency: City of Rockwall
 Date: 2/2/2019
 Period: PM Peak Hour
 Project ID: Hacienda Car Wash Buildout PM
 E/W St: White Hills Ln
 Inter.: Ridge Rd at White Hills Ln
 Area Type: All other areas
 Jurisd: TxDOT
 Year : 2020
 N/S St: Ridge Rd

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	0	0	0	1	1	1	2	0	1	2	0
LGConfig					LT	R	L	TR		L	T	
Volume				62	0	145	3	1280	187	104	956	
Lane Width					12.0	12.0	12.0	12.0		12.0	12.0	
RTOR Vol						0			0			

Duration 0.25 Area Type: All other areas

Phase Combination	Signal Operations							
	1	2	3	4	5	6	7	8
EB Left					NB Left	P		
Thru					Thru	P		
Right					Right	P		
Peds					Peds			
WB Left	P				SB Left	P		
Thru	P				Thru	P		
Right	P				Right	P		
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	25.0				55.0			
Yellow	4.0				4.0			
All Red	1.0				1.0			

Cycle Length: 90.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group	Approach	
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay LOS
Eastbound							
Westbound							
LT	503	1810	0.14	0.28	25.0	C	27.3 C
R	449	1615	0.36	0.28	28.3	C	
Northbound							
L	252	413	0.01	0.61	6.9	A	
TR	2168	3548	0.75	0.61	15.1	B	15.0 B
Southbound							
L	91	149	1.27	0.61	202.5	F	
T	2211	3618	0.48	0.61	10.4	B	29.3 C

Intersection Delay = 21.5 (sec/veh) Intersection LOS = C