



## **ALDRIDGE TRANSPORTATION CONSULTANTS, LLC**

*Advanced Transportation Planning and Traffic Engineering*

John M.W. Aldridge, P.E.  
Colorado Licensed Professional Engineer

1082 Chimney Rock Road  
Highlands Ranch, CO 80126  
303-703-9112

May 18, 2021

Mr. Jason Pock - Richmond American  
Mr. Glenn Ellis – JR Engineering

Technical Memorandum  
Urban Collection at Palmer Village

This technical memorandum responds to the El Paso County comments dated April 19, 2021 regarding the Transportation/Traffic Impact Study. Specifically, the comments focus on the utilization and responsibility for costs and construction of an extension of Akers Dr. from Constitution Ave to a connection with Blue Avena View.

The proposed connection will serve as an emergency access only. It will be gated at the connection to Blue Avena View and signed “Authorized Vehicles Only” at the intersection with Constitution Ave. As an emergency access only, there will be no daily traffic. It will be for the exclusive use by and/or for residents of Palmer Village in the event of an emergency.

Should Akers Dr. be reconstructed in the future and extended to the southern property line, the connection to Blue Avena View will be revised and remain as an emergency access only. As an emergency only connection no daily traffic will use Akers Dr. Thus, no cost participation or opening of an escrow account is required.

ATC appreciates the opportunity to be of service. Please call if you have any questions. We can be reached at 303-703-9112.

Respectfully submitted,

**Aldridge Transportation Consultants, LLC**



John M.W. Aldridge, P.E.  
Principal



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1082 Chimney Rock Road  
Highlands Ranch, CO 80126  
303-703-9112  
Mobile: 303-594-4132  
Email: [john@atceng.com](mailto:john@atceng.com)

July 13, 2020

Mr. Jason J.W. Pock  
Director of Entitlements  
Richmond American Homes  
4350 S. Monaco Street,  
Denver, CO 80237

Re: Transportation Impact Study - Revised  
Feathergrass – Colorado Springs, Colorado

Dear Mr. Pock:

Aldridge Transportation Consultants (ATC) is pleased to present this Traffic Impact Study regarding the proposed development of Feathergrass in Colorado Springs.

ATC is professional service firm specializing in traffic engineering and transportation planning. ATC's principal, John M.W. Aldridge, is a Colorado licensed professional engineer. In the past 20 years, ATC has prepared over 1,000 traffic impact studies, designed over 100 traffic signals, and has provided expert witness testimony on engineering design and access issues on multi-million dollar interchange and highway projects in Kansas and Colorado.

ATC appreciates the opportunity to be of service. Please call if you have any questions. We can be reached at 303-703-9112.



Respectfully submitted,  
**Aldridge Transportation Consultants, LLC**

John M.W. Aldridge, P.E.  
Principal



Signature Page

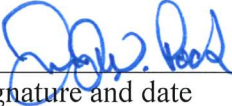
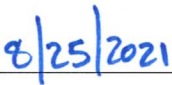
The attached traffic report and supporting information were prepared under my responsible charge and they comport with the standard of care. So far as is consistent with the standard of care, said report was prepared in general conformance with the criteria established by the County for traffic reports.



**Aldridge Transportation Consultants, LLC**

John M.W. Aldridge, P.E.  
Principal

I, Jason J.W. Pock, Director of Entitlements for Richmond American Homes, have read and will comply with all the commitments made on my behalf within this report.

   
\_\_\_\_\_  
Signature and date

Mr. Jason J.W. Pock  
Director of Entitlements  
Richmond American Homes  
4350 S. Monaco Street,  
Denver, CO 80237



## 1. PROJECT DESCRIPTION

Richmond American Homes is proposing to construct 100 paired homes (duplexes) on the southeast and southwest corners of Constitution Ave. and Hannah Ridge Dr. in Colorado Springs. Figure 1 below shows the location of the site, site plans, and the adjacent streets and intersection. Note that the lot layout and lot count shown is up to date at the writing of this study. It is subject to change as planning and development moves forward.

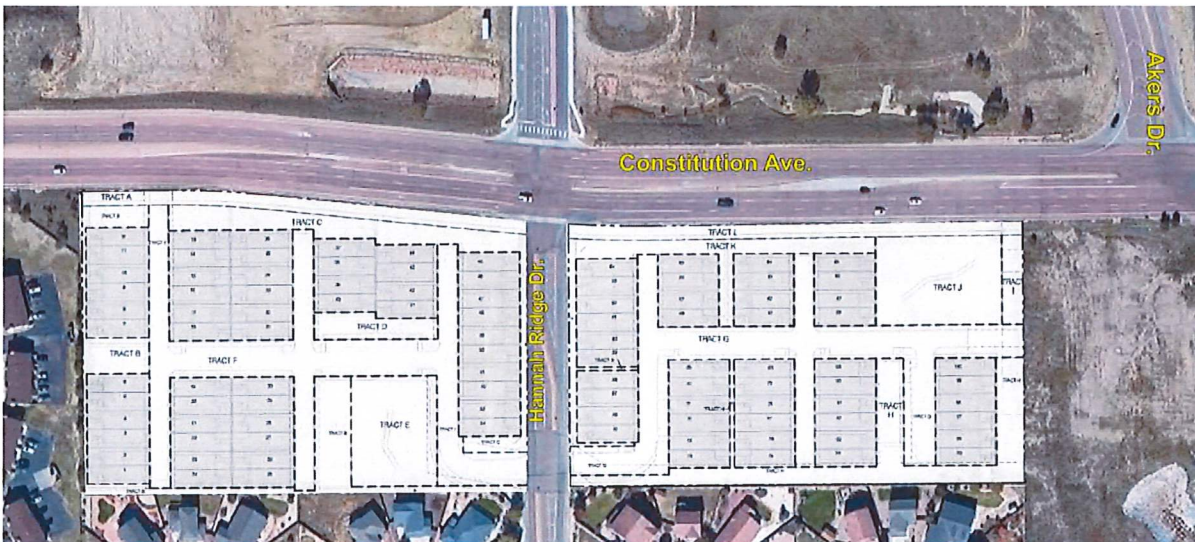


Figure 1

## 2. GENERAL EXISTING CONDITIONS

Constitution Ave. is a four-lane Principal Arterial with continuous right turn lanes on both sides. It is divided with a raised concrete median. It carries approximately 18,000 ADT and posted at 50 mph. Hannah Ridge Dr. is a two-lane Non-Residential Collector. It is also divided with a raised concrete median. It carries approximately 2,300 ADT on the south side and less than 500 ADT on the north side. No speed limit signs are posted on Hannah Ridge Dr. The intersection is two-way stop sign controlled.

The AM and PM peak hours at the intersection of Constitution/Hannah Ridge were counted on October 15, 2019 by All Traffic Data. The counts are attached.

Both sides of the development will be accessible only from Hannah Ridge Dr. The Constitution/Hannah Ridge intersection is already in place and features approximately 100-foot left turn lanes in both directions. Emergency accesses are proposed on the west side and east side of the full development. These are emergency accesses as they wouldn't conform to the County roadway cross-section criteria. They will be gated in conformance with the emergency responders' requirements. Note the type of gate and location will be identified on the site development plan. Because the emergency accesses will be gated, no traffic (other than emergency responders) may utilize them. As a result, no traffic will access Constitution via the Constitution/Akers intersection on the east emergency access. Therefore, there will be no contribution to traffic on Akers Dr. When the proposed extension to Akers Dr. is constructed, the east side emergency access could be relocated or closed if sufficient secondary access becomes available at such time.

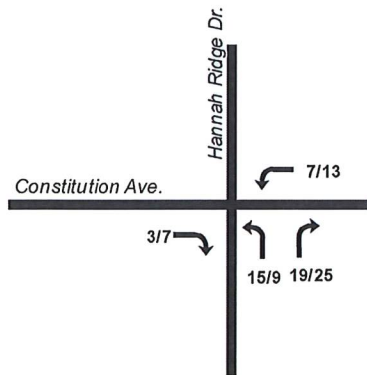


### 3. DEVELOPMENT SITE CHARACTERISTICS

The trip generation for the residential development is defined in Table 1. It is based on the rates and values found in the *ITE Trip Generation Manual, 10<sup>th</sup> Edition*. Although Land Use Code 220 is generally for a single building with at least three other dwelling units and that have one or two levels (floors) it is far more representative of this type of residential unit. City staff suggested that single-family detached is the appropriate category. However, per the ITE Trip Generation Manual, single-family detached units are on individual lots, had the highest trip generation rate per dwelling unit of all residential uses because they were the largest units in size and had more residents and more vehicles per unit than other residential land uses; they were generally located farther away from shopping centers, employment areas, and other trip attractors than other residential land uses; and they generally had fewer alternative modes of transportation available because they were typically not as concentrated as other residential land uses. Because these units are much smaller and house less residents and vehicles, we believe Land Use 220 is a better representation of the trip generation. Shown are the Average Daily Traffic and the AM and PM peak hours. Note that a fitted curve equation is available for the ADT and the AM and PM peak hours, but the results are virtually identical. Mode shifting is not available as Mountain Metropolitan Transit does not serve this location.

**Table 1**

ITE CODE	LAND USE	UNIT	QUANTITY	ADT	WEEKDAY					
					AM			PM		
					IN	OUT	TOTAL	IN	OUT	TOTAL
220	Paired Homes (Duplexes)	DU	100	7.32	0.11	0.35		0.35	0.21	
				<b>732</b>	<b>11</b>	<b>35</b>	<b>46</b>	<b>35</b>	<b>21</b>	<b>56</b>
<b>Total Trips</b>				<b>732</b>	<b>11</b>	<b>35</b>	<b>46</b>	<b>35</b>	<b>21</b>	<b>56</b>



The PM peak hour is the heaviest time of traffic on the highway and the development. It is considered the design hour volume (DHV) for operations and geometric design purposes.

The distribution of the site generated traffic mirrors that of the existing movements at the intersection. Generally, the directional split is 65 percent to the east and 35 percent to the west. The assignment of the traffic is shown in the graphic to the left.

### 4. FUTURE CONDITIONS

A review of the *2016 El Paso Major Transportation Corridors Plan Update* revealed only one area on Constitution Ave. (same 6-lane cross-section) with an existing and 2040 forecasted volume. It showed a 20-year 1.3 growth factor. To be conservative we applied a 1.5 growth factor (2 percent annually) for the 2040 analysis and 1.1 growth factor for the 5-year (2025) analysis.

### 5. PROJECT IMPACTS

ATC uses Synchro v.10 for operations analyses. The Synchro v.10 methodologies are based on the *Highway Capacity Manual, 6<sup>th</sup> Edition* (HCM). The Synchro HCM reports in the appendix are for reference. LOS is letter rating from A to F. LOS A indicates free-flow traffic conditions and no delay at



intersections. LOS F is heavy traffic congestion with significant delay. LOS is provided for the overall operations at signalized intersections. LOS D is generally the benchmark for acceptable signalized intersection operations during the weekday peak hours. The critical movement, not the overall, provides the LOS rating for unsignalized intersections. The critical movement is generally a left turn from the minor approach. Caution is advised when evaluating the LOS at unsignalized intersections particularly when LOS F shows. In cases of a LOS F, the HCM suggests that other evaluation measures should be considered such as the volume over capacity ratio and the 95<sup>th</sup> percentile queue length to make the most effective traffic control decision. LOS F at unsignalized intersections is considered normal for the weekday peak hour particularly when the v/c ratio and the 95<sup>th</sup> percentile queue length are acceptable.

Level of Service Summary										
LOS/Delay(secs) - 95th%ile queue length (veh)										
Intersection	Existing		2025 Background		2025 TOTAL		2040 Background		2040 TOTAL	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
<b>Unsignalized</b>										
Constitution/Hannah Ridge	E/44.5	F/95.4	F/57.7	F/137.3	F/75.4	F/203.4	F/232.1	F/>300	F/>300	F/>300
	1.7	1.7	2.1	2.1	3.2	3.2	4.6	4	6.4	5.3

The intersection currently operates at LOS F based on the critical movement which in this case is the northbound left turn and will continue to do so in all future conditions. The ECM specifies that LOS D is the minimum acceptable LOS. However, per the Highway Capacity Manual, this is an acceptable operating through 2025 as the volume over capacity ratios are below 1 and only 2-4 cars will queue in the 95<sup>th</sup> percentile queue condition. In 2040 in background and total conditions, the intersection will not provide acceptable operations. The v/c ratio is over 1 and the queues will spill into the through and right turn lane.

Traffic signals are not warranted now but could be in the future conditions, particularly if the surrounding area develops and adds more traffic to the intersection. There is no point in doing a complete traffic signal warrant analysis as the peak hour volume on the minor street approach is well below what is required to meet any volume warrant (MUTCD Warrants 1-3). This is same conclusion reached by LSC Transportation Consultants, Inc. in their Transportation Memorandum for Midtown Collection at Hanna Ridge Filings 1 & 2 (PUDSP194). LSC examined both the southbound and northbound approaches on Hanna Ridge for the eight-hour and four-hour signal warrants and found them well short of meeting the warrant in the short-term. They also examined the crash warrant and found that the number of crashes susceptible to correction with traffic signalization is well below the warrant threshold.

**6. PEDESTRIAN AND BICYCLE IMPACT EVALUATIONS**

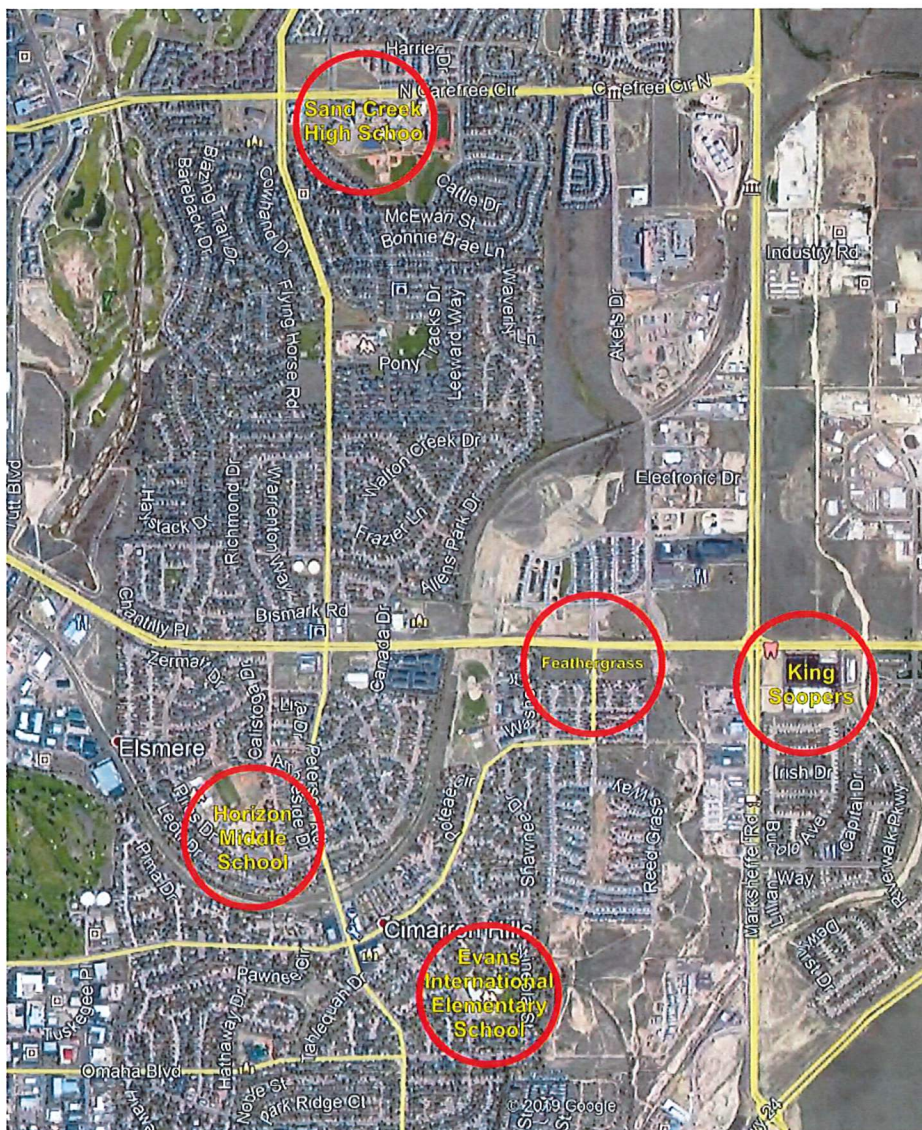
Presently there are no sidewalks or bike lanes along the frontage of Constitution Ave. There are bike lanes on Hannah Ridge Dr. but no sidewalks. The site plan shows detached sidewalks on the Constitution Ave. and Hannah Ridge Dr. frontages but no bike lanes on Constitution Ave.

The map on the next page shows the location of the three schools that would be attended by students in Feathergrass. Evans International Elementary School is approximately 1.1 miles to the south. Sidewalks are available along all streets from Feathergrass to the school. However, it is likely that the school district would provide buses. Same situation for the Horizon Middle School which is 1.5 miles away. The Sand



Creek High School is approximately 2.25 miles north of Feathergrass and would require pedestrians and bikers to cross Constitution Ave. Students here would be bussed or allowed to use personal vehicles.

A King Soopers grocery store is located on the southeast corner of Constitution Ave. and Marksheffel Road. It is approximately one-half mile away from Feathergrass. There are no sidewalks now, but it is walkable and the signalized intersection of Constitution/Marksheffel is complete with pedestrian actuation. Cimarron Eastridge Park is just a short distance less than .25 miles to the west and accessible on sidewalks via Hanna Ridge Dr. and Palmer Park Blvd.





## **7. MITIGATION MEASURES**

Other than sidewalks no mitigation measures are necessary to Hannah Ridge Dr. or Constitution Ave. to accommodate the trip generation from Feathergrass safely and efficiently. Feathergrass will be assessed a County Road Impact Fee of \$3,830.00 per dwelling unit. Note that the paired homes are considered single-family. The purpose of the program is to develop a process to identify transportation improvements needed to accommodate growth, to allocate fairly the costs of transportation improvements among new developments, and to ensure the proper and timely accounting of improvements and funds. The program does not include all roads in the unincorporated County, only higher traffic roads that provide for regional travel.

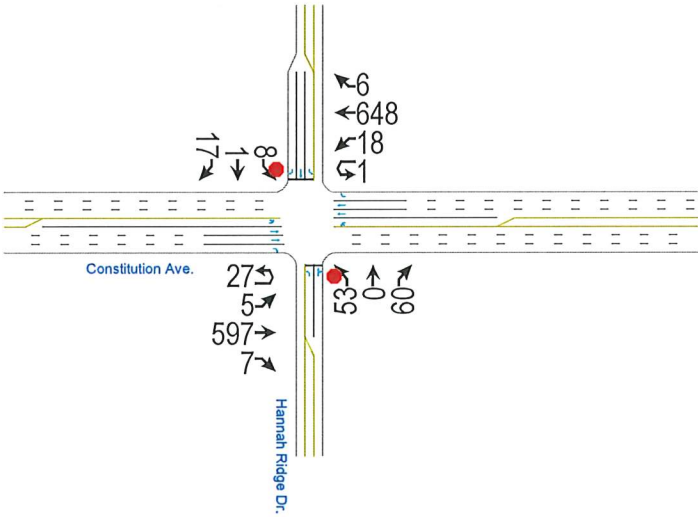
## **8. CONCLUSIONS AND RECOMMENDED IMPROVEMENTS SUMMARY**

The study and operations analyses contained herein provides evidence that the recommended access locations and type will function within acceptable traffic engineering parameters promulgated by FHWA, AASHTO, MUTCD, CDOT, and El Paso County. The access locations and type are essential for safe and smooth transitions on and off the highway and to reduce to the greatest extent unnecessary on-site circulation. In my professional opinion, the transportation facilities will be adequate and available to serve the proposed development within one year of the full build out of the project and that it meets or exceeds the applicable adopted level of service provided the El Paso County Engineering Criteria Manual.





## APPENDIX

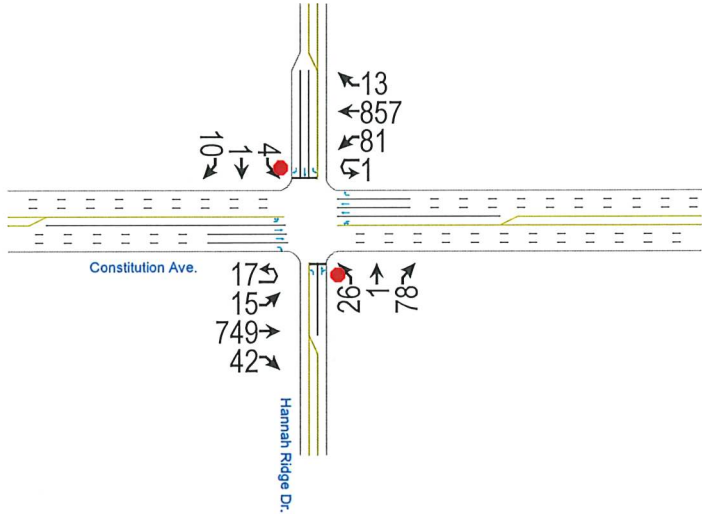


Intersection														
Int Delay, s/veh	2.8													
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↕↕	↗		↔	↕↕	↗	↗	↗	↗	↗	↗	↗
Traffic Vol, veh/h	27	5	597	7	1	18	648	6	53	0	60	8	1	17
Future Vol, veh/h	27	5	597	7	1	18	648	6	53	0	60	8	1	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	-	None	-	-	None	-	-	None
Storage Length	-	325	-	0	-	225	-	0	100	-	-	150	-	150
Veh in Median Storage, #	-	-	0	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	5	649	8	1	20	704	7	58	0	65	9	1	18

Major/Minor	Major1			Major2			Minor1			Minor2				
Conflicting Flow All	704	711	0	0	649	657	0	0	1112	1470	325	1139	1471	352
Stage 1	-	-	-	-	-	-	-	-	717	717	-	746	746	-
Stage 2	-	-	-	-	-	-	-	-	395	753	-	393	725	-
Critical Hdwy	6.44	4.14	-	-	6.44	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.52	2.22	-	-	2.52	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	514	884	-	-	557	926	-	-	163	126	671	156	126	644
Stage 1	-	-	-	-	-	-	-	-	387	432	-	372	419	-
Stage 2	-	-	-	-	-	-	-	-	602	416	-	603	428	-
Platoon blocked, %			-	-			-	-						
Mov Cap-1 Maneuver	536	536	-	-	887	887	-	-	147	115	671	131	115	644
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	147	115	-	131	115	-
Stage 1	-	-	-	-	-	-	-	-	362	404	-	348	409	-
Stage 2	-	-	-	-	-	-	-	-	569	406	-	509	400	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.3	26.7	19.1
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	147	671	536	-	-	887	-	-	131	115	644
HCM Lane V/C Ratio	0.392	0.097	0.065	-	-	0.023	-	-	0.066	0.009	0.029
HCM Control Delay (s)	44.5	10.9	12.2	-	-	9.2	-	-	34.4	36.6	10.8
HCM Lane LOS	E	B	B	-	-	A	-	-	D	E	B
HCM 95th %tile Q(veh)	1.7	0.3	0.2	-	-	0.1	-	-	0.2	0	0.1

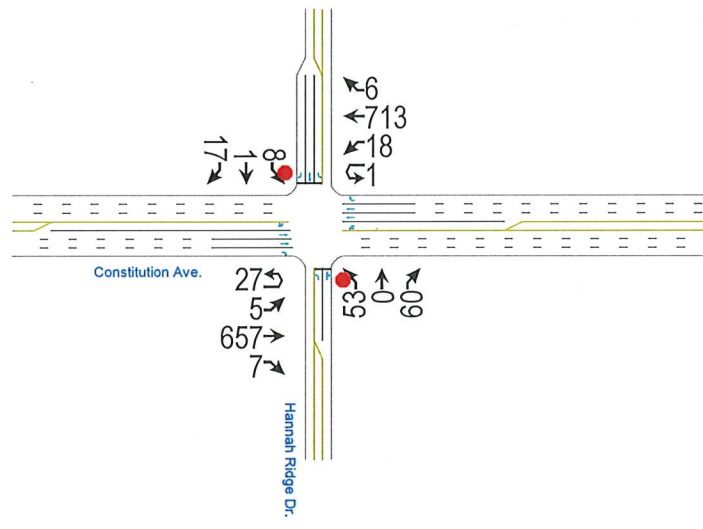


Intersection														
Int Delay, s/veh	2.8													
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↕	↕		↔	↕	↕	↔	↔		↔	↕	↕
Traffic Vol, veh/h	17	15	749	42	1	81	857	13	26	1	78	4	1	10
Future Vol, veh/h	17	15	749	42	1	81	857	13	26	1	78	4	1	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	-	None	-	-	None	-	-	None
Storage Length	-	325	-	0	-	225	-	0	100	-	-	150	-	150
Veh in Median Storage, #	-	-	0	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	16	814	46	1	88	932	14	28	1	85	4	1	11

Major/Minor	Major1				Major2				Minor1			Minor2		
Conflicting Flow All	932	946	0	0	814	860	0	0	1527	2006	407	1586	2038	466
Stage 1	-	-	-	-	-	-	-	-	882	882	-	1110	1110	-
Stage 2	-	-	-	-	-	-	-	-	645	1124	-	476	928	-
Critical Hdwy	6.44	4.14	-	-	6.44	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.52	2.22	-	-	2.52	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	367	721	-	-	437	777	-	-	80	59	593	73	56	543
Stage 1	-	-	-	-	-	-	-	-	307	362	-	223	283	-
Stage 2	-	-	-	-	-	-	-	-	427	279	-	539	345	-
Platoon blocked, %			-	-			-	-						
Mov Cap-1 Maneuver	470	470	-	-	767	767	-	-	66	48	593	53	46	543
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	66	48	-	53	46	-
Stage 1	-	-	-	-	-	-	-	-	284	335	-	206	250	-
Stage 2	-	-	-	-	-	-	-	-	368	247	-	426	319	-

Approach	EB				WB				NB			SB		
HCM Control Delay, s	0.5				0.9				33.6			34.6		
HCM LOS									D			D		

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	66	518	470	-	-	767	-	-	53	46	543
HCM Lane V/C Ratio	0.428	0.166	0.074	-	-	0.116	-	-	0.082	0.024	0.02
HCM Control Delay (s)	95.4	13.3	13.3	-	-	10.3	-	-	78.9	85.1	11.8
HCM Lane LOS	F	B	B	-	-	B	-	-	F	F	B
HCM 95th %tile Q(veh)	1.7	0.6	0.2	-	-	0.4	-	-	0.3	0.1	0.1

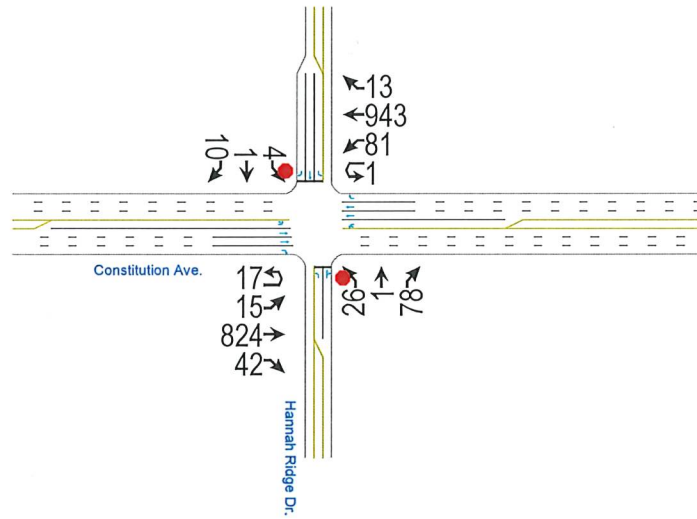


Intersection														
Int Delay, s/veh	3.1													
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↕	↕		↔	↕	↕	↔	↔		↔	↕	↕
Traffic Vol, veh/h	27	5	597	7	1	18	648	6	53	0	60	8	1	17
Future Vol, veh/h	27	5	597	7	1	18	648	6	53	0	60	8	1	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	-	None	-	-	None	-	-	None
Storage Length	-	325	-	0	-	225	-	0	100	-	-	150	-	150
Veh in Median Storage, #	-	-	0	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	5	714	8	1	20	775	7	58	0	65	9	1	18

Major/Minor	Major1				Major2				Minor1			Minor2		
Conflicting Flow All	775	782	0	0	714	722	0	0	1212	1606	357	1242	1607	388
Stage 1	-	-	-	-	-	-	-	-	782	782	-	817	817	-
Stage 2	-	-	-	-	-	-	-	-	430	824	-	425	790	-
Critical Hdwy	6.44	4.14	-	-	6.44	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.52	2.22	-	-	2.52	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	463	832	-	-	506	876	-	-	138	104	639	131	104	611
Stage 1	-	-	-	-	-	-	-	-	353	403	-	337	388	-
Stage 2	-	-	-	-	-	-	-	-	574	385	-	578	400	-
Platoon blocked, %			-	-			-	-						
Mov Cap-1 Maneuver	485	485	-	-	836	836	-	-	123	94	639	109	94	611
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	123	94	-	109	94	-
Stage 1	-	-	-	-	-	-	-	-	328	374	-	313	378	-
Stage 2	-	-	-	-	-	-	-	-	541	375	-	482	371	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.2	33.1	21.5
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	123	639	485	-	-	836	-	-	109	94	611
HCM Lane V/C Ratio	0.468	0.102	0.072	-	-	0.025	-	-	0.08	0.012	0.03
HCM Control Delay (s)	57.7	11.3	13	-	-	9.4	-	-	40.9	43.7	11.1
HCM Lane LOS	F	B	B	-	-	A	-	-	E	E	B
HCM 95th %tile Q(veh)	2.1	0.3	0.2	-	-	0.1	-	-	0.3	0	0.1



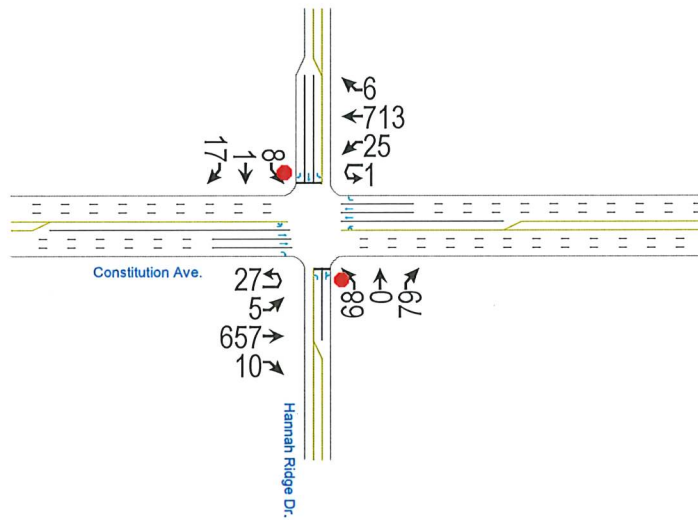


Intersection														
Int Delay, s/veh	3.3													
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↕↕	↗		↔	↕↕	↗	↖	↖		↖	↖	↗
Traffic Vol, veh/h	17	15	749	42	1	81	857	13	26	1	78	4	1	10
Future Vol, veh/h	17	15	749	42	1	81	857	13	26	1	78	4	1	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	-	None	-	-	None	-	-	None
Storage Length	-	325	-	0	-	225	-	0	100	-	-	150	-	150
Veh in Median Storage, #	-	-	0	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	16	896	46	1	88	1025	14	28	1	85	4	1	11

Major/Minor	Major1		Major2		Minor1		Minor2							
Conflicting Flow All	1025	1039	0	0	896	942	0	0	1655	2181	448	1720	2213	513
Stage 1	-	-	-	-	-	-	-	-	964	964	-	1203	1203	-
Stage 2	-	-	-	-	-	-	-	-	691	1217	-	517	1010	-
Critical Hdwy	6.44	4.14	-	-	6.44	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.52	2.22	-	-	2.52	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	320	665	-	-	387	724	-	-	64	45	558	58	43	506
Stage 1	-	-	-	-	-	-	-	-	274	332	-	196	256	-
Stage 2	-	-	-	-	-	-	-	-	401	252	-	509	316	-
Platoon blocked, %			-	-			-	-						
Mov Cap-1 Maneuver	417	417	-	-	714	714	-	-	52	36	558	41	34	506
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	52	36	-	41	34	-
Stage 1	-	-	-	-	-	-	-	-	251	304	-	180	224	-
Stage 2	-	-	-	-	-	-	-	-	342	221	-	394	289	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.9	44.8	43.3
HCM LOS			E	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	52	471	417	-	-	714	-	-	41	34	506
HCM Lane V/C Ratio	0.543	0.182	0.083	-	-	0.125	-	-	0.106	0.032	0.021
HCM Control Delay (s)	137.3	14.3	14.4	-	-	10.8	-	-	103	114.4	12.3
HCM Lane LOS	F	B	B	-	-	B	-	-	F	F	B
HCM 95th %tile Q(veh)	2.1	0.7	0.3	-	-	0.4	-	-	0.3	0.1	0.1

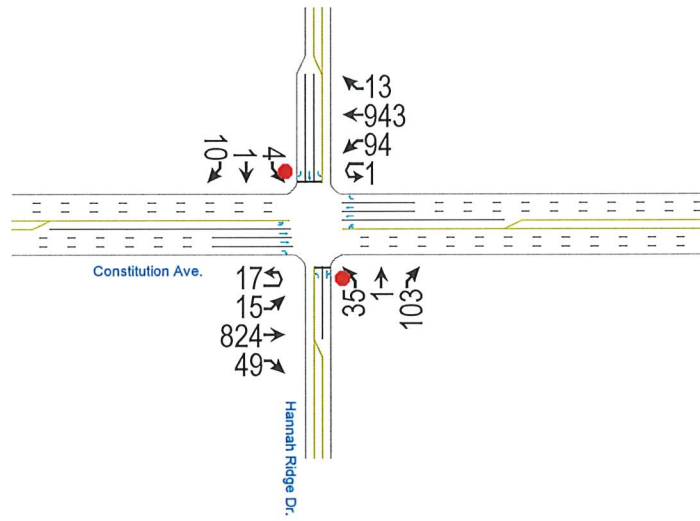


Intersection														
Int Delay, s/veh	4.5													
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↕↕	↗		↔	↕↕	↗	↗	↗		↗	↕	↗
Traffic Vol, veh/h	27	5	597	10	1	25	648	6	68	0	79	8	1	17
Future Vol, veh/h	27	5	597	10	1	25	648	6	68	0	79	8	1	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	-	None	-	-	None	-	-	None
Storage Length	-	325	-	0	-	225	-	0	100	-	-	150	-	150
Veh in Median Storage, #	-	-	0	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	5	714	11	1	27	775	7	74	0	86	9	1	18

Major/Minor	Major1		Major2		Minor1		Minor2							
Conflicting Flow All	775	782	0	0	714	725	0	0	1226	1620	357	1256	1624	388
Stage 1	-	-	-	-	-	-	-	-	782	782	-	831	831	-
Stage 2	-	-	-	-	-	-	-	-	444	838	-	425	793	-
Critical Hdwy	6.44	4.14	-	-	6.44	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.52	2.22	-	-	2.52	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	463	832	-	-	506	874	-	-	135	102	639	128	102	611
Stage 1	-	-	-	-	-	-	-	-	353	403	-	330	383	-
Stage 2	-	-	-	-	-	-	-	-	563	380	-	578	398	-
Platoon blocked, %			-	-			-	-						
Mov Cap-1 Maneuver	485	485	-	-	842	842	-	-	119	91	639	102	91	611
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	119	91	-	102	91	-
Stage 1	-	-	-	-	-	-	-	-	328	374	-	306	370	-
Stage 2	-	-	-	-	-	-	-	-	526	367	-	464	369	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.3	41.1	22.4
HCM LOS			E	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	119	639	485	-	-	842	-	-	102	91	611
HCM Lane V/C Ratio	0.621	0.134	0.072	-	-	0.034	-	-	0.085	0.012	0.03
HCM Control Delay (s)	75.4	11.5	13	-	-	9.4	-	-	43.6	45	11.1
HCM Lane LOS	F	B	B	-	-	A	-	-	E	E	B
HCM 95th %tile Q(veh)	3.2	0.5	0.2	-	-	0.1	-	-	0.3	0	0.1

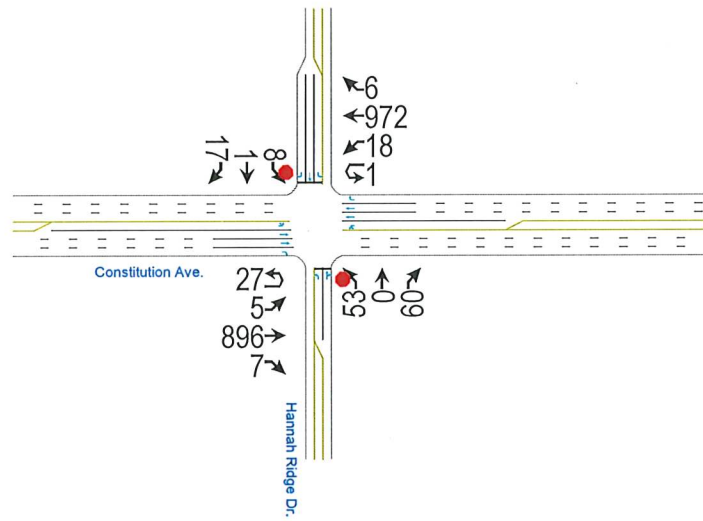


Intersection														
Int Delay, s/veh	5.1													
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↕↕	↗		↔	↕↕	↗	↖	↗		↖	↕	↗
Traffic Vol, veh/h	17	15	749	49	1	94	857	13	35	1	103	4	1	10
Future Vol, veh/h	17	15	749	49	1	94	857	13	35	1	103	4	1	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	-	None	-	-	None	-	-	None
Storage Length	-	325	-	0	-	225	-	0	100	-	-	150	-	150
Veh in Median Storage, #	-	-	0	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	16	896	53	1	102	1025	14	38	1	112	4	1	11

Major/Minor	Major1		Major2		Minor1		Minor2							
Conflicting Flow All	1025	1039	0	0	896	949	0	0	1683	2209	448	1748	2248	513
Stage 1	-	-	-	-	-	-	-	-	964	964	-	1231	1231	-
Stage 2	-	-	-	-	-	-	-	-	719	1245	-	517	1017	-
Critical Hdwy	6.44	4.14	-	-	6.44	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.52	2.22	-	-	2.52	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	320	665	-	-	387	719	-	-	61	44	558	55	41	506
Stage 1	-	-	-	-	-	-	-	-	274	332	-	188	248	-
Stage 2	-	-	-	-	-	-	-	-	386	244	-	509	313	-
Platoon blocked, %			-	-			-	-						
Mov Cap-1 Maneuver	417	417	-	-	709	709	-	-	48	34	558	36	32	506
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	48	34	-	36	32	-
Stage 1	-	-	-	-	-	-	-	-	251	304	-	172	212	-
Stage 2	-	-	-	-	-	-	-	-	321	209	-	371	287	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	1	62.1	47.8
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	48	486	417	-	-	709	-	-	36	32	506
HCM Lane V/C Ratio	0.793	0.233	0.083	-	-	0.146	-	-	0.121	0.034	0.021
HCM Control Delay (s)	203.4	14.6	14.4	-	-	10.9	-	-	118.3	121.4	12.3
HCM Lane LOS	F	B	B	-	-	B	-	-	F	F	B
HCM 95th %tile Q(veh)	3.2	0.9	0.3	-	-	0.5	-	-	0.4	0.1	0.1

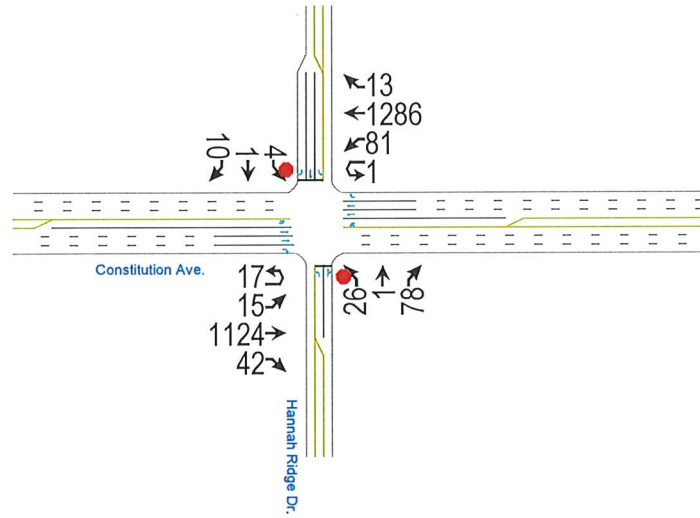


Intersection														
Int Delay, s/veh	7.2													
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↕	↕		↔	↕	↕	↔	↔		↔	↕	↕
Traffic Vol, veh/h	27	5	597	7	1	18	648	6	53	0	60	8	1	17
Future Vol, veh/h	27	5	597	7	1	18	648	6	53	0	60	8	1	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	-	None	-	-	None	-	-	None
Storage Length	-	325	-	0	-	225	-	0	100	-	-	150	-	150
Veh in Median Storage, #	-	-	0	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	5	973	8	1	20	1057	7	58	0	65	9	1	18

Major/Minor	Major1		Major2		Minor1		Minor2							
Conflicting Flow All	1057	1064	0	0	973	981	0	0	1612	2147	487	1654	2148	529
Stage 1	-	-	-	-	-	-	-	-	1041	1041	-	1099	1099	-
Stage 2	-	-	-	-	-	-	-	-	571	1106	-	555	1049	-
Critical Hdwy	6.44	4.14	-	-	6.44	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.52	2.22	-	-	2.52	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	305	651	-	-	346	699	-	-	69	48	526	65	48	494
Stage 1	-	-	-	-	-	-	-	-	246	305	-	227	287	-
Stage 2	-	-	-	-	-	-	-	-	473	284	-	484	303	-
Platoon blocked, %			-	-			-	-						
Mov Cap-1 Maneuver	323	323	-	-	655	655	-	-	58	41	526	51	41	494
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	58	41	-	51	41	-
Stage 1	-	-	-	-	-	-	-	-	219	272	-	202	278	-
Stage 2	-	-	-	-	-	-	-	-	439	275	-	378	270	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.2	115.7	39.5
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	58	526	323	-	-	655	-	-	51	41	494
HCM Lane V/C Ratio	0.993	0.124	0.108	-	-	0.032	-	-	0.171	0.027	0.037
HCM Control Delay (s)	232.1	12.8	17.5	-	-	10.7	-	-	89.6	95.2	12.6
HCM Lane LOS	F	B	C	-	-	B	-	-	F	F	B
HCM 95th %tile Q(veh)	4.6	0.4	0.4	-	-	0.1	-	-	0.6	0.1	0.1





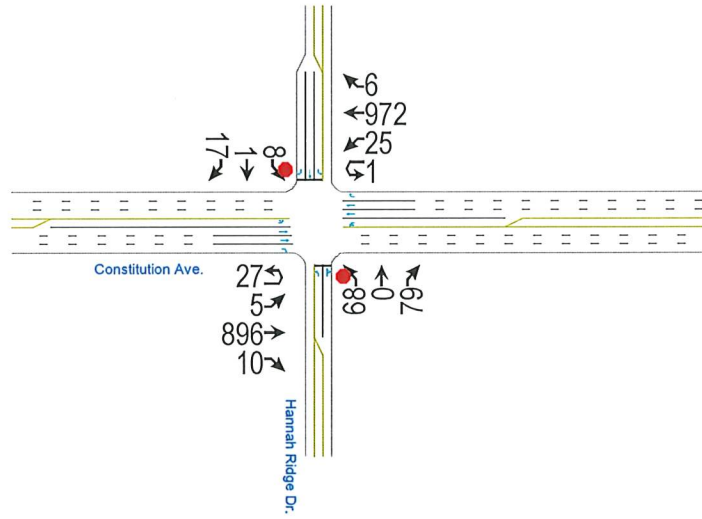
Intersection														
Int Delay, s/veh	9.1													
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↕↕	↔		↔	↕↕	↔	↔	↔		↔	↕	↔
Traffic Vol, veh/h	17	15	749	42	1	81	857	13	26	1	78	4	1	10
Future Vol, veh/h	17	15	749	42	1	81	857	13	26	1	78	4	1	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	-	None	-	-	None	-	-	None
Storage Length	-	325	-	0	-	225	-	0	100	-	-	150	-	150
Veh in Median Storage, #	-	-	0	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	16	1221	46	1	88	1397	14	28	1	85	4	1	11

Major/Minor	Major1		Major2		Minor1		Minor2							
Conflicting Flow All	1397	1411	0	0	1221	1267	0	0	2166	2878	611	2254	2910	699
Stage 1	-	-	-	-	-	-	-	-	1289	1289	-	1575	1575	-
Stage 2	-	-	-	-	-	-	-	-	877	1589	-	679	1335	-
Critical Hdwy	6.44	4.14	-	-	6.44	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.52	2.22	-	-	2.52	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	184	479	-	-	239	544	-	-	~26	16	437	23	15	382
Stage 1	-	-	-	-	-	-	-	-	173	232	-	115	169	-
Stage 2	-	-	-	-	-	-	-	-	310	166	-	408	221	-
Platoon blocked, %			-	-			-	-						
Mov Cap-1 Maneuver	253	253	-	-	532	532	-	-	~18	11	437	13	11	382
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	~18	11	-	13	11	-
Stage 1	-	-	-	-	-	-	-	-	149	200	-	99	141	-
Stage 2	-	-	-	-	-	-	-	-	249	138	-	282	191	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.8	197.6	136.9
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	18	293	253	-	-	532	-	-	13	11	382
HCM Lane V/C Ratio	1.57	0.293	0.137	-	-	0.168	-	-	0.334	0.099	0.028
HCM Control Delay (s)	\$ 730.4	22.3	21.5	-	-	13.1	-	-	\$ 385.4	\$ 365.4	14.7
HCM Lane LOS	F	C	C	-	-	B	-	-	F	F	B
HCM 95th %tile Q(veh)	4	1.2	0.5	-	-	0.6	-	-	0.8	0.3	0.1

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



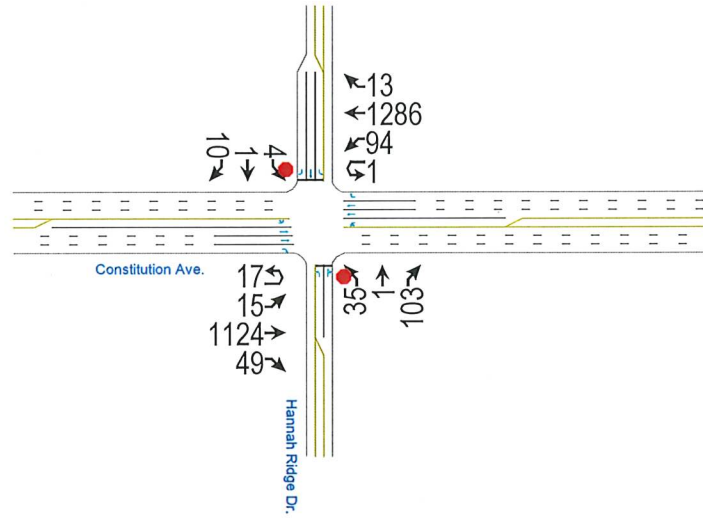
Intersection														
Int Delay, s/veh	12.3													
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↕	↕		↔	↕	↕	↔	↔		↔	↕	↕
Traffic Vol, veh/h	27	5	597	10	1	25	648	6	68	0	79	8	1	17
Future Vol, veh/h	27	5	597	10	1	25	648	6	68	0	79	8	1	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	-	None	-	-	None	-	-	None
Storage Length	-	325	-	0	-	225	-	0	100	-	-	150	-	150
Veh in Median Storage, #	-	-	0	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	5	973	11	1	27	1057	7	74	0	86	9	1	18

Major/Minor	Major1		Major2		Minor1		Minor2							
Conflicting Flow All	1057	1064	0	0	973	984	0	0	1626	2161	487	1668	2165	529
Stage 1	-	-	-	-	-	-	-	-	1041	1041	-	1113	1113	-
Stage 2	-	-	-	-	-	-	-	-	585	1120	-	555	1052	-
Critical Hdwy	6.44	4.14	-	-	6.44	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.52	2.22	-	-	2.52	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	305	651	-	-	346	698	-	-	~ 68	47	526	63	47	494
Stage 1	-	-	-	-	-	-	-	-	246	305	-	222	282	-
Stage 2	-	-	-	-	-	-	-	-	464	280	-	484	302	-
Platoon blocked, %			-	-			-	-						
Mov Cap-1 Maneuver	323	323	-	-	663	663	-	-	~ 57	40	526	47	40	494
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	~ 57	40	-	47	40	-
Stage 1	-	-	-	-	-	-	-	-	219	272	-	198	270	-
Stage 2	-	-	-	-	-	-	-	-	426	268	-	361	269	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.3	163.5	42.2
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	57	526	323	-	-	663	-	-	47	40	494
HCM Lane V/C Ratio	1.297	0.163	0.108	-	-	0.043	-	-	0.185	0.027	0.037
HCM Control Delay (s)	\$ 338.2	13.2	17.5	-	-	10.7	-	-	98.2	97.5	12.6
HCM Lane LOS	F	B	C	-	-	B	-	-	F	F	B
HCM 95th %tile Q(veh)	6.4	0.6	0.4	-	-	0.1	-	-	0.6	0.1	0.1

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



Feathergrass  
3: Hannah Ridge Dr. & Constitution Ave.

2040 PM Total  
10/25/2019

Intersection														
Int Delay, s/veh	15.6													
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↕	↕		↔	↕	↕	↔	↔		↔	↕	↕
Traffic Vol, veh/h	17	15	749	49	1	94	857	13	35	1	103	4	1	10
Future Vol, veh/h	17	15	749	49	1	94	857	13	35	1	103	4	1	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	-	None	-	-	None	-	-	None
Storage Length	-	325	-	0	-	225	-	0	100	-	-	150	-	150
Veh in Median Storage, #	-	-	0	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	16	1221	53	1	102	1397	14	38	1	112	4	1	11

Major/Minor	Major1		Major2		Minor1		Minor2							
Conflicting Flow All	1397	1411	0	0	1221	1274	0	0	2194	2906	611	2282	2945	699
Stage 1	-	-	-	-	-	-	-	-	1289	1289	-	1603	1603	-
Stage 2	-	-	-	-	-	-	-	-	905	1617	-	679	1342	-
Critical Hdwy	6.44	4.14	-	-	6.44	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.52	2.22	-	-	2.52	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	184	479	-	-	239	541	-	-	~25	15	437	21	15	382
Stage 1	-	-	-	-	-	-	-	-	173	232	-	110	163	-
Stage 2	-	-	-	-	-	-	-	-	298	161	-	408	219	-
Platoon blocked, %			-	-			-	-						
Mov Cap-1 Maneuver	253	253	-	-	530	530	-	-	~17	10	437	11	10	382
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	~17	10	-	11	10	-
Stage 1	-	-	-	-	-	-	-	-	149	200	-	95	131	-
Stage 2	-	-	-	-	-	-	-	-	231	130	-	260	189	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.9	277.8	163
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	17	310	253	-	-	530	-	-	11	10	382
HCM Lane V/C Ratio	2.238	0.365	0.137	-	-	0.195	-	-	0.395	0.109	0.028
HCM Control Delay (s)	\$ 1034.6	23.1	21.5	-	-	13.4	-	-	\$ 473.2	\$ 404.9	14.7
HCM Lane LOS	F	C	C	-	-	B	-	-	F	F	B
HCM 95th %tile Q(veh)	5.3	1.6	0.5	-	-	0.7	-	-	0.9	0.3	0.1

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



Location: 1 HANNAH RIDGE RD & CONSTITUTION AVE AM

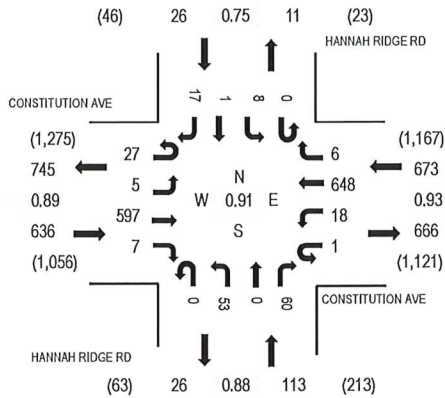
Date: Tuesday, October 15, 2019

Peak Hour: 07:00 AM - 08:00 AM

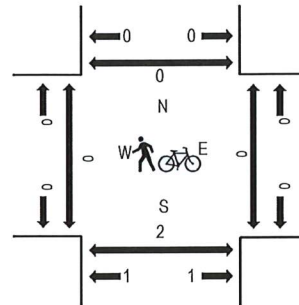
Peak 15-Minutes: 07:15 AM - 07:30 AM

(303) 216-2439  
www.alltrafficdata.net

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	CONSTITUTION AVE Eastbound				CONSTITUTION AVE Westbound				HANNAH RIDGE RD Northbound				HANNAH RIDGE RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	8	1	158	2	0	5	156	1	0	19	0	13	0	2	0	4	369	1,448	0	0	0	0
7:15 AM	3	2	172	1	1	4	174	1	0	18	0	13	0	2	0	5	396	1,370	0	0	1	0
7:30 AM	8	1	141	1	0	5	162	2	0	11	0	14	0	2	0	2	349	1,246	0	0	0	0
7:45 AM	8	1	126	3	0	4	156	2	0	5	0	20	0	2	1	6	334	1,144	0	0	1	0
8:00 AM	4	3	120	2	0	7	121	1	0	12	0	14	0	4	0	3	291	1,034	0	0	0	0
8:15 AM	4	1	98	3	0	5	129	2	0	11	0	17	0	0	0	2	272		0	0	0	0
8:30 AM	1	0	89	2	0	9	110	1	0	15	0	13	0	3	0	4	247		0	0	0	0
8:45 AM	2	3	83	5	0	4	104	1	0	5	0	13	0	1	0	3	224		0	0	1	0
Count Total	38	12	987	19	1	43	1,112	11	0	96	0	117	0	16	1	29	2,482		0	0	3	0
Peak Hour	27	5	597	7	1	18	648	6	0	53	0	60	0	8	1	17	1,448		0	0	2	0



(303) 216-2439  
www.alltrafficdata.net

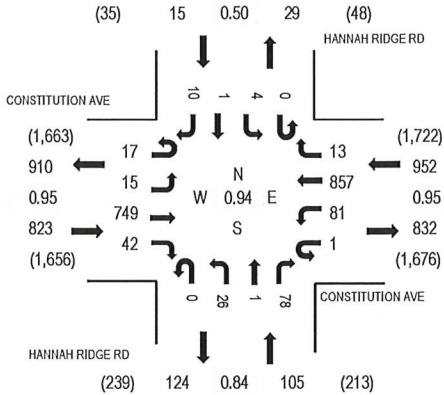
Location: 1 HANNAH RIDGE RD & CONSTITUTION AVE PM

Date: Tuesday, October 15, 2019

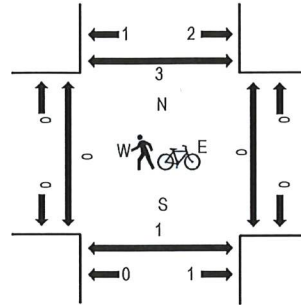
Peak Hour: 04:30 PM - 05:30 PM

Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	CONSTITUTION AVE Eastbound				CONSTITUTION AVE Westbound				HANNAH RIDGE RD Northbound				HANNAH RIDGE RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	4	3	185	10	0	17	168	1	0	9	0	15	0	0	0	4	416	1,764	0	0	0	0
4:15 PM	5	2	194	10	0	10	181	4	0	7	0	22	0	3	0	2	440	1,832	0	0	0	0
4:30 PM	4	5	166	13	0	24	219	7	0	4	0	19	0	2	0	2	465	1,895	0	0	0	1
4:45 PM	2	2	178	11	0	17	201	1	0	10	0	16	0	2	0	3	443	1,883	0	0	0	1
5:00 PM	4	4	199	9	0	23	218	2	0	5	0	19	0	0	0	1	484	1,862	0	0	0	0
5:15 PM	7	4	206	9	1	17	219	3	0	7	1	24	0	0	1	4	503		0	0	1	1
5:30 PM	2	2	189	11	0	23	189	4	0	5	0	17	0	4	1	6	453		0	0	0	0
5:45 PM	7	3	189	17	0	16	157	0	0	7	0	26	0	0	0	0	422		0	0	0	0
Count Total	35	25	1,506	90	1	147	1,552	22	0	54	1	158	0	11	2	22	3,626		0	0	1	3
Peak Hour	17	15	749	42	1	81	857	13	0	26	1	78	0	4	1	10	1,895		0	0	1	3



2880 International Circle, Suite 110  
 Colorado Springs, CO 80910  
 Phone 719-520-6300  
 Fax 719-520-6695  
 www.elpasoco.com

**EL PASO COUNTY PLANNING AND  
 COMMUNITY DEVELOPMENT  
 DEPARTMENT**

**TRAFFIC IMPACT STUDY**

Revised: November 2019

		Applicant	PCD
<b>1. Traffic Impact Study Report</b>			
*	Verify type, level of TIS/memorandum provided in accordance with ECM B.1 (for this checklist -->)	✓	
a	Signature Page (ECM B.8)	✓	
b	Table of contents, pages numbered	N/A	
c	Existing/background conditions narrative	✓	
1	~ Vicinity Map showing study area	✓	
2	~ Label all roads discussed in the report.	✓	
3	~ Graphically indicate all intersections evaluated.	✓	
4	~ Accurately depict the site location and boundaries	✓	
5	~ Study Area – Provide calculations showing that the study area includes all affected intersections, address ECM B.2.3 requirements	✓	
6	~ Background traffic	✓	
i	- Clearly explain how background traffic was derived.	✓	
ii	- List other traffic studies in the area of study within the past five years identified by County staff or that the applicant is aware of. State whether the current study is consistent with those studies and explain any discrepancies.	✓	
iii	- Excerpts from studies of those developments are included in the appendices.	N/A	
7	~ Sketch diagrams of all existing intersections evaluated in the study showing widths of all approach lanes and lengths of auxiliary lanes and tapers.	N/A	
8	~ Description, classification, and link ADT of major roads in the study area (collector classification and higher).	✓	
9	~ Specify MTCP functional and corridor preservation classifications	✓	
10	~ Description of intersections evaluated in the study including existing controls	✓	
11	~ Do existing road segments meet cross section standards for designated classifications?	✓	
12	~ Traffic Count Data	✓	
13	~ 24 Hour Counts for ADT for major road segments	✓	
14	~ Peak-hour counts for all intersections evaluated in the study	✓	
d	Proposed development and trip generation narrative	✓	
1	~ Site Plan	✓	
2	~ Land Use – Type and extent correspond with associated application documents	✓	
3	~ Discussion of applicable ITE land use type(s) (including ITE code(s)) and comparison between the proposed use(s) and the codified use	✓	
4	~ Total traffic generated by the proposed development using ITE trip generation; provide footnotes on the methods used (equation/chart/interpolation)	✓	
5	~ Adjustments to trip generation including pass-by trips and internal trip capture	N/A	
6	~ Trip distribution assumptions and map	✓	
7	~ Specify expected year of completion (build-out) and intermediate years if phasing is proposed	✓	





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8 ~ On-site road classification figure including ADT numbers	✓	
9 ~ On-site Traffic control recommendations (particularly stop controls at intersections)	✓	
10 ~ Evaluation of intersection spacing along all interior roads, and new intersections on adjacent or off-site roads, and confirmation that the spacing meet criteria	N/A	
11 ~ List ECM criteria for stacking, storage, and taper for every affected auxiliary lane and access and state whether this access can be met. If it cannot be met, state the required modifications so that it can be met.	N/A	
12 ~ State what the sight distance is for every affected access and whether it can be met. If it cannot be met, state the required modifications so that it can be met.	N/A	
<b>e</b> Evaluation and Mitigation of Impacts	✓	
1 ~ Short-term, intermediate and long-term analysis horizon years are clearly stated and years are labeled on the corresponding figures.	✓	
2 ~ Capacity analysis of major road segments. Results presented in a figure or table showing short-term and long-term ADTs against maximum allowable ADT	✓	
3 ~ Capacity analysis of all existing intersections evaluated in the study and all proposed access locations onto existing public roads	✓	
4 ~ For capacity analysis of signalized intersections, provide discussion of the following parameters:	N/A	
i - Cycle length	N/A	
ii - Provisions for left turns ~ permissive/protected; lead/lag	N/A	
iii - Free right turns	N/A	
5 ~ Identification of any sub-standard LOS situations and discussion of recommendations for mitigation.	✓	
6 ~ Evaluation of safety-based warrants for turn lanes at unsignalized intersections (speed change lanes).	✓	
7 ~ Weaving analysis if applicable	N/A	
8 ~ Summary table of necessary turn lane improvements including design speed, taper rates and taper lengths, storage lengths, deceleration or acceleration lengths, and the resulting full-width lane lengths.	N/A	
9 ~ Signal warrant analysis; estimated projected need if not currently warranted	✓	
10 ~ Graphical depiction of improvements required to meet level-of-service standards	N/A	
11 ~ Trigger points for the construction of all required future improvements including but not limited to turn lanes, signals, widenings, and openings or closings of accesses. ("Trigger points" are the conditions that, when met, will call for the construction of said improvements.)	N/A	
12 ~ Summary of accident history within the study area.	✓	
13 ~ Accident history data presented in tabular form by location and including annual vehicle use volume and accident rate calculations	N/A	
14 ~ Discussion of pedestrian/bicyclist needs and provisions.	✓	
15 ~ School and pedestrian routing plans	✓	
16 ~ School traffic analysis per North Carolina DOT MSTA <a href="https://connect.ncdot.gov/municipalities/School/pages/default.aspx">https://connect.ncdot.gov/municipalities/School/pages/default.aspx</a>	N/A	
17 ~ Master-planned trails	N/A	



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18	~ Project Traffic modeling and figures	✓	
19	~ Short Term Background Plus Project Traffic lanes, intersection control and LOS modeling and figures for all affected intersection movements	✓	
20	~ Long Term Background Plus Project Traffic lanes, intersection control and LOS modeling and figures for all affected intersection movements	✓	
21	~ Assess and summarize all project impacts (roadways, intersections, pedestrians, bicycles, etc.)	✓	
22	~ Describe proposed mitigation measures	✓	
23	~ Specifically address all deviations requested (separate form(s) required)	N/A	
24	~ Address any special studies that apply (access management plan, neighborhood impact evaluation, sight distance evaluation, traffic speed study, etc.)	N/A	
<b>f</b>	<b>Recommendations and Report Conclusions</b>	✓	
1	~ Narrative recommendations and conclusions	✓	
2	~ For final plats, state definitively what improvements the developer will be constructing with the project.	N/A	
3	~ State whether or not any improvements affected by the project are reimbursable under the current Major Transportation Corridors Plan (MTCP) and Road Fee program.	✓	
4	~ State whether the MTCP or other approved corridor study calls for the construction of improvements in the immediate area.	✓	
5	~ State what the current applicable Road Impact Fees are and what option the developer will be selecting for payment. If the site is in a special district, so state and summarize the applicable fees.	✓	
6	~ Provide a description of how transportation improvements will be financed (responsibility) and a Recommended Improvements Summary Table per ECM section B.6.1.D.	✓	
7	~ List of References.	N/A	
<b>g</b>	<b>Appendices</b>	✓	
1	~ Complete modeling for all existing and proposed development horizons	✓	
2	~ Modeled signal cycle timing matches narrative and is within DPW allowances and signal coordination requirements, if applicable	N/A	
3	~ Modeled lanes match improvements table and CDs	N/A	
<b>2. Applicant Comments:</b>			
If the applicant has failed to provide any of the required items they must provide justification in the comment section below indicating why the requirement is unnecessary.			
a			
b			



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		Applicant	PCD
c			