

Comments: 01/06/2020

By: Kyle Morris (BHI) and City review by Brianna Medema

1. This document must be signed by a registered PE.
2. Provide LOS and Queueing analysis at the site's main full access. Verify that NB queues at the proposed signalized intersection will not interfere with access operation.
3. Provide discussion section ensuring pedestrian crossings have been designed to minimize hazards to users.
4. See comments throughout report.



Traffic Impact Study

Bubble Time C
Aurora, Colorado

1. The revised traffic study will include a S&S by a licensed engineer.
2. A LOS and queue analysis has been provided at the main full access internal to the site. From the analysis, the northbound queues at the intersection of Alameda Parkway and Alameda Drive are not anticipated to interfere with the access operations nor will the southbound movements at the City Center Driveway / Internal Project Access intersection interfere with the intersection of Alameda Parkway and Alameda Drive.
3. Additional pedestrian information is included in Section 5.5.
4. Please see individual comments throughout this document.

Prepared for:

G and M Car Wash, LLC.

Kimley»»Horn

1.0 EXECUTIVE SUMMARY

Bubble Tim Car Wash project is proposed to be located within the existing City Center Marketplace retail center located on the southeast corner of the Alameda Parkway and Chambers Road intersection in Aurora, Colorado. Bubble Time Car Wash is proposed to be located in the northeast corner of the existing retail development. For the purposes of this analysis, the Bubble Time Car Wash project is anticipated to include an automated car wash with a building area of 4,496 square feet. It is expected that the project will be completed by 2022. Therefore, analysis was conducted for the 2022 short term horizon as well as the 2040 long-term horizon.

The purpose of this traffic study is to identify project traffic generation characteristics and potential project traffic related impacts on the local street system, as well as to develop mitigation measures required for identified impacts. The intersection of Alameda parkway and Alameda Drive was incorporated into this traffic study in accordance with City of Aurora requirements.

Regional access to the project is provided by Interstate 225. Primary access to the project is provided by Alameda Parkway, Chambers Road, and Buckley Road. Direct access is proposed to be maintained via an existing full-access driveway located approximately 620 feet (measured center to center) to the east of Chambers Road. The existing retail center also has two accesses located along the east side of Chambers Road including a right-in/right-out access and a three-quarter movement access, as well as two full movement accesses along the north side of Center Avenue. A portion of project traffic is expected to enter the right-in/right-out driveway along Chambers Road; however, this movement does provide any vehicle delays.

Does not?

Revised.

The Bubble Time Car Wash project is expected to generate a total of approximately 640 daily weekday trips. Of these, a total of 64 weekday morning peak hour and 64 weekday afternoon peak hour trips peak hour trips are expected.

Distribution of site traffic on the street system was based on the area street system characteristics, existing traffic patterns, anticipated surrounding development in the area, and

3.0 EXISTING AND FUTURE CONDITIONS

3.1 Existing Study Area

The existing site is comprised of a parking lot and vacant land. The project is located within the City Center Marketplace which contains a mix of uses on the southeast corner of Alameda Parkway and Chambers Road. The City of Aurora Municipal Center is located northwest of the project while a small retail center and apartment complex is located north of the site. Residential communities are located in each direction surrounding the project. The Town Center at Aurora shopping mall is located in the extended area to the west while Buckley Air Force Base is located in the extended area east of the project. The land uses and roadway network surrounding the site are shown in the aerial of **Figure 2**.

3.2 Existing and Future Roadway Network

Alameda Parkway extends east-west with three through lanes of travel in each direction. The posted speed limit is 40 miles per hour within the study area. Alameda Parkway provides raised center median and has left turn lanes at major intersections.

The intersection of Alameda Parkway and Alameda Drive operates under stop control on the north-south approaches of Alameda Drive. The eastbound and westbound approaches of this intersection consist of a left turn lane and three through lanes with the outside lane being a through/right turn lane. The northbound and southbound approaches provide a shared single lane for all movements. There is currently adequate pavement width to stripe northbound and southbound left turn lanes at this intersection. The intersection lane configuration and for the study area key intersections are shown in **Figure 3**.

Provide description section for Alameda Drive

A description for Alameda Drive has been included in the revised traffic study.

Existing Traffic Volumes

12-hour turning movement counts were conducted at the key study intersection on Monday, October 27, 2020. Counts were conducted in 15-minute intervals from 7:00 AM to 7:00 PM on this count date.

Due to the COVID-19 pandemic, these counts were adjusted based on a comparison of 2018 daily volumes provided by the City of Aurora that were collected prior to the COVID-19 pandemic along Alameda Parkway, west of Chambers Road. The traffic counts from 2018 were

grown by the City of Aurora standard two (2) percent annual growth rate to year 2020 and compared with the calculated average daily traffic volumes along Alameda Parkway, east of Chambers Road. It was determined that the existing 2020 traffic volumes needed to be increased by approximately 14 percent to identify the normal condition traffic volumes to account for COVID-19. Existing adjusted peak hour turning movement counts are shown in **Figure 4** with count sheets provided in **Appendix A**.

3.4 Unspecified Development Traffic Growth

To generate 2022 and 2040 background volumes, the City of Aurora standard annual growth rate of two (2) percent was applied to the study area intersections. It was noticed the Alameda View Apartments have been constructed but it was not determined the occupancy; therefore, project traffic assignment from the Alameda View Apartments were also included as background traffic to provide a conservative analysis. Applicable documents from the Alameda View Apartments Traffic Impact Study are included for reference in **Appendix C**. The background traffic volumes for 2022 and 2040 are shown in **Figure 5** and **Figure 6**, respectively.

The Alameda View Apartments TIS is over 2 years old. Please run new trip generation for this site.

Correspondence with the leasing office provided that the View Apartments is 82 percent occupied (95 out of 116). Therefore, 18% (or 21 units) of percent of the assignment from the original traffic study was included as background traffic in this study.

Table 4 – Turn Lane Length Analysis Signalized Results

Intersection Turn Lane	Existing Turn Lane Length (feet)	2022 Calculated Queue Length (feet)	2022 Recommended Turn Lane Length (feet)	2040 Calculated Queue Length (feet)	2040 Recommended Turn Lane Length (feet)
Alameda Pkwy & Alameda Dr					
Eastbound Left	125'	26'	125'	35'	125'
Westbound Left	100'	70'	100'	103'	100'
Northbound Left	DNE	83'	100'	102'	100'
Southbound Left	DNE	24'	100'	37'	100'

DL = Dual Left Turn Lanes; DNE = Does Not Exist; C = Continuous Turn Lane, CDOT = CDOT SHAC

As shown in the queuing table, all vehicle queues are expected to be contained within the existing turn lanes in 2022 and 2040. It is recommended that separate northbound and southbound left turn lanes be striped at the intersection of Alameda Parkway and Alameda Drive with a length of 100 feet. There is currently adequate pavement width to stripe northbound and southbound left turn lanes at this intersection without the need for roadway widening.

The City of Aurora is currently reviewing the proposed project and the Department of Transportation (CDOT) State Highway Access Code (SHAC) to determine if right turn lanes are warranted at the intersection. Right turn lanes are typically absorbed with the third through lane along Corridor 100. If right turn lanes are warranted, they should be provided at the project access along Corridor 100. Figure 11.

Existing WB left turn storage is not adequate for 2040

2040 recommended WB and NB Left turn lanes do not provide adequate storages for calculated queues.

If 2040 volumes are materialized, the westbound left turn lane may be extended to 125 feet.

With appropriate green time on the minor northbound approach, the northbound left turn queue will remain within the 100-foot recommended left turn storage. This has been modified in the revised traffic study.

5.5 Site Circulation and Drive Through

Vehicles entering the project site will circulate east to north prior to arriving to the car wash tunnel. Since the project site is located east to north prior to the washing portion of the automated car wash, a vehicle queue analysis was conducted to ensure vehicles would not spill out to adjacent retail center drive aisles or Alameda Parkway.

The Bubble Time Car Wash will contain three lanes for vehicles queuing with storage for 15 vehicles (five vehicles in each lane). There is approximately 90 feet of additional spill back length on-site through the parking area before exiting vehicles conflict with the entering

Date: Tue, Oct 27, 2020
 Count Period: 7:00 AM to 7:00 PM



Twelve-Hour Count Summaries

Interval Start	E ALAMEDA PKWY				E ALAMEDA PKWY				E ALAMEDA DR				E ALAMEDA DR				15-min Total	Rolling One Hour		
	Eastbound				Westbound				Northbound				Southbound							
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT				
7:00 AM	0	1	106	9	0	7	217	3	0	2	1	9	0	0	0	1	356	0		
7:15 AM	0	2	131	6	1	4	287	1	0	4	0	7	0	0	0	6	449	0		
7:30 AM	1	1	135	5	1	6	303	4	0	2	0	6	0	0	0	6	470	0		
7:45 AM	0	1	126	5	0	9	311	8	0	7	0	14	0	2	1	1	485	1,760		
8:00 AM	1	2	150	14	1	5	254	4	0	3	0	6	0	3	0	5	448	1,852		
8:15 AM	0	2	153	12	0	8	268	1	0	7	0	7	0	3	0	5	466	1,869		
8:30 AM	0	1	94	12	0	12	235	2	0	6	0	9	0	0	0	1	372	1,771		
8:45 AM	1	0	121	10	0	11	210	1	0	3	1	14	0	1	0	1	374	1,660		
9:00 AM	0	2	111	5	0	16	158	1	0	5	0	11	0	0	1	1	311	1,523		
9:15 AM	2	2	96	11	0	15	167	1	0	6	0	14	0	0	0	1	315	1,372		
9:30 AM	0	3	126	5	0	7	146	0	0	5	0	7	0	2	0	4	305	1,305		
9:45 AM	0	0	121	11	0	16	170	1	0	6	0	6	0	1	0	4	336	1,267		
10:00 AM	0	4	125	17	0	14	157	1	0	7	0	14	0	1	0	7	347	1,303		
10:15 AM	1	0	128	23	0	14	178	1	1	7	0	16	0	0	0	4	373	1,361		
10:30 AM	1	3	138	26	1	12	150	1	0	8	0	19	0	0	0	1	360	1,416		
10:45 AM	1	4	132	18	4	22	160	3	0	12	0	17	0	0	0	4	377	1,457		
11:00 AM	0	2	119	19	0	21	174	1	0	10	0	25	0	3	1	2	377	1,487		
11:15 AM	1	2	146	18	1	14	181	1	0	12	1	19	0	0	0	1	397	1,511		
11:30 AM	1	4	162	20	0	20	175	4	0	13	1	26	0	2	0	4	432	1,583		
11:45 AM	0	1	153	21	0	9	162	0	0	12	2	26	0	3	0	7	396	1,602		
12:00 PM	1	5	168	19	0	12	162	2	0	6	2	19	0	5	1	3	405	1,630		
12:15 PM	2	1	180	27	0	14	182	3	0	12	2	19	0	2	1	4	449	1,682		
12:30 PM	0	2	181	18	0	15	195	1	0	16	2	27	0	1	1	5	464	1,714		
12:45 PM	1	3	176	27	0	20	205	4	0	11	1	21	0	4	0	4	477	1,795		
1:00 PM	0	6	182	28	0	15	162	4	0	11	0	20	0	0	0	6	434	1,824		
1:15 PM	1	10	192	24	0	12	192	1	0	19	0	21	0	1	1	4	478	1,853		
1:30 PM	0	4	184	23	0	17	181	2	0	13	0	17	0	1	1	6	449	1,838		
1:45 PM	2	4	202	29	0	21	192	5	0	4	1	27	0	1	1	1	490	1,851		
2:00 PM	0	4	170	21	2	14	198	0	0	9	1	25	0	2	1	5	452	1,869		
2:15 PM	0	5	194	25	0	15	208	0	0	9	0	22	0	4	2	3	487	1,878		
2:30 PM	0	5	243	18	0	17	202	3	0	17	0	27	0	4	0	6	542	1,971		
2:45 PM	0	5	212	32	0	20	237	2	0	10	1	28	0	1	0	2	550	2,031		
3:00 PM	0	2	233	26	0	15	215	3	0	17	0	29	0	4	0	2	546	2,125		
3:15 PM	0	3	322	29	0	14	222	2	0	10	1	27	0	0	0	4	634	2,272		
3:30 PM	0	6	287	15	1	15	230	1	0	8	0	25	0	2	0	7	597	2,327		
3:45 PM	0	6	342	33	1	29	226	2	0	5	1	28	0	1	1	5	680	2,457		
4:00 PM	0	3	331	30	0	21	250	0	0	9	1	33	0	0	0	3	681	2,592		
4:15 PM	1	2	329	18	1	20	249	2	0	6	2	32	0	0	0	1	663	2,621		
4:30 PM	0	9	343	25	0	19	238	4	0	8	0	29	0	3	0	3	681	2,705		
4:45 PM	0	6	355	24	0	13	227	0	0	11	0	28	0	2	0	8	674	2,699		
5:00 PM	0	6	333	23	0	21	241	2	0	10	1	33	0	1	0	5	676	2,694		
5:15 PM	0	4	383	15	0	13	213	1	0	7	0	30	0	2	2	3	673	2,704		
5:30 PM	1	10	327	18	3	12	224	1	0	7	1	29	0	0	0	5	638	2,661		
5:45 PM	1	7	348	17	0	12	198	4	0	9	1	27	0	3	1	4	632	2,619		
6:00 PM	2	9	331	16	2	9	204	3	0	3	1	18	0	1	0	4	603	2,546		
6:15 PM	0	6	274	21	0	13	216	2	0	4	3	29	0	0	4	7	579	2,452		
6:30 PM	1	11	220	19	0	13	159	1	0	1	0	22	0	0	0	3	474	2,288		
6:45 PM	0	10	252	18	0	6	180	0	0	0	0	22	0	0	0	6	508	2,164		
Count Total	23	191	9,867	905	19	679	9,877	185	22	2,927	0	37	4,783	0	12	1,660	0	17	2,619	0
AM Total (7:00 - 9:00)	4	12	972	80	1	90	1,600	22	22	2,927	0	37	4,783	0	12	1,660	0	17	2,619	0
PM Total (4:00 - 6:00)	5	63	2,468	147	5	99	1,633	37	37	4,783	0	12	1,660	0	12	1,660	0	17	2,619	0
AM Peak (8:00 - 9:00)	2	5	518	48	1	36	967	12	12	2,927	0	37	4,783	0	12	1,660	0	17	2,619	0
PM Peak (5:00 - 6:00)	2	27	1,391	73	3	58	876	17	17	4,783	0	12	1,660	0	12	1,660	0	17	2,619	0

Provide PHF and HV% from counts, update synchro inputs accordingly.

The PHF and HV% have been included in the Counts Appendix. The PHF and HV% have already been included in the Synchro analysis. As shown in the counts, the overall heavy vehicle percentage was two percent or less; therefore, the HCM urban standard heavy vehicle percentage of two percentage was utilized to provide a conservative analysis.