FEHR PEERS

Memorandum

Date: May 25, 2022

To: Kurt Wagenknecht, K12 Architects, Inc.

From: Greg Behrens, Fehr & Peers

Subject: Traffic Study for 4810 Chiles Road

RS20-3918

This memorandum documents the transportation and site access analysis of the proposed project at 4810 Chiles Road, located on the south side of Chiles Road east of Mace Boulevard in Davis, California. The project would include a gas station with 10 vehicle fueling positions, a convenience store comprised of 4,069 square feet, retail/office space comprised of 4,791 square feet, and a car wash.

This memorandum is organized into the following sections:

- Existing Conditions
- Existing Plus Project Conditions
- Project Access & On-Site Circulation

Existing Conditions

Project Site Setting

Figure 1 shows the project site location. The site is currently occupied by a gas station with 14 vehicle fueling positions (12 gas and 2 truck fueling positions), a convenience store, and a Subway restaurant. The site is currently accessible from Mace Boulevard via a right-in/right-out driveway and from Chiles Road via three full access driveways.

Near the project site, Chiles Road is two lanes and Mace Boulevard is four lanes. Both roads have a posted speed limit of 35 miles per hour (MPH). The Mace Boulevard/Chiles Road intersection is signalized and includes channelized right-turn lanes in the northbound, southbound, and eastbound direction.

The Interstate 80 (I-80)/Mace Boulevard interchange is located a short distance north of the project site. The interchange includes on- and off-ramps for both eastbound and westbound travel on I-80.

Figure 1

Study Area

Bus stops are located on both sides of Chiles Road along the project frontage. The bus stops are served by Unitrans Routes A and T and Yolobus Routes 42A, 42B, 44, and 232. Yolobus utilizes the eastbound stop as a layover/recovery location for its intercity routes. There are sidewalks on both sides of Chiles Road and Mace Boulevard. Class II bike lanes are provided in both directions on Chiles Road and Mace Boulevard. The westbound Chiles Road bike lane ends approximately 340 feet east of the Mace Boulevard/Chiles Road intersection.

Methodology

This study analyzes traffic conditions at the study intersections using Level of Service (LOS) as the primary measure of operational performance. LOS is a qualitative measure of traffic flow from the perspective of motorists and is an indication of the comfort associated with driving. Typical factors that affect LOS include speed, travel time, and traffic interruptions. Empirical LOS criteria and methods of calculation have been documented in the *Highway Capacity Manual, 6th Edition* (Transportation Research Board, 2016). LOS is a letter classification system, from A (representing free-flow traffic conditions) to F (oversaturated conditions where traffic demand exceeds capacity, resulting in long queues and delays). These methodologies were implemented using Synchro 10 software.

This study analyzes peak hour operations at the following intersections:

1. Mace Boulevard/Alhambra Drive
2. Mace Boulevard/Second Street/County Road 32A (CR 32A)
3. Mace Boulevard/I-80 Westbound Ramps
4. Mace Boulevard/Chiles Road
5. Chiles Road/I-80 Eastbound Ramps
6. Mace Boulevard/Cowell Boulevard
7. Mace Boulevard/North El Macero Drive

Traffic operations at these intersections were analyzed using SimTraffic 11 simulation software, which accounts for interactions between intersections, queue spillback, vehicle platooning, etc. The program also produces more accurate estimates of vehicular queuing (when compared to more deterministic methods).

The 4810 Chiles Road project traffic study dated March 2021 utilizes an older version of the SimTraffic model that represents the Mace Boulevard corridor and adjoining roadways. This study utilizes a newer version of the SimTraffic model that was updated for the existing conditions traffic operations analyses prepared for the DiSC 2022 project and the Davis Express Car Wash project. This model built off of the SimTraffic 10 model prepared for the DISC EIR (2020) by updating the model to SimTraffic 11 and incorporating model refinements for the roadway network within the immediate vicinity of the project site. In addition to the study intersections, the SimTraffic model includes nearby driveways (e.g., the El Macero Shopping Center driveway on the west side of Mace Boulevard) and all ramps at the I-80/Mace Boulevard interchange.

Applicable LOS Policies

Per the *City of Davis General Plan Transportation Element*, LOS E is the minimum acceptable LOS for City-operated study intersections (study intersections 1, 2, 4, 6, and 7).

Per the *Caltrans District 3 Interstate 80 Transportation Concept Report* (TCR) (August 2017), the horizon year LOS for I-80 within the study area (including the ramp terminal intersections at study intersections 3 and 5) is LOS F. It is important to note that in light of SB 743 and as described in the *Caltrans VMT-Focused Transportation Impact Study Guide* (May 2020), Caltrans has transitioned away from requesting LOS or other vehicle operations analyses of land use projects. Instead, Caltrans review of land use projects and plans is focused on a VMT metric, consistent with changes to the CEQA Guidelines resulting from SB 743.

Data Collection

This study analyzes the project's impacts during the weekday PM peak hour. This hour was chosen over other hours (e.g., morning or weekend peaks) for several reasons. Data shows volumes and delay on Mace Boulevard are greater during this period than others. Trip generating land uses near the project site are generally busier during the evening versus morning peak hour. Finally, trips generated by the proposed project would be similar during both the morning and evening peak hours. Hence, analysis of the project for weekday PM peak hour conditions provides a worst-case assessment of potential off-site impacts and on-site project access needs.

Intersection turning movement counts were conducted during the AM and PM peak periods on Thursday, May 30, 2019 and Thursday, October 16, 2019. Intersection counts included volumes for vehicles, bicyclists, and pedestrians. During the traffic counts and field observations, local schools and UC Davis were in regular session and weather conditions were dry and clear. Additionally, Fehr & Peers conducted peak period field observations at project site driveways in February and June 2020.

Intersection Operations

Table 1 displays the existing peak hour delay and level of service at the study intersections.

All intersections currently operate at LOS C or better during the AM peak hour, with traffic generally progressing smoothly and most motorists experiencing little delay as they progress through signalized intersections.

Considerable delay and queueing occur during the weekday PM peak hour, with a few intersections operating at LOS F. Two of these intersections — Mace Boulevard/Cowell Boulevard and Mace Boulevard/North El Macero Drive — are owned and operated by the City of Davis and do not meet the City of Davis General Plan LOS policy (maintain LOS E or better). These conditions can be attributed to several factors, including the prevalence of diverted regional traffic from eastbound I-80 onto local study area roadways, as well as the existing ramp metering at the eastbound I-80 on-ramps from Mace Boulevard. These conditions are particularly prevalent on Wednesday, Thursday, and Friday afternoons and evenings.

During the PM peak period traffic counts, field observations indicated that congested conditions were present on both eastbound I-80 and local roadways surrounding the Mace Boulevard interchange. Stacked vehicles were observed on southbound Mace Boulevard from the eastbound I-80 on-ramp to beyond Alhambra Drive, on northbound Mace Boulevard from the eastbound I-80 on-ramp to beyond San Marino Drive, and on eastbound Chiles Road from Mace Boulevard to the Hanlees Davis Toyota car dealership/service center. This is reflected in the LOS E and LOS F conditions reported during the weekday PM peak hour.

Table 1: Peak Hour Intersection Operations – Existing Conditions

Intersection	Jurisdiction	Traffic Control[1]	AM Peak Hour		PM Peak Hour	
			Delay[2]	LOS[3]	Delay[2]	LOS[3]
1. Mace Boulevard/Alhambra Drive	City of Davis	Signal	17	B	20	B
2. Mace Boulevard/Second Street/CR 32A	City of Davis	Signal	34	C	36	D
3. Mace Boulevard/I-80 Westbound Ramps	Caltrans	Signal	20	C	65	E
4. Mace Boulevard/Chiles Road	City of Davis	Signal	33	C	80	E
5. Chiles Road/I-80 Eastbound Ramps	Caltrans	Signal	11	B	89	F
6. Mace Boulevard/Cowell Boulevard	City of Davis	Signal	11	B	**103**	**F**
7. Mace Boulevard/North El Macero Drive	City of Davis	AWSC	8	A	**113**	**F**

Notes:

1. "Signal" represents an intersection that operates with a traffic signal. "AWSC" represents an intersection with all-way stop control.
2. Delay is reported as seconds per vehicle. Values are rounded to the nearest whole number so the same delay may represent two different LOS conditions if the delay is within 0.5 seconds of the LOS threshold. Average control delay for signalized and all-way stop-controlled intersections is the weighted average for all movements.
3. "LOS" represents level of service, calculated based on methodologies contained in the *Highway Capacity Manual*, *6th Edition* (Transportation Research Board, 2016).

Source: Fehr & Peers, 2022.

Existing Plus Project Conditions

Figure 2 shows the project site plan (*Chiles Plaza Site Plan*, K12 Architects, February 2, 2021). The proposed project would consist of a gas station with 10 vehicle fueling positions, a convenience store comprised of 4,069 square feet, retail/office space comprised of 4,791 square feet, and a car wash. Except for Subway, the project applicant has not identified specific site tenants at this time. The project would reconfigure vehicular access via Chiles Road by reducing the number of Chiles Road project site driveways from three to two. The existing Mace Boulevard driveway would remain as-is.

The site is currently occupied by a gas station with 14 vehicle fueling positions (12 gas and 2 truck fueling positions), a 3,600 square-foot convenience store, and a 1,650 square-foot Subway restaurant. These uses would be demolished as part of the project. Thus, relative to the existing site uses, the project would entail the following changes:

- Reduction of the number of gas station fueling positions by 2 gas fueling positions and 2 truck fueling positions
- Addition of 459 square feet to the convenience store
- Addition of 3,141 square feet of retail/office space
- Addition of a car wash

The project travel characteristics estimates described below reflect these "net" changes to the on-site uses that would result from the project.

Travel Characteristics

Trip Generation

Table 2 shows the estimated project vehicle trip generation, developed based on the following data sources:

- **Gas Station and Convenience Store** – For the gas station and associated convenience store, the trip generation is based on the data and information provided in the *Trip Generation Manual, 10th Edition* (Institute of Transportation Engineers (ITE), 2017). The "853 – Convenience Market with Gasoline Pumps" land use category was used to estimate the PM peak hour trips for the site. This land use category provides trip rates for convenience stores with gas pumps based on the size of the convenience store. Accordingly, because the project would increase the size of the convenience store, the project would increase the number of project site vehicle trips associated with the gas station and convenience store relative to existing conditions.
- **Retail/Office Space** – For the remaining retail/office space, the trip generation is based on the allocation of space identified in the retail floor plan (*Chiles Plaza Retail Floor Plan*, K12 Architects, February 2, 2021) and associated trip rates identified in the *Trip Generation Manual, 10th Edition*. The 4,791 square foot retail/office space would be comprised of the following uses:
    - Subway – 1,100 square feet
    - Office/retail space – 1,667 square feet

- Office space – 2,024 square feet

- The "933 – Fast-Food Restaurant without Drive-Through Window" ITE land use category was used to estimate the PM peak hour trips for the 1,100 square-foot Subway restaurant. The "930 – Fast Casual Restaurant" ITE land use category was used to estimate the PM peak hour trips for the 1,667 square-foot office/retail space. The "710 – General Office Building" ITE land use category was used to estimate the PM peak hour trips for the 2,024 square-foot office space.

Table 2 includes reductions for internal, pass-by, and diverted trips. Pass-by and diverted trips are trips already on the network that are diverted to and from a commercial or retail land use, and therefore would not be considered as new trips generated by the project. Pass-by and diverted trips were estimated from data presented in the *Trip Generation Handbook, 3rd Edition* (Institute of Transportation Engineers, 2017).

Note that the proposed removal of the existing truck fueling positions would eliminate heavy truck refueling activity at the project site and associated heavy truck trips on the surrounding roadway network.

Table 2: Project Trip Generation

Land Use	Quantity	Units	PM Peak Hour		
			In	Out	Total
Project Site – Existing Conditions					
Convenience Market with Gasoline Pumps [1]	3,600	Square feet	88	88	176
Fast-Food Restaurant without Drive-Through [2]	1,650	Square feet	24	24	48
		Total Gross Trips	**112**	**112**	**224**
		Internal Trip Reduction [3]	*-3*	*-3*	*-6*
		Total Gross External Trips	**109**	**109**	**218**
		Pass-By Trip Reduction for Convenience Market with Gasoline Pumps (66%) [4]	*-57*	*-57*	*-114*
		Pass-By Trip Reduction for Fast-Food Restaurant without Drive-Through (50%) [4]	*-11*	*-11*	*-22*
		Diverted Trip Reduction for Convenience Market with Gasoline Pumps (17%) [5]	*-15*	*-15*	*-30*
		Net External Trips	**26**	**26**	**52**
Project Site – Existing Plus Project Conditions					
Convenience Market with Gasoline Pumps [1]	4,069	Square feet	101	101	202
Fast-Food Restaurant without Drive-Through [2]	1,100	Square feet	16	16	32
Fast Casual Restaurant [6]	1,667	Square feet	34	39	73
General Office Building [7]	2,024	Square feet	0	3	3
		Total Gross Trips	**151**	**159**	**310**
		Internal Trip Reduction [3]	*-11*	*-11*	*-22*
		Total Gross External Trips	**140**	**148**	**288**

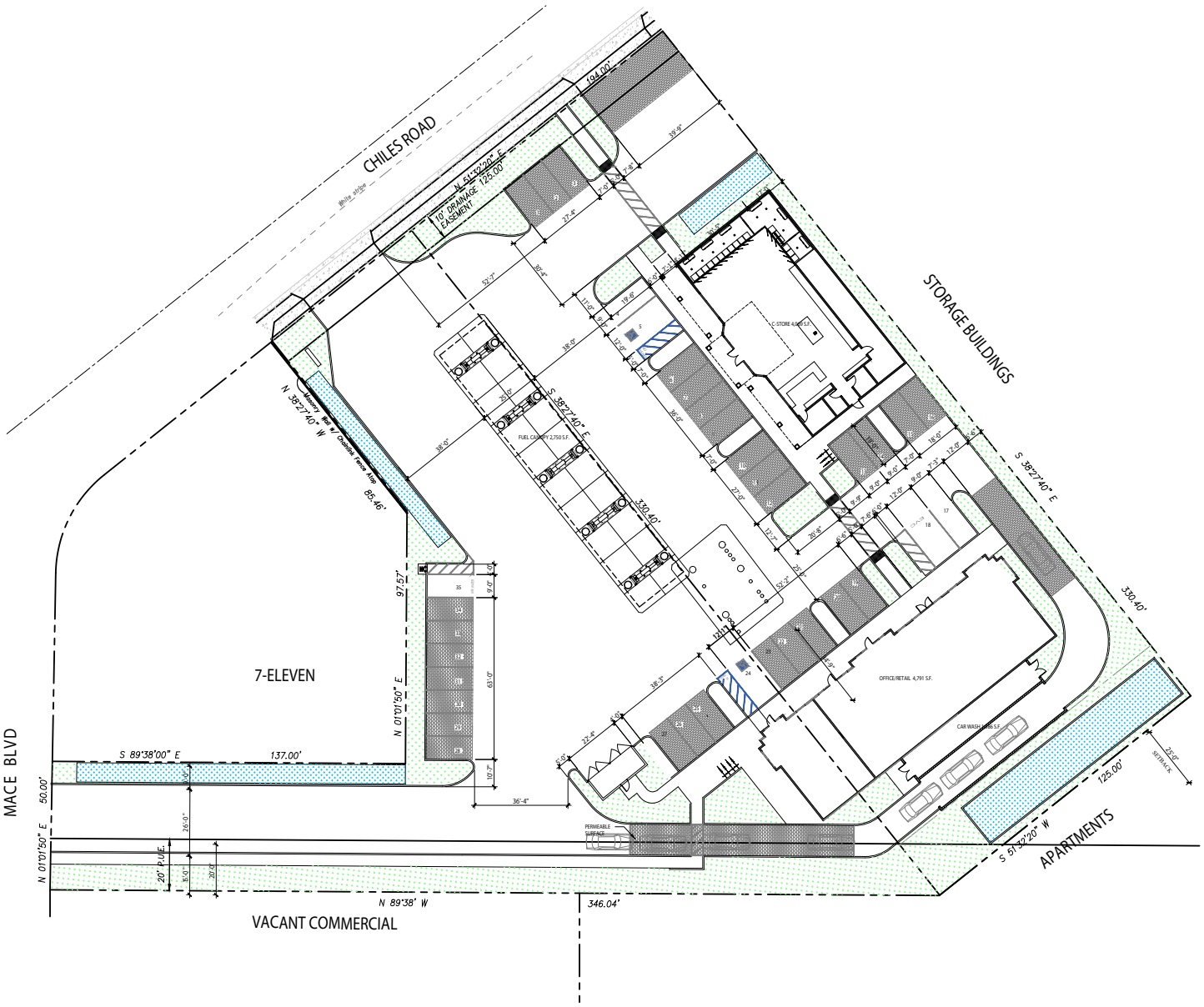
Table 2: Project Trip Generation

Land Use	Quantity	Units	PM Peak Hour		
			In	Out	Total
Pass-By Trip Reduction for Convenience Market with Gasoline Pumps (66%) [4]			*-62*	*-62*	*-124*
Pass-By Trip Reduction for Fast-Food Restaurant without Drive-Through (50%) [4]			*-6*	*-6*	*-12*
Pass-By Trip Reduction for Fast-Food Restaurant without Drive-Through (50%) [4]			*-16*	*-18*	*-34*
Diverted Trip Reduction for Convenience Market with Gasoline Pumps (17%) [5]			*-16*	*-16*	*-32*
Net External Trips			**40**	**46**	**86**
Project Site – Net External Trips					
Existing Conditions			26	26	52
Existing Plus Project Conditions			40	46	86
Net New External Trips			**14**	**20**	**34**

Notes:

1. Trip generation estimate calculated using average rate obtained from *Trip Generation Manual, 10th Edition* (Institute of Transportation Engineers, 2017) for Convenience Market with Gasoline Pumps land use (Land Use Code 853).
2. Trip generation estimate calculated using average rate obtained from *Trip Generation Manual, 10th Edition* (Institute of Transportation Engineers, 2017) for Fast-Food Restaurant without Drive-Through land use (Land Use Code 933).
3. Trip internalization estimated using MXD+ mixed-use project trip generation tool.
4. Pass-by trips estimated from *Trip Generation Handbook, 3rd Edition* (Institute of Transportation Engineers, 2017).
5. Diverted trips estimated for similar land uses from *Trip Generation Handbook, 3rd Edition* (Institute of Transportation Engineers, 2017).
6. Trip generation estimate calculated using average rate obtained from *Trip Generation Manual, 10th Edition* (Institute of Transportation Engineers, 2017) for Fast Casual Restaurant land use (Land Use Code 930).
7. Trip generation estimate calculated using average rate obtained from *Trip Generation Manual, 10th Edition* (Institute of Transportation Engineers, 2017) for General Office Building land use (Land Use Code 710).

Source: Fehr & Peers, 2021.



PROJECT DATA

ASSESSOR'S PARCEL NUMBER(S): 068-010-011

ZONING: AUTO CENTER

SITE ADDRESS: 4810 CHILES RD

PROJECT SITE AREA (GROSS):

PARCEL 1	+/-41,300 S.F.	+/-.948 ACRES
PARCEL 1	+/-36,618 S.F.	+/-.84 ACRES
TOTAL	+/-77,918 S.F.	+/-1.788 ACRES

BUILDING DATA:

STRUCTURE	CBC OCCUP.	TYPE OF CONST.	AREA
CONVENIENCE STORE	M	VB	4,069 S.F.
RETAIL	M	VB	4,791 S.F.
CAR WASH	B	IIB	1,586 S.F.
FUELING CANOPY	M	IIB	2,750 S.F.

FLOOR TO AREA RATIO:

TOTAL AREA OF SITE: 77.918 S.F.
TOTAL AREA OF BLDG: (56.4%) 11,048 S.F.

LANDSCAPING DATA:

TOTAL AREA OF LANDSCAPING: XXX S.F.
PERCENTAGE OF SITE LANDSCAPED: XX %

PARKING DATA:

BUILDING AREA	PARKING RATIO	REQ'D.
RETAIL / OFFICE	(1:300/1:400) 4,791 / 300	= 16
CONVENIENCE STORE	(1:400) 4,069 / 400	= 10
CAR WASH	(1:400) 1,586/ 500	= 3
RESTAURANT SUBWAY	1,100 / 15 SEATS	= 5
	TOTAL REQ'D PARKING	= 34

PARKING PROVIDED

REGULAR SPACES		= 30
VAN ACCESSIBLE SPACES		= 2
ELECTRIC VEHICLE CHARGING		= 2
AIR/WATER	= 1	
TOTAL =		34

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Figure 2

Project Site Plan

Trip Distribution and Trip Assignment

New project trips were assigned to the roadway network based on existing traffic patterns and the general distribution of jobs, schools, and housing in the area, as well as permitted driveway movements. The net new external trips are assigned to the roadway network as follows:

Direction	Percentage
Chiles Road to/from the east	25%
Chiles Road to/from the west	29%
Mace Boulevard to/from the north (including to/from I-80)	40%
Mace Boulevard to/from the south	6%

Diverted project trips were assigned based on the mainline freeway volume on I-80. Pass-by trips were assigned based on the volume of traffic on Mace Boulevard and Chiles Road and ease of performing pass-by maneuvers.

Intersection Operations

Table 3 presents the average delay and LOS under Existing Plus Project conditions. Under Existing Plus Project conditions, the project would increase delay at several study intersections but would not worsen LOS (i.e., none of the study intersections would drop an LOS letter grade).

Table 3: PM Peak Hour Intersection Operations – Existing Plus Project Conditions

Intersection	Jurisdiction	Traffic Control[1]	Existing Conditions		Existing Plus Project Conditions	
			Delay[2]	LOS[3]	Delay[2]	LOS[3]
1. Mace Boulevard/Alhambra Drive	City of Davis	Signal	20	B	21	C
2. Mace Boulevard/Second Street/CR 32A	City of Davis	Signal	36	D	31	C
3. Mace Boulevard/I-80 Westbound Ramps	Caltrans	Signal	65	E	57	E
4. Mace Boulevard/Chiles Road	City of Davis	Signal	80	E	79	E
5. Chiles Road/I-80 Eastbound Ramps	Caltrans	Signal	89	F	68	E
6. Mace Boulevard/Cowell Boulevard	City of Davis	Signal	**103**	**F**	**106**	**F**
7. Mace Boulevard/North El Macero Drive	City of Davis	AWSC	**113**	**F**	**110**	**F**

Notes:

Grey text indicates intersections where PM peak hour operations would exceed applicable vehicle delay/LOS thresholds.

1. "Signal" represents an intersection that operates with a traffic signal. "AWSC" represents an intersection with all-way stop control.
2. Delay is reported as seconds per vehicle. Values are rounded to the nearest whole number so the same delay may represent two different LOS conditions if the delay is within 0.5 seconds of the LOS threshold. Average control delay for signalized and all-way stop-controlled intersections is the weighted average for all movements.
3. "LOS" represents level of service, calculated based on methodologies contained in the *Highway Capacity Manual*, *6th Edition* (Transportation Research Board, 2016).

Source: Fehr & Peers, 2022.

At the Mace Boulevard/Cowell Boulevard intersection, the project would increase average intersection delay by three seconds and exacerbate existing LOS F conditions. In instances where a signalized intersection currently operates at LOS F, the City considers a project to have an adverse effect on roadway operations if it would increase delay by five seconds or more. Therefore, this delay increase would not constitute an adverse effect to roadway operations for the purposes of this study.

The Mace Boulevard/North El Macero Drive unsignalized intersection would continue to operate at LOS F under Existing Plus Project conditions. The project would increase traffic volumes at the Mace Boulevard/ North El Macero Drive intersection by three trips, or less than one percent, during the PM peak hour. In such circumstances, the City considers a project to have an adverse effect on roadway operations if the intersection meets the peak hour signal warrant, or if the volume increase resulting from the project would cause the intersection to meet the peak hour signal warrant. The Mace Boulevard/North El Macero Drive intersection does not meet the peak hour signal warrant under either existing or Existing Plus Project conditions. Therefore, this volume increase would not constitute an adverse effect to roadway operations for the purposes of this study.

Note that the results presented in Table 3 indicate that the project would decrease delay at several intersections. This decrease is the result of variation that occurs when averaging the results of multiple microsimulation model runs. Variation in model runs is particularly common when congested conditions are present, as is the case in the roadway network evaluated in this study. From this, it can be concluded that the effect of project trips is less noticeable than variations in results between model runs.

Project Access and On-Site Circulation

This section outlines the access and on-site circulation components of the project. The project-specific recommendations are shown in Figure 3.

Driveway Analysis

It is important that driveways be designed with adequate width, capacity, and throat depth to accommodate exiting traffic, such that blockages to incoming traffic are minimized. Such blockages could cause inbound traffic to spill back onto public streets, which could increase conflicts with other vehicles and modes of travel. The driveway analysis also includes an assessment of inbound vehicle movements to evaluate the extent to which vehicles waiting to enter the project site could affect traffic operations on the adjacent roadway.

Table 4 presents the estimated maximum vehicle queues entering and exiting the two Chiles Road project site driveways under Existing Plus Project conditions. See Appendix A for technical calculations. The following conclusions can be drawn from the driveway analysis:

- Chiles Road West Driveway Egress – This driveway throat depth would provide approximately 10 feet of storage (less than one car length) measured from the back of the sidewalk on the south side of Chiles Road. The project site plan does not indicate that separate outbound left- and right-turn lanes would be provided. Therefore, outbound left- and right-turn vehicles are assumed to form a

single-file queue. This movement would experience a maximum vehicle queue of 25 feet (equivalent to one vehicle), which would exceed the available driveway storage. However, given the configuration of this driveway relative to internal drive aisles and parking stalls, this condition would not block vehicles from entering the project site or otherwise adversely affect internal circulation patterns.

- Chiles Road East Driveway Egress – This driveway throat depth would provide approximately 35 feet of storage. The project site plan does not indicate that separate outbound left- and right-turn lanes would be provided. Therefore, outbound left- and right-turn vehicles are assumed to form a single-file queue. This movement would experience a maximum vehicle queue of 100 feet (equivalent to four vehicles), which would exceed the available driveway storage. This queue could potentially block ingress/egress maneuvers for three parking stalls (labeled as stalls #1, #2, and #3 on the project site plan), but would not otherwise adversely affect internal circulation patterns.
- Westbound Left-Turn Ingress from Chiles Road – Based on the project site plan and the current configuration of Chiles Road, westbound left-turn access from Chiles Road into the project site would occur from the westbound through lane. The American Association of State Highway and Transportation Officials (AASHTO) *Policy on Geometric Design of Highways and Streets* (the *Green Book*) recommends that left-turning traffic should be removed from the through lane whenever practical. The provision of left-turn lanes is reported to reduce crash rates by 20 to 65 percent and improve service levels for intersections and associated turning movements. Table 9-24 of the AASHTO *Green Book* provides left-turn lanes warrants at unsignalized intersections on arterials in urban areas based on left-turn volumes and opposing traffic volumes.

  Based on the project trip generation and trip assignment estimates, the westbound left-turn volumes from Chiles Road into the project site would total an estimated 40 vehicles during the PM peak hour. Opposing eastbound traffic volumes measure at approximately 600 vehicles during the PM peak hour. Table 9-24 of the AASHTO *Green Book* recommends that left-turn lanes be provided at four-legged intersections[1] with a peak hour left-turn volume of 40 vehicles when the opposing traffic volume is 50 vehicles or more. Therefore, the westbound left-turn movements into the Chiles Road driveway would meet the AASHTO *Green Book* criteria for a westbound left-turn lane.
- Northbound Channelized Right-Turn Lane at Mace Boulevard/Chiles Road – Immediately west of the project site, the Mace Boulevard/Chiles Road intersection includes a northbound channelized right-turn lane with a large turning radius at an obtuse angle. This configuration enables vehicles to complete northbound right-turns without the need to substantially reduce travel speeds. As such, vehicles exiting the northbound channelized right-turn lane to proceed eastbound on Chiles Road typically approach the project site at higher rates of speed. Moreover, vehicles exiting the channelized right-turn lane enter Chiles Road in close proximity to the project site, approximately 75 feet from the western project site boundary. Finally, due to the existing roadway geometrics, vehicles utilizing the northbound channelized right-turn lane would not be easily visible for vehicles exiting the project site (i.e., vehicles in the channelized right-turn lane would be over the shoulder

[1] Four the purposes of this analysis, this location is considered a four-legged intersection due to the presence of the Taco Bell driveway on the opposing northerly side of Chiles Road.

and behind drivers of vehicles waiting to exit the project site onto Chiles Road). Altogether, these conditions would limit the reaction time available to drivers of vehicles exiting the project site prior to entering conflict areas with eastbound traffic on Chiles Road. These conflicts would be particularly prevalent for vehicles utilizing the proposed west project site driveway, which would be located approximately 75 feet from the northbound channelized right-turn lane merge area on Chiles Road.

Table 4: PM Peak Hour Maximum Vehicle Queue Lengths – Existing Plus Project Conditions

Driveway		Direction	Movement	Storage (ft.)	Maximum Vehicle Queue[1] (vehicles)
Chiles Road West Driveway	Outbound	NB	Left/Right	10 ft.	**25 ft. (1 vehicle)**
Chiles Road East Driveway	Outbound	NB	Left/Right	35 ft.	**100 ft. (4 vehicles)**

Notes:
Grey text indicates that the maximum queue exceeds the available storage capacity.
1. Maximum queue lengths estimated using methodology described in *Estimation of Maximum Queue Lengths at Unsignalized Intersections* (ITE Journal, November 2001).

Source: Fehr & Peers, 2021.

Fehr & Peers recommends the following (refer to Figure 3):

- Install a raised median on Chiles Road east of Mace Boulevard to reduce conflicts involving vehicles turning left in and out of the Chiles Road west project driveway. This modification would convert the driveway from full access to right-in/right-out only. The median should extend at least 100 feet east on Chiles Road. Install accompanying "No Left Turn" signage and pavement markings for outbound traffic at the Chiles Road west project driveway.
- Install a two-way left-turn lane on Chiles Road to accommodate left-turns in and out of the Chiles Road east project driveway. In order to serve the project site and other adjacent existing Chiles Road uses, the two-way left-turn lane should begin at the back of the striping for the westbound left-turn pocket at the Mace Boulevard/Chiles Road intersection (immediately east of the raised median recommended above) and extend at least to the eastern edge of the South Davis Storage site. Extension of the two-way left-turn lane to the Chiles Road/El Cemonte Avenue intersection would provide a uniform street cross-section and eliminate the need for a midblock transition. This recommendation would require restriping of Chiles Road between Mace Boulevard and El Cemonte Avenue, including the removal of on-street parking on one or both sides of Chiles Road (depending on the desired lane widths and expected users). The resulting Chiles Road cross-section would include the two-way left-turn lane in addition to a vehicle travel lane and a Class II bike lane in each direction. If on-street parking can be preserved on one side of Chiles Road with this cross-section, it is recommended that it be preserved on the north side. Additionally, coordination should occur with relevant transit operators to determine the extent to which this modification would affect transit operations, particularly for Yolobus layover activities.
- Install separate outbound left-turn and right-turn lanes and accompanying signage/pavement markings at the Chiles Road east project driveway to accommodate outbound vehicle queues. The project site plan indicates that this driveway would have a width of approximately 35 feet. Additional width may be required to accommodate a single inbound lane and two outbound lanes depending on the anticipated design vehicle that would utilize this driveway.
- Modify the northbound channelized right-turn lane at Mace Boulevard/Chiles Road to reduce vehicle travel speeds and reduce potential conflicts between vehicles exiting the project site and eastbound traffic on Chiles Road (originating from the northbound channelized right-turn lane). Potential modifications include a) removing and replacing the lane with a standard right-turn lane, b) retrofitting the lane to reduce vehicle speeds and increase yield compliance rates (e.g., reduce turning radius, construct vertical traffic calming element within the turn lane, etc.), c) installing signage and pavement markings, d) relocating the western project site driveway further to the east to increase reaction time between eastbound motorists and motorists turning right out of the project site, or e) a modification of equal effectiveness as determined by the City of Davis Public Works Department.

The recommendations provided above would alter access for the project site as well as for the existing Sinclair gas station immediately west of the project site. The Sinclair gas station currently includes a full access driveway on Chiles Road immediately east of Mace Boulevard. The implementation of the

recommendations above would prevent left-turns in and out of this driveway. Thus, vehicles traveling to the Sinclair gas station from westbound Chiles Road would require an alternate route. One likely route would be use of the project site itself, by entering the Chiles Road east project driveway, circulating through the project site, exiting the Mace Boulevard project driveway, and entering the Sinclair driveway on Mace Boulevard. Given this likely behavior, it may be desirable to modify the project site to provide alternate accommodations for westbound Chiles Road traffic traveling to the Sinclair gas station. One potential solution could be to extend the internal east-west drive aisle into the Sinclair gas station site.

Vehicle Miles Traveled (VMT)

Background

Senate Bill 743

Senate Bill (SB) 743 creates or encourages several statewide changes to the evaluation of transportation and traffic impacts under CEQA. First, it directs the Governor's Office of Planning and Research (OPR) to amend the State CEQA Guidelines to establish new metrics for determining the significance of transportation impacts of projects within transit priority areas (TPAs) and allows OPR to extend use of the new metrics beyond TPAs. In the amended State CEQA Guidelines, OPR selected VMT as the preferred transportation impact metric and applied its discretion to recommend the use of VMT statewide. The California Natural Resources Agency certified and adopted the amended State CEQA Guidelines in December 2018. The amended State CEQA Guidelines state that "generally, VMT is the most appropriate measure of transportation impacts" and required the use of VMT statewide as of July 1, 2020. The amended State CEQA Guidelines further state that land use "projects within 0.5 mile of either an existing major transit stop or a stop along an existing high quality transit corridor should be presumed to cause a less-than-significant transportation impact."

Second, SB 743 establishes that aesthetic and parking impacts of a residential, mixed-use residential, or employment center projects on an infill site within a TPA shall not be considered significant impacts on the environment.

Third, SB 743 added Section 21099 to the Public Resources Code, which states that automobile delay, as described by level of service (LOS) or similar measures of vehicular capacity or traffic congestion, shall not be considered a significant impact on the environment upon certification of the State CEQA Guidelines by the California Natural Resources Agency. Since the amended State CEQA Guidelines were certified in December 2018, changes in LOS or similar measures of vehicular capacity or traffic congestion are not considered a significant impact on the environment.

Lastly, SB 743 establishes a new CEQA exemption for a residential, mixed-use, and employment center project (a) within a TPA, (b) consistent with a specific plan for which an EIR has been certified, and (c) consistent with an SCS. This exemption requires further review if the project or circumstances changes significantly.

Technical Advisory on Evaluating Transportation Impacts in CEQA

To aid in SB 743 implementation, OPR released a Technical Advisory on Evaluating Transportation Impacts in CEQA (Technical Advisory) in December 2018. The Technical Advisory provides advice and recommendations to CEQA lead agencies on how to implement SB 743 changes. This includes technical recommendations regarding the assessment of VMT, thresholds of significance, VMT mitigation measures, and screening thresholds for certain land use projects. Lead agencies may consider and use these recommendations at their discretion.

The Technical Advisory identifies screening thresholds to quickly identify when a project should be expected to cause a less-than-significant impact without conducting a detailed study. The Technical Advisory suggests that projects meeting one or more of the following criteria should be expected to have a less-than-significant impact on VMT.

- Small projects—projects consistent with a SCS and local general plan that generate or attract fewer than 110 trips per day.
- Projects near major transit stops—certain projects (residential, retail, office, or a mix of these uses) proposed within 0.5 mile of an existing major transit stop or an existing stop along a high-quality transit corridor.
- Affordable residential development—a project consisting of a high percentage of affordable housing may be a basis to find a less-than-significant impact on VMT.
- Local-serving retail—local-serving retail development tends to shorten trips and reduce VMT. The Technical Advisory encourages lead agencies to decide when a project will likely be local-serving, but generally acknowledges that retail development including stores larger than 50,000 square feet might be considered regional-serving. The Technical Advisory suggests lead agencies analyze whether regional-serving retail would increase or decrease VMT (i.e., not presume a less-than-significant impact).
- Projects in low-VMT areas—residential and office projects that incorporate similar features (i.e., density, mix of uses, transit accessibility) as existing development in areas with low VMT will tend to exhibit similarly low VMT.
- The Technical Advisory also identifies recommended numeric VMT thresholds for residential, office, and retail projects, as described below.
- Residential development that would generate vehicle travel exceeding 15 percent below existing residential VMT per capita may indicate a significant transportation impact. Existing VMT per capita may be measured as a regional VMT per capita or as city VMT per capita.
- Office projects that would generate vehicle travel exceeding 15 percent below existing regional VMT per employee may indicate a significant transportation impact.
- Retail projects that result in a net increase in total VMT may indicate a significant transportation impact.

The Technical Advisory also provides guidance on impacts to transit. Specifically, the Technical Advisory suggests that lead agencies generally should not treat the addition of new transit users as an adverse impact. As an example, the Technical Advisory suggests the following.

> [An] infill development may add riders to transit systems and the additional boarding and alighting may slow transit vehicles, but it also adds destinations, improving proximity and accessibility. Such development also improves regional vehicle flow by adding less vehicle travel onto the regional network. (Governor's Office of Planning and Research, 2018).

VMT Screening Assessment

The project would be an infill project that would entail the redevelopment of existing gas station and retail commercial uses on the project site. The project would result in a net decrease of gas station fueling positions by 2 gas fueling positions and 2 truck fueling positions. Additionally, the project would result in a net increase in commercial space by 3,600 square feet and the addition of a car wash. The project commercial uses would be predominantly retail in nature.

In accordance with the OPR Technical Advisory, the project would satisfy the local-serving retail VMT screening criteria by virtue of the nature and size of the project (predominantly retail development less than 50,000 square feet in size). Therefore, the project is assumed to have a less than significant impact on VMT since it satisfies one or more of the VMT screening criteria identified in the OPR Technical Advisory. No quantitative VMT analysis or associated mitigation measures are required.

Summary & Conclusions

In summary, review of the project revealed the need for the following modifications to the surrounding roadway network:

- Install a raised median on Chiles Road east of Mace Boulevard.
- Install a two-way left-turn lane on Chiles Road east of Mace Boulevard.
- Install separate outbound left-turn and right-turn lanes and accompanying signage/pavement markings at the Chiles Road east project driveway.
- Modify the northbound channelized right-turn lane at the Mace Boulevard/Chiles Road intersection to reduce vehicle travel speeds.

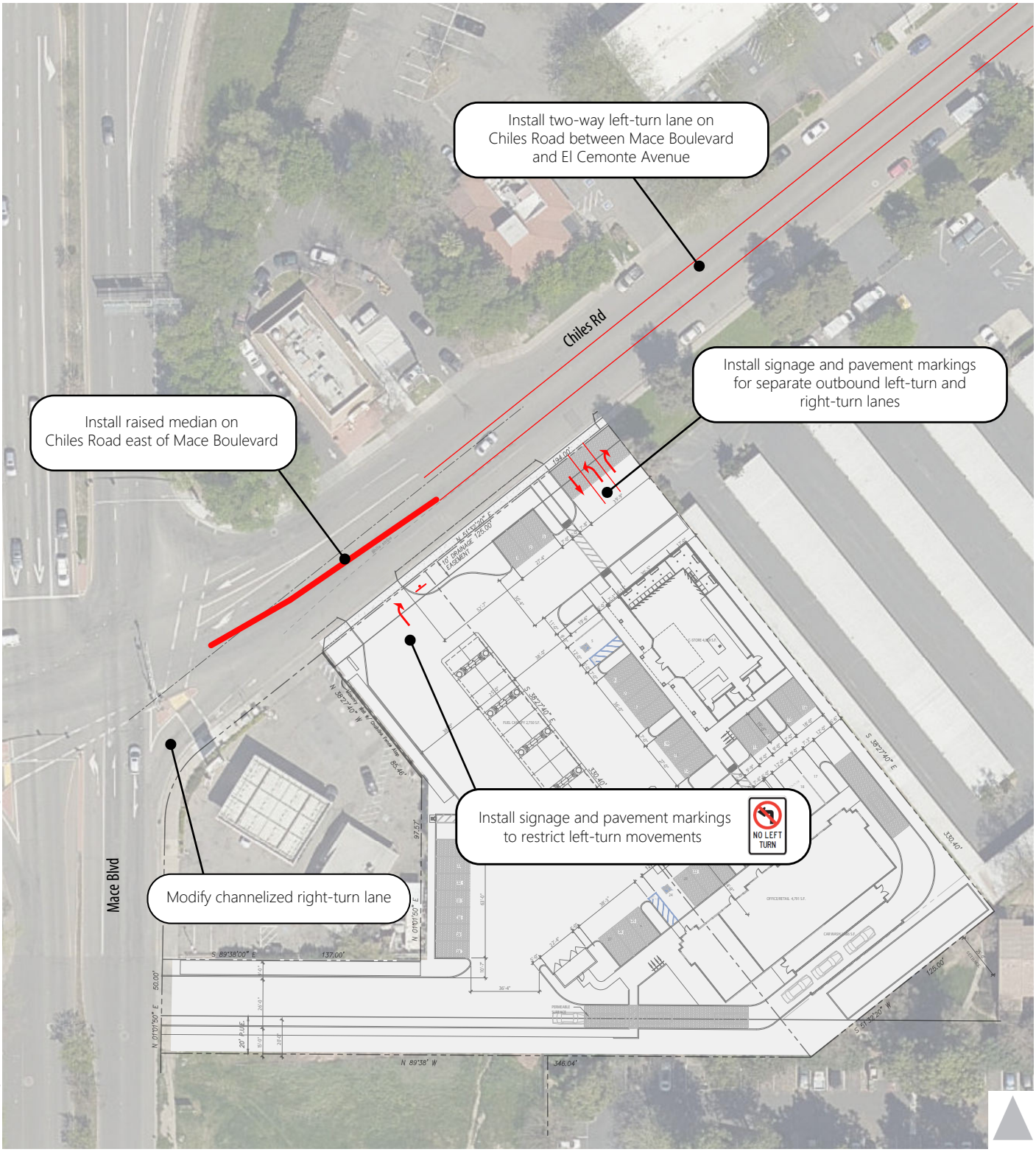

Figure 3

Recommended Site Access Improvements

References

Institute of Transportation Engineers (2017). *Trip Generation Handbook, 3rd Edition*.

Institute of Transportation Engineers (2017). *Trip Generation Manual, 10th Edition*.

ITE Journal (2001). *Estimation of Maximum Queue Lengths at Unsignalized Intersections.*

Transportation Research Board (2016). *Highway Capacity Manual, 6th Edition*.

Appendix A. Technical Appendix

SimTraffic Post-Processor **4810 Chiles Road**
Average Results from 10 Runs **Existing Plus Project**
Volume and Delay by Movement **PM Peak Hour**

Intersection 1 **Mace Blvd/Alhambra Dr** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	253	249	98.5%	46.3	11.6	D
	Through	611	595	97.4%	16.0	2.9	B
	Right Turn						
	Subtotal	864	844	97.7%	24.7	5.3	C
SB	Left Turn						
	Through	653	675	103.4%	22.7	3.6	C
	Right Turn	23	23	98.3%	8.6	2.0	A
	Subtotal	676	698	103.2%	22.1	3.5	C
EB	Left Turn	12	10	84.2%	40.9	26.1	D
	Through						
	Right Turn	199	196	98.4%	2.3	0.2	A
	Subtotal	211	206	97.6%	4.0	1.1	A
WB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
Total		1,751	1,748	99.8%	21.2	3.0	C

Intersection 2 **Mace Blvd/ 2nd Ave-Co Rd 32A** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	367	363	98.8%	27.0	3.3	C
	Through	719	701	97.5%	18.7	3.6	B
	Right Turn	32	31	95.6%	16.1	5.0	B
	Subtotal	1,118	1,094	97.9%	21.2	3.1	C
SB	Left Turn	98	102	104.4%	46.0	10.9	D
	Through	662	658	99.4%	42.2	11.2	D
	Right Turn	93	99	106.7%	9.4	2.3	A
	Subtotal	853	860	100.8%	39.1	9.3	D
EB	Left Turn	124	118	95.1%	35.5	4.5	D
	Through	113	110	97.3%	32.3	8.7	C
	Right Turn	633	633	99.9%	38.2	54.0	D
	Subtotal	870	860	98.9%	35.3	35.9	D
WB	Left Turn	19	18	94.7%	46.1	23.2	D
	Through	22	23	103.6%	31.8	12.6	C
	Right Turn	41	45	109.3%	13.1	6.1	B
	Subtotal	82	86	104.4%	25.3	8.2	C
Total		2,923	2,900	99.2%	30.6	12.9	C

Intersection 4 **Mace Blvd/I-80 WB Ramps** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	254	225	88.7%	34.5	6.5	C
	Through	449	419	93.4%	7.8	2.4	A
	Right Turn						
	Subtotal	703	644	91.7%	17.5	3.2	B
SB	Left Turn						
	Through	1,095	1,060	96.8%	118.3	83.2	F
	Right Turn	219	218	99.5%	67.8	58.7	E
	Subtotal	1,314	1,278	97.2%	110.3	79.1	F
EB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
WB	Left Turn	390	393	100.7%	31.3	6.2	C
	Through						
	Right Turn	669	669	99.9%	4.2	0.7	A
	Subtotal	1,059	1,061	100.2%	14.2	2.6	B
Total		3,076	2,983	97.0%	56.5	34.3	E

Intersection 5 **Mace Blvd/Chiles Rd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	24	23	97.5%	129.5	26.2	F
	Through	516	438	84.9%	153.0	32.6	F
	Right Turn	161	136	84.3%	138.3	35.7	F
	Subtotal	701	597	85.2%	148.8	32.6	F
SB	Left Turn	270	261	96.7%	94.9	19.1	F
	Through	427	423	99.1%	43.0	9.5	D
	Right Turn	287	277	96.5%	29.6	11.8	C
	Subtotal	984	961	97.7%	54.1	8.5	D
EB	Left Turn	337	305	90.5%	143.1	29.0	F
	Through	280	272	97.2%	26.9	4.3	C
	Right Turn	85	79	92.9%	1.9	0.4	A
	Subtotal	702	656	93.5%	79.8	16.6	E
WB	Left Turn	50	48	95.4%	42.7	33.8	D
	Through	63	64	101.1%	37.9	29.0	D
	Right Turn	273	271	99.2%	46.8	42.1	D
	Subtotal	386	382	99.0%	44.8	38.6	D
Total		2,773	2,597	93.6%	78.7	10.6	E

Intersection 15 **Chiles Blvd/I-80 EB Ramps** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
SB	Left Turn	177	178	100.6%	32.0	17.3	C
	Through						
	Right Turn	29	30	103.1%	3.6	1.0	A
	Subtotal	206	208	101.0%	28.1	14.8	C
EB	Left Turn						
	Through	525	489	93.2%	131.0	80.0	F
	Right Turn						
	Subtotal	525	489	93.2%	131.0	80.0	F
WB	Left Turn						
	Through	374	365	97.5%	9.4	2.6	A
	Right Turn						
	Subtotal	374	365	97.5%	9.4	2.6	A
Total		1,105	1,062	96.1%	67.8	38.6	E

Intersection 6 **Mace Blvd/Cowell Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	15	13	86.7%	330.2	139.3	F
	Through	360	277	77.0%	396.8	192.2	F
	Right Turn	27	21	78.9%	393.8	220.8	F
	Subtotal	402	312	77.5%	391.0	187.7	F
SB	Left Turn	142	140	98.9%	44.6	7.7	D
	Through	226	221	97.6%	20.5	4.9	C
	Right Turn	67	69	102.7%	7.5	1.7	A
	Subtotal	435	430	98.8%	26.4	4.4	C
EB	Left Turn	119	115	96.8%	96.9	55.0	F
	Through	102	106	103.8%	45.8	41.5	D
	Right Turn	24	25	105.8%	40.7	45.7	D
	Subtotal	245	247	100.6%	67.4	46.2	E
WB	Left Turn	21	18	87.1%	58.1	24.5	E
	Through	47	47	99.4%	76.6	41.5	E
	Right Turn	98	97	98.5%	71.0	31.5	E
	Subtotal	166	162	97.3%	71.1	29.9	E
Total		1,248	1,149	92.1%	105.6	19.1	F

SimTraffic Post-Processor **4810 Chiles Road**
Average Results from 10 Runs **Existing Plus Project**
Volume and Delay by Movement **PM Peak Hour**

Intersection 7 **Mace Blvd/El Macero** **All-way Stop**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	14	13	95.7%	299.4	260.8	F
	Through	331	271	81.8%	366.3	198.8	F
	Right Turn	9	7	73.3%	332.9	234.9	F
	Subtotal	354	291	82.1%	359.2	195.3	F
SB	Left Turn	99	93	94.1%	8.9	1.2	A
	Through	163	161	98.6%	11.1	1.1	B
	Right Turn	9	8	91.1%	7.2	3.8	A
	Subtotal	271	262	96.7%	10.3	1.0	B
EB	Left Turn	4	3	72.5%	30.3	44.3	D
	Through	7	7	94.3%	19.8	38.4	C
	Right Turn	10	12	116.0%	7.4	8.3	A
	Subtotal	21	21	100.5%	15.8	18.1	C
WB	Left Turn	7	5	74.3%	91.8	117.4	F
	Through	14	15	106.4%	73.3	99.0	F
	Right Turn	67	65	96.3%	121.9	95.5	F
	Subtotal	88	85	96.1%	118.2	93.6	F
Total		734	658	89.7%	110.3	29.9	F

Maximum Queue Estimation for:
Minor Street Left/Through/Right-Turn

Movement: Outbound East Driveway Left/Right to Chiles Road

Input Data

Subject Approach	
Total Approach Volume (vph) =	103
PHF=	0.94
%RT's =	0.45
Is a Traffic Signal Located on Major Street Within 1/4 mi of intersection? (Enter 1 if yes; 0 if no)	1

Major Street	
Conflicting Traffic Volume for Left/Through Movements (vph) =	943
PHF=	0.94
Conflicting Traffic Volume for Right-Turn Movements (vph) =	576
PHF=	0.94

Output

Estimated Maximum Queue	4	vehicles

Maximum Queue Estimation for:
Minor Street Left/Through/Right-Turn

Movement: Outbound West Driveway Left/Right to Chiles Road

Input Data

Subject Approach	
Total Approach Volume (vph) =	37
PHF=	0.94
%RT's =	0.5
Is a Traffic Signal Located on Major Street Within 1/4 mi of intersection? (Enter 1 if yes; 0 if no)	1

Major Street	
Conflicting Traffic Volume for Left/Through Movements (vph) =	959
PHF=	0.94
Conflicting Traffic Volume for Right-Turn Movements (vph) =	597
PHF=	0.94

Output

Estimated Maximum Queue	1	vehicles