

Draft Memorandum

Date: March 15, 2022
To: Matthew Ilagan, City of Sacramento
From: Greg Behrens, Fehr & Peers
Subject: Transportation Operations Review of Maverik Gas Station on Sheldon Road in Sacramento, CA

RS21-4131

This memorandum documents the analysis of transportation operations, site access, and on-site circulation associated with the proposed Maverik Gas Station project on Sheldon Road in Sacramento, California.

Project Site Setting

The project site is located on a vacant lot at the northwest corner of the Sheldon Road/Southbound State Route (SR) 99 Ramps/West Stockton Boulevard intersection.

Figure 1 illustrates the existing roadway network within the project site vicinity. Along the project site frontage (west of West Stockton Boulevard), Sheldon Road is a six-lane arterial with a posted speed limit of 40 miles per hour. To the east, Sheldon Road provides connections to SR 99 at the Sheldon Road interchange before continuing east into the City of Elk Grove. To the west, Sheldon Road transitions into Center Parkway and travels north past Cosumnes River College continuing further into the City of Sacramento.

Near the project site, West Stockton Boulevard is a two-lane roadway. The posted speed limit is 45 miles per hour, but speed surveys conducted in January 2021¹ indicated that the 85th percentile (i.e., critical) speed is 50 miles per hour for southbound traffic within the vicinity of the project site. To the north, West Stockton Boulevard continues until its terminus at Bruceville Road near the Cosumnes River College campus.

¹ Radar speed survey conducted on West Stockton Boulevard by National Data & Surveying Services (NDS) on January 20, 2021. Refer to technical appendix for speed survey data.



Figure 2 illustrates existing and planned bicycle facilities within the project site vicinity. Class II bike lanes are present on Sheldon Road, Jocelyn Way, and Lewis Stein Road. The *City of Elk Grove Bicycle, Pedestrian, and Trails Master Plan* (City of Elk Grove, May 2021) includes planned Class II buffered bike lanes on Sheldon Road. The *City of Sacramento Bicycle Master Plan* (City of Sacramento, August 2016) does not include any planned bicycle facility improvements within the project site vicinity.

Figure 3 illustrates existing pedestrian facilities within the project site vicinity. Generally, sidewalks are present on both sides of roadways near the project site, including Sheldon Road and West Stockton Boulevard along the project site frontage. Marked crosswalks are present on the north, south, and west legs of the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard signalized intersection.

Figure 4 illustrates existing transit services and facilities within the project site vicinity. Existing transit services near the project site include Elk Grove Transit Services local and commuter fixed-route bus routes operated by the Sacramento Regional Transit District (SacRT). Routes E10, E13, and E16 are commuter bus routes that operate between Elk Grove and Downtown Sacramento during peak periods on weekdays. Route 110 is a local bus route that operates between Cosumnes River College, Sutter Elk Grove Medical Center, and Kaiser Permanente Elk Grove Promenade Medical Office via Big Horn Boulevard. Existing bus stops nearest to the project site are located approximately one-quarter mile west of the project site at the Sheldon Road/Jocelyn Way/Lewis Stein Road intersection.

Data Collection

This analysis considers transportation operations and project access needs during the weekday AM and PM peak hours. Based on direction from City staff, this analysis additionally considers operating conditions under cumulative conditions, which assumes the completion of all planned local and regional land use and transportation system projects through 2040.

Baseline intersection turning movement data was derived from multiple sources for the following three study intersections:

1. Sheldon Road/Jocelyn Way/Lewis Stein
2. Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard
3. Sheldon Road/Northbound SR 99 Ramps

First, intersection turning movement data at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection was acquired through StreetLight Data from Fall 2019. Fall 2019 was selected because it represents the most recent “typical” scenario prior to the COVID-19 pandemic. Next, AM and PM peak period intersection turning movement data was collected at the Sheldon Road/Jocelyn Way/Lewis Stein, Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard, and Sheldon Road/Northbound



SR 99 Ramps intersections on Thursday, February 3, 2022. AM and PM peak hour data derived from these counts were adjusted upwards based on the Fall 2019 data at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection to establish baseline intersection turning movement estimates for the three study intersections. This step was necessary due to the lingering effects of the COVID-19 pandemic that were present during the February 2022 data collection, including remote instruction at the nearby Cosumnes River College.

Using the baseline intersection turning movement estimates, cumulative intersection turning movement data for a 2040 analysis year was estimated using the SACSIM19 travel demand model. The SACSIM19 model was used to prepare base and future year model forecasts, which were then used to adjust the baseline intersection turning movement estimates by applying the difference method to yield 2040 intersection turning movement estimates at the three study intersections.

February 2021 Access Feasibility Study Recommendations

The technical memorandum entitled *Access Feasibility Study for Maverik Gas Station on Sheldon Road in Sacramento, CA* (Fehr & Peers, February 18, 2021) summarizes an assessment of the preliminary proposed access for the proposed project. The following recommendations were identified in this study:

- Construct a westbound right-turn deceleration lane at the approach to the project's Sheldon Road driveway.
- Construct a two-way left-turn lane (TWLTL) on West Stockton Boulevard beginning at the end of the striping for the southbound left-turn pocket at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection and ending approximately 100 feet north of the project's West Stockton Boulevard driveway.
- Keep the Sheldon Road and West Stockton Boulevard landscaping strips and the West Stockton Boulevard center median clear of vegetation or other objects with a height in excess of six inches within the green areas shown on Figures 2 and 3 (of the prior technical memorandum).
- Design the Maverik site plan to accommodate a future drive aisle serving the vacant parcels located to the west and north.

These recommendations were incorporated into the current version of the project site plan, as described in the following section.



Project Travel Characteristics

Figure 5 shows the project site plan (*Preliminary Site Plan – Maverik – Sheldon Rd. & W. Stockton Blvd., Cartwright Nor Cal, August 12, 2021*). The proposed project would include a 5,637 square foot convenience store and 16 fueling positions.

The project would be accessed via two driveways. A right-in/right-out only driveway would be provided on Sheldon Road on the western edge of the project site. The project would modify the Sheldon Road project site frontage to accommodate a right-turn deceleration lane to serve this driveway. A full access driveway would be provided on West Stockton Boulevard on the northern edge of the project site. The project would modify the West Stockton Boulevard project site frontage to accommodate a TWLTL to serve this driveway.

Trip Generation

Typically, the trip generation of a proposed project is calculated using trip rates or equations contained in the *Institute of Transportation Engineers (ITE) Trip Generation Manual*. However, Fehr & Peers' experience analyzing comparable Maverik stores indicates that ITE rates substantially overstate peak hour trip generation compared to empirical data reviewed at existing Maverik stores.

In order to estimate trip generation for the proposed project, sales transaction data was obtained from three existing and comparable Maverik stores. Maverik stores #358 (Lehi, UT), #468 (Pasco, WA) and #503 (Boise, ID) provided store transaction data for all Mondays, Tuesdays, Wednesdays, and Thursdays in October 2019, which is an above average month in terms of fuel sales. Fehr & Peers conducted a weighted average of these three stores to estimate transactions for the proposed project.

The collected data was supplemented with PM peak hour observations on September 29, 2020 at a Maverik Gas Station located at 425 South Redwood Road, Salt Lake City, UT to determine local "internal trip estimates". Additional counts were also collected in September 2020 at similar gas station and convenience market/restaurant facilities in Roseville to verify local conditions. It was necessary to determine the proportion of fuel sales that also included a purchase inside store using sales transaction data due to the inclusion of the convenience store in the project description. These facilities were purposefully chosen because they share similar operating/design characteristics to that of the proposed project.

Table 1 shows the project's expected trip generation, including reductions for pass-by trips. Pass-by trips are trips already on the network and therefore would not be considered as new trips generated by the project. Pass-by trips were estimated from data presented in the *Trip Generation Handbook, 3rd Edition* (Institute of Transportation Engineers, 2017).



Table 1: Project Trip Generation

Land Use	Daily	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Total Gross Trips	3,714	134	134	268	109	109	218
<i>Pass-By Trip Reduction</i>	-2,792	-101	-101	-202	-82	-82	-164
Net New External Trips	922	33	33	66	27	27	54

Note:
 Trip generation estimate calculated using observed data and pass-by rates obtained from Trip Generation Handbook, 3rd Edition (Institute of Transportation Engineers, 2017) for the Gas Station land use (Land Use Code 945).
 Source: Fehr & Peers, Maverik, *ITE Trip Generation Handbook, 3rd Edition, 2021*.

As shown in Table 1, during the AM peak hour, the project would generate 66 net new vehicle trips (50% in/50% out). During the PM peak hour, the project would generate 54 net new vehicle trips (50% in/50% out). Daily, the project would generate 922 net new vehicle trips. These represent net new external vehicle trips after accounting for reductions made for pass-by activity per the *Trip Generation Handbook*.

Trip Distribution and Assignment

Table 2 summarizes the estimated distribution of project trips. New project trips were assigned to the roadway network based on traffic patterns and the general distribution of jobs, housing, and other destinations in the area, as well as permitted driveway movements. Pass-by trips were assigned based on the volume of traffic at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard and ease of performing pass-by maneuvers.

Table 2: Project Trip Distribution

Direction	Existing Plus Project				Cumulative Plus Project			
	AM		PM		AM		PM	
	In	Out	In	Out	In	Out	In	Out
Sheldon Road to/from the west	42%	28%	30%	40%	41%	25%	28%	38%
Sheldon Road to/from the east	42%	44%	45%	38%	40%	45%	45%	39%
SR 99 Ramps to/from the south	9%	17%	19%	16%	11%	19%	20%	15%
W Stockton Boulevard to/from north	8%	11%	7%	7%	8%	11%	7%	8%

Source: Fehr & Peers, 2021.



Traffic Operations Analysis

AM and PM peak hour traffic forecasts were developed for Baseline Plus Project and Cumulative Plus Project conditions by adding project trips to baseline and Cumulative No Project volumes using the project's trip generation from Table 1 and the trip distribution percentages from Table 2.

The project would cause the following increases to baseline peak hour traffic volumes in the study area:

- AM Peak Hour
 - Two-way traffic volumes on Sheldon Road west of the project site would increase from 2,549 to 2,565 vehicles (0.6 percent increase)
 - Two-way traffic volumes on Sheldon Road east of West Stockton Boulevard would increase from 3,483 to 3,549 vehicles (1.9 percent increase)
 - Two-way traffic volumes on the Northbound SR 99 Ramps south of Sheldon Road would increase from 1,040 to 1,053 vehicles (1.3 percent increase)
 - Two-way traffic volumes on West Stockton Boulevard north of Sheldon Road would increase from 772 to 810 vehicles (4.9 percent increase)
- PM Peak Hour
 - Two-way traffic volumes on Sheldon Road west of the project site would increase from 2,768 to 2,784 vehicles (0.6 percent increase)
 - Two-way traffic volumes on Sheldon Road east of West Stockton Boulevard would increase from 3,886 to 3,926 vehicles (1.0 percent increase)
 - Two-way traffic volumes on the Northbound SR 99 Ramps south of Sheldon Road would increase from 1,607 to 1,627 vehicles (1.2 percent increase)
 - Two-way traffic volumes on West Stockton Boulevard north of Sheldon Road would increase from 656 to 694 vehicles (5.8 percent increase)

Peak Hour Intersection Operations

Peak hour intersection operations were analyzed using vehicle delay and level of service (LOS) as a 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 SimTraffic 10 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 SimTraffic analysis utilized a seeding time of 15 minutes and a recording time of 15 minutes. Reported results are based on an average of 10 runs. The peak hour factor (PDF) was set at 1.0 in accordance with City of Sacramento Traffic Impact Study Guidelines.

Per *City of Elk Grove General Plan* Policy MOB-1-3, the peak hour delay target for signalized intersections within the City of Elk Grove is 55 seconds or better for average intersection delay. This target applies to the Sheldon Road/Jocelyn Way/Lewis Stein intersection, which is owned and operated by the City of Elk Grove.

The Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard and Sheldon Road/Northbound SR 99 Ramps intersections are owned and operated by Caltrans. 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.

Table 3 displays the peak hour delay and LOS at the three study intersections under Baseline and Baseline Plus Project conditions. All three study intersections operate at LOS C or better during the AM and PM peak hours under baseline conditions. The project would result in increases to peak hour delay at all three study intersections during the AM and PM peak hour under Baseline Plus Project conditions. However, the project would not result in a degradation of a LOS grade at any of the three study intersections between Baseline and Baseline Plus Project conditions.

Table 3: Peak Hour Intersection Operations – Baseline Plus Project Conditions

Intersection	Traffic Control	Jurisdiction	Baseline Conditions				Baseline Plus Project Conditions			
			AM		PM		AM		PM	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Sheldon Road/Jocelyn Way/Lewis Stein Road	Signal	City of Elk Grove	29	C	29	C	33	C	32	C
2. Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard	Signal	Caltrans	29	C	29	C	32	C	28	C
3. Sheldon Road/Northbound SR 99 Ramps	Signal	Caltrans	8	A	12	B	8	A	13	B
Notes: Average intersection delay is reported in seconds per vehicle for all approaches. Estimates derived using SimTraffic 10 simulation software. Source: Fehr & Peers, 2022.										



For the cumulative conditions traffic operations analysis, the phasing and cycle length inputs for the three study intersections were optimized with the anticipation that traffic operations would be monitored and that signal timing plans would be updated as conditions change. Given the coordinated signal operations along the Sheldon Road corridor, the cycle lengths were matched for the traffic signal inputs across the three study intersections. Additionally, the Sheldon Road/Jocelyn Way/Lewis Stein intersection lane configurations were modified from a single westbound left-turn lane to dual westbound left-turn lanes under the assumption that this modification would be implemented as future land development occurs in the area (e.g., the large vacant parcels at the southwest corner of the intersection). Note that the existing intersection geometrics could accommodate this modification and that the area that would accommodate the second westbound left-turn lane is unused and closed to traffic with hatched pavement markings.

Table 4 displays the peak hour delay and LOS at the three study intersections under Cumulative No Project and Cumulative Plus Project conditions. Under Cumulative No Project conditions, all three study intersections would operate at LOS D or better during the AM and PM peak hours. Under Cumulative Plus Project conditions, the implementation of the project would increase peak hour delay at each of the three study intersections. Moreover, the project would degrade LOS at the Sheldon Road/Jocelyn Way/Lewis Stein Road intersection from LOS C to LOS D during the AM and PM peak hours.

Note that the results presented in Table 4 indicate that the project would improve LOS at the Sheldon Road/Northbound SR 99 Ramps intersection. 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 (particularly due to high demand along both eastbound and westbound Sheldon Road). From this, it can be concluded that the effect of project trips is less noticeable than variations in results between model runs.



Table 4: Peak Hour Intersection Operations – Cumulative Plus Project Conditions

Intersection	Traffic Control	Jurisdiction	Cumulative No Project Conditions				Cumulative Plus Project Conditions			
			AM		PM		AM		PM	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Sheldon Road/Jocelyn Way/Lewis Stein Road	Signal	City of Elk Grove	29	C	34	C	38	D	36	D
2. Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard	Signal	Caltrans	44	D	45	D	45	D	51	D
3. Sheldon Road/Northbound SR 99 Ramps	Signal	Caltrans	10	B	22	C	10	A	23	C
Note: Average intersection delay is reported in seconds per vehicle for all approaches. Estimates derived using SimTraffic 10 simulation software. Source: Fehr & Peers, 2022.										

Table 5 displays the AM and PM peak hour maximum vehicle queues for the eastbound and southbound left-turn movements at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection, the SR 99 off-ramps at both of the Sheldon Road interchange ramp terminal intersections, and for critical inbound and outbound movements at the project driveways under Baseline Plus Project conditions. The maximum vehicle queue for the southbound left-turn movement at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection would exceed the available storage during the AM peak hour under Baseline and Baseline Plus Project conditions. Sufficient storage would be available to accommodate maximum vehicle queues for the eastbound left-turn movement at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection, the SR 99 off-ramps at both of the Sheldon Road interchange ramp terminal intersections, and for critical inbound and outbound movements at the project driveways.



Table 5: Peak Hour Maximum Queues – Baseline Plus Project Conditions

Intersection	Approach (Movement)	Storage (ft.)	Maximum Vehicle Queue (ft./vehicles)			
			Baseline Conditions		Baseline Plus Project Conditions	
			AM	PM	AM	PM
Sheldon Road/ Southbound SR 99 Ramps/West Stockton Boulevard	SB (Left) ¹	230 ft.	250 ft./ 10 vehicles	200 ft./ 8 vehicles	275 ft./ 11 vehicles	225 ft./ 9 vehicles
	EB (Left) ¹	310 ft.	125 ft./ 5 vehicles	100 ft./ 4 vehicles	125 ft./ 5 vehicles	100 ft./ 4 vehicles
	NB (All) ¹	1,790 ft. ³	125 ft./ 5 vehicles	200 ft./ 8 vehicles	150 ft./ 6 vehicles	250 ft./ 10 vehicles
Sheldon Road/ Northbound SR 99 Ramps	NB (All) ¹	1,670 ft. ³	150 ft./ 6 vehicles	225 ft./ 9 vehicles	150 ft./ 6 vehicles	200 ft./ 8 vehicles
Sheldon Road Driveway	SB (Right) ²	75 ft.	N/A	N/A	50 ft./ 2 vehicles	75 ft./ 3 vehicles
West Stockton Boulevard Driveway	NB (Left) ²	85 ft.	N/A	N/A	75 ft./ 3 vehicles	75 ft./ 3 vehicles
	EB (Left) ²	75 ft.	N/A	N/A	50 ft./ 2 vehicles	50 ft./ 2 vehicles
	EB (Right) ²	75 ft.	N/A	N/A	75 ft./ 3 vehicles	50 ft./ 2 vehicles

Notes: **Grey** text indicates maximum queue that would exceed the available storage capacity.

¹ Maximum queue lengths estimated using SimTraffic traffic operations analysis software. Queue lengths rounded up to nearest 25-foot increment.

² Maximum queue lengths estimated using methodology described in *Estimation of Maximum Queue Lengths at Unsignalized Intersections* (ITE Journal, November 2001).

³ Measured from the intersection stop bar to the gore point of the freeway off-ramp. Does not include auxiliary lane on freeway mainline.

Source: Fehr & Peers, 2022.



Table 6 displays the AM and PM peak hour maximum vehicle queues for the eastbound and southbound left-turn movements at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection, the SR 99 off-ramps at both of the Sheldon Road interchange ramp terminal intersections, and for critical inbound and outbound movements at the project driveways under Cumulative No Project and Cumulative Plus Project conditions. The maximum vehicle queue for the southbound left-turn movement at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection would exceed the available storage during both the AM and PM peak hours under both Cumulative No Project and Cumulative Plus Project conditions. Sufficient storage would be available to accommodate maximum vehicle queues for the eastbound left-turn movement at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection, the SR 99 off-ramps at both of the Sheldon Road interchange ramp terminal intersections, and for critical inbound and outbound movements at the project driveways.

Table 6: Peak Hour Maximum Queues – Cumulative Plus Project Conditions

Intersection	Approach (Movement)	Storage (ft.)	Maximum Vehicle Queue (ft./vehicles)			
			Cumulative No Project Conditions		Cumulative Plus Project Conditions	
			AM	PM	AM	PM
Sheldon Road/ Southbound SR 99 Ramps/West Stockton Boulevard	SB (Left) ¹	230 ft.	300 ft./ 12 vehicles	275 ft./ 11 vehicles	300 ft./ 12 vehicles	300 ft./ 12 vehicles
	EB (Left) ¹	310 ft.	150 ft./ 6 vehicles	100 ft./ 6 vehicles	150 ft./ 6 vehicles	250 ft./ 10 vehicles
	NB (All) ¹	1,790 ft. ³	125 ft./ 5 vehicles	300 ft./ 12 vehicles	175 ft./ 7 vehicles	375 ft./ 15 vehicles
Sheldon Road/ Northbound SR 99 Ramps	NB (All) ¹	1,670 ft. ³	125 ft./ 5 vehicles	375 ft./ 15 vehicles	100 ft./ 4 vehicles	350 ft./ 14 vehicles
Sheldon Road Driveway	SB (Right) ²	75 ft.	N/A	N/A	75 ft./ 3 vehicles	75 ft./ 3 vehicles
West Stockton Boulevard Driveway	NB (Left) ²	85 ft.	N/A	N/A	75 ft./ 3 vehicles	75 ft./ 3 vehicles
	EB (Left) ²	75 ft.	N/A	N/A	50 ft./ 2 vehicles	50 ft./ 2 vehicles
	EB (Right) ²	75 ft.	N/A	N/A	75 ft./ 3 vehicles	75 ft./ 3 vehicles

Notes: **Grey** text indicates maximum queue that would exceed the available storage capacity.

¹ Maximum queue lengths estimated using SimTraffic traffic operations analysis software. Queue lengths rounded up to nearest 25-foot increment.

² Maximum queue lengths estimated using methodology described in *Estimation of Maximum Queue Lengths at Unsignalized Intersections* (ITE Journal, November 2001).

³ Measured from the intersection stop bar to the gore point of the freeway off-ramp. Does not include auxiliary lane on freeway mainline.

Source: Fehr & Peers, 2022.



As shown in Tables 5 and 6, at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection, southbound left-turn maximum vehicle queues would exceed the available storage and contribute to blockages and queueing in the adjacent southbound through travel lane. Note that this condition would occur occasionally, as southbound left-turn average vehicle queues would be sufficiently accommodated within the available storage. Southbound left-turn maximum vehicle queues would also have implications for corner sight distance for outbound left-turn movements from the West Stockton Boulevard project driveway. Refer to the “West Stockton Boulevard Project Driveway” section later in this technical memorandum for additional information.

Project Site Access and Circulation Evaluation

The following items were considered during this evaluation:

- Pedestrian and bicycle access
- Driveway width, throat depth, corner radii, permitted turning movements, and corner sight distance
- Fuel truck turning movements

Pedestrian and Bicycle Access

Pedestrian access to and from the project site would be accommodated by existing sidewalks and marked crosswalks present within the project site vicinity. Sidewalks are currently present on the Sheldon Road and West Stockton Boulevard project site frontages. The project would reconstruct portions of these sidewalks as part of proposed frontage modifications required to accommodate the right-turn deceleration lane at the Sheldon Road project driveway and the TWLTL at the West Stockton Boulevard project driveway. As such, the project would sustain contiguous pedestrian paths of travel along its Sheldon Road and West Stockton Boulevard frontages.

The project would include a direct pedestrian connection between the on-site convenience store and the sidewalk on the westerly side of West Stockton Boulevard. The project would not include a direct pedestrian connection to the sidewalk on the northerly side of Sheldon Road. Pedestrians who desire to access the site via Sheldon Road would be required to walk in the Sheldon Road project driveway. *It is recommended that a direct pedestrian connection be constructed between the on-site convenience store and the sidewalk on the northerly side of Sheldon Road.*

Pedestrian access to and from the project site would be accommodated by existing bicycle facilities present within the project site vicinity. A Class II bike lane is currently present on westbound Sheldon Road along the project site frontage. The project would modify this frontage to accommodate the right-turn deceleration lane at the Sheldon Road project driveway. The project site plan indicates that the Class II bike



lane would be maintained between the westbound through travel lanes and the right-turn deceleration lane. *It is recommended that high visibility conflict markings be installed along the length of the bike lane between the westbound through travel lanes and the right-turn deceleration lane.*

Sheldon Road Project Driveway

The Sheldon Road project driveway would be a new driveway that would provide right-in/right-out only (RIRO) only access to and from the project site. The driveway would be located approximately 225 feet west of the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection, as measured from the driveway centerline to the intersection near curb return.

The driveway would be 35 feet wide and provide approximately 75 feet of throat depth based on the configuration of the driveway and its placement relative to on-site facilities, internal drive aisles, etc.. The driveway would have one inbound lane and one outbound lane.

The driveway would be served by a new westbound right-turn deceleration lane on Sheldon Road that would be constructed as part of the project. The deceleration lane would be approximately 175 feet long plus a taper length of 50 feet. Note that the installation of a right-turn deceleration lane was a recommendation identified in the February 2021 technical memorandum entitled *Access Feasibility Study for Maverik Gas Station on Sheldon Road in Sacramento, CA*.

As shown in Tables 5 and 6, the Sheldon Road project driveway would provide sufficient throat depth to accommodate anticipated outbound maximum vehicle queues exiting the project site. The proposed westbound right-turn deceleration lane would accommodate inbound vehicles entering the project site from Sheldon Road and help to reduce the potential for conflicts and adverse operational effects at the westbound approach to the Sheldon Road driveway as described in the *Access Feasibility Study for Maverik Gas Station on Sheldon Road in Sacramento, CA* technical memorandum.

The City of Sacramento *Design and Procedures Manual, Section 15 – Street Design Standards* Section 15.9 requires that City streets and non-residential driveways shall be designed in accordance with the sight distance requirements as defined by the *Caltrans Highway Design Manual, Sections 201 and 405*. **Figure 6** illustrates the corner sight distance for vehicles stopped at the stop bar and preparing to exit the Sheldon Road project driveway based on a travel speed of 50 miles per hour. As shown, this line of sight would generally be unobstructed except for the utility pole, light pole, and bus stop pad located immediately east of the driveway. It is unclear from the project site plan if a bus stop shelter or other bus stop amenities would be installed on the pad as part of the project, or if it is proposed to be included for future use only. Note that while a pad is currently present, it is not utilized as an active bus stop. In the event that the pad is intended for use as a bus stop in the future, stopped buses would further obstruct this line of sight for



vehicles exiting the project driveway looking at oncoming westbound traffic. Additionally, stopped buses at this location would block vehicles attempting to enter the project site from Sheldon Road, which would increase the potential for queued vehicles conflicting with westbound through traffic on Sheldon Road.

The following modifications to the Sheldon Road driveway are recommended:

- *Place the proposed utility pole and light pole immediately north of the line of sight shown on Figure 6.*
- *Place the proposed bus stop pad immediately west of the Sheldon Road driveway. It may be desirable to provide a bus turnout west of the driveway to enable buses to stop outside of the flow of westbound vehicle and bicycle traffic on Sheldon Road.*
- *Keep the Sheldon Road landscaping strip clear of vegetation or other objects with a height in excess of six inches within the green areas shown on Figure 6.*
- *Construct the driveway width and corner radii to City standard.*
- *Modify the project striping plan to provide only a right-turn arrow pavement marking in the outbound travel lane at the Sheldon Road project driveway.*

West Stockton Boulevard Project Driveway

The West Stockton Boulevard project driveway would be a new driveway that would provide full access to and from the project site. The driveway would be located approximately 375 feet north of the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection, as measured from the driveway centerline to the intersection near curb return.

The driveway would be 45 feet wide and provide approximately 75 feet of throat depth based on the configuration of the driveway and its placement relative to on-site facilities, internal drive aisles, etc.. The driveway would have one inbound lane, one outbound right-turn lane, and one outbound left-turn lane.

Left-turns in and out of the driveway would be served by a new TWLTL that would be constructed as part of the project. The TWLTL would extend approximately 85 feet south of the driveway and 120 feet north of the driveway (as measured from the driveway centerline). Note that the installation of a TWLTL lane with 100 feet of storage that adheres to applicable City design standards was a recommendation identified in the February 2021 technical memorandum entitled *Access Feasibility Study for Maverik Gas Station on Sheldon Road in Sacramento, CA*.

As shown in Tables 5 and 6, the West Stockton Boulevard project driveway would provide sufficient throat depth to accommodate anticipated outbound maximum vehicle queues exiting the project site. Moreover, the TWLTL would provide sufficient storage to accommodate maximum vehicle queues for northbound left-turns entering the project site.



While the proposed TWLTL would accommodate left-turns in and out of the project site via West Stockton Boulevard, the proposed design poses the following issues:

- The lane transitions on both sides of the TWLTL would not meet standards established in the California *Highway Design Manual*. Based on a 12-foot lane transition and a 50 mile per hour design speed (the observed 85th percentile speed on this segment of West Stockton Boulevard), Figure 405.2A of the *Highway Design Manual* indicates that the lane transition length should be 600 feet. The proposed lane transition lengths identified on the project site plan would be approximately 110 feet for the entry lane transition and 90 feet for the exit lane transition, well below the associated standard identified in the *Highway Design Manual*. These abrupt lane transitions could cause operational and safety issues for southbound through motorists on West Stockton Boulevard.
- Northbound left-turn maximum vehicle queues utilizing the TWLTL to enter the project site would obstruct sight lines for southbound vehicles on West Stockton Boulevard looking at queued vehicles at the southbound approach of the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection based on associated stopping sight distance requirements established in the California *Highway Design Manual*. This condition could increase the potential for conflicts involving southbound vehicles on West Stockton Boulevard and downstream queued vehicles approaching Sheldon Road.

Figure 7 illustrates the corner sight distance for vehicles exiting the West Stockton Boulevard project driveway based on a travel speed of 50 miles per hour. As shown, these lines of sight would generally be unobstructed except for the landscaping strips along the West Stockton Boulevard frontage and the center median on West Stockton Boulevard.

Additionally, the line of sight for vehicles exiting the West Stockton Boulevard driveway looking at oncoming northbound traffic (i.e., to complete an eastbound left-turn onto West Stockton Boulevard), would be obstructed by queued vehicles waiting to complete a southbound left-turn at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection. As shown in Table 5, this maximum vehicle queue would be expected to reach a length of 11 vehicles (275 feet) during the AM peak hour under Baseline Plus Project conditions.

Upon review of the updated project site plan, modifying West Stockton Boulevard to accommodate left-turn ingress at the project driveway in compliance with applicable design standards would require substantial realignment of the roadway, additional right-of-way acquisition, and intersection/signal modifications at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection. *Therefore, it is recommended that the West Stockton Boulevard project driveway be designed to provide right-in/right-out only (RIRO) only access. This should be accomplished by extending the existing raised median on the north leg of the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection north beyond the northerly edge of the proposed West Stockton Boulevard project driveway and by installing "Right*



Turn Only” signage for vehicles exiting the driveway. The median should be designed to discourage U-turn maneuvers from northbound West Stockton Boulevard into the project site and to accommodate maneuvers and swept paths for fuel trucks exiting the project site and traveling southbound on West Stockton Boulevard. Note that this modification would restrict access to RIRO at any potential future driveway located at the southerly edge of the vacant parcel located opposite the project site on the east side of West Stockton Boulevard.

Additionally, it is recommended that West Stockton Boulevard landscaping strips and the West Stockton Boulevard center median are kept clear of vegetation or other objects with a height in excess of six inches within the green areas shown on Figure 7.

Fuel Truck Access

Fuel truck turning analyses are not provided in the project application materials, nor is information regarding the anticipated fuel truck circulation patterns. *Based on the analysis above, it is recommended that fuel trucks enter the project site by turning right into the Sheldon Road project driveway and exit the site by turning right out of the West Stockton Boulevard project driveway. It is recommended that the project driveway widths and corner radii be constructed to City standard to adequately accommodate fuel truck maneuvers and swept paths. It is also recommended that the project applicant prepare fuel truck turning analyses to illustrate anticipated fuel truck ingress and egress maneuvers.*

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 development of a currently vacant site with a gas station with 16 fueling positions and a 5,637 square foot convenience store. The project would be 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 (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, this evaluation revealed the following conclusions and recommended modifications to the project site plan and surrounding roadway network:

- Peak Hour Intersection Operations
 - The project would cause minor increases to peak hour delay and queuing at the three nearby study intersections. With the implementation of the project, all three study intersections would operate acceptably based on applicable intersection peak hour delay performance targets.
 - The southbound left-turn maximum vehicle queue would exceed available storage at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection.
- Pedestrian and Bicycle Access
 - Pedestrian and bicycle access to and from the project site would be accommodated by existing pedestrian and bicycle facilities within the project site vicinity.
 - The following modifications are recommended to improve pedestrian and bicycle access and circulation within the project site vicinity:
 - Construct a direct pedestrian connection between the on-site convenience store and the sidewalk on the northerly side of Sheldon Road.
 - At the Sheldon Road driveway, install high visibility conflict markings along the length of the bike lane between the westbound through travel lanes and the right-turn deceleration lane.
- Sheldon Road Project Driveway
 - The proposed westbound right-turn deceleration lane would adequately accommodate inbound vehicles entering the project site from Sheldon Road.
 - The Sheldon Road project driveway would provide sufficient throat depth to accommodate anticipated outbound maximum vehicle queues exiting the project site.
 - The following modifications are recommended to provide adequate corner sight distance for vehicles exiting the Sheldon Road project driveway:
 - At the Sheldon Road driveway, place the proposed utility pole and light pole immediately north of the line of sight shown on Figure 6.
 - At the Sheldon Road driveway, place the proposed bus stop pad immediately west of the Sheldon Road driveway. Consider the need for a bus turnout west of the driveway to enable buses to stop outside of the flow of westbound vehicle and bicycle traffic on Sheldon Road.
 - Keep the Sheldon Road landscaping strips clear of vegetation or other objects with a height in excess of six inches within the green areas shown on Figure 6.
 - The project striping plan should be modified to provide only a right-turn arrow pavement marking in the outbound travel lane at the Sheldon Road project driveway.



- West Stockton Boulevard Project Driveway
 - The West Stockton Boulevard project driveway would provide sufficient throat depth to accommodate anticipated outbound maximum vehicle queues exiting the project site.
 - The proposed TWLTL serving the project driveway would not meet applicable design standards. Moreover, downstream queueing at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection would obstruct corner sight distance for vehicles exiting and turning left out of the project driveway. The following modifications are recommended to address these issues:
 - Design the West Stockton Boulevard project driveway to provide right-in/right-out only (RIRO) only access. This should be accomplished by extending the existing raised median on the north leg of the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection north beyond the northerly edge of the proposed West Stockton Boulevard project driveway and by installing “Right Turn Only” signage for vehicles exiting the driveway. The median should be designed to discourage U-turn maneuvers from northbound West Stockton Boulevard into the project site and to accommodate maneuvers and swept paths for fuel trucks exiting the project site and traveling southbound on West Stockton Boulevard.
 - Keep the West Stockton Boulevard landscaping strips and center median clear of vegetation or other objects with a height in excess of six inches within the green areas shown on Figure 7.
- Fuel Truck Access
 - Fuel trucks should enter the project site by turning right into the Sheldon Road project driveway and exit the site by turning right out of the West Stockton Boulevard project driveway.
 - The Sheldon Road and West Stockton Boulevard project driveways should be constructed to City standard and to better accommodate fuel truck movements and swept paths.
 - The project applicant should prepare fuel truck turning analyses to illustrate anticipated fuel truck ingress and egress maneuvers
- Vehicle Miles Traveled (VMT)
 - The project would satisfy the local-serving retail VMT screening criteria by virtue of the nature and size of the project (retail development less than 50,000 square feet in size) and is assumed to have a less than significant impact on VMT in accordance with the OPR Technical Advisory.

References

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Figures



-  Project Site
-  Number of Travel Lanes (Excluding Turn Lanes at Intersections)
-  Traffic Signal
-  Posted Speed Limit



Figure 1
Existing Roadway Network



- Project Site
- Class II Bike Lanes (Existing)
- - Class II Buffered Bike Lanes (Planned)



Figure 2
Existing and Planned Bicycle Facilities



-  Project Site
-  Marked Crosswalk
-  Traffic Signal



Figure 3
Existing Pedestrian Facilities



- Project Site
- Bus Route
- Bus Stop



Figure 4
Existing Transit Services and Facilities

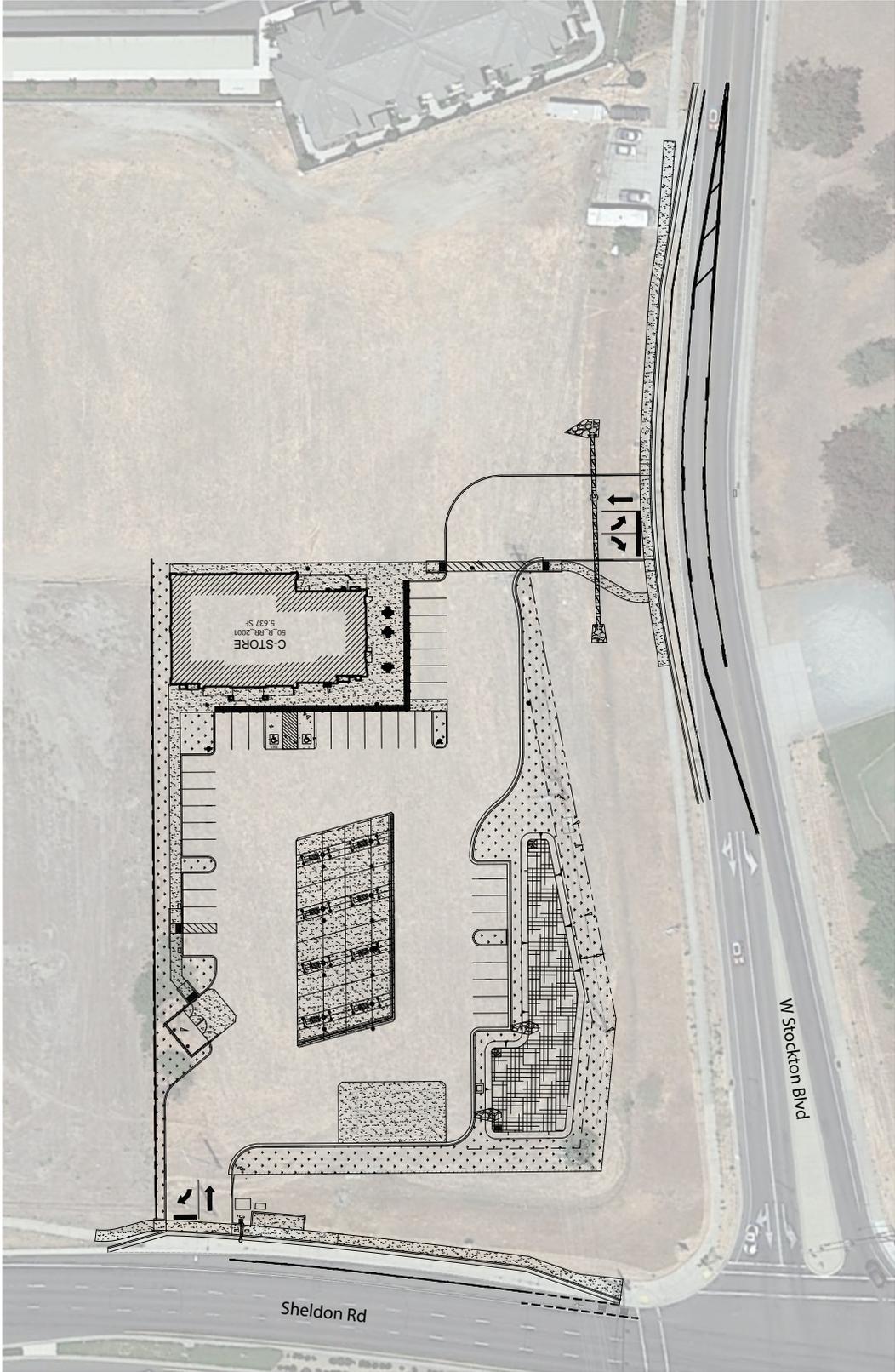
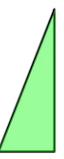


Figure 5
Project Site Plan





LEGEND:



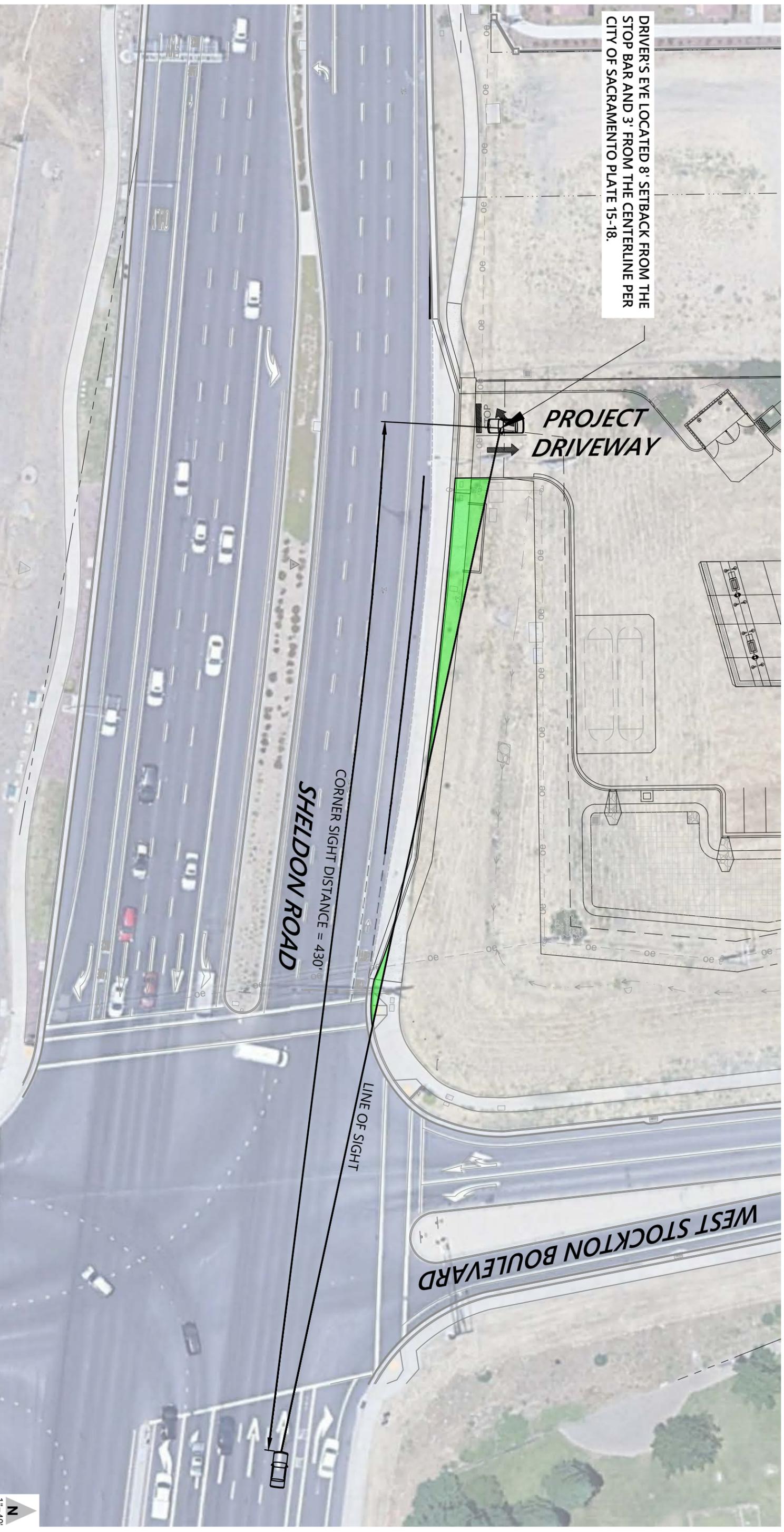
CORNER SIGHT DISTANCE TRIANGLE - DESIGN OF VERTICAL ELEMENTS IN THIS AREA TO BE CONSISTENT WITH HIGHWAY DESIGN MANUAL TOPIC 405.1 (2)

DESIGN SPEED:

SHELDON ROAD - 45 MPH
(BASED ON POSTED SPEED LIMIT PLUS 5 MPH)

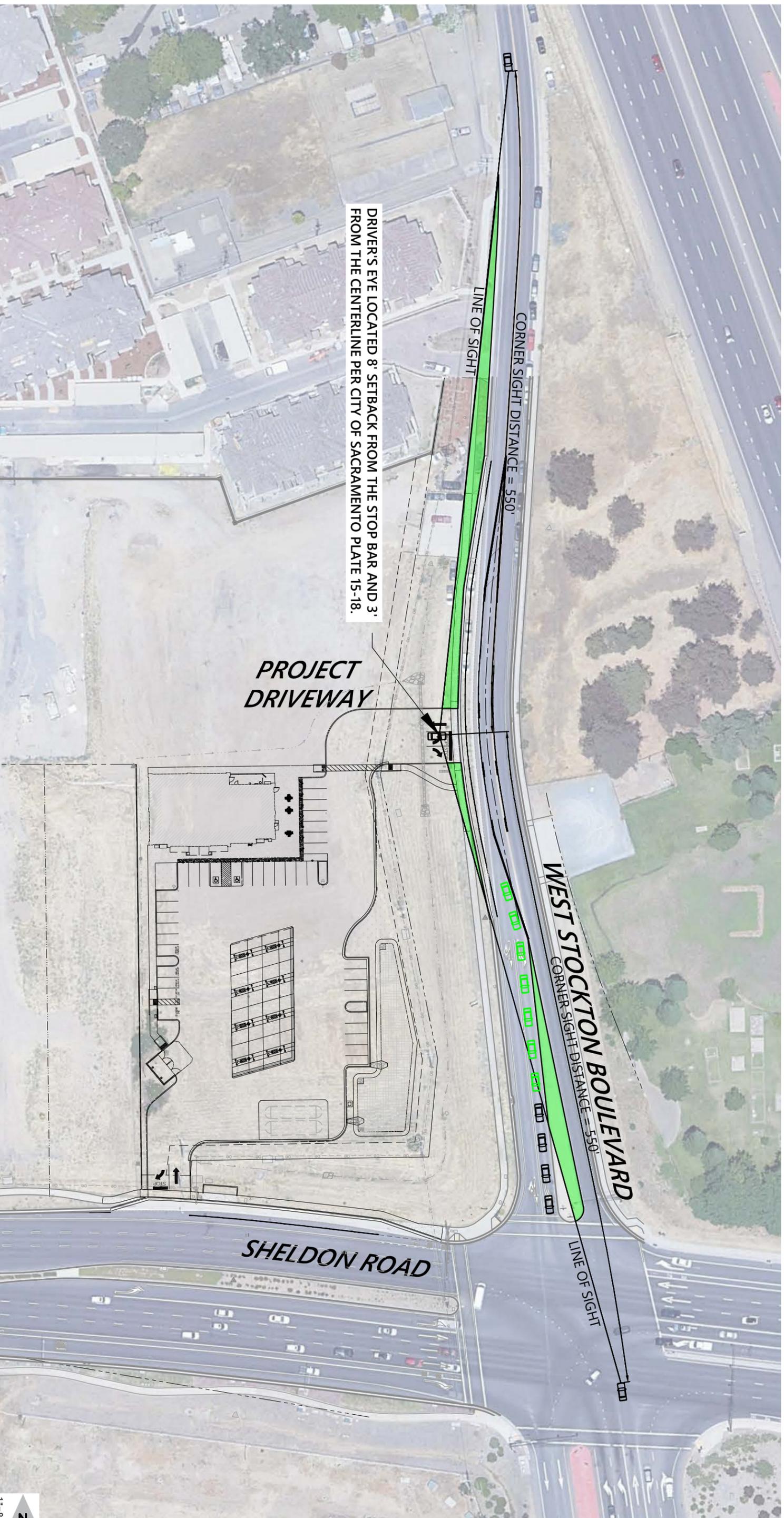
CORNER SIGHT DISTANCE:

CORNER SIGHT DISTANCE = 430' CALCULATED PER HIGHWAY DESIGN MANUAL TOPIC 405.1(2)

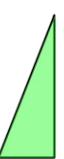


Corner Sight Distance Analysis
Project Driveway at Sheldon Road

Figure 6



LEGEND:



CORNER SIGHT DISTANCE TRIANGLE - DESIGN OF VERTICAL ELEMENTS IN THIS AREA TO BE CONSISTENT WITH HIGHWAY DESIGN MANUAL TOPIC 405.1 (2)

DESIGN SPEED:

WEST STOCKTON BOULEVARD - 50 MPH
(BASED ON SPEED SURVEY PERFORMED BY THE CITY ON 1/20/2021)

CORNER SIGHT DISTANCE:

CORNER SIGHT DISTANCE = 550' CALCULATED PER HIGHWAY DESIGN MANUAL TOPIC 405.1(2)



Figure 7

Corner Sight Distance Analysis
Project Driveway at West Stockton Boulevard

Technical Appendix

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Sheldon Maverik Gas Station
Existing Conditions
AM Peak Hour

Intersection 1 Jocelyn Way-Lewis Stein Rd/Sheldon Rd Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		LOS
			Average	Percent	Average	Std. Dev.	
NB	Left Turn	114	125	109.5%	33.9	5.1	C
	Through	33	38	113.9%	33.0	7.8	C
	Right Turn	502	490	97.5%	31.4	8.6	C
	Subtotal	649	652	100.5%	32.0	7.2	C
SB	Left Turn	159	190	119.5%	40.6	5.6	D
	Through	40	42	106.0%	40.6	8.4	D
	Right Turn	16	13	80.0%	8.8	3.2	A
	Subtotal	215	245	114.0%	38.8	4.5	D
EB	Left Turn	8	9	110.0%	63.1	34.6	E
	Through	870	835	96.0%	26.3	2.6	C
	Right Turn	53	56	106.4%	13.2	2.0	B
	Subtotal	931	900	96.7%	26.0	2.7	C
WB	Left Turn	250	232	92.6%	62.0	17.0	E
	Through	708	707	99.9%	17.1	3.7	B
	Right Turn	60	69	115.3%	4.9	1.2	A
	Subtotal	1,018	1,008	99.0%	26.8	4.2	C
Total		2,813	2,806	99.7%	28.9	3.5	C

Intersection 2 W Stockton Blvd-SR 99 SB Ramps/Sheldon Rd Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		LOS
			Average	Percent	Average	Std. Dev.	
NB	Left Turn	206	207	100.4%	38.5	3.6	D
	Through	8	8	105.0%	30.2	26.7	C
	Right Turn	137	141	103.1%	17.8	3.6	B
	Subtotal	351	356	101.5%	30.2	2.9	C
SB	Left Turn	217	223	102.7%	46.0	8.4	D
	Through	81	78	96.8%	46.8	6.9	D
	Right Turn	20	21	106.0%	28.8	14.1	C
	Subtotal	318	322	101.4%	45.1	7.1	D
EB	Left Turn	75	83	110.4%	41.2	4.9	D
	Through	1,435	1,400	97.6%	32.8	3.0	C
	Right Turn	203	220	108.4%	7.8	1.5	A
	Subtotal	1,713	1,703	99.4%	30.0	2.7	C
WB	Left Turn	405	401	99.0%	34.5	3.2	C
	Through	918	922	100.5%	27.1	5.3	C
	Right Turn	371	372	100.2%	9.9	2.0	A
	Subtotal	1,694	1,695	100.0%	25.2	2.8	C
Total		4,076	4,076	100.0%	29.3	2.0	C

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Sheldon Maverik Gas Station
Existing Conditions
AM Peak Hour

Intersection 3

SR 99 NB Ramps/Sheldon Rd

Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		LOS
			Average	Percent	Average	Std. Dev.	
NB	Left Turn	127	126	98.9%	25.7	4.3	C
	Through						
	Right Turn	183	185	101.0%	13.0	2.9	B
	Subtotal	310	310	100.1%	18.1	2.1	B
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	1,319	1,311	99.4%	6.9	0.9	A
	Right Turn	470	475	101.1%	5.6	0.3	A
	Subtotal	1,789	1,786	99.9%	6.6	0.7	A
WB	Left Turn						
	Through	2,142	2,209	103.1%	8.0	1.6	A
	Right Turn						
	Subtotal	2,142	2,209	103.1%	8.0	1.6	A
Total		4,241	4,306	101.5%	8.1	1.1	A

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Sheldon Maverik Gas Station
Existing Conditions
PM Peak Hour

Intersection 1 Jocelyn Way-Lewis Stein Rd/Sheldon Rd Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		LOS
			Average	Percent	Average	Std. Dev.	
NB	Left Turn	325	326	100.2%	43.5	3.6	D
	Through	84	87	103.3%	37.0	7.2	D
	Right Turn	403	384	95.4%	14.9	1.9	B
	Subtotal	812	797	98.1%	29.0	2.2	C
SB	Left Turn	67	56	83.0%	49.6	9.6	D
	Through	46	46	99.1%	45.4	9.1	D
	Right Turn	20	20	100.0%	10.4	3.5	B
	Subtotal	133	121	91.1%	41.4	5.5	D
EB	Left Turn	16	16	97.5%	55.5	30.6	E
	Through	728	706	96.9%	27.7	3.7	C
	Right Turn	139	140	100.7%	15.3	2.3	B
	Subtotal	883	861	97.5%	26.3	3.5	C
WB	Left Turn	410	405	98.7%	45.9	11.1	D
	Through	1,075	1,108	103.1%	23.5	3.6	C
	Right Turn	85	84	99.3%	6.1	1.3	A
	Subtotal	1,570	1,598	101.8%	28.4	4.4	C
Total		3,398	3,377	99.4%	28.5	2.2	C

Intersection 2 W Stockton Blvd-SR 99 SB Ramps/Sheldon Rd Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		LOS
			Average	Percent	Average	Std. Dev.	
NB	Left Turn	367	380	103.5%	42.4	3.6	D
	Through	44	49	110.9%	35.7	12.5	D
	Right Turn	460	453	98.5%	18.7	2.2	B
	Subtotal	871	882	101.3%	30.0	2.4	C
SB	Left Turn	150	155	103.5%	47.0	4.0	D
	Through	136	155	114.1%	49.1	7.3	D
	Right Turn	46	55	119.1%	34.7	6.5	C
	Subtotal	332	365	110.0%	46.2	3.6	D
EB	Left Turn	38	44	116.8%	65.0	12.0	E
	Through	1,172	1,047	89.3%	27.5	1.8	C
	Right Turn	191	193	100.9%	7.2	1.0	A
	Subtotal	1,401	1,284	91.6%	25.8	1.7	C
WB	Left Turn	409	443	108.4%	61.7	7.7	E
	Through	1,453	1,354	93.2%	19.4	3.0	B
	Right Turn	242	240	99.2%	6.1	1.1	A
	Subtotal	2,104	2,037	96.8%	27.1	3.4	C
Total		4,708	4,568	97.0%	28.8	1.8	C

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Sheldon Maverik Gas Station
Existing Conditions
PM Peak Hour

Intersection 3 SR 99 NB Ramps/Sheldon Rd Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		
			Average	Percent	Average	Std. Dev.	LOS
NB	Left Turn	291	294	101.2%	27.8	5.7	C
	Through						
	Right Turn	323	332	102.7%	16.3	2.0	B
	Subtotal	614	626	102.0%	21.7	3.5	C
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	1,406	1,356	96.5%	11.6	1.5	B
	Right Turn	376	378	100.5%	4.9	0.4	A
	Subtotal	1,782	1,734	97.3%	10.1	1.2	B
WB	Left Turn						
	Through	2,100	2,138	101.8%	11.5	1.9	B
	Right Turn						
	Subtotal	2,100	2,138	101.8%	11.5	1.9	B
Total		4,496	4,498	100.0%	12.4	1.1	B

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Sheldon Maverik Gas Station
Existing Plus Project
AM Peak Hour

Intersection 1 Jocelyn Way-Lewis Stein Rd/Sheldon Rd Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		
			Average	Percent	Average	Std. Dev.	LOS
NB	Left Turn	114	117	102.8%	34.7	6.5	C
	Through	33	30	92.1%	54.8	15.6	D
	Right Turn	505	517	102.4%	48.6	18.6	D
	Subtotal	652	665	102.0%	46.6	14.6	D
SB	Left Turn	160	177	110.8%	40.2	4.8	D
	Through	40	42	106.0%	42.4	10.2	D
	Right Turn	16	11	67.5%	5.6	2.0	A
	Subtotal	216	230	106.7%	38.8	4.0	D
EB	Left Turn	8	7	85.0%	72.2	23.9	E
	Through	876	878	100.2%	26.9	1.4	C
	Right Turn	53	55	104.2%	12.4	1.7	B
	Subtotal	937	940	100.3%	26.4	1.4	C
WB	Left Turn	251	241	95.9%	75.9	20.1	E
	Through	713	711	99.7%	14.4	2.9	B
	Right Turn	60	56	93.3%	4.1	1.0	A
	Subtotal	1,024	1,008	98.4%	28.7	6.6	C
Total		2,829	2,843	100.5%	33.0	4.6	C

Intersection 2 W Stockton Blvd-SR 99 SB Ramps/Sheldon Rd Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		
			Average	Percent	Average	Std. Dev.	LOS
NB	Left Turn	210	214	101.7%	39.5	3.9	D
	Through	10	8	76.0%	38.7	32.6	D
	Right Turn	137	139	101.6%	18.3	3.8	B
	Subtotal	357	360	101.0%	31.4	2.8	C
SB	Left Turn	265	271	102.2%	61.8	14.9	E
	Through	87	92	105.7%	43.5	8.4	D
	Right Turn	23	26	113.0%	23.2	9.9	C
	Subtotal	375	389	103.7%	55.2	12.0	E
EB	Left Turn	86	81	94.0%	41.0	6.3	D
	Through	1,438	1,466	102.0%	34.6	1.6	C
	Right Turn	204	206	101.0%	7.2	1.4	A
	Subtotal	1,728	1,753	101.5%	31.7	1.5	C
WB	Left Turn	405	416	102.8%	39.1	7.6	D
	Through	965	962	99.6%	26.3	4.4	C
	Right Turn	339	342	101.0%	8.1	1.6	A
	Subtotal	1,709	1,720	100.7%	25.8	2.5	C
Total		4,169	4,223	101.3%	31.5	1.7	C

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Sheldon Maverik Gas Station
Existing Plus Project
AM Peak Hour

Intersection 3

SR 99 NB Ramps/Sheldon Rd

Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		LOS
			Average	Percent	Average	Std. Dev.	
NB	Left Turn	134	125	93.1%	25.4	4.1	C
	Through						
	Right Turn	183	179	97.7%	14.0	2.6	B
	Subtotal	317	304	95.8%	18.6	3.1	B
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	1,344	1,402	104.3%	7.2	0.8	A
	Right Turn	496	506	102.0%	5.7	0.3	A
	Subtotal	1,840	1,908	103.7%	6.8	0.6	A
WB	Left Turn						
	Through	2,150	2,211	102.8%	7.7	1.3	A
	Right Turn						
	Subtotal	2,150	2,211	102.8%	7.7	1.3	A
Total		4,307	4,423	102.7%	8.0	0.8	A

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Sheldon Maverik Gas Station
Existing Plus Project
PM Peak Hour

Intersection 1 Jocelyn Way-Lewis Stein Rd/Sheldon Rd Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		
			Average	Percent	Average	Std. Dev.	LOS
NB	Left Turn	325	302	92.8%	43.5	5.8	D
	Through	84	81	96.2%	38.1	6.3	D
	Right Turn	405	395	97.6%	15.6	4.6	B
	Subtotal	814	778	95.5%	29.1	4.3	C
SB	Left Turn	67	59	88.4%	48.6	3.7	D
	Through	46	40	87.8%	54.5	15.4	D
	Right Turn	20	24	122.0%	8.7	3.6	A
	Subtotal	133	124	93.2%	43.0	6.4	D
EB	Left Turn	16	18	110.0%	67.2	13.4	E
	Through	732	693	94.7%	29.9	3.7	C
	Right Turn	139	131	94.1%	17.3	3.4	B
	Subtotal	887	842	94.9%	28.7	3.6	C
WB	Left Turn	412	436	105.8%	66.7	38.4	E
	Through	1,082	1,103	102.0%	24.5	4.2	C
	Right Turn	86	91	106.0%	6.2	1.8	A
	Subtotal	1,580	1,630	103.2%	35.0	12.7	D
Total		3,414	3,374	98.8%	32.4	6.5	C

Intersection 2 W Stockton Blvd-SR 99 SB Ramps/Sheldon Rd Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		
			Average	Percent	Average	Std. Dev.	LOS
NB	Left Turn	375	396	105.7%	45.1	4.1	D
	Through	45	52	114.7%	37.7	7.4	D
	Right Turn	460	484	105.1%	21.2	2.4	C
	Subtotal	880	932	105.9%	32.3	2.3	C
SB	Left Turn	177	184	104.2%	50.1	9.5	D
	Through	146	158	108.2%	49.1	6.3	D
	Right Turn	52	53	102.3%	34.4	11.3	C
	Subtotal	375	396	105.5%	47.6	6.8	D
EB	Left Turn	52	49	94.6%	54.7	8.1	D
	Through	1,174	1,084	92.3%	25.3	2.1	C
	Right Turn	192	188	98.1%	5.0	1.4	A
	Subtotal	1,418	1,322	93.2%	23.5	1.9	C
WB	Left Turn	409	410	100.2%	59.4	5.5	E
	Through	1,484	1,410	95.0%	19.3	2.6	B
	Right Turn	222	217	97.7%	6.8	1.7	A
	Subtotal	2,115	2,037	96.3%	26.1	1.7	C
Total		4,788	4,686	97.9%	28.4	1.4	C

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Sheldon Maverik Gas Station
Existing Plus Project
PM Peak Hour

Intersection 3

SR 99 NB Ramps/Sheldon Rd

Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		LOS
			Average	Percent	Average	Std. Dev.	
NB	Left Turn	295	270	91.4%	27.2	5.4	C
	Through						
	Right Turn	323	320	98.9%	16.1	2.3	B
	Subtotal	618	589	95.3%	21.2	3.0	C
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	1,420	1,442	101.5%	12.7	1.6	B
	Right Turn	391	399	102.1%	4.9	0.4	A
	Subtotal	1,811	1,841	101.7%	11.0	1.3	B
WB	Left Turn						
	Through	2,107	2,156	102.3%	11.8	2.0	B
	Right Turn						
	Subtotal	2,107	2,156	102.3%	11.8	2.0	B
Total		4,536	4,586	101.1%	12.7	1.3	B

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Sheldon Maverik Gas Station
Cumulative No Project
AM Peak Hour

Intersection 1 Jocelyn Way-Lewis Stein Rd/Sheldon Rd Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		LOS
			Average	Percent	Average	Std. Dev.	
NB	Left Turn	125	158	126.4%	35.0	5.5	D
	Through	40	37	93.0%	36.0	6.9	D
	Right Turn	510	495	97.1%	30.8	7.8	C
	Subtotal	675	690	102.3%	32.0	6.3	C
SB	Left Turn	160	164	102.3%	43.8	4.7	D
	Through	50	55	110.4%	40.2	8.6	D
	Right Turn	20	24	122.0%	6.5	3.1	A
	Subtotal	230	243	105.7%	38.9	2.9	D
EB	Left Turn	15	11	72.0%	68.0	20.4	E
	Through	1,090	1,054	96.7%	30.8	5.7	C
	Right Turn	80	80	99.5%	14.7	2.5	B
	Subtotal	1,185	1,144	96.6%	30.0	5.4	C
WB	Left Turn	305	270	88.4%	48.5	8.2	D
	Through	710	731	103.0%	16.5	4.7	B
	Right Turn	60	61	102.0%	5.0	1.5	A
	Subtotal	1,075	1,062	98.8%	24.1	4.5	C
Total		3,165	3,140	99.2%	29.3	2.8	C

Intersection 2 W Stockton Blvd-SR 99 SB Ramps/Sheldon Rd Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		LOS
			Average	Percent	Average	Std. Dev.	
NB	Left Turn	210	214	102.1%	39.7	4.9	D
	Through	30	29	97.3%	40.7	12.0	D
	Right Turn	210	218	104.0%	19.8	1.5	B
	Subtotal	450	462	102.7%	30.5	2.9	C
SB	Left Turn	270	266	98.5%	62.9	17.7	E
	Through	110	110	100.0%	48.0	9.1	D
	Right Turn	30	26	85.3%	35.3	11.4	D
	Subtotal	410	402	98.0%	56.8	13.4	E
EB	Left Turn	100	105	104.8%	48.6	12.0	D
	Through	1,590	1,536	96.6%	45.6	5.7	D
	Right Turn	210	206	97.9%	11.4	2.6	B
	Subtotal	1,900	1,847	97.2%	42.1	5.6	D
WB	Left Turn	550	500	90.9%	102.4	42.1	F
	Through	930	930	100.0%	29.6	2.6	C
	Right Turn	380	377	99.3%	10.8	1.7	B
	Subtotal	1,860	1,807	97.1%	46.2	13.2	D
Total		4,620	4,517	97.8%	43.8	5.2	D

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Sheldon Maverik Gas Station
Cumulative No Project
AM Peak Hour

Intersection 3

SR 99 NB Ramps/Sheldon Rd

Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		LOS
			Average	Percent	Average	Std. Dev.	
NB	Left Turn	130	122	94.2%	28.3	6.8	C
	Through						
	Right Turn	190	178	93.7%	15.7	2.7	B
	Subtotal	320	300	93.9%	20.9	3.9	C
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	1,520	1,510	99.3%	10.0	3.3	B
	Right Turn	550	540	98.1%	6.6	0.5	A
	Subtotal	2,070	2,050	99.0%	9.2	2.6	A
WB	Left Turn						
	Through	2,500	2,511	100.4%	9.8	2.6	A
	Right Turn						
	Subtotal	2,500	2,511	100.4%	9.8	2.6	A
Total		4,890	4,861	99.4%	10.2	2.2	B

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Sheldon Maverik Gas Station
Cumulative No Project
PM Peak Hour

Intersection 1 Jocelyn Way-Lewis Stein Rd/Sheldon Rd Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		LOS
			Average	Percent	Average	Std. Dev.	
NB	Left Turn	360	385	107.0%	48.3	7.8	D
	Through	100	107	107.2%	35.4	7.0	D
	Right Turn	500	504	100.7%	25.1	4.6	C
	Subtotal	960	996	103.8%	35.2	4.5	D
SB	Left Turn	70	71	101.7%	48.1	8.1	D
	Through	60	62	104.0%	41.7	10.2	D
	Right Turn	30	32	105.3%	12.9	3.9	B
	Subtotal	160	165	103.3%	38.5	6.8	D
EB	Left Turn	25	30	120.0%	62.9	17.5	E
	Through	970	986	101.7%	33.3	9.2	C
	Right Turn	180	177	98.4%	19.6	4.3	B
	Subtotal	1,175	1,194	101.6%	32.1	7.8	C
WB	Left Turn	460	457	99.4%	57.6	2.7	E
	Through	1,500	1,430	95.3%	27.1	2.8	C
	Right Turn	90	92	102.2%	7.0	1.2	A
	Subtotal	2,050	1,979	96.5%	33.3	2.2	C
Total		4,345	4,334	99.7%	33.5	2.4	C

Intersection 2 W Stockton Blvd-SR 99 SB Ramps/Sheldon Rd Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		LOS
			Average	Percent	Average	Std. Dev.	
NB	Left Turn	390	425	108.9%	56.1	14.7	E
	Through	70	81	116.0%	40.8	10.2	D
	Right Turn	810	811	100.1%	34.2	6.9	C
	Subtotal	1,270	1,317	103.7%	42.0	5.8	D
SB	Left Turn	220	227	103.1%	77.7	21.9	E
	Through	150	152	101.3%	68.5	24.5	E
	Right Turn	70	77	110.3%	51.8	23.6	D
	Subtotal	440	456	103.6%	70.6	21.2	E
EB	Left Turn	70	61	87.4%	59.9	11.7	E
	Through	1,490	1,396	93.7%	43.0	5.7	D
	Right Turn	200	194	97.0%	10.1	1.6	B
	Subtotal	1,760	1,652	93.8%	39.9	5.6	D
WB	Left Turn	570	567	99.5%	71.0	9.7	E
	Through	1,880	1,744	92.8%	40.8	7.1	D
	Right Turn	330	328	99.3%	17.9	4.0	B
	Subtotal	2,780	2,639	94.9%	44.5	5.6	D
Total		6,250	6,064	97.0%	44.8	2.9	D

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Sheldon Maverik Gas Station
Cumulative No Project
PM Peak Hour

Intersection 3 SR 99 NB Ramps/Sheldon Rd Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		
			Average	Percent	Average	Std. Dev.	LOS
NB	Left Turn	420	418	99.6%	43.4	8.8	D
	Through						
	Right Turn	430	440	102.4%	39.4	5.9	D
	Subtotal	850	859	101.0%	41.3	6.7	D
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	2,120	2,085	98.4%	14.7	1.9	B
	Right Turn	400	410	102.5%	6.8	0.9	A
	Subtotal	2,520	2,495	99.0%	13.4	1.7	B
WB	Left Turn						
	Through	2,790	2,682	96.1%	23.5	4.2	C
	Right Turn						
	Subtotal	2,790	2,682	96.1%	23.5	4.2	C
Total		6,160	6,036	98.0%	21.8	2.0	C

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Sheldon Maverik Gas Station
Cumulative Plus Project
AM Peak Hour

Intersection 1 Jocelyn Way-Lewis Stein Rd/Sheldon Rd Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		LOS
			Average	Percent	Average	Std. Dev.	
NB	Left Turn	125	116	93.1%	41.0	7.2	D
	Through	40	49	123.0%	48.4	22.3	D
	Right Turn	513	542	105.7%	43.8	25.2	D
	Subtotal	678	708	104.4%	44.0	21.0	D
SB	Left Turn	161	154	95.9%	55.6	5.4	E
	Through	50	50	100.0%	40.7	14.5	D
	Right Turn	20	16	82.0%	5.4	2.5	A
	Subtotal	231	221	95.6%	48.5	4.3	D
EB	Left Turn	15	16	106.7%	81.1	12.7	F
	Through	1,096	1,017	92.8%	40.0	11.7	D
	Right Turn	80	82	103.0%	20.0	4.0	B
	Subtotal	1,191	1,115	93.6%	39.2	11.4	D
WB	Left Turn	306	330	107.8%	57.1	8.3	E
	Through	715	708	99.1%	19.3	1.9	B
	Right Turn	60	54	90.0%	4.3	0.7	A
	Subtotal	1,081	1,092	101.1%	30.0	2.8	C
Total		3,181	3,136	98.6%	38.1	7.7	D

Intersection 2 W Stockton Blvd-SR 99 SB Ramps/Sheldon Rd Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		LOS
			Average	Percent	Average	Std. Dev.	
NB	Left Turn	214	206	96.4%	46.9	8.2	D
	Through	32	29	90.0%	49.0	13.3	D
	Right Turn	210	202	96.0%	18.2	2.9	B
	Subtotal	456	437	95.8%	33.5	3.5	C
SB	Left Turn	318	319	100.4%	54.4	9.8	D
	Through	116	120	103.8%	39.9	8.6	D
	Right Turn	33	34	101.8%	27.8	11.5	C
	Subtotal	467	473	101.3%	48.6	6.9	D
EB	Left Turn	111	107	96.6%	49.5	6.9	D
	Through	1,593	1,439	90.3%	56.5	5.9	E
	Right Turn	211	213	100.9%	11.2	1.6	B
	Subtotal	1,915	1,759	91.8%	50.6	4.8	D
WB	Left Turn	550	568	103.2%	72.1	22.7	E
	Through	977	972	99.5%	33.8	3.8	C
	Right Turn	348	336	96.7%	11.6	1.7	B
	Subtotal	1,875	1,876	100.1%	41.5	6.0	D
Total		4,713	4,545	96.4%	45.1	3.2	D

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Sheldon Maverik Gas Station
Cumulative Plus Project
AM Peak Hour

Intersection 3

SR 99 NB Ramps/Sheldon Rd

Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		LOS
			Average	Percent	Average	Std. Dev.	
NB	Left Turn	137	140	101.9%	30.6	4.2	C
	Through						
	Right Turn	190	203	106.7%	14.6	2.9	B
	Subtotal	327	342	104.7%	21.1	1.9	C
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	1,545	1,449	93.8%	8.8	1.7	A
	Right Turn	576	553	96.0%	6.6	0.4	A
	Subtotal	2,121	2,002	94.4%	8.2	1.3	A
WB	Left Turn						
	Through	2,508	2,404	95.8%	9.8	2.0	A
	Right Turn						
	Subtotal	2,508	2,404	95.8%	9.8	2.0	A
Total		4,956	4,748	95.8%	9.9	1.5	A

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Sheldon Maverik Gas Station
Cumulative Plus Project
PM Peak Hour

Intersection 1 Jocelyn Way-Lewis Stein Rd/Sheldon Rd Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		LOS
			Average	Percent	Average	Std. Dev.	
NB	Left Turn	360	394	109.3%	37.3	4.5	D
	Through	100	119	119.2%	36.5	10.9	D
	Right Turn	502	521	103.8%	28.7	6.2	C
	Subtotal	962	1,034	107.5%	33.0	3.0	C
SB	Left Turn	70	78	112.0%	45.7	6.4	D
	Through	60	65	108.7%	47.2	6.7	D
	Right Turn	30	27	90.7%	10.0	5.9	A
	Subtotal	160	171	106.8%	40.3	3.2	D
EB	Left Turn	25	28	112.0%	70.3	13.4	E
	Through	974	983	100.9%	30.9	2.6	C
	Right Turn	180	171	95.1%	15.2	1.6	B
	Subtotal	1,179	1,182	100.3%	29.6	2.4	C
WB	Left Turn	462	444	96.0%	64.1	4.4	E
	Through	1,507	1,438	95.4%	34.7	4.2	C
	Right Turn	91	88	97.1%	12.6	2.6	B
	Subtotal	2,060	1,970	95.7%	40.4	3.1	D
Total		4,361	4,357	99.9%	35.7	1.5	D

Intersection 2 W Stockton Blvd-SR 99 SB Ramps/Sheldon Rd Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		LOS
			Average	Percent	Average	Std. Dev.	
NB	Left Turn	398	444	111.6%	51.9	5.9	D
	Through	71	76	107.6%	43.0	9.9	D
	Right Turn	810	830	102.5%	44.0	11.7	D
	Subtotal	1,279	1,350	105.6%	46.7	7.4	D
SB	Left Turn	247	267	108.0%	70.5	20.4	E
	Through	160	166	103.5%	63.4	9.3	E
	Right Turn	76	84	110.5%	47.7	11.8	D
	Subtotal	483	516	106.9%	65.0	12.3	E
EB	Left Turn	84	69	82.4%	67.3	11.0	E
	Through	1,492	1,492	100.0%	51.1	5.0	D
	Right Turn	201	198	98.7%	8.1	1.4	A
	Subtotal	1,777	1,759	99.0%	46.8	4.8	D
WB	Left Turn	570	492	86.4%	113.2	36.0	F
	Through	1,911	1,842	96.4%	41.1	8.1	D
	Right Turn	310	316	102.1%	18.9	6.0	B
	Subtotal	2,791	2,650	95.0%	51.8	6.7	D
Total		6,330	6,276	99.2%	50.5	4.8	D

SimTraffic Post-Processor
Average Results from 10 Runs
Volume and Delay by Movement

Sheldon Maverik Gas Station
Cumulative Plus Project
PM Peak Hour

Intersection 3

SR 99 NB Ramps/Sheldon Rd

Signal

Direction	Movement	Demand Volume (vph)	Served Volume (vph)		Total Delay (sec/veh)		LOS
			Average	Percent	Average	Std. Dev.	
NB	Left Turn	424	402	94.7%	43.4	4.5	D
	Through						
	Right Turn	430	432	100.4%	45.1	10.5	D
	Subtotal	854	833	97.6%	44.2	7.3	D
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	2,134	2,198	103.0%	17.9	4.4	B
	Right Turn	415	435	104.9%	7.6	1.3	A
	Subtotal	2,549	2,634	103.3%	16.2	3.9	B
WB	Left Turn						
	Through	2,797	2,748	98.3%	23.7	2.2	C
	Right Turn						
	Subtotal	2,797	2,748	98.3%	23.7	2.2	C
Total		6,200	6,215	100.2%	23.3	1.7	C

Intersection: 1: Lewis Stein Rd/Jocelyn Way & Sheldon Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	UL	L	T	T	R	UL	T	T	T	R	UL	L
Maximum Queue (ft)	15	23	240	311	68	296	202	158	169	76	84	104
Average Queue (ft)	3	5	154	221	20	216	111	98	104	28	32	57
95th Queue (ft)	18	23	262	347	92	334	218	172	183	83	81	101
Link Distance (ft)			2456	2456			704	704	704			1318
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			300	320				180	170	
Storage Blk Time (%)			0	1		3			1		0	0
Queuing Penalty (veh)			0	1		8			1		0	0

Intersection: 1: Lewis Stein Rd/Jocelyn Way & Sheldon Rd

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	L	T	R
Maximum Queue (ft)	348	230	106	151	65	26
Average Queue (ft)	147	195	36	100	30	7
95th Queue (ft)	402	271	102	165	66	26
Link Distance (ft)	1318				862	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		170	200	200		150
Storage Blk Time (%)	0	28		0		
Queuing Penalty (veh)	0	9		0		

Intersection: 2: SB SR 99 Ramps/W Stockton Blvd & Sheldon Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	NB
Directions Served	L	T	T	T	R	L	L	T	T	T	R	L
Maximum Queue (ft)	123	229	311	392	75	188	189	226	182	189	152	98
Average Queue (ft)	73	150	229	327	45	131	133	143	121	121	70	53
95th Queue (ft)	139	229	329	417	79	200	193	245	196	214	166	106
Link Distance (ft)		653	653	653				650	650	650		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280				400	680	680				180	310
Storage Blk Time (%)		0		1					3		0	
Queuing Penalty (veh)		0		2					11		1	

Intersection: 2: SB SR 99 Ramps/W Stockton Blvd & Sheldon Rd

Movement	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	R	L	TR
Maximum Queue (ft)	121	26	72	74	233	188
Average Queue (ft)	73	6	39	40	147	99
95th Queue (ft)	121	27	79	78	248	241
Link Distance (ft)	433	433	433			1472
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)				310	230	
Storage Blk Time (%)					5	0
Queuing Penalty (veh)					5	0

Intersection: 3: NB SR 99 Ramps & Sheldon Rd

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	T	T	T	T	T	L	LR	R
Maximum Queue (ft)	90	94	119	177	128	142	128	74	130	88
Average Queue (ft)	37	36	53	84	49	73	59	28	80	52
95th Queue (ft)	84	87	113	183	127	148	145	70	137	98
Link Distance (ft)	180	180	180	632	632	632	632	557	557	557
Upstream Blk Time (%)			0							
Queuing Penalty (veh)			0							
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 1: Lewis Stein Rd/Jocelyn Way & Sheldon Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	UL	L	T	T	R	UL	T	T	T	R	UL	L
Maximum Queue (ft)	22	29	225	302	136	360	376	314	264	131	182	191
Average Queue (ft)	7	7	141	193	48	272	203	177	195	41	119	128
95th Queue (ft)	25	27	246	327	133	411	405	298	279	142	188	206
Link Distance (ft)			2456	2456			704	704	704			1318
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			300	320				180	170	
Storage Blk Time (%)			0	1		9			12		2	4
Queuing Penalty (veh)			0	1		32			10		2	7

Intersection: 1: Lewis Stein Rd/Jocelyn Way & Sheldon Rd

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	L	T	R
Maximum Queue (ft)	165	190	42	94	89	26
Average Queue (ft)	74	125	9	39	39	12
95th Queue (ft)	171	205	42	96	91	30
Link Distance (ft)	1318				862	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		170	200	200		150
Storage Blk Time (%)	0	2				
Queuing Penalty (veh)	1	2				

Intersection: 2: SB SR 99 Ramps/W Stockton Blvd & Sheldon Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	NB
Directions Served	L	T	T	T	R	L	L	T	T	T	R	L
Maximum Queue (ft)	91	162	232	296	73	223	234	232	234	230	80	170
Average Queue (ft)	45	93	151	211	37	150	161	122	117	130	14	128
95th Queue (ft)	99	169	243	319	77	232	247	225	225	226	71	189
Link Distance (ft)		653	653	653				650	650	650		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280				400	680	680				180	310
Storage Blk Time (%)				0						4		
Queuing Penalty (veh)				0						9		

Intersection: 2: SB SR 99 Ramps/W Stockton Blvd & Sheldon Rd

Movement	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	R	L	TR
Maximum Queue (ft)	198	66	141	152	190	237
Average Queue (ft)	156	38	100	104	131	157
95th Queue (ft)	227	85	151	162	211	245
Link Distance (ft)	433	433	433			1472
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)				310	230	
Storage Blk Time (%)					0	2
Queuing Penalty (veh)					1	2

Intersection: 3: NB SR 99 Ramps & Sheldon Rd

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	T	T	T	T	T	L	LR	R
Maximum Queue (ft)	154	167	209	297	251	286	130	137	205	157
Average Queue (ft)	89	98	130	148	108	126	48	83	142	85
95th Queue (ft)	172	178	224	315	261	283	130	153	211	155
Link Distance (ft)	180	180	180	632	632	632	632	557	557	557
Upstream Blk Time (%)	0	0	2							
Queuing Penalty (veh)	1	2	9							
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 1: Lewis Stein Rd/Jocelyn Way & Sheldon Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	UL	L	T	T	R	UL	T	T	T	R	UL	L
Maximum Queue (ft)	20	19	259	319	40	343	187	142	142	44	82	101
Average Queue (ft)	4	3	174	238	12	249	88	85	95	20	34	50
95th Queue (ft)	20	14	279	353	37	383	187	155	152	47	90	101
Link Distance (ft)			2456	2456			704	704	704			1318
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			300	320				180	170	
Storage Blk Time (%)			0	1		5	0		0			
Queuing Penalty (veh)			0	1		13	0		0			

Intersection: 1: Lewis Stein Rd/Jocelyn Way & Sheldon Rd

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	L	T	R
Maximum Queue (ft)	463	229	90	164	68	28
Average Queue (ft)	288	206	26	96	32	6
95th Queue (ft)	638	278	81	163	75	26
Link Distance (ft)	1318				862	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		170	200	200		150
Storage Blk Time (%)		49		0		
Queuing Penalty (veh)		16		0		

Intersection: 2: SB SR 99 Ramps/W Stockton Blvd & Sheldon Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	NB
Directions Served	UL	T	T	T	R	L	L	T	T	T	R	L
Maximum Queue (ft)	120	257	329	419	94	198	204	219	202	214	124	107
Average Queue (ft)	72	176	248	357	54	139	148	140	125	141	51	53
95th Queue (ft)	126	267	352	445	96	208	217	238	222	229	128	111
Link Distance (ft)		359	359	359	359			650	650	650		
Upstream Blk Time (%)			0	11								
Queuing Penalty (veh)			0	46								
Storage Bay Dist (ft)	280					680	680				180	310
Storage Blk Time (%)		0							5		0	
Queuing Penalty (veh)		0							16		0	

Intersection: 2: SB SR 99 Ramps/W Stockton Blvd & Sheldon Rd

Movement	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	R	L	TR
Maximum Queue (ft)	136	21	76	65	273	301
Average Queue (ft)	81	6	39	33	208	136
95th Queue (ft)	140	25	76	64	315	341
Link Distance (ft)	433	433	433			561
Upstream Blk Time (%)						0
Queuing Penalty (veh)						1
Storage Bay Dist (ft)				310	230	
Storage Blk Time (%)					14	
Queuing Penalty (veh)					15	

Intersection: 3: NB SR 99 Ramps & Sheldon Rd

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	T	T	T	T	T	L	LR	R
Maximum Queue (ft)	80	94	111	185	143	165	164	66	128	101
Average Queue (ft)	42	46	60	76	49	74	65	28	79	52
95th Queue (ft)	86	107	119	170	139	156	170	66	137	105
Link Distance (ft)	180	180	180	632	632	632	632	557	557	557
Upstream Blk Time (%)		0								
Queuing Penalty (veh)		1								
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 1: Lewis Stein Rd/Jocelyn Way & Sheldon Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	UL	L	T	T	R	UL	T	T	T	R	UL	L
Maximum Queue (ft)	22	29	273	334	125	387	454	364	279	96	167	204
Average Queue (ft)	5	12	144	211	53	332	303	236	195	39	111	125
95th Queue (ft)	22	32	280	366	153	449	675	484	287	120	185	218
Link Distance (ft)			2456	2456			704	704	704			1318
Upstream Blk Time (%)							2					
Queuing Penalty (veh)							13					
Storage Bay Dist (ft)	280	280			300	320				180	170	
Storage Blk Time (%)			0	2		24	0		12		2	3
Queuing Penalty (veh)			0	3		85	0		10		2	6

Intersection: 1: Lewis Stein Rd/Jocelyn Way & Sheldon Rd

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	L	T	R
Maximum Queue (ft)	170	185	37	86	64	28
Average Queue (ft)	87	125	10	39	35	13
95th Queue (ft)	220	216	36	88	77	34
Link Distance (ft)	1318				862	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		170	200	200		150
Storage Blk Time (%)	0	5				
Queuing Penalty (veh)	0	4				

Intersection: 2: SB SR 99 Ramps/W Stockton Blvd & Sheldon Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	NB
Directions Served	UL	T	T	T	R	L	L	T	T	T	R	L
Maximum Queue (ft)	78	182	244	296	78	217	222	233	267	295	196	188
Average Queue (ft)	44	107	160	212	43	137	145	124	124	154	39	138
95th Queue (ft)	84	188	246	304	83	214	220	247	263	301	184	212
Link Distance (ft)		359	359	359	359			650	650	650		
Upstream Blk Time (%)				0								
Queuing Penalty (veh)				0								
Storage Bay Dist (ft)	280					680	680				180	310
Storage Blk Time (%)										5		
Queuing Penalty (veh)										11		

Intersection: 2: SB SR 99 Ramps/W Stockton Blvd & Sheldon Rd

Movement	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	R	L	TR
Maximum Queue (ft)	233	89	162	169	218	216
Average Queue (ft)	167	44	117	120	158	153
95th Queue (ft)	249	95	174	193	238	229
Link Distance (ft)	433	433	433			561
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)				310	230	
Storage Blk Time (%)	0				1	0
Queuing Penalty (veh)	0				2	1

Intersection: 3: NB SR 99 Ramps & Sheldon Rd

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	T	T	T	T	T	L	LR	R
Maximum Queue (ft)	202	207	238	276	218	271	100	118	197	148
Average Queue (ft)	113	124	149	141	97	128	42	69	133	89
95th Queue (ft)	205	213	246	298	224	283	111	133	202	156
Link Distance (ft)	180	180	180	632	632	632	632	557	557	557
Upstream Blk Time (%)	1	2	4							
Queuing Penalty (veh)	6	10	18							
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 1: Lewis Stein Rd/Jocelyn Way & Sheldon Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	NB
Directions Served	UL	L	T	T	R	UL	L	T	T	T	R	UL
Maximum Queue (ft)	22	31	328	408	206	156	168	133	144	155	53	88
Average Queue (ft)	6	10	215	281	67	111	127	72	85	102	26	40
95th Queue (ft)	25	31	356	440	254	172	186	141	157	178	56	88
Link Distance (ft)			2456	2456				704	704	704		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			300	320	320				180	170
Storage Blk Time (%)			2	7						2		
Queuing Penalty (veh)			0	6						1		

Intersection: 1: Lewis Stein Rd/Jocelyn Way & Sheldon Rd

Movement	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	T	R	L	L	T	R
Maximum Queue (ft)	109	356	230	81	146	81	28
Average Queue (ft)	68	145	199	29	93	40	12
95th Queue (ft)	120	400	270	80	154	84	33
Link Distance (ft)	1317	1317				861	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			170	200	200		150
Storage Blk Time (%)		0	26		0		
Queuing Penalty (veh)		1	10		0		

Intersection: 2: SB SR 99 Ramps/W Stockton Blvd & Sheldon Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	NB
Directions Served	L	T	T	T	R	L	L	T	T	T	R	L
Maximum Queue (ft)	141	315	401	545	297	391	398	290	202	191	175	102
Average Queue (ft)	89	217	299	424	106	294	302	170	141	132	79	56
95th Queue (ft)	170	343	434	579	369	493	506	304	219	209	173	108
Link Distance (ft)		653	653	653				650	650	650		
Upstream Blk Time (%)				0								
Queuing Penalty (veh)				1								
Storage Bay Dist (ft)	280				400	680	680				180	310
Storage Blk Time (%)		2		18						2	1	
Queuing Penalty (veh)		2		39						7	2	

Intersection: 2: SB SR 99 Ramps/W Stockton Blvd & Sheldon Rd

Movement	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	R	L	TR
Maximum Queue (ft)	124	60	101	98	277	329
Average Queue (ft)	76	25	57	55	207	169
95th Queue (ft)	130	64	100	99	316	388
Link Distance (ft)	433	433	433			1472
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)				310	230	
Storage Blk Time (%)					16	1
Queuing Penalty (veh)					23	2

Intersection: 3: NB SR 99 Ramps & Sheldon Rd

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	T	T	T	T	T	L	LR	R
Maximum Queue (ft)	146	156	178	276	192	202	231	73	128	85
Average Queue (ft)	66	78	90	120	71	91	109	34	81	41
95th Queue (ft)	170	182	204	298	213	223	277	79	134	84
Link Distance (ft)	180	180	180	632	632	632	632	557	557	557
Upstream Blk Time (%)	1	1	2							
Queuing Penalty (veh)	5	6	8							
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 1: Lewis Stein Rd/Jocelyn Way & Sheldon Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	NB
Directions Served	UL	L	T	T	R	UL	L	T	T	T	R	UL
Maximum Queue (ft)	36	42	346	418	276	217	232	309	320	350	258	191
Average Queue (ft)	13	18	218	275	117	156	169	204	221	246	77	146
95th Queue (ft)	38	49	390	471	329	227	246	310	331	362	234	217
Link Distance (ft)			2456	2456				704	704	704		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			300	320	320				180	170
Storage Blk Time (%)			4	7				0		22		7
Queuing Penalty (veh)			1	12				1		20		10

Intersection: 1: Lewis Stein Rd/Jocelyn Way & Sheldon Rd

Movement	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	T	R	L	L	T	R
Maximum Queue (ft)	234	307	228	35	94	92	38
Average Queue (ft)	172	147	190	13	53	50	16
95th Queue (ft)	266	336	265	44	110	98	41
Link Distance (ft)	1317	1317				861	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			170	200	200		150
Storage Blk Time (%)	7	0	19			0	
Queuing Penalty (veh)	16	1	19			0	

Intersection: 2: SB SR 99 Ramps/W Stockton Blvd & Sheldon Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	NB	
Directions Served	L	T	T	T	R	L	L	T	T	T		R	L
Maximum Queue (ft)	91	295	344	482	254	321	353	483	502	542	270	206	
Average Queue (ft)	57	198	261	349	78	235	249	321	305	325	167	160	
95th Queue (ft)	103	304	375	505	282	335	380	507	524	580	359	248	
Link Distance (ft)		653	653	653				650	650	650			
Upstream Blk Time (%)								0	0	0			
Queuing Penalty (veh)								1	0	5			
Storage Bay Dist (ft)	280				400	680	680				180	310	
Storage Blk Time (%)		1		7				0		32		0	
Queuing Penalty (veh)		1		13				0		106		0	

Intersection: 2: SB SR 99 Ramps/W Stockton Blvd & Sheldon Rd

Movement	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	R	L	TR
Maximum Queue (ft)	242	99	298	280	273	380
Average Queue (ft)	192	58	223	217	229	255
95th Queue (ft)	286	107	338	317	327	486
Link Distance (ft)	433	433	433			1472
Upstream Blk Time (%)				0		
Queuing Penalty (veh)				1		
Storage Bay Dist (ft)				310	230	
Storage Blk Time (%)	0		2	1	15	12
Queuing Penalty (veh)	1		6	5	33	26

Intersection: 3: NB SR 99 Ramps & Sheldon Rd

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	T	T	T	T	T	L	LR	R
Maximum Queue (ft)	209	212	241	593	546	496	312	262	356	273
Average Queue (ft)	127	133	165	397	323	323	146	165	254	197
95th Queue (ft)	217	220	259	652	614	558	330	275	359	283
Link Distance (ft)	180	180	180	632	632	632	632	557	557	557
Upstream Blk Time (%)	3	3	6	1	0					
Queuing Penalty (veh)	16	18	39	4	1					
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 1: Lewis Stein Rd/Jocelyn Way & Sheldon Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	NB
Directions Served	UL	L	T	T	R	UL	L	T	T	T	R	UL
Maximum Queue (ft)	21	96	465	542	331	170	191	124	142	166	38	74
Average Queue (ft)	7	34	316	391	138	122	144	65	80	103	21	37
95th Queue (ft)	27	174	538	635	394	175	201	119	139	169	46	82
Link Distance (ft)			2456	2456				704	704	704		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			300	320	320				180	170
Storage Blk Time (%)			9	17						1		
Queuing Penalty (veh)			1	14						1		

Intersection: 1: Lewis Stein Rd/Jocelyn Way & Sheldon Rd

Movement	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	T	R	L	L	T	R
Maximum Queue (ft)	223	521	230	101	146	84	25
Average Queue (ft)	72	321	215	35	94	44	6
95th Queue (ft)	327	784	269	104	156	96	25
Link Distance (ft)	1317	1317				861	
Upstream Blk Time (%)	0	1					
Queuing Penalty (veh)	0	0					
Storage Bay Dist (ft)			170	200	200		150
Storage Blk Time (%)		0	35		0	0	
Queuing Penalty (veh)		0	14		0	0	

Intersection: 2: SB SR 99 Ramps/W Stockton Blvd & Sheldon Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	NB
Directions Served	UL	T	T	T	R	L	L	T	T	T	R	L
Maximum Queue (ft)	135	352	410	465	147	331	344	266	219	234	174	135
Average Queue (ft)	85	279	335	441	64	252	260	168	143	159	70	69
95th Queue (ft)	144	395	447	505	153	370	385	262	232	252	168	138
Link Distance (ft)		388	388	388	388			650	650	650		
Upstream Blk Time (%)		0	3	45								
Queuing Penalty (veh)		1	15	218								
Storage Bay Dist (ft)	280					680	680				180	310
Storage Blk Time (%)		6							9		0	
Queuing Penalty (veh)		7							30		2	

Intersection: 2: SB SR 99 Ramps/W Stockton Blvd & Sheldon Rd

Movement	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	R	L	TR
Maximum Queue (ft)	161	52	83	83	286	317
Average Queue (ft)	94	24	52	48	224	163
95th Queue (ft)	170	56	91	87	319	357
Link Distance (ft)	433	433	433			587
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)				310	230	
Storage Blk Time (%)					16	0
Queuing Penalty (veh)					24	0

Intersection: 3: NB SR 99 Ramps & Sheldon Rd

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	T	T	T	T	T	L	LR	R
Maximum Queue (ft)	123	126	163	275	181	176	230	88	152	122
Average Queue (ft)	51	53	71	120	69	88	100	32	93	64
95th Queue (ft)	139	139	172	299	199	209	242	85	157	129
Link Distance (ft)	180	180	180	632	632	632	632	557	557	557
Upstream Blk Time (%)	0	0	0							
Queuing Penalty (veh)	1	1	3							
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 1: Lewis Stein Rd/Jocelyn Way & Sheldon Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	NB
Directions Served	UL	L	T	T	R	UL	L	T	T	T	R	UL
Maximum Queue (ft)	34	53	296	371	193	237	326	405	394	438	259	181
Average Queue (ft)	10	24	193	245	70	185	220	284	298	326	115	121
95th Queue (ft)	34	56	313	389	210	261	340	425	435	465	302	185
Link Distance (ft)			2456	2456				704	704	704		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			300	320	320				180	170
Storage Blk Time (%)			2	3			0	5		28		2
Queuing Penalty (veh)			0	5			0	23		26		3

Intersection: 1: Lewis Stein Rd/Jocelyn Way & Sheldon Rd

Movement	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	T	R	L	L	T	R
Maximum Queue (ft)	240	348	229	40	92	99	32
Average Queue (ft)	148	184	200	13	58	54	13
95th Queue (ft)	221	414	266	42	105	108	36
Link Distance (ft)	1317	1317				861	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			170	200	200		150
Storage Blk Time (%)	4	0	27			0	
Queuing Penalty (veh)	10	2	27			0	

Intersection: 2: SB SR 99 Ramps/W Stockton Blvd & Sheldon Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	NB
Directions Served	UL	T	T	T	R	L	L	T	T	T	R	L
Maximum Queue (ft)	235	409	425	469	79	380	437	523	535	584	269	213
Average Queue (ft)	96	326	362	448	50	310	329	344	341	369	177	160
95th Queue (ft)	261	439	454	494	86	490	525	568	582	648	373	235
Link Distance (ft)		388	388	388	388			650	650	650		
Upstream Blk Time (%)	0	2	4	26			0	0	0	1		
Queuing Penalty (veh)	0	8	17	114			0	1	1	5		
Storage Bay Dist (ft)	280					680	680				180	310
Storage Blk Time (%)		11					0	0		32		
Queuing Penalty (veh)		9					0	1		98		

Intersection: 2: SB SR 99 Ramps/W Stockton Blvd & Sheldon Rd

Movement	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	R	L	TR
Maximum Queue (ft)	243	90	361	349	280	413
Average Queue (ft)	182	51	252	243	230	247
95th Queue (ft)	267	94	383	366	322	466
Link Distance (ft)	433	433	433			587
Upstream Blk Time (%)			0			2
Queuing Penalty (veh)			2			10
Storage Bay Dist (ft)				310	230	
Storage Blk Time (%)	0		5	4	17	6
Queuing Penalty (veh)	0		21	18	39	15

Intersection: 3: NB SR 99 Ramps & Sheldon Rd

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	T	T	T	T	T	L	LR	R
Maximum Queue (ft)	238	239	250	570	537	519	409	274	344	296
Average Queue (ft)	162	171	190	400	327	350	178	176	254	205
95th Queue (ft)	284	287	296	637	596	567	397	296	364	316
Link Distance (ft)	180	180	180	632	632	632	632	557	557	557
Upstream Blk Time (%)	9	10	13	0		0				
Queuing Penalty (veh)	56	65	85	1		0				
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Draft Memorandum

Date: February 18, 2021
To: Aelita Milatzo, City of Sacramento
From: Greg Behrens, John Gard, and Tinotenda Jonga, Fehr & Peers
Subject: **Access Feasibility Study for Maverik Gas Station on Sheldon Road in Sacramento, CA**

RS21-4011

This memorandum documents the data collection, travel characteristics, travel demand forecasting, and access feasibility assessment prepared for the Maverik Gas Station project on Sheldon Road in Sacramento, California.

Project Site Setting

The project site is located on a vacant lot at the northwest corner of the Sheldon Road/Southbound State Route (SR) 99 Ramps/West Stockton Boulevard intersection.

Along the project site frontage (west of West Stockton Boulevard), Sheldon Road is a six-lane arterial with a posted speed limit of 40 miles per hour. To the east, Sheldon Road provides connections to SR 99 at the Sheldon Road interchange before continuing east into the City of Elk Grove. To the west, Sheldon Road transitions into Center Parkway and travel north past Cosumnes River College and into the City of Sacramento.

Near the project site, West Stockton Boulevard is a two-lane roadway. The posted speed limit is 45 miles per hour, but speed surveys conducted in January 2021¹ indicated that the 85th percentile (i.e., critical) speed is 50 miles per hour for southbound traffic within the vicinity of the project site. To the north, West Stockton Boulevard continues until its terminus at Bruceville Road near the Cosumnes River College campus.

¹ Radar speed survey conducted on West Stockton Boulevard by National Data & Surveying Services (NDS) on January 20, 2021. Refer to technical appendix for speed survey data.



Data Collection

This assessment considers project access needs during the weekday AM and PM peak hours. Based on direction from City staff, this assessment additionally considers driveway needs under cumulative conditions, which assumes the completion of all planned local and regional land use and transportation system projects through 2040.

In order to derive cumulative traffic volumes at the project driveways, baseline intersection turning movement data was collected at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection during the AM and PM peak periods. Intersection turning movement data was acquired through StreetLight Data from Fall 2019. Fall 2019 was selected for the purposes of this study because it represents the most recent "typical" scenario prior to the COVID-19 pandemic. The COVID-19 pandemic has had a pronounced effect on typical traffic conditions and operations due to stay-at-home orders and related effects of the pandemic, so using new traffic counts collected during the pandemic would not have provided useful data for the purposes of this study.

Using the Fall 2019 intersection turning movement data as baseline traffic data, cumulative intersection turning movement data for a 2040 analysis year was estimated using the SACSIM19 travel demand model. The SACSIM19 model was used to prepare base and future year model forecasts, which were then used to adjust the Fall 2019 intersection turning movement data by applying the difference method to yield 2040 intersection turning movement estimates at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection. In turn, this data was utilized to estimate through traffic volumes on Sheldon Road and West Stockton Boulevard at the two proposed project driveways under 2040 conditions.

Project Travel Characteristics

Figure 1 shows the project site plan (*FIT Study Analysis, Option A, December 2020*). The proposed project would include a 5,637 square foot convenience store and 20 fueling positions.

The project would be accessed via two driveways. A right-in/right-out only driveway would be provided on Sheldon Road on the western edge of the project site. A full access driveway would be provided on West Stockton Boulevard on the northern edge of the project site. The project site plan does not include any additional modifications to Sheldon Road or West Stockton Boulevard within the vicinity of the project site.

Trip Generation

Typically, the trip generation of a proposed project is calculated using trip rates or equations contained in the *Institute of Transportation Engineers (ITE) Trip Generation Manual*. However, Fehr & Peers' experience



analyzing comparable Maverik stores indicates that ITE rates substantially overstate peak hour trip generation compared to empirical data reviewed at existing Maverik stores.

In order to estimate trip generation for the proposed project, sales transaction data was obtained from three existing and comparable Maverik stores. Maverik stores #358 (Lehi, UT), #468 (Pasco, WA) and #503 (Boise, ID) provided store transaction data for all Mondays, Tuesdays, Wednesdays, and Thursdays in October 2019, which is an above average month in terms of fuel sales. Fehr & Peers conducted a weighted average of these three stores to estimate transactions for the proposed project.

The collected data was supplemented with PM peak hour observations on September 29, 2020 at a Maverik Gas Station located at 425 South Redwood Road, Salt Lake City, UT to determine local “internal trip estimates”. Additional counts were also collected in September 2020 at similar gas station and convenience market/restaurant facilities in Roseville to verify local conditions. It was necessary to determine the proportion of fuel sales that also included a purchase inside store using sales transaction data due to the inclusion of the convenience store in the project description. These facilities were purposefully chosen because they share similar operating/design characteristics to that of the proposed project.

Table 1 shows the project’s expected trip generation, including reductions for pass-by trips. Pass-by trips are trips already on the network and therefore would not be considered as new trips generated by the project. Pass-by trips were estimated from data presented in the Trip Generation Handbook, 3rd Edition (Institute of Transportation Engineers, 2017).

Table 1 Project Trip Generation

Land Use	Daily	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Total Gross Trips	3,714	134	134	268	109	109	218
<i>Pass-By Trip Reduction</i>	-2,792	-101	-101	-202	-82	-82	-164
Net New External Trips	922	33	33	66	27	27	54

Note:
 Trip generation estimate calculated using observed data and pass-by rates obtained from Trip Generation Handbook, 3rd Edition (Institute of Transportation Engineers, 2017) for the Gas Station land use (Land Use Code 945).
 Source: Fehr & Peers, Maverik, ITE Trip Generation Handbook, 3rd Edition, 2021.

As shown in **Table 1**, during the AM peak hour, the project would generate 66 net new vehicle trips (50% in/50% out). During the PM peak hour, the project would generate 54 net new vehicle trips (50% in/50% out). Daily, the project would generate 922 net new vehicle trips. These represent net new external vehicle trips after accounting for reductions made for pass-by activity per the Trip Generation Handbook (ITE, 2017).



Trip Distribution and Assignment

Table 2 summarizes the estimated distribution of project trips. New project trips were assigned to the roadway network based on traffic patterns projected under cumulative conditions and the general distribution of jobs, housing, and other destinations in the area, as well as permitted driveway movements. Pass-by trips were assigned based on the volume of traffic at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard and ease of performing pass-by maneuvers.

Table 2: Project Trip Distribution

Direction	Existing Plus Project				Cumulative Plus Project			
	AM		PM		AM		PM	
	In	Out	In	Out	In	Out	In	Out
Sheldon Road to/from the west	42%	28%	30%	40%	41%	25%	28%	38%
Sheldon Road to/from the east	42%	44%	45%	38%	40%	45%	45%	39%
SR 99 Ramps to/from the south	9%	17%	19%	16%	11%	19%	20%	15%
W Stockton Boulevard to/from north	8%	11%	7%	7%	8%	11%	7%	8%

Source: Fehr & Peers, 2021.



Project Driveway Evaluation

The following items were considered during the evaluation of the proposed project driveways:

- Need for right-turn deceleration lane at Sheldon Road driveway approach. Configuration of right-turn deceleration lane at Sheldon Road driveway approach, if needed, including taper length, deceleration lane length, and accommodations for bicyclists and pedestrians.
- Need for left-turn ingress at the West Stockton Boulevard project driveway.
- Corner sight distance for vehicles exiting the two project driveways.
- Access considerations for adjacent vacant parcels

Need for Right-Turn Deceleration Lane at Sheldon Road Driveway

Based on the project site plan, westbound right-turn access from Sheldon Road into the project site would be completed from the outside westbound through lane.

Standards and Guidance

The City of Sacramento *Design and Procedures Manual, Section 15 – Street Design Standards* (City of Sacramento, July 2009) Section 15.7.7 states that “acceleration and deceleration lanes may be required at driveways and minor intersections based on the street designation, design speed, and projected volumes.” However, the City *Street Design Standards* does not describe specific conditions under which right-turn lanes at driveways are required. The following resources provide guidance on this topic:

- AASHTO *Green Book* – Section 9.7.2.1 of the American Association of State Highway and Transportation Officials (AASHTO) *Policy on Geometric Design of Highways and Streets* (the *Green Book*) states that the “provision for deceleration clear of the through-traffic lanes is a desirable objective on arterial roads and streets and should be incorporated into design, whenever practical.” Additionally, the AASHTO *Green Book* describes how research has demonstrated that providing a left- and right-turn lane on any intersection approach has a substantial crash reduction benefit.
- Caltrans LDIGR Safety Review Guidance – In *Traffic Safety Bulletin 20-02-R1: Interim Local Development Intergovernmental Review (LDIGR) Safety Review Practitioners Guidance* (Caltrans, December 18, 2020) Caltrans provides guidance for conducting safety impact analysis for proposed land use projects and plans in compliance with CEQA. Caltrans indicates that traffic safety mitigation may be appropriate if a project would cause an off-ramp queue to spill back onto the freeway mainline, causing a speed differential of 30 miles per hour or greater. Caltrans states that speed differentials in congestion-related rear-end collisions that are 30 mph or greater have shown the potential to increase severe injury and fatal injuries exponentially as the speed differential increases above the 30 miles per hour speed differential. While Caltrans guidance pertains to project impacts



on the State highway system, similar operational and safety considerations could be given to arterial roads with higher speeds and volumes of vehicle traffic.

- *Transportation and Land Development - Transportation and Land Development* (Stover and Koepke, 2002) is a reference to practitioners, providing design guidance and recommendations that pertain to transportation-related issues involved in land use planning and development. Chapter 5 describes principles of access design. Similar to the Caltrans LDIGR Safety Review Guidance, *Transportation and Land Development* describes the relationship between speed differentials and crash rates. Table 5-12 summarizes the relative crash rates for at-grade arterials based on a variety of speed differentials, indicating that crash rates for speed differentials at 30 miles per hour are 23 times greater than crash rates for speed differentials of 10 miles per hour. The document additionally describes the use of turn bays as a strategy to address speed differentials at driveways and intersections. Figure 5-25 provides suggested warrants for right-turn bays at driveways and intersections and recommends that right-turn bays be provided where right lane volumes are 350 vehicles per hour per lane or more.

Evaluation

Based on the project trip generation and trip assignment estimates, the project is anticipated to generate considerable peak hour right-turn volumes at the Sheldon Road driveway. Right-turn volumes into the Sheldon Road driveway would total an estimated 100 vehicles during the AM peak hour and 80 vehicles during the PM peak hour. This would be roughly equivalent to a vehicle turning into the driveway once every 36 seconds during the AM peak hour and once every 45 seconds during the PM peak hour (assuming peak hour project vehicle trips are evenly spread across the AM and PM peak hours).

Sheldon Road is classified as an arterial road and has a posted speed limit of 40 miles per hour along the project site frontage. Vehicles completing a westbound right-turn movement into the project site driveway would be required to slow to speeds in the 5 to 15 mile per hour range while maneuvering into the project site.² Therefore, a considerable speed differential (ranging from 25 to 35 miles per hour) would exist between westbound through traffic and westbound right turning traffic, which could in turn increase the potential for conflicts and adverse operational effects at the approach to the Sheldon Road driveway.

Under cumulative conditions, westbound traffic volumes on Sheldon Road passing the proposed driveway location would total an estimated 1,160 vehicles during the AM peak hour and 2,250 vehicles during the PM peak hour. Considering the westbound lane utilization at this location, these volumes would be sufficient to meet the right-turn bay warrant identified in Figure 5-25 of *Transportation and Land Development* (right lane volume of 350 vehicles per hour per lane or more).

² Observed data reported in Table 7-1 in *Transportation and Land Development* (Stover and Koepke, 2002) indicates that average right-turn entry speeds at driveways range from as low as 7 miles per hour to as high as 12.8 miles per hour.



Recommendations

Fehr & Peers recommends the construction of a westbound right-turn deceleration lane at the Sheldon Road driveway. The Maverik site plan indicates that 225 feet would be available between the Sheldon Road driveway centerline and the near curb return at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection. Therefore, a right-turn deceleration lane with a lane length of 175 feet plus a taper length of 50 feet (for a total of 225 feet) could be accommodated at the Sheldon Road driveway.

Table 9-20 in the AASHTO *Green Book* provides guidance on desirable lane change and deceleration distances for deceleration lanes. For a roadway with a design speed of 40 miles per hour, Table 9-20 recommends a combined lane change and deceleration distance of 265 feet. Therefore, the proposed right-turn deceleration lane at the Sheldon Road driveway would measure approximately 40 feet less than the desired distance identified by AASHTO. Note that AASHTO acknowledges that it is not practical on many facilities to provide the full deceleration length due to constraints such as restricted right-of-way, distance available between adjacent intersections, and storage needs. AASHTO recommends the installation of turn lanes where warranted even where the desired distances in Table 9-20 cannot be achieved, citing the demonstrated crash reduction benefit of turn lanes.

Note that the recommended deceleration lane would require the widening of Sheldon Road. Additionally, the deceleration lane should include high visibility conflict markings for the westbound bike lane that would be located between the through lane and the right-turn lane.

Need for Left-Turn Ingress at the West Stockton Boulevard Driveway

Based on the project site plan, northbound left-turn access from West Stockton Boulevard into the project site would be completed from the northbound through lane.

Standards and Guidance

The AASHTO *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 *Green Book* provides left-turn lanes warrants at unsignalized intersections on arterials in urban areas based on left-turn volumes and opposing traffic volumes.



Evaluation

Based on the project trip generation and trip assignment estimates, northbound left-turn volumes from West Stockton Boulevard into the project site would total an estimated 20 vehicles during both the AM and PM peak hours. Note that under cumulative conditions, it is conceivable that these volumes would be even greater with the future buildout of the existing vacant parcels zoned for general commercial development surrounding the project site (these volumes would also be influenced by the access provisions for these vacant parcels, which are not known at this time). Furthermore, opposing southbound traffic volumes would measure at an estimated 380 vehicles during the AM peak hour and 420 vehicles during the PM peak hour under cumulative conditions. Table 9-24 of the *Green Book* recommends that left-turn lanes be provided at three-legged intersections with a peak hour left-turn volume of 20 vehicles when the opposing traffic volume is 200 vehicles or more. Therefore, the West Stockton Boulevard driveway would meet the AASHTO *Green Book* criteria for a northbound left-turn lane.

Recommendations

Fehr & Peers recommends that a two-way left-turn lane (TWLTL) be constructed on West Stockton Boulevard beginning at the end of the striping for of the southbound left-turn pocket at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection and ending approximately 100 feet north of the project's West Stockton Boulevard driveway. This configuration would provide approximately 100 feet of storage for northbound left-turning vehicles into the project site (approximately four car lengths), which would serve both project vehicle trips as well as potential future vehicles accessing vacant parcels surrounding the project site. The modification should adhere to applicable City design standards. The TWLTL would accommodate left-turns in and out of the West Stockton Boulevard driveway while minimizing their effects on through traffic along West Stockton Boulevard.

Note that the AASHTO *Green Book* recommends that a minimum storage length of 100 feet be provided for left-turn lanes for high-speed (40 miles per hour or more) and rural locations. Moreover, according to Table 9-22 of the AASHTO *Green Book*, a left-turn lane with 100 feet of storage would be sufficient to accommodate left-turn volumes of up to 300 vehicles per hour at locations where opposing traffic volumes measure 400 vehicles per hour (based on the 85th percentile critical gap).

Note that West Stockton Boulevard would need to be widened north and south of the project driveway in order to accommodate the lateral lane transition required for the northbound and southbound through lanes within the vicinity of the TWLTL.



Driveway Corner Sight Distance

Standards and Guidance

The City of Sacramento *Design and Procedures Manual, Section 15 – Street Design Standards* Section 15.9 requires that City streets and non-residential driveways shall be designed in accordance with the sight distance requirements as defined by the Caltrans Highway Design Manual, Sections 201 and 405.

Evaluation

Figure 2 and **Figure 3** illustrate the corner sight distance for vehicles exiting the project driveways on Sheldon Road and West Stockton Boulevard, respectively, based on a travel speed of 50 miles per hour. As shown, these lines of sight would generally be unobstructed except for the landscaping strips along the Sheldon Road and West Stockton Boulevard frontages and the center median on West Stockton Boulevard.

Additionally, the line of sight for vehicles exiting the West Stockton Boulevard driveway looking at oncoming northbound traffic (i.e., to complete an eastbound left-turn onto West Stockton Boulevard), could be obstructed by queued vehicles waiting to complete a southbound left-turn at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection. This queue would need to reach a length of approximately 100 feet (four car lengths) before this sight triangle would be obstructed. Note that a detailed peak hour traffic operations analysis would need to be conducted to estimate the length of this queue under Cumulative Plus Project conditions.

Recommendations

Fehr & Peers recommends that the Sheldon Road and West Stockton Boulevard landscaping strips and the West Stockton Boulevard center median are kept clear of vegetation or other objects with a height in excess of six inches within the green areas shown on Figures 2 and 3. Note that the recommended right-turn deceleration lane (refer to “Need for Right-Turn Deceleration Lane at Sheldon Road Driveway” section) would clear the potential line of sight obstruction at the Sheldon Road driveway shown in Figure 2.

Also note that the installation of a TWLTL (refer to “Need for Left-Turn Ingress at the West Stockton Boulevard Driveway” section) would reduce the potential for conflicts associated with potential sight distance issues between eastbound traffic exiting the West Stockton Boulevard project driveway and northbound traffic on West Stockton Boulevard by allowing for two-stage left-turn maneuvers exiting the West Stockton Boulevard driveway. If required, the following additional modification should be analyzed to address this potential sight distance issue:



- Modify signal timing at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection to reduce delay and, in turn, queue lengths for the southbound left-turn movement at this intersection.

A detailed traffic operations analysis should be conducted for Cumulative Plus Project conditions to determine the extent to which the southbound left-turn queue at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection would cause sight distance issues at the West Stockton Boulevard driveway.

Access Considerations for Adjacent Vacant Parcels

The project site is surrounded to the north and to the west by vacant parcels that are currently zoned for general commercial development. The specific uses of these parcels and their access needs are not known at this time. However, the construction of the Maverik project would influence potential future access accommodations for these parcels as their development occurs.

To the west, the vacant parcel would have approximately 130 feet of available frontage on Sheldon Road. It is presumed that access to this commercial parcel from Sheldon Road would be desirable given the high volume of vehicle traffic on Sheldon Road. However, the construction of an additional driveway on Sheldon Road along the vacant parcel's frontage is not recommended given the relatively small frontage and the proximity of the proposed Maverik driveway on the western edge of the project site. Moreover, the provision of an additional driveway on the vacant parcel's Sheldon Road frontage would generate additional ingress/egress maneuvers along a short segment of Sheldon Road, which in turn would increase the potential for vehicle-vehicle and vehicle-bicycle conflicts at this location. For these reasons, Fehr & Peers recommends that the Maverik site plan be designed to accommodate a future drive aisle serving the vacant parcel located to the west. This would allow Maverik and adjacent vacant parcel to the west to share a driveway, thus providing access to the vacant parcel from Sheldon Road while minimizing the number of multi-modal conflicts points on this segment of Sheldon Road.



Summary & Conclusions

In summary, the evaluation of the proposed project driveways revealed the need for the following modifications to the project site plan and surrounding roadway network:

- Construct a westbound right-turn deceleration lane at the approach to the project's Sheldon Road driveway.
- Construct a TWLTL on West Stockton Boulevard beginning at the end of the striping for the southbound left-turn pocket at the Sheldon Road/Southbound SR 99 Ramps/West Stockton Boulevard intersection and ending approximately 100 feet north of the project's West Stockton Boulevard driveway.
- Keep the Sheldon Road and West Stockton Boulevard landscaping strips and the West Stockton Boulevard center median clear of vegetation or other objects with a height in excess of six inches within the green areas shown on Figures 2 and 3.
- Design the Maverik site plan to accommodate a future drive aisle serving the vacant parcels located to the west and north.

References

American Association of State Highway and Transportation Officials (2018). *A Policy on Geometric Design of Highways and Streets Green Book, 2018 edition.*

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

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

State of California, Department of Transportation (December 18, 2020). *Traffic Safety Bulletin 20-02-R1: Interim Local Development Intergovernmental Review (LDiGR) Safety Review Practitioners Guidance.*

Stover, V G and Koepke, FJ (2002). *Transportation and Land Development, 2nd Edition.*

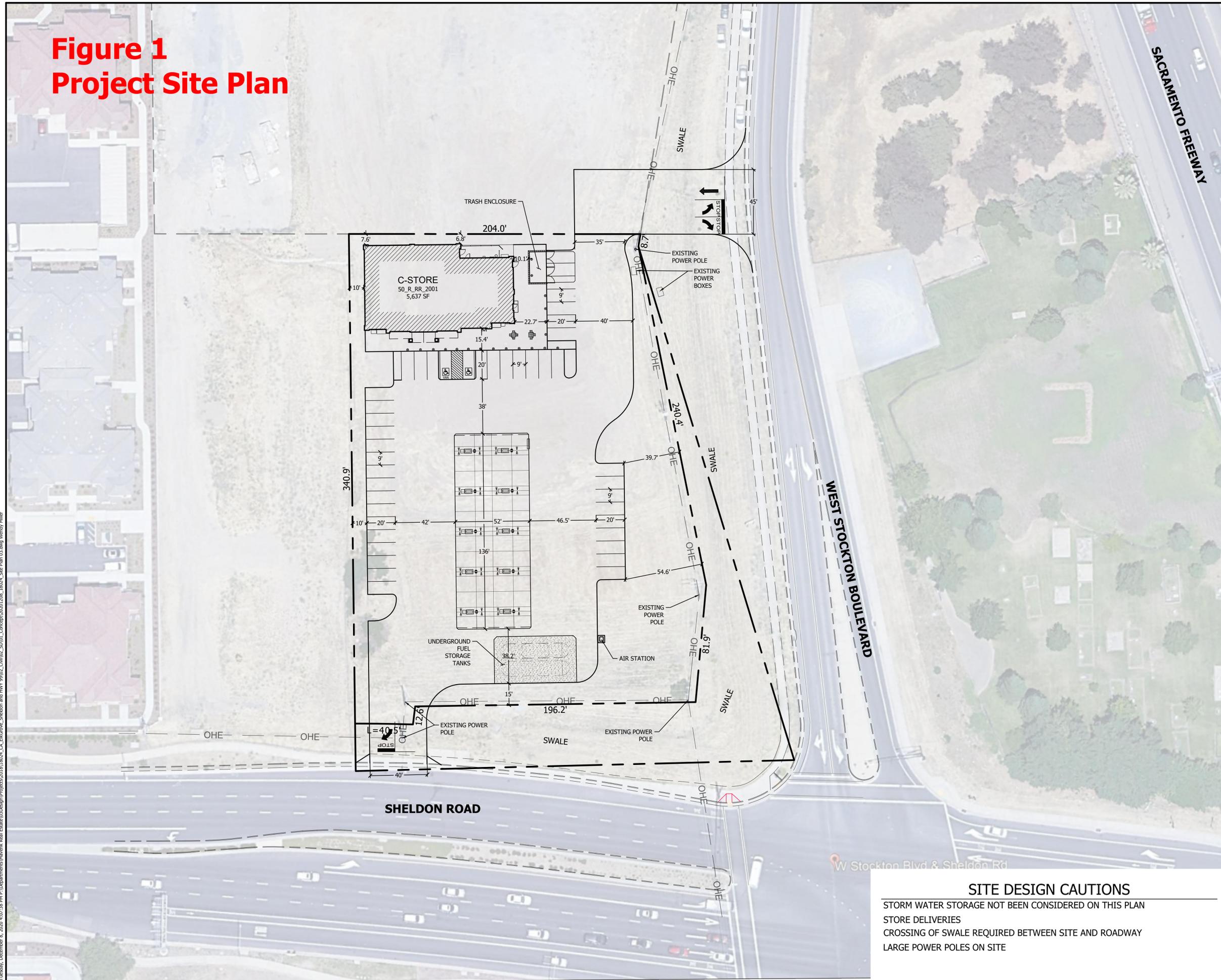
Transportation Research Board (2016). *Highway Capacity Manual, 6th Edition.*

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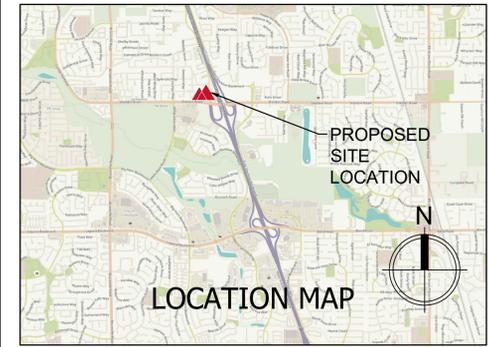
Technical Appendix

DRAFT

**Figure 1
Project Site Plan**



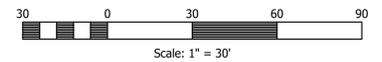
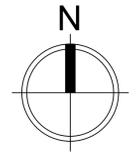
**STORE #: TBD
MAVERIK, INC.
WEST STOCKTON BOULEVARD
& SHELDON ROAD
SACRAMENTO, CALIFORNIA**



- NOTES:
- AREAS AND DIMENSIONS PROVIDED ARE APPROXIMATE AND SHOULD BE VERIFIED BY A SURVEY
 - THIS PLAN IS FOR ILLUSTRATIVE PURPOSES ONLY
 - THE BOUNDARIES OF THE PROPERTY SHOWN ON THIS DRAWING WERE CREATED FROM SCALED INFORMATION AND SHOULD NOT BE CONSIDERED ACCURATE.

SITE DATA

PARKING:	44 STALLS PROVIDED (2 A.D.A.) (Not incl. gas canopy locations)	
PARCEL AREA:	75,425 SQ. FT.	1.73 ACRES
BUILDING AREA:	5,637 SQ. FT.	0.13 ACRES



#	DATE	DESCRIPTION	REVISED BY
5	2020/12/08	MOVE ACCESS POINT	WLMR
4	2020/10/01	FIT STUDY ANALYSIS 03	WLMR
3	2020/08/21	LANDSCAPING CHANGES, UST ROTATED, TEAM COMMENTS	WLMR
2	2020/08/18	ADDED SCALE	WLMR

JOB NUMBER: 18-024 DRAWN BY: WLMR

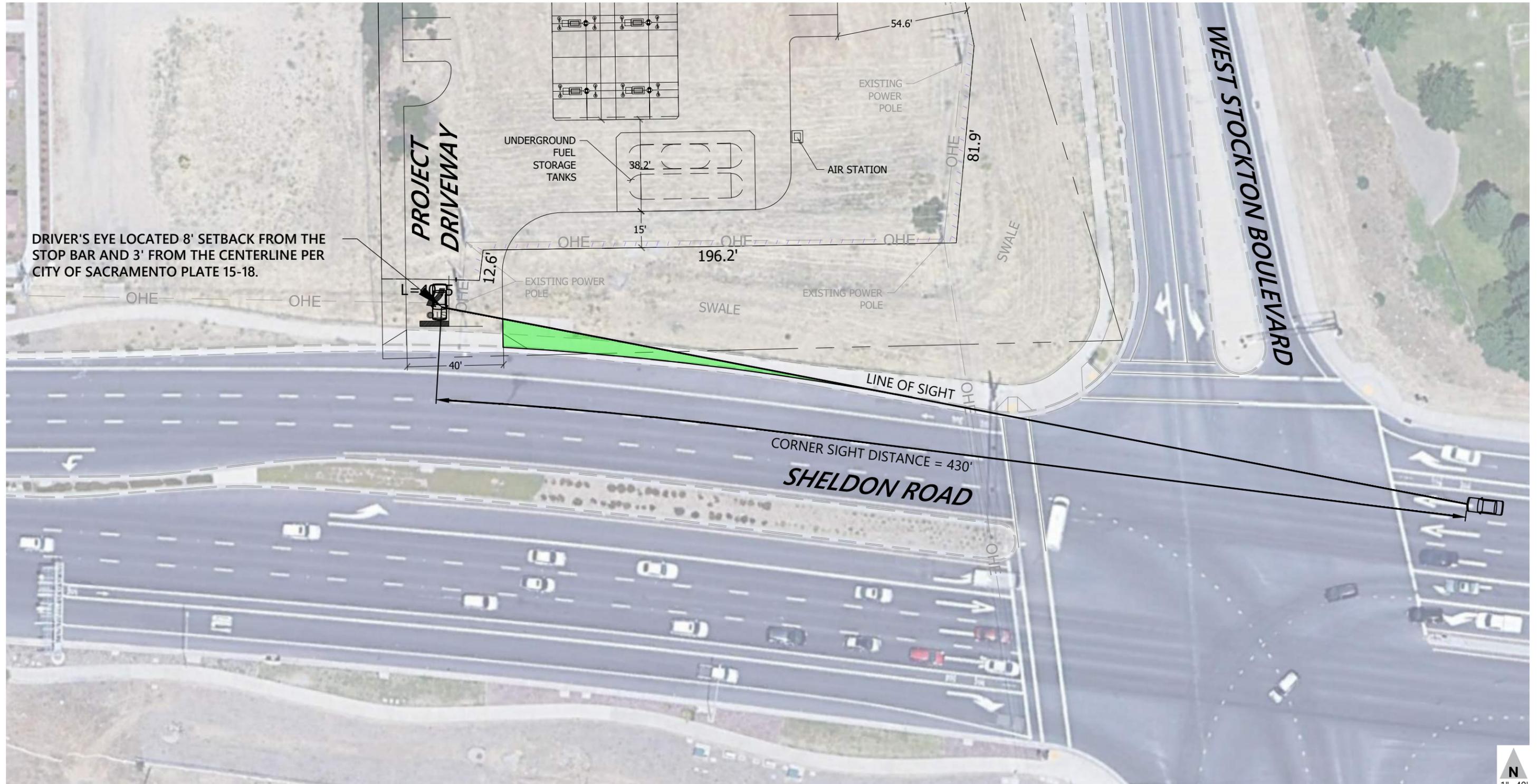
SITE DESIGN CAUTIONS

- STORM WATER STORAGE NOT BEEN CONSIDERED ON THIS PLAN
- STORE DELIVERIES
- CROSSING OF SWALE REQUIRED BETWEEN SITE AND ROADWAY
- LARGE POWER POLES ON SITE

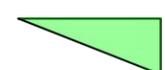
FIT STUDY ANALYSIS 03

Option A

Tuesday, December 8, 2020 4:07:38 PM P:\Departments\Maverik Real Estate\03\Design\Projects\2018\18024_CA_Eligrove_Sheldon and HWY 99\02_Civil\02_SDI\02_Site Plan 03.dwg Wendy Miller



LEGEND:

 CORNER SIGHT DISTANCE TRIANGLE - DESIGN OF VERTICAL ELEMENTS IN THIS AREA TO BE CONSISTENT WITH HIGHWAY DESIGN MANUAL TOPIC 405.1 (2)

DESIGN SPEED:

SHELDON ROAD - 45 MPH
(BASED ON POSTED SPEED LIMIT PLUS 5 MPH)

CORNER SIGHT DISTANCE:

CORNER SIGHT DISTANCE = 430' CALCULATED PER HIGHWAY DESIGN MANUAL TOPIC 405.1(2)

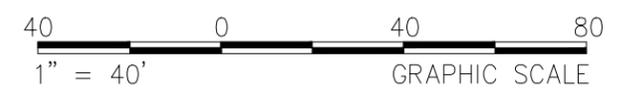
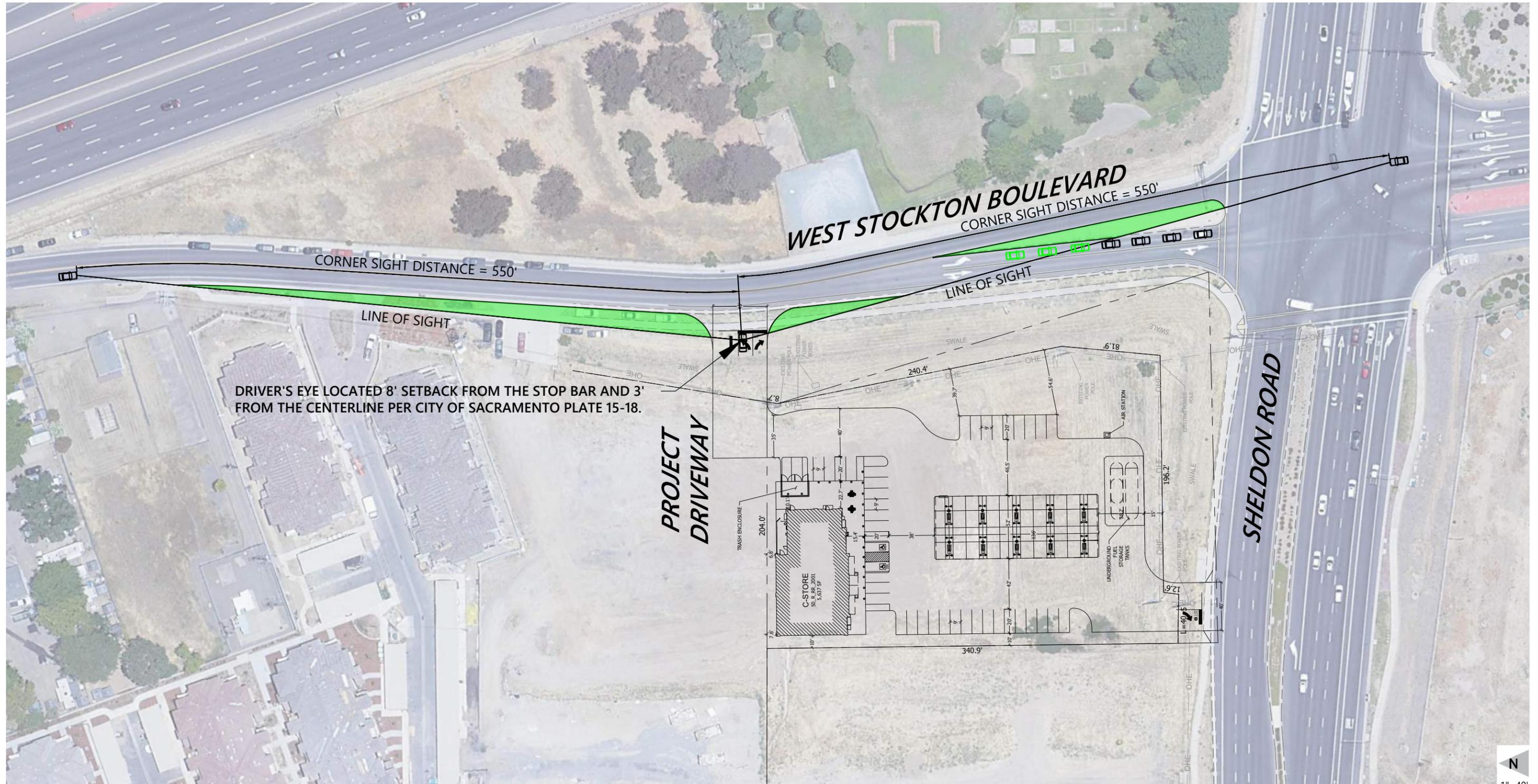


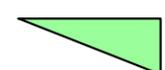
Figure 2

Corner Sight Distance Analysis
Project Driveway at Sheldon Road



DRIVER'S EYE LOCATED 8' SETBACK FROM THE STOP BAR AND 3' FROM THE CENTERLINE PER CITY OF SACRAMENTO PLATE 15-18.

LEGEND:

 CORNER SIGHT DISTANCE TRIANGLE - DESIGN OF VERTICAL ELEMENTS IN THIS AREA TO BE CONSISTENT WITH HIGHWAY DESIGN MANUAL TOPIC 405.1 (2)



DESIGN SPEED:

WEST STOCKTON BOULEVARD - 50 MPH
(BASED ON SPEED SURVEY PERFORMED BY NDS ON 1/20/2021)

CORNER SIGHT DISTANCE:

CORNER SIGHT DISTANCE = 550' CALCULATED PER HIGHWAY DESIGN MANUAL TOPIC 405.1(2)



Figure 3

Corner Sight Distance Analysis
Project Driveway at West Stockton Boulevard

Spot Speed Study

Prepared by: National Data & Surveying Services

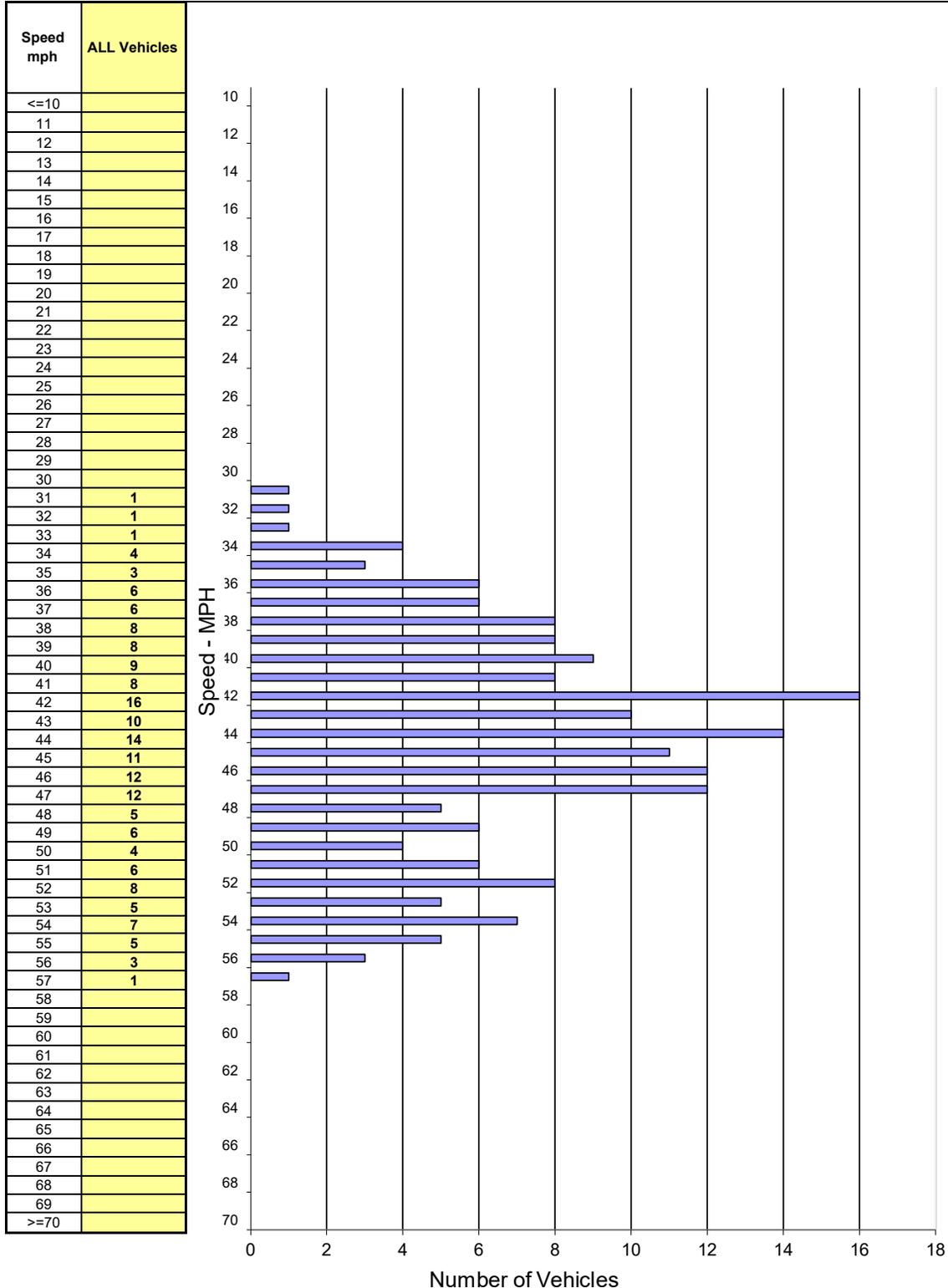
City of Sacramento

DATE: 1/20/2021
TIME: 11:00-13:00

Location: 8680 Stockton Blvd
Posted Speed: 45 MPH Clear/Dry

Project #: 21-070008-001

Northbound Spot Speeds



SPEED PARAMETERS									
Class	Count	Range	50th Percentile	85th Percentile	10 MPH Pace	# in Pace	Percent in Pace	% / # Below Pace	% / # Above Pace
ALL	180	31 - 57	44 mph	52 mph	38 - 47	108	60%	12% / 22	28% / 50

Spot Speed Study

Prepared by: National Data & Surveying Services

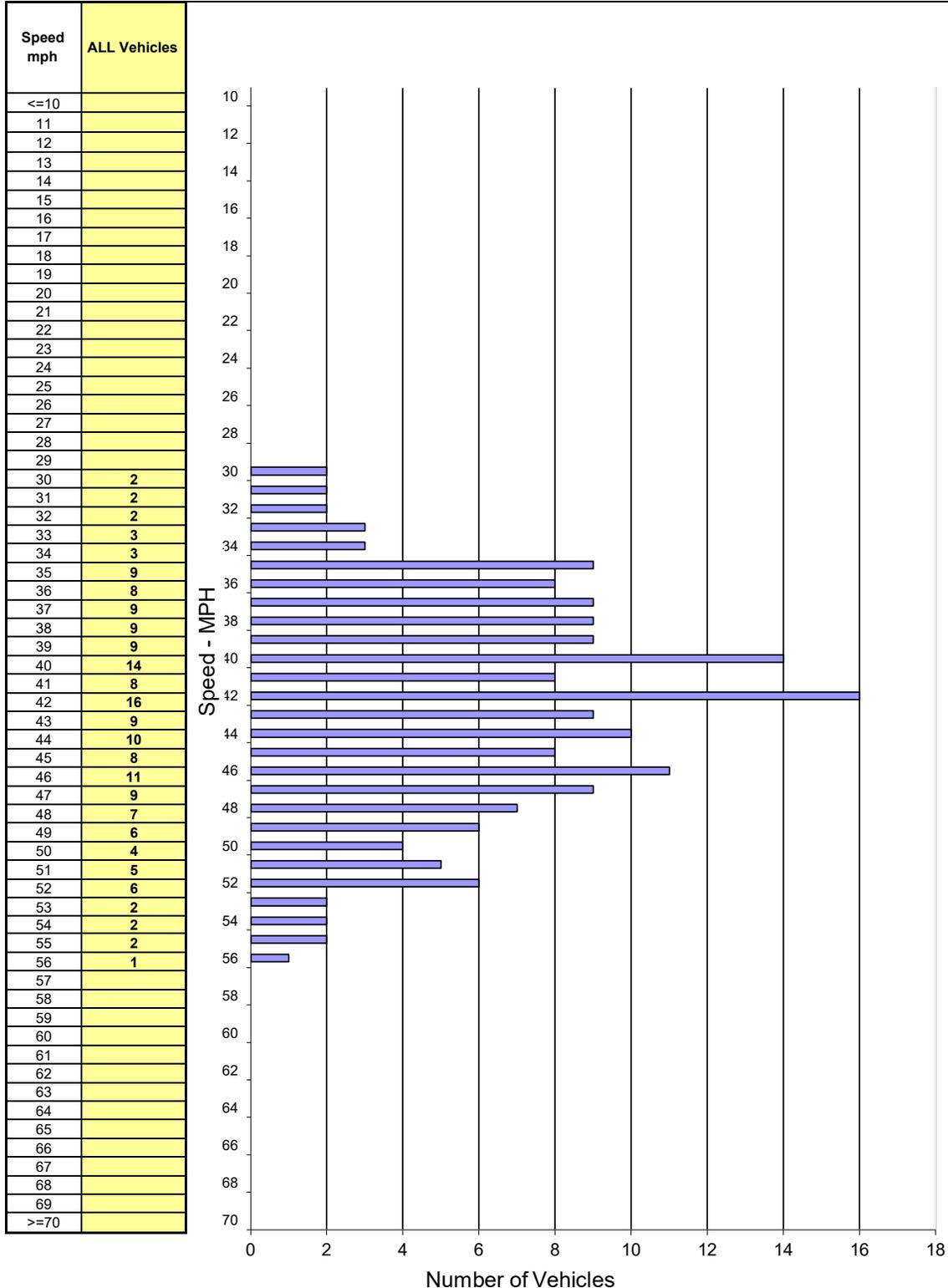
City of Sacramento

DATE: 1/20/2021
TIME: 11:00-13:00

Location: 8680 Stockton Blvd
Posted Speed: 45 MPH Clear/Dry

Project #: 21-070008-001

Southbound Spot Speeds



SPEED PARAMETERS									
Class	Count	Range	50th Percentile	85th Percentile	10 MPH Pace	# in Pace	Percent in Pace	% / # Below Pace	% / # Above Pace
ALL	176	30 - 56	42 mph	49 mph	37 - 46	103	59%	16% / 29	25% / 44