Transportation Impact Study for

Sutter Roseville Medical Center Expansion

Prepared for
City of Roseville

February 21, 2017

FEHR PEERS

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EXECUTIVE SUMMARY

This study analyzes the transportation impacts associated with the proposed Emergency Department (ED) expansion of the Sutter Roseville Medical Center (SRMC), which is located in northeast Roseville. The SRMC campus is located directly north of East Roseville Parkway and west of Secret Ravine Parkway. This study analyzes expected transportation conditions with the proposed expansion in place under existing conditions. Parking supply, internal circulation, and vehicle miles of travel are also evaluated.

PROJECT DESCRIPTION

The ED expansion is proposed for construction in the middle of the Sutter Roseville Medical Center campus in a planned growth area currently used for physician parking (see Appendix A for site plan). The proposed expansion consists of a three-story building with 76,291 departmental gross square footage (DGSF) and 92,319 building gross square footage (BGSF). This space will be occupied by an expanded emergency department, additional intensive care space, a catheterization lab, and other supporting uses. A new drop-off and porte-cochère (i.e., covered vehicle access) will also be constructed.

The ED expansion is necessary to relieve overcrowding in the current ED and to provide additional ICU space. It is not intended to accommodate additional outpatient visits, or other high turnover activities. The expansion would increase the total square footage on the campus from 831,156 square feet to 923,475 square feet, within the 1.1 million square feet permitted under the campus Master Plan.

STUDY AREA, ANALYSIS PERIODS, AND SCENARIOS

The study area includes the following six intersections in the City of Roseville:

1. Roseville Parkway/Galleria Boulevard
2. Roseville Parkway/Creekside Ridge Drive
3. East Roseville Parkway/Taylor Road
4. East Roseville Parkway/North Sunrise Avenue
5. East Roseville Parkway/Secret Ravine Parkway
6. Secret Ravine Parkway/Medical Plaza Drive–Falcon Pointe Lane

Project impacts are analyzed on the surrounding roadway network during the weekday a.m. (7:30 – 8:30) and p.m. (4:45 – 5:45) peak hours.

The study analyzes the existing transportation conditions along with the expected transportation conditions with the proposed expansion in place (existing plus project conditions).

The SRMC Master Plan contemplates development up to 1.1 million square feet on the campus. Accordingly, the City's 2035 CIP travel demand model already include full campus buildout. Therefore, the cumulative effects of the project already have been considered. As a result, a cumulative analysis is not necessary for this study.

EXISTING CONDITIONS

Under existing conditions, three study intersections operate at LOS D or worse during the a.m. peak hour and four study intersections operate at LOS D or worse during the p.m. peak hour, as shown below:

- Roseville Parkway/Galleria Boulevard (LOS D during the a.m. peak hour; LOS E during the p.m. peak hour)
- Roseville Parkway/Creekside Ridge Drive (LOS D during the p.m. peak hour)
- East Roseville Parkway/Taylor Road (LOS E during the a.m. and p.m. peak hours)
- East Roseville Parkway/North Sunrise Avenue (LOS D during the a.m. and p.m. peak hours)

All four of these intersections are listed in the Roseville General Plan as expected to operate at LOS D or worse during the weekday a.m. and p.m. peak hours.

The traffic operations at the Roseville Parkway/Creekside Ridge Drive intersection are greatly influenced by the Roseville Parkway/Galleria Boulevard intersection during the p.m. peak hour. Queuing on westbound Roseville Parkway was observed to queue back from Galleria Boulevard through the Creekside Ridge Drive intersection. This queuing and delay on the westbound Roseville Parkway is the primary cause of the LOS D condition at Roseville Parkway/Creekside Ridge Drive.

QUEUING

The existing queue for the eastbound left-turn movement at East Roseville Parkway/North Sunrise Avenue exceeds the available storage during the a.m. peak hour. This queue extends beyond the pocket and into the adjacent through lane on the bridge over Dry Creek. This queue is primarily caused by imbalanced lane utilization of the two left-turn lanes. More motorists use the outside left-turn lane versus the inside left-turn lane in advance of turning onto North Sunrise Avenue to enter the SRMC campus. This blocks access to the inside left-turn lane. The imbalanced lane utilization is caused by the downstream intersection at North

Sunrise Avenue/Medical Plaza Drive where the large majority of drivers entering the campus turn right onto Medical Plaza Drive.

EXISTING PLUS PROJECT CONDITIONS

Under existing plus project conditions, the addition of project trips generally results in slight increases in delay at most study intersections. However, the LOS at all study intersections will remain unchanged.

QUEUING

The project would add traffic to the eastbound left-turn at East Roseville Parkway/North Sunrise Avenue during the a.m. peak hour, causing the maximum queue to increase from 500 feet to 575 feet. To address this queuing into the campus during the a.m. peak hour, the following improvements are recommended:

- Restripe North Sunrise Avenue north of East Roseville Parkway (within SRMC) as follows:
  - Provide two northbound free right-turn lanes at the first internal intersection (Medical Plaza Drive). This will require restriping Medical Plaza Drive to have two receiving lanes by converting the existing center median lane to a receiving lane.
  - Restripe the inside (#1) southbound lane to be the northbound through lane. To accommodate southbound queues at East Roseville Parkway/North Sunrise Avenue, the inside southbound lane would need to be maintained at least to the north end of the bridge over the ravine. Therefore, the northbound through lane should be striped as a pocket with 100 feet of storage and a 60-foot taper.
  - These improvements will require moving the existing channelized right-turn island to accommodate two free right turn lanes. This will also require restriping the pedestrian crosswalk to this new island location.
- To accommodate the new northbound lane configurations on North Sunrise Avenue, the following restriping would need to occur on North Sunrise Avenue north of Medical Plaza Drive:
  - Eliminate the southbound left turn pocket and prohibit the southbound left-turn movement. Existing southbound left-turn movements would be shifted to make a u-turn at the East Roseville Parkway/North Sunrise Avenue intersection.
  - Realign the northbound receiving lane to align with the northbound departure lane
  - Create a new pedestrian island for the realigned crosswalk
  - Use bollards and/or a raised curb along Medical Plaza Drive to direct pedestrians to the new pedestrian island

Figure ES-1 provides a conceptual illustration of these improvements. It is noted that ambulances may use the existing center median lane on Medical Plaza Drive to transport patients to the ED. With the proposed restriping, vehicles would still have ample space to pull over to allow ambulances to pass.

INTERNAL CIRCULATION

Access to the ED expansion would be provided from Medical Plaza Drive via the existing access road to the existing emergency department. A new porte-cochère would be constructed approximately 100 feet east of the existing emergency department drop-off. In terms of internal circulation on the campus, traffic flow to and from the emergency department drop-off would remain unchanged.

PARKING

The proposed expansion would occur in the middle of the campus in a planned growth area currently consisting of physician parking. This displaced physician parking would be accommodated in the adjacent parking garage.

In addition to the displaced parking, the ED expansion is expected to generate a peak parking demand for up to 47 spaces. The combination of the displaced parking along with the additional demand generated by the ED expansion would increase parking utilization in the adjacent parking garage and nearby parking lots. For those parking areas closest to the ED expansion, the total peak period parking utilization would increase from 76 to 86 percent. The campus-wide parking utilization would increase from 83 percent to 88 percent.

Refer to the separate parking study prepared by Fehr & Peers for the campus in January 2017 for more details regarding parking supply and demand. Additionally, that study included various recommendations for redesignating certain underutilized/empty spaces to increase available parking, and providing static or real-time information relating to parking lot/garage fill times to simplify the process of finding parking.

PROJECT IMPACTS

Since the Project impacts to the roadway system, bicycle facilities, pedestrian facilities, and transit facilities would be less-than-significant and no mitigation is required.

N

20 0 20 40

1" = 40' SCALE

Note: measurements/dimensions shown are approximations based on aerial photography

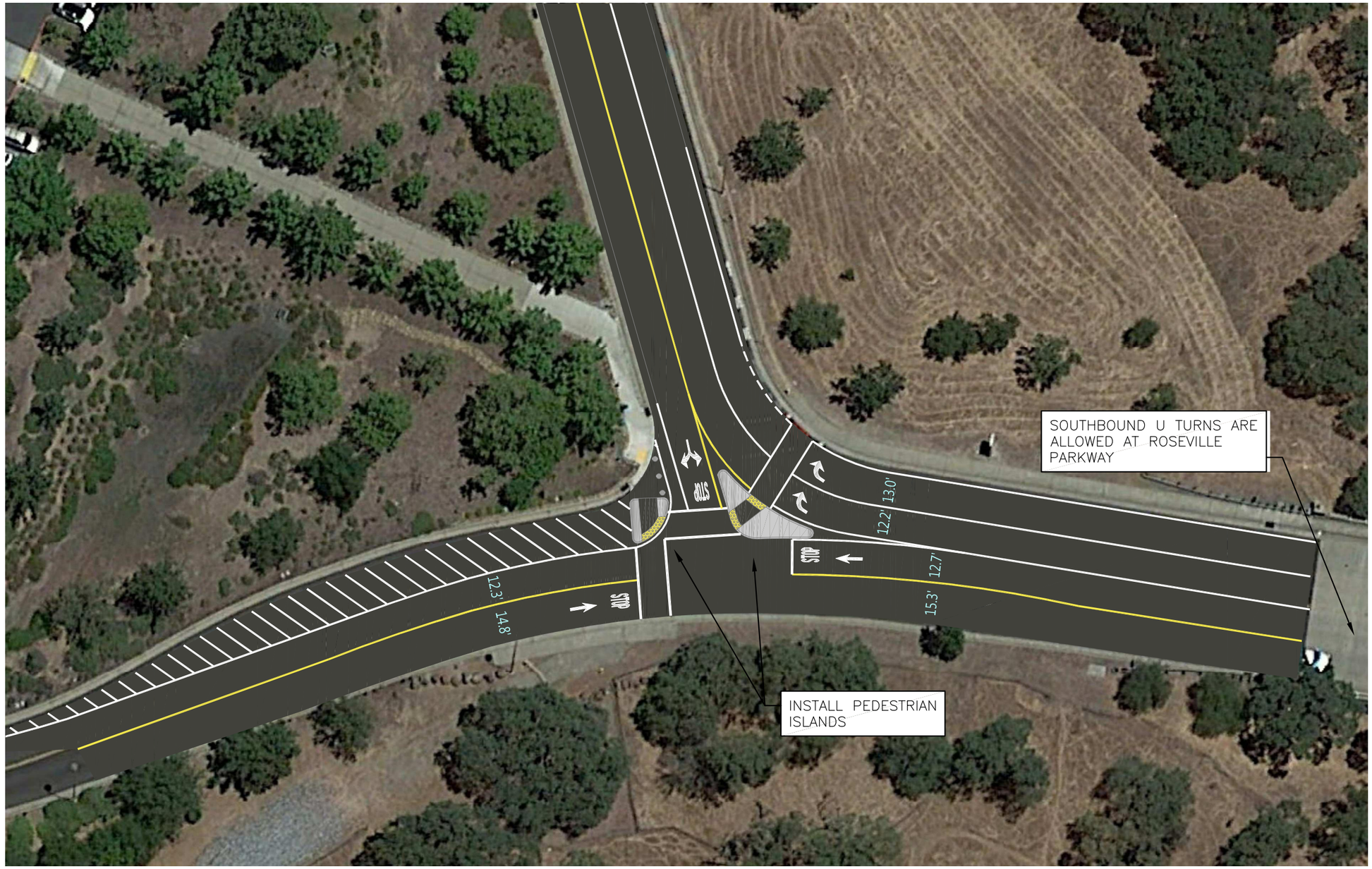

Figure ES-1

Conceptual Improvements at North Sunrise Avenue/Medical Plaza Drive

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I. INTRODUCTION

PURPOSE

This study analyzes the transportation impacts associated with the proposed Emergency Department (ED) expansion at the Sutter Roseville Medical Center (henceforth referred to as "the project"), which is located in northeast Roseville. The Sutter Roseville Medical Center (SRMC) campus is located directly north of East Roseville Parkway and west of Secret Ravine Parkway. This study analyzes expected transportation conditions with the proposed expansion in place under existing conditions. Parking supply, internal circulation, and vehicle miles of travel are also evaluated.

PROJECT DESCRIPTION

Figure 1 shows the SRMC campus location in the context of the study area, including study intersections. Sutter Health proposes to construct an expansion of the campus's Emergency Department in the middle of the campus in a planned growth area currently used for physician parking (see Appendix A for site plan). The proposed expansion consists of a three-story building with 76,291 departmental gross square footage (DGSF) and 92,319 building gross square footage (BGSF). This space will be occupied by an expanded emergency department, additional intensive care space, a catheterization lab, and other supporting uses. A new drop-off and porte-cochère (i.e., covered vehicle access) will also be constructed.

Sutter administrators provided the following data regarding anticipated patient visitation and staffing for the proposed expansion:

- Sutter Health's Business Plan projects 82,896 annual patient visits to the ED by 2020, which is an approximate 2.8 percent increase over the 2016 total of about 80,600 patient visits. Since patient visits occur throughout the year, this could translate into an additional six patients per day.
- Sutter administrators estimate that an additional 44 employees could eventually work in the expanded ED, additional critical beds, and relocated cardiac catheterization labs, though this is considered a rough estimate and could change.

The ED expansion is necessary to relieve overcrowding in the current ED and to provide additional ICU space. It is not intended to accommodate outpatient visits, or other high turnover activities. The expansion would increase the total square footage on the campus from 831,156 square feet to 923,475 square feet, within the 1.1 million square feet permitted under the SRMC Master Plan.

1 Study Intersection

Figure 1

Study Area

STUDY AREA AND PERIODS

The City of Roseville has historically relied on the weekday p.m. peak hour to characterize its street system operations and need for capital improvements because this hour generally represents the busiest hour of travel during a typical weekday. Accordingly, this study includes an analysis of project impacts associated with its typical weekday p.m. peak hour operations.

In mid-2016, the Roseville City Council approved the Amoruso Ranch Specific Plan along with several important changes in how the City analyzes intersections and measures the adequacy of their operations. One of the changes involved expanding the City's General Plan LOS policies to include weekday a.m. peak hour conditions in addition to the p.m. peak hour. Therefore, this study also includes an analysis of project impacts during the a.m. peak hour.

The study area includes the following six intersections in the City of Roseville:

1. Roseville Parkway/Galleria Boulevard
2. Roseville Parkway/Creekside Ridge Drive
3. East Roseville Parkway/Taylor Road
4. East Roseville Parkway/North Sunrise Avenue
5. East Roseville Parkway/Secret Ravine Parkway
6. Secret Ravine Parkway/Medical Plaza Drive–Falcon Pointe Lane

These intersections were selected in consultation with City of Roseville Engineering Department staff and consider the project's size, location, and expected generation and distribution of trips.

Although the City of Roseville does not analyze roadway segments for level of service, the following 11 roadway segments were selected to display the distribution of project traffic:

1. Roseville Parkway: West of Galleria Boulevard
2. Roseville Parkway: Galleria Boulevard to Taylor Road
3. East Roseville Parkway: Taylor Road to North Sunrise Avenue
4. East Roseville Parkway: North Sunrise Avenue to Secret Ravine Parkway
5. East Roseville Parkway: East of Secret Ravine Parkway
6. Galleria Boulevard: North of Roseville Parkway
7. Taylor Road: North of East Roseville Parkway

8. Taylor Road: South of East Roseville Parkway
9. North Sunrise Avenue: South of East Roseville Parkway
10. Secret Ravine Parkway: East Roseville Parkway to Medical Plaza Drive/Falcon Pointe Lane
11. Secret Ravine Parkway: East of Medical Plaza Drive/Falcon Pointe Lane

The following describes the study time periods:

- Weekday a.m. peak hour: occurs between 7:30 to 8:30 a.m. at the majority of study intersections.
- Weekday p.m. peak hour: occurs between 4:45 to 5:45 p.m. at the majority of study intersections.

The SRMC Master Plan contemplates development up to 1.1 million square feet on the campus. Accordingly, the City's 2035 CIP travel demand model already include full campus buildout. Therefore, the cumulative effects of the project have been considered. As a result, a cumulative analysis is not necessary for this study.

ANALYSIS METHODOLOGIES

This study analyzes traffic operating conditions using level of service (LOS) as the primary measure of operational performance. Vehicle LOS is a qualitative measure of traffic flow from the perspective of motorists and are an indication of the comfort and convenience associated with driving. The LOS analysis uses procedures identified in the 2010 Highway Capacity Manual (HCM) published by the Transportation Research Board of the National Academies of Science. The HCM defines six levels of service ranging from LOS A (representing free-flow vehicular traffic conditions with little to no congestion) to LOS F (oversaturated conditions where traffic demand exceeds capacity resulting in long queues and delays).

SIGNALIZED INTERSECTIONS

The LOS at signalized intersections is based on the average delay experienced by all motorists traveling through the intersection. Table 1 presents the delay range for each LOS category for signalized intersections as presented in Chapter 18 of 2010 HCM. This study uses the SimTraffic microsimulation model software to analyze individual intersections and overall corridor traffic operations. This software considers the effects of signal coordination, vehicle queue spillbacks between intersections, and variation in driver and vehicle types.

TABLE 1:
LEVEL OF SERVICE DEFINITIONS – SIGNALIZED INTERSECTIONS

Level of Service	Description	Average Control Delay[1]
A	Volume-to-capacity ratio is low and either progression is exceptionally favorable or cycle length is very short. Most vehicles arrive during the green phase and travel through the intersection without stopping.	≤ 10
B	Volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.	>10 to 20
C	Progression is favorable or the cycle length is moderate. Individual cycle failures (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.	>20 to 35
D	Volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.	>35 to 55
E	Volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.	>55 to 80
F	Volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.	>80

Notes: [1]Average control delay presented in seconds per vehicle. Delay values are rounded to the nearest second and evaluated for LOS based on the above thresholds (i.e., 10 seconds per vehicle = LOS A)
Source: *Highway Capacity Manual* (Transportation Research Board, 2010).

STANDARDS OF SIGNIFICANCE

The City of Roseville's level of service policy, based on the City's current General Plan, calls for maintaining a LOS C standard at a minimum of 70 percent of all signalized intersections in the City during the p.m. peak hour. The City Council, following a public hearing, may determine, on a case-by-case basis that "extraordinary" improvements are not feasible or desirable and may relax the LOS C standard for a particular intersection.

In mid-2016, the Roseville City Council approved the Amoruso Ranch Specific Plan along with several important changes in how the City analyzes intersections and measures the adequacy of their operations. Specifically, as part of the *Amoruso Ranch Specific Plan Final Transportation Impact Study* (Fehr & Peers, February 2016), the following changes in analysis methods, horizons, and analysis periods were made:

1. Replacing the *Interim Materials on Highway Capacity – Circular 212* (Transportation Research Board, 1980) methodology to analyze signalized intersections with the more state-of-the-practice *Highway Capacity Manual* (Transportation Research Board, 2010) methodology.

2. Expanding the General Plan level of service (LOS) policies to include weekday a.m. peak hour conditions, in addition to p.m. peak hour.

Since the City Council approved the Amoruso Ranch Specific Plan and its corresponding changes in analysis methods and time periods, the City's General Plan now reflects a revised list of intersections that are expected to operate at LOS D or worse during the weekday a.m. and p.m. peak hours. The General Plan list includes the following intersections analyzed in this study (with the corresponding p.m. peak hour LOS shown in parentheses):

1. Roseville Parkway/Galleria Boulevard (LOS D)
2. Roseville Parkway/Creekside Ridge Drive (LOS D)
3. East Roseville Parkway/Taylor Road (LOS E)
4. East Roseville Parkway/North Sunrise Avenue (LOS D)

The following thresholds of significance have been used to determine whether implementing the proposed project would result in a significant transportation impact. These thresholds of significance are derived from questions posed in Appendix G of the CEQA Guidelines, thresholds of significance adopted by the City in applicable planning documents and previous environmental documents, and professional judgment. For purposes of this study, a significant impact would occur if the project would:

ROADWAY SYSTEM

1. Cause a signalized intersection in Roseville to be degraded as follows under existing conditions during the a.m. or p.m. peak hours:
   - For intersections currently operating at LOS C or better: worsen operations to LOS D or worse.
   - For intersections that currently operate at LOS D or E: cause operations to further worsen by one or more service levels.
   - For intersections that currently operate at LOS F: cause intersection delay to worsen by 12.5 seconds or greater.
2. Cause the overall percentage of signalized intersections throughout the City of Roseville operating at LOS C or better during the a.m. and p.m. peak hours to fall below 70 percent.

BICYCLE SYSTEM

Not meet the policies and guidelines of Roseville's Bicycle Master Plan.

PEDESTRIAN SYSTEM

Interfere with the operation of an existing pedestrian facility or preclude the construction of a planned pedestrian facility.

TRANSIT SYSTEM

Have a negative impact on transit operations, travel times, and/or circulation.

II. EXISTING CONDITIONS

This chapter describes the existing transportation system including the roadway, bicycle, pedestrian, and transit systems within the study area.

ROADWAY SYSTEM

The following arterial streets provide access to the site.

- **Roseville Parkway** is a northeast-southwest arterial that extends easterly from Washington Boulevard into Granite Bay, where it ends at Barton Road. Within the study area, it has a posted speed limit of 45 miles per hour (mph) with three travel lanes in each direction separated by a center median or channelized left-turn pockets.
- **Secret Ravine Parkway** is an east-west arterial that extends from Roseville Parkway to Sierra College Boulevard. Within the study area, it has a posted speed limit of 45 mph with two travel lanes in each direction separated by a center median or channelized left-turn pockets.

Traffic signals along Roseville Parkway are coordinated to facilitate progression of through traffic.

PEAK HOUR TRAFFIC VOLUMES

Traffic counts were obtained at all study intersections from the City of Roseville's traffic count database. The traffic counts from the City were collected in October 2016. Given the importance of the East Roseville Parkway/North Sunrise Avenue and Secret Ravine Parkway/Medical Plaza Drive intersections to this study as the primary access points into and out of the SRMC campus, additional traffic counts were collected at these two intersections on Tuesday, November 15, and Thursday, November 17, 2016. The traffic volumes during these two days in November 2016 were similar to the October 2016 count data provided by the City, and were used in the study.

Additional driveway counts (within the SRMC campus) were also collected to fully measure the existing trip generation of the SRMC campus. This is described in further detail in the Existing Trip Generation section starting on page 21.

Schools were in session at the time of the counts and generally typical traffic conditions were observed. This included queuing on East Roseville Parkway that normally occurs during the a.m. and p.m. peak hour. Queues were also observed on Taylor Road north of East Roseville Parkway caused by the lane drop and

merging traffic from the I-80 eastbound off-ramp. This queuing on Taylor Road occasionally built back to the East Roseville Parkway intersection, causing queuing for the westbound right-turn from East Roseville Parkway onto Taylor Road.

Figure 2 shows the resulting weekday a.m. and p.m. peak hour traffic volumes, lane configurations, and traffic controls at each study intersection. Throughout the study area, the a.m. peak hour occurred from 7:30 to 8:30 a.m. and the p.m. peak hour occurred from 4:45 to 5:45 p.m.

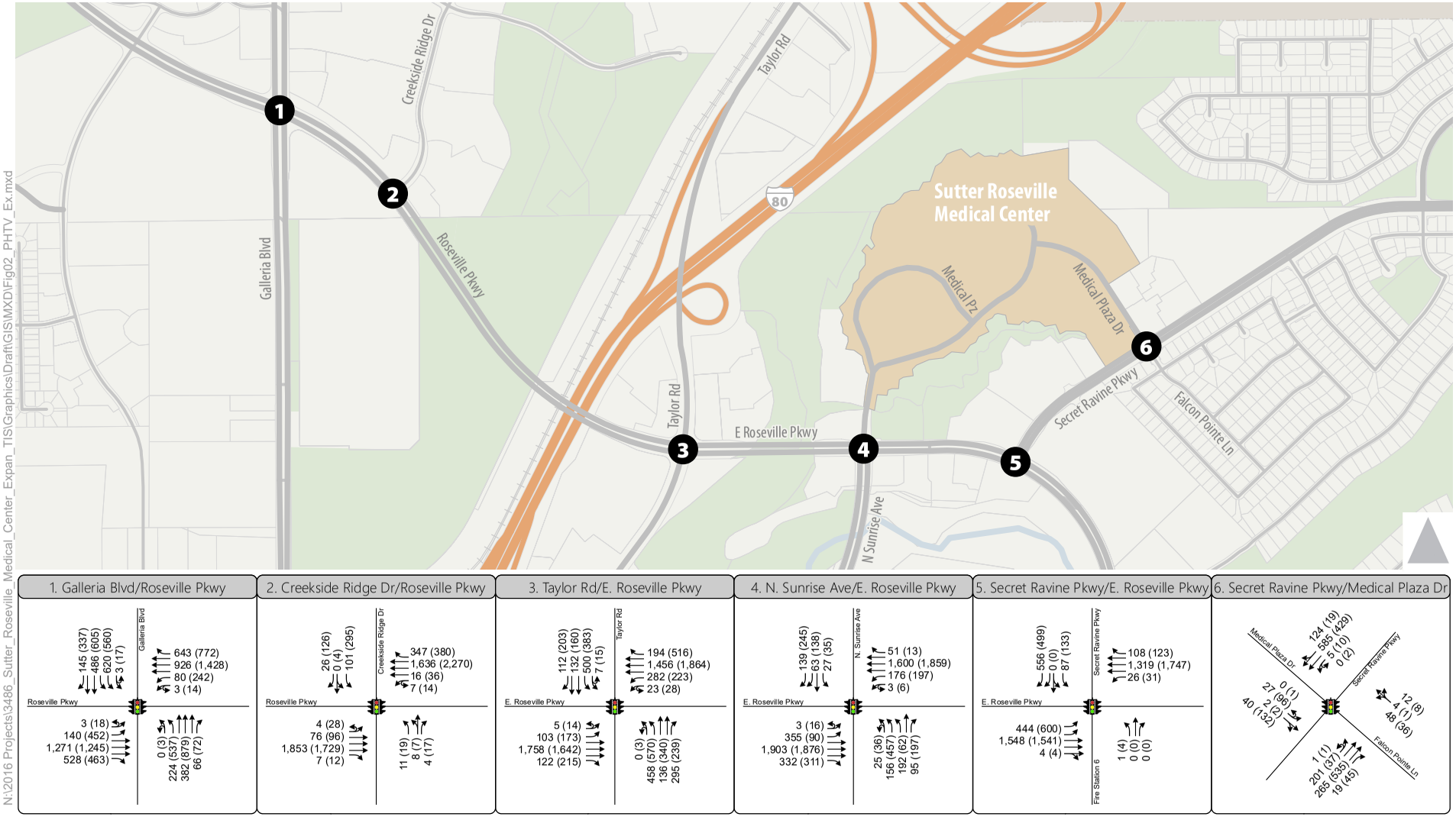


Figure 2

Peak Hour Traffic Volumes and Lane Configurations - Existing Conditions

SIMTRAFFIC MODEL CALIBRATION

It is critical that the SimTraffic microsimulation model be adequately validated to existing conditions to accurately predict "plus project" conditions. Model validation criteria typically consists of measures relating to volume served, queue lengths, and average travel time. Given the modest size of the study area but moderate levels of congestion, volume served and vehicle queuing are considered the most important validation parameters.

As part of the traffic count data collection, Fehr & Peers observed and recorded maximum vehicle queues for critical turning movements at the East Roseville Parkway/North Sunrise Avenue and Secret Ravine Parkway/Medical Plaza Drive–Falcon Pointe Lane intersections at the same time as the traffic counts. Table 2 and Table 3 display the available storage, observed maximum vehicle queue, and modeled (via SimTraffic) maximum queue for the a.m. and p.m. peak hours, respectively. The maximum modeled queue represents the maximum back of queue observed for the peak 15-minute interval of the peak hour, averaged for ten SimTraffic runs.

TABLE 2:
QUEUING ANALYSIS: SIMULATION CALIBRATION – A.M. PEAK HOUR

Intersection	Movement	Available Storage[1]	Maximum Observed Vehicle Queue[2]	Maximum Modeled Vehicle Queue[3]
E. Roseville Parkway/N. Sunrise Avenue	Eastbound Left-Turn	175	**500**	**650**
Secret Ravine Parkway/Medical Plaza Dr. – Falcon Pointe Lane	Northeast Left-Turn[4]	225	**300**	225

Notes: [1]Available storage lengths are shown in feet and based on measurements from aerial imagery.
[2]Observed queue data is presented in feet and based on queue counts conducted on Tuesday, November 15, 2016.
[3]Modeled queuing results are presented in feet and based on average of 10 SimTraffic runs.
[4]Left-turn movement from northeast-bound Secret Ravine Parkway onto Medical Plaza Drive entering the SRMC campus
Refer to the description below for explanation of differences in model estimate compared to observed maximum queues.
BOLD cells indicate that the maximum queue exceeds the available storage.
Source: Fehr & Peers, 2016.

Table 2 shows that the queue for the eastbound left-turn movement at East Roseville Parkway/North Sunrise Avenue exceeds the available storage during the a.m. peak hour. This queue extends beyond the pocket and into the adjacent through lane on the bridge over Dry Creek. This queue is primarily caused by imbalanced lane utilization of the two left-turn lanes. More motorists use the outside left-turn lane versus the inside left-turn lane in advance of turning onto northbound North Sunrise Avenue. This blocks access to the inside left-turn lane. The imbalanced lane utilization is caused by the downstream intersection at North Sunrise Avenue/Medical Plaza Drive where the large majority of drivers entering the campus turn

right onto Medical Plaza Drive. This condition occurs a few times during the a.m. peak hour, and typically not during other periods of the day.

Table 2 also shows that the SimTraffic model has some variation to observed maximum queues. This is generally due to variations among multiple SimTraffic model runs, and limitations in the model's precision. The following movements were challenging to accurately validate for the following reasons:

- Eastbound left turn at East Roseville Parkway/North Sunrise Avenue – The outside left-turn lane was observed to have a maximum queue of 500 feet during the a.m. peak hour. This occurred as a result of the imbalanced lane utilization described above. SimTraffic was able to model this imbalanced lane utilization; however, the model lacked sensitivity to precisely replicate the level of lane imbalance, which in turn affected the amount of queue spillback into the through lanes. The excess queuing in this movement was reported by SimTraffic as being part of the queue for the eastbound through movement.

- Northeast left turn at Secret Ravine Parkway/Medical Plaza Drive – The left turn lane was observed to have a maximum queue of 300 feet during the p.m. peak hour, more than the 225 feet modeled in SimTraffic. For the SimTraffic analysis, a single peak hour factor (PHF) was used for all intersections and movements to ensure conservation of flow in the microsimulation model. However, the observed PHF for this movement was lower than the system-wide PHF used in the SimTraffic model (i.e., there was greater "peaking" in the traffic flow for this left-turn movement than modeled in SimTraffic), which explains the variation.

TABLE 3:
QUEUING ANALYSIS: SIMULATION CALIBRATION – P.M. PEAK HOUR

Intersection	Movement/ Approach	Available Storage[1]	Maximum Observed Vehicle Queue[2]	Maximum Modeled Vehicle Queue[3]
E. Roseville Parkway/N. Sunrise Avenue	Southbound Approach[4]	450	400	200[4]
Secret Ravine Parkway/Medical Plaza Dr. – Falcon Pointe Lane	Southeast Left-Turn[5]	100	100	125

Notes: [1]Available storage lengths are shown in feet and based on measurements from aerial imagery.
[2]Observed queue data is presented in feet and based on queue counts conducted on Tuesday, November 15, 2016.
[3]Modeled queuing results are presented in feet and based on average of 10 SimTraffic runs.
[4]Southbound approach on North Sunrise Avenue departing the SRMC campus
[5]Southeast left turn from Medical Plaza Drive onto Secret Ravine Parkway departing the SRMC campus
Refer to the description below for explanation of differences in model estimate compared to observed maximum queues.
Source: Fehr & Peers, 2016.

Table 3 shows that the SimTraffic model has some variation to observed maximum queues, similar to the a.m. peak hour. During the p.m. peak hour, the following movements were challenging to accurately validate for the following reasons:

- Southbound through at East Roseville Parkway/North Sunrise Avenue – The through travel lane was observed to have a maximum queue of 400 feet during the p.m. peak hour, more than the 200 feet modeled in SimTraffic. For the SimTraffic analysis, a single PHF was used for all intersections and movements to ensure conservation of flow in the microsimulation model. Similar to the northeast left-turn at Secret Ravine Parkway/Medical Plaza Drive, the observed PHF for this approach was lower than the system-wide PHF used in the SimTraffic model.

The SimTraffic model validates well against most of the other queuing that occurs. The model is able to replicate the vehicle queues that extend back from the East Roseville Parkway/Taylor Road intersection through the East Roseville Parkway/North Sunrise Avenue intersection. The model is also able to replicate the queues extending back from the Roseville Parkway/Galleria Boulevard intersection through the Roseville Parkway/Creekside Ridge Drive intersection and onto the Antelope Creek and I-80 overcrossings.

Due to the lack of model accuracy for the movements identified above, this study uses a difference method approach to forecast how queues would change with the proposed ED expansion. This methodology calculates the future queue using the following formula:

Plus Project Queue Forecasts = Existing Observed Queue Length +
(Plus Project SimTraffic Model Queue – Existing Conditions SimTraffic Model Queue)

Below is a screenshot of the SimTraffic model used to analyze the p.m. peak hour intersections under Existing Conditions.

View of SimTraffic micro-simulation model used to analyze existing p.m. peak hour conditions

INTERSECTION OPERATIONS

Table 4 displays the existing weekday a.m. and p.m. peak hour traffic operations analysis results at the six study intersections (refer to Appendix B for detailed calculations). As shown, three intersections operate at LOS D or worse during the a.m. peak hour and four intersections operate at LOS D or worse during the p.m. peak hour.

TABLE 4:
PEAK HOUR INTERSECTION OPERATIONS – EXISTING CONDITIONS

Intersection	Traffic Control	Peak Hour	Existing Conditions	
			Delay[1]	LOS
1. Roseville Parkway/Galleria Boulevard	Signal	A.M.	**38**	**D**
		P.M.	**67**	**E**
2. Roseville Parkway/Creekside Ridge Drive	Signal	A.M.	18	B
		P.M.	**50**	**D**
3. East Roseville Parkway/Taylor Road	Signal	A.M.	**73**	**E**
		P.M.	**66**	**E**
4. East Roseville Parkway/North Sunrise Avenue	Signal	A.M.	**48**	**D**
		P.M.	**52**	**D**
5. East Roseville Parkway/Secret Ravine Parkway	Signal	A.M.	29	C
		P.M.	32	C
6. Secret Ravine Parkway/Medical Plaza Drive–Falcon Pointe Lane	Signal	A.M.	18	B
		P.M.	11	B

Notes: [1]Average delay (rounded to the nearest second) and LOS for signalized intersections is the weighted average for all movements.
All intersections are analyzed in SimTraffic.
BOLD text indicates the intersection operates at LOS D or worse
Source: Fehr & Peers, 2017.

It should be noted that traffic operations at the Roseville Parkway/Creekside Ridge Drive intersection are greatly influenced by the Roseville Parkway/Galleria Boulevard intersection during the p.m. peak hour. Queuing on westbound Roseville Parkway was observed to queue back from Galleria Boulevard through the Creekside Ridge Drive intersection. Field observations (which were replicated in SimTraffic) indicated that westbound queues extended back from the Antelope Creek to Interstate 80 overpasses, particularly in the most outside (#3) lane. This queuing and delay on the westbound Roseville Parkway is the primary cause of the LOS D condition at Roseville Parkway/Creekside Ridge Drive.

QUEUING CONDITIONS

In addition to the delay and LOS results presented above, one of the critical traffic flow issues for travel to and from the SRMC campus is queuing for inbound and outbound movements. Existing queue results for critical inbound and outbound movements were presented in Table 2 and Table 3.

As noted above, queuing for the eastbound left-turn movement at East Roseville Parkway/North Sunrise Avenue during the a.m. peak hour is of particular interest since the existing queue extends beyond the pocket into the adjacent through lane, as shown in Table 2. Additional details regarding the cause of this queuing was presented above in the SimTraffic Model Calibration section starting on page 11.

DAILY ROADWAY TRAFFIC VOLUMES

Table 5 summarizes the average daily traffic (ADT) on roadway segments surrounding the project site under existing conditions. This data was obtained from the City of Roseville's traffic count database and represents conditions in November 2016. As shown, Roseville Parkway currently carries the greatest amount of traffic through the project area, with the highest traffic volume traveling between Galleria Boulevard and Secret Ravine Parkway.

TABLE 5:
ROADWAY AVERAGE DAILY TRAFFIC – EXISTING CONDITIONS

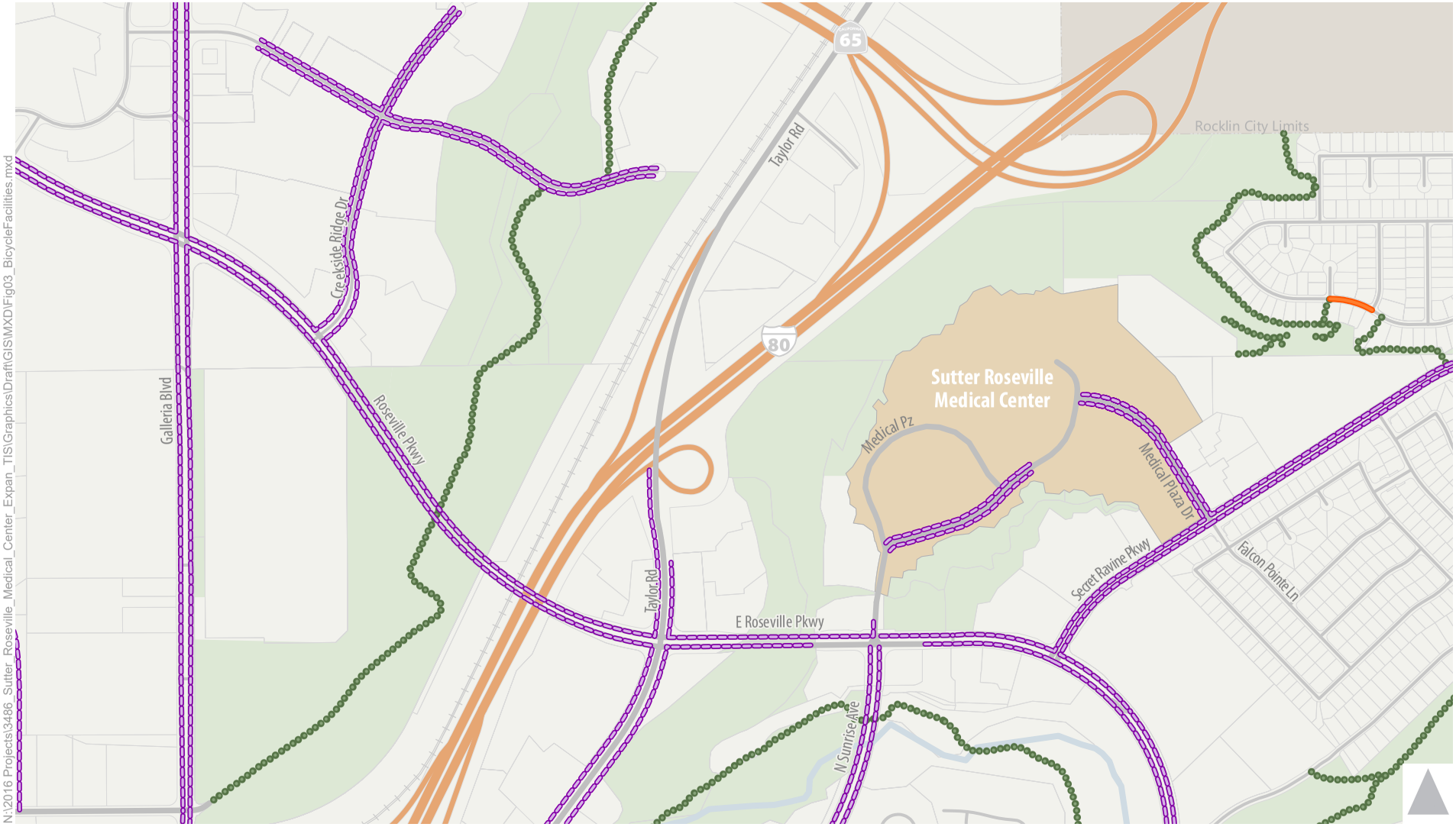
Roadway Segment	Number of Lanes	Daily Traffic Volume[1]
1. Roseville Parkway: West of Galleria Boulevard	6	47,600
2. Roseville Parkway: Galleria Boulevard to Taylor Road	6	53,800
3. East Roseville Parkway: Taylor Road to North Sunrise Avenue	6	57,400
4. East Roseville Parkway: North Sunrise Avenue to Secret Ravine Parkway	6	51,500
5. East Roseville Parkway: East of Secret Ravine Parkway	6	41,300
6. Galleria Boulevard: North of Roseville Parkway	6	41,600
7. Taylor Road: North of East Roseville Parkway	4[2]	17,000
8. Taylor Road: South of East Roseville Parkway	4	21,300
9. North Sunrise Avenue: South of East Roseville Parkway	6	15,900
10. Secret Ravine Parkway: East Roseville Parkway to Medical Plaza Drive	4	16,700
11. Secret Ravine Parkway: East of Medical Plaza Drive	4	13,400

Notes: [1]Daily traffic volume data collected on November 2, 2016 and rounded to nearest 100 vehicles.
[2]Taylor Road reduces to 2 lanes approximately 500 feet north of East Roseville Parkway.
Source: City of Roseville Traffic Count Database, November 2016

BICYCLE/PEDESTRIAN SYSTEM

Figure 3 displays the existing bicycle facilities located near the project site. A Class II bikeway (bike lane), designated on-street with appropriate signing and striping, is provided in both directions of Roseville Parkway, Galleria Boulevard, Creekside Ridge Drive, Taylor Road, and Secret Ravine Parkway throughout the study area, though there is a gap in the eastbound bike lane on East Roseville Parkway at the intersection of North Sunrise Avenue. Bike lanes are also provided on North Sunrise Avenue south of East Roseville Parkway.

Sidewalks are present along the majority of the streets within the project vicinity. Sidewalks are not present along the west side of North Sunrise Avenue from Roseville Parkway to Medical Plaza Drive, portions of the north side of East Roseville Parkway from North Sunrise Avenue to Secret Ravine Parkway, and the west side of Secret Ravine Parkway north of East Roseville Parkway. At signalized intersections, crosswalks with push-button pedestrian activation are present. A variety of pedestrian facilities are present within SRMC.



Existing Bicycle Facilities

- Class I - Bike Path
- Class II - Bike Lane
- Class III - Bike Route

Figure 3

Bicycle Facilites

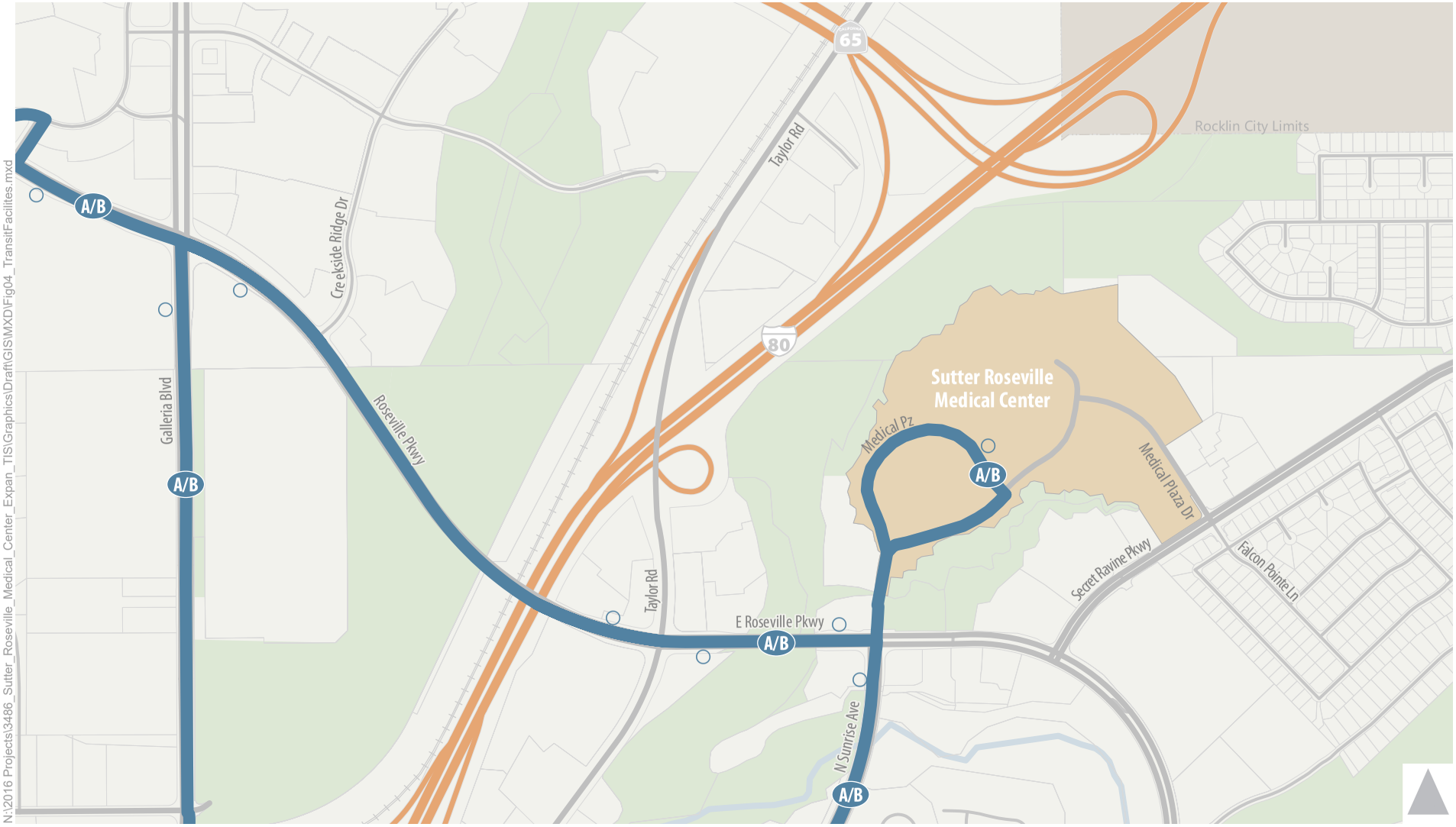
TRANSIT SYSTEM

Figure 4 displays transit service to the site. The City of Roseville operates both fixed route busing and demand-responsive dial-a-ride services throughout much of City. A bus stop for Roseville Transit Route A and Route B is located on the medical center campus near the main entrance to the hospital. The project is served by the following bus routes:

Route A operates in a clockwise loop starting at the Galleria Transfer Point at the Westfield Galleria at Roseville Mall, using Roseville Parkway, North Sunrise Avenue, Cirby Way, Riverside Avenue, Vernon Street, Atlantic Street, and Galleria Boulevard. Route A operates Monday through Friday on approximately 30 minute headways from 6:00 a.m. to 6:30 p.m., and hourly headways thereafter until 9:53 p.m. On Saturday, Route A operates on 1-hour headways from 8:00 a.m. to 5:00 p.m.

Route B operates in a counter-clockwise loop starting at the Galleria Transfer Point at the Westfield Galleria at Roseville Mall, using Galleria Boulevard, Atlantic Street, Vernon Street, Riverside Avenue, Cirby Way, Sunrise Avenue, and East Roseville Parkway. Route B operates Monday through Friday on approximately 30 minute headways from 6:10 a.m. to 6:40 p.m., and hourly headways thereafter until 9:43 p.m. On Saturday, Route B operates on 1-hour headways from 8:07 a.m. to 4:50 p.m.

Both Route A and Route B connect the Sutter Roseville Medical Center campus to the Westfield Galleria at Roseville Mall, the Downtown Roseville Civic Center, and the Sunrise Avenue corridor. Both routes also provide connections to additional bus routes via the Galleria, Civic Center, Louis/Orlando and Sierra Gardens Transfer Points.



Roseville Transit Bus Stop

Roseville Transit - Local Service

Route A/B

Figure 4

Transit Facilites

III. PROJECT TRAVEL CHARACTERISTICS

This chapter describes the expected travel characteristics of the proposed project. Refer to Figure 1 for project study area and Appendix A for project site plan.

PROPOSED MEDICAL CENTER EXPANSION

The proposed ED expansion of the Sutter Roseville Medical Center would consist of an expanded emergency department, additional intensive care space, a catheterization lab, and other supporting uses in the middle of the campus (see Appendix A for site plan). Sutter administrators provided the following data regarding anticipated patient visitation and staffing for the proposed expansion:

- Sutter Health's Business Plan projects 82,896 annual patient visits to the ED by 2020, which is an approximate 2.8 percent increase over the 2016 total of about 80,600 patient visits. Since patient visits occur throughout the year, this could translate into an additional six patients per day.
- Sutter administrators estimate that an additional 44 employees could eventually work in the expanded ED, additional critical beds, and relocated cardiac catheterization labs, though this estimate is considered preliminary and could change.

The existing Sutter Roseville Medical Center consists of the following uses:

- A hospital consisting of acute care space in bed towers, an intensive care unit, emergency department, and the Sutter Rehabilitation Institute (SRI)
- Multiple medical office buildings providing outpatient care

The proposed ED expansion would add to the amount of acute care uses on the campus. Table 6 presents a summary of the existing space on the SRMC campus as well as the proposed expansion space. As shown, the proposed ED expansion would increase the total square footage on the campus by 92,319 square feet to 923,475 square feet, within the 1.1 million square feet permitted under the campus Master Plan. Table 6 also differentiates between constructed space and occupied space. According to Sutter administrators, approximately 30,000 square feet of acute care space in the Sutter Rehabilitation Institute building is constructed by not currently occupied. Therefore, 516,599 square feet of the 546,599 square foot hospital use (801,156 square feet of the 831,156 square foot campus overall) is considered to be occupied for the existing trip generation analysis.

TABLE 6:
SUTTER ROSEVILLE MEDICAL CENTER LAND USE INFORMATION

Use	Existing		Proposed Expansion	After Expansion	
	Built	Occupied		Built	Occupied
Hospital (Acute Care)	546,599 sq. ft.	516,599 sq. ft.	92,319 sq. ft.	638,918 sq. ft.	608,918 sq. ft.
Outpatient (Medical Office)	284,557 sq. ft.	284,557 sq. ft.	-	284,557 sq. ft.	284,557 sq. ft.
Total	**831,156 sq. ft.**	**801,156 sq. ft.**	**92,319 sq. ft.**	**923,475 sq. ft.**	**893,475 sq. ft.**

Notes: Breakdown of existing hospital and outpatient/medical office uses and occupied versus un-occupied space provided by Sutter Roseville Medical Center in December 2016.
Source: Sutter Health, 2016.

INTERNAL CIRCULATION AND PARKING

Access to the ED expansion would be provided from Medical Plaza Drive via the existing access road to the existing emergency department. A new porte-cochère would be constructed approximately 100 feet east of the existing emergency department drop-off. In terms of internal circulation on the campus, traffic flow to and from the emergency department drop-off would remain unchanged.

The proposed expansion would occur in the middle of the campus in a planned growth area currently used for physician parking. Sutter administrators have indicated that this displaced physician parking would be accommodated in the adjacent parking garage. Sutter Health recently retained Fehr & Peers to conduct a parking study for the SRMC campus. The results of that study as it pertains to the proposed expansion are presented in the Parking Supply and Demand section on page 39.

EXISTING TRIP GENERATION OF SUTTER ROSEVILLE MEDICAL CENTER

The traffic data collected in November 2016 for this study was used to calculate the existing trip generation rates of the SRMC campus. This included:

- the a.m. and p.m. peak period traffic counts collected at the East Roseville Parkway/North Sunrise Avenue and Secret Ravine Parkway/Medical Plaza Drive–Falcon Pointe Lane intersections,
- driveway counts for the following locations:
  - Medical Plaza Drive driveway for the medical offices at the north corner of the Secret Ravine Parkway/Medical Plaza Drive intersection (which are not part of the SRMC campus)
  - Driveway on Secret Ravine Parkway serving the recently completed 8 Medical Plaza building on the west corner of the Secret Ravine Parkway/Medical Plaza Drive intersection

The total trip generation for the existing SRMC campus was calculated using the following process:

1. Include all trips on the north leg of the East Roseville Parkway/North Sunrise Avenue intersection
2. Add all trips on the northwest leg of the Secret Ravine Parkway/Medical Plaza Drive–Falcon Pointe Lane intersection
3. Subtract the trips traveling on Medical Plaza Drive to the medical office complex at the north corner of the Secret Ravine Parkway/Medical Plaza Drive intersection (which are not part of the campus). This was done by subtracting the trips observed using the Medical Plaza Drive driveway opposite the 8 Medical Plaza office building.
4. Add trips traveling towards/from 3 Medical Plaza and 8 Medical Plaza using the driveway on Secret Ravine Parkway adjacent to 8 Medical Plaza

For purposes of the trip generation analysis, this study uses the amount of existing occupied square footage on the SRMC campus presented in Table 6 to estimate the campus' existing trip generation rate. Table 7 presents the existing trip generation for the SRMC campus and the trip generation rate based on occupied square footage. During the a.m. peak hour, 75 percent of trips were inbound. During the p.m. peak hour, 75 percent of trips were outbound.

TABLE 7:
EXISTING TRIP GENERATION – SUTTER ROSEVILLE MEDICAL CENTER

Time Period	Land Use[1]	Observed Traffic Volume[2]			Trip Generation Rate (Trips per KSF)[3]		
		Total	In	Out	Total	In	Out
Morning Peak Hour of Adjacent Roadway (7:30 a.m. - 8:30 a.m.)	801.2 KSF	1,171	881	290	1.46	75.2%	24.8%
Evening Peak Hour of Adjacent Roadway (4:45 p.m. - 5:45 p.m.)		828	206	622	1.03	24.9%	75.1%

Notes: [1]Land Use is the existing occupied square footage on the Sutter Roseville Medical Center campus and includes both hospital and outpatient (i.e., medical office) uses.
[2]Based on traffic counts collected in November 2016.
[3]Trip Generation Rate calculated by taking the observed traffic count and dividing it by the total occupied square footage
KSF = thousand square feet
Source: Fehr & Peers, 2017.

Since the existing Sutter Roseville Medical Center is a mix of both hospital and outpatient (i.e., medical office) uses, this study uses trip rates contained in the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 9th Edition* to estimate the split in trips generated by these different land use types.

Table 8 presents the ITE trip generation calculation for the existing SRMC campus and compares it to the observed trip generation data presented in Table 7.

TABLE 8:
ITE TRIP GENERATION ESTIMATE – EXISTING SUTTER ROSEVILLE MEDICAL CENTER

		Trip Rates (per KSF)[2]						Trips[3]					
		A.M. Peak Hour			P.M. Peak Hour			A.M. Peak Hour			P.M. Peak Hour		
Land Use	**KSF[1]**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**
Hospital[4]	516.6	0.95	63%	37%	0.93	38%	62%	491	309	182	480	182	298
Medical Office[5]	284.6	2.39	79%	21%	3.57	28%	72%	680	537	143	1,016	284	732
							ITE Sub-Total	1,171	846	325	1,496	466	1,030
							Observed Trip Generation[6]	1,171	881	290	828	206	622
							Difference of Observed versus ITE Trip Rates	**0**	**+35**	**-35**	**-668**	**-260**	**-408**

Notes: [1]Existing square footage by land use type based on data provided by Sutter Roseville Medical Center
[2]Trip rates obtained from *Trip Generation Manual, 9th Ed.* (Institute of Transportation Engineers, 2012)
[3]Number of trips calculated using trip rates from *Trip Generation Manual, 9th Ed.* (Institute of Transportation Engineers, 2012)
[4]Based on trip rates contained in *Trip Generation Manual, 9th Ed.* (Institute of Transportation Engineers, 2012) for the Hospital Land Use Category (610)
[5]Based on trip rates contained in *Trip Generation Manual, 9th Ed.* (Institute of Transportation Engineers, 2012) for the Medical Office Land Use Category (720).
[6]Observed trip generation at Sutter Roseville Medical Center based on traffic counts collected in November 2016. Trip generation during peak hour of adjacent street traffic (7:30 to 8:30 a.m. and 4:45 to 5:45 p.m.) is reported.
KSF = thousand square feet
Source: Fehr & Peers, 2017.

Table 8 shows that ITE trip rates match the campus' trip generation during the a.m. peak hour, but overestimate the campus' trip generation by 80 percent during the p.m. peak hour. This suggests that the SRMC campus has different trip making characteristics than the sites used to develop the ITE trip rates during the p.m. peak hour. Therefore, this study factors the ITE p.m. peak hour trip generation rate for hospital uses (ITE Land Use Category 610), as described in detail below, to match the observed trip making at SRMC.

Table 9 presents the trip generation rate calculation comparison used to develop the hospital trip rate for the proposed project. The a.m. peak hour uses the ITE hospital trip rate and the observed directionality. The p.m. peak hour trip rate is calculated by maintaining the existing ratio between the a.m. and p.m. peak hour trips.

TABLE 9:
TRIP GENERATION RATE CALCULATION – SUTTER ROSEVILLE MEDICAL CENTER

	SRMC Overall Trip Rate						Proposed ED Expansion Trip Rate					
	ITE[1]			Observed[2]			ITE[3]			Observed[4]		
Time Period	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**
A.M. Peak Hour	1.46	72%	28%	1.46	75%	25%	0.95	63%	37%	**0.95**	**66%**	**34%**
P.M. Peak Hour	1.87	31%	69%	1.03	25%	75%	0.93	38%	62%	**0.67**[5]	**30%**	**70%**

Notes: [1]SRMC ITE trip rate calculated by taking ITE calculated number of trips and dividing by total occupied square footage of the campus, as shown in Table 8.
[2]SRMC observed trip rate based on traffic counts collected in November 2016, as shown in Table 7.
[3]Trip rates contained in *Trip Generation Manual, 9th Ed.* (Institute of Transportation Engineers, 2012) for the Hospital land use category (610).
[4]Trip rate for hospital uses on the SRMC campus. Since the campus' observed trip rate matched the ITE trip rate in the a.m. peak hour, the ITE hospital trip rate is used for the a.m. peak hour. The p.m. peak hour rate is calculated using the campus' observed a.m. peak hour to p.m. peak hour ratio (see note 5 below).
[5]Calculated as: 0.95 * (1.03/1.46) = 0.67
BOLD and UNDERLINED trip rate is used for the proposed ED expansion.
Source: Fehr & Peers, 2017.

Table 10 presents the a.m. and p.m. peak hour trip generation of the proposed project. The proposed ED expansion would cause a seven percent increase in overall campus trip generation. It should be noted that this trip generation estimate assumes the ED expansion generates traffic at the same rate as the other hospital space on campus. Based on anticipated staffing levels and the number of additional ED patient visits expected on a typical weekday, the actual trip generation would likely be less than the estimates shown in Table 10.

TABLE 10:
TRIP GENERATION ESTIMATE – PROPOSED SUTTER ROSEVILLE MEDICAL CENTER EXPANSION

		Trip Rates (per KSF)[2]						Trips[3]					
		A.M. Peak Hour			P.M. Peak Hour			A.M. Peak Hour			P.M. Peak Hour		
Facility	**KSF[1]**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**
Existing SRMC Campus	801.2	1.46	75%	25%	1.03	25%	75%	1,171	881	290	828	206	622
Proposed Expansion	**92.3**	0.95	66%	34%	0.67	30%	70%	**88**	**58**	**30**	**62**	**19**	**43**
							Total Trips	1,259	939	320	890	225	665

Notes: [1]Existing and proposed square footage based on data provided by Sutter Roseville Medical Center
[2]Trip rates for existing SRMC campus based on traffic counts collected in November 2016. Proposed expansion trip rates based on calculation shown in Table 9.
[3]Trips for existing SRMC campus based on traffic counts collected in November 2016. Proposed expansion trip generation calculated by multiplying the expansion square footage by the trip rates.
KSF = thousand square feet
Source: Fehr & Peers, 2017.

Although this study analyzes the a.m. and p.m. peak hour conditions to assess project impacts, the project's daily trip generation is also calculated to show the change in daily traffic volumes on adjacent roadways. Table 11 presents the daily trip generation of the proposed project. Since the ITE trip generation rates match the campus' trip generation during the a.m. peak hour, this study uses the ITE daily trip generation rate for hospital uses (ITE Land Use Category 610). It should be noted that this is a conservative daily trip generation estimate because it assumes the ED expansion generates traffic at the same rate as the other hospital space on campus, and the observed SRMC campus p.m. peak hour trip generation is 55 percent less than the ITE trip generation estimate indicating the possibility that the existing SRMC campus generates fewer trips than the ITE survey sites.

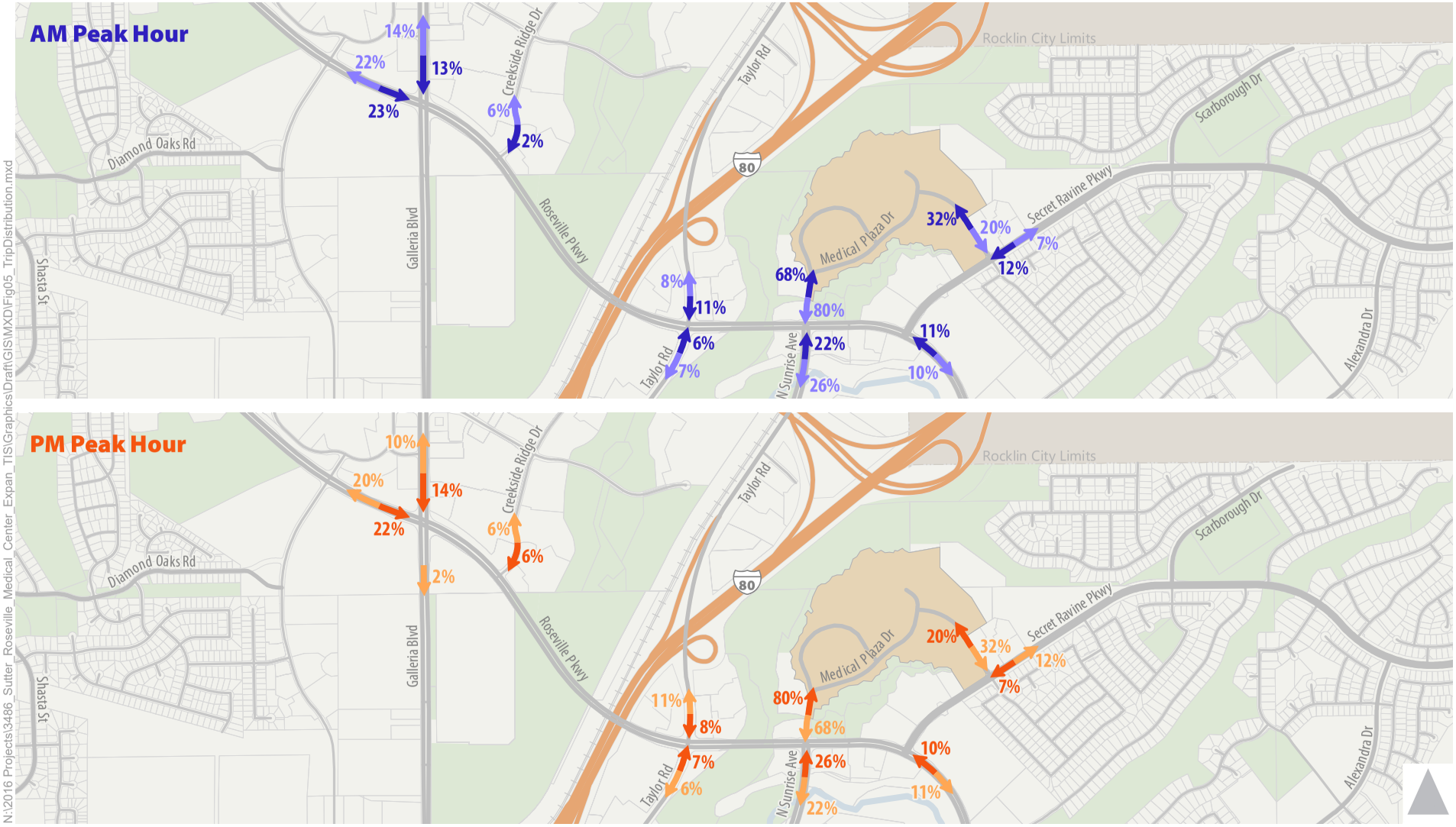
TABLE 11:
DAILY TRIP GENERATION ESTIMATE –
PROPOSED SUTTER ROSEVILLE MEDICAL CENTER EXPANSION

Land Use	KSF[1]	Daily Trip Generation	
		Trip Rate (per KSF)[2]	Trips
Proposed ED Expansion	92.3	13.22	1,220

Notes: [1]Proposed square footage based on data provided by Sutter Roseville Medical Center
[2]Trip rates contained in *Trip Generation Manual, 9th Ed.* (Institute of Transportation Engineers, 2012) for the Hospital land use category (610).
KSF = thousand square feet
Source: Fehr & Peers, 2017.

TRIP DISTRIBUTION CHARACTERISTICS

Figure 5 shows the existing/observed trip distribution of the existing project. These percentages were derived based on existing turning movement volumes for trip patterns to and from the Sutter Roseville Medical Center. Since the proposed ED expansion would be located in the central portion of the campus, and would rely on parking in nearby lots/garages, it is reasonable to expect the trip distribution for the expansion to be consistent with the existing travel patterns.



Inbound Trip Distribution

Outbound Trip Distribution

Sutter Roseville Medical Center

Figure 5

Existing Trip Distribution of Sutter Roseville Medical Center

IV. EXISTING PLUS PROJECT CONDITIONS

This chapter analyzes the potential impacts of the proposed project on the surrounding roadway network under an "existing plus project" scenario. It also includes an evaluation of the proposed project's effects on parking and internal campus circulation.

TRAFFIC FORECASTS

The trip generation presented in Table 10 and the trip distribution shown in Figure 5 are used to calculate the assignment of project trips. Figure 6 displays the a.m. and p.m. peak hour project trip assignment at study intersections.

This project trip assignment is added to the existing traffic volumes shown in Figure 2. Figure 7 presents the resulting a.m. and p.m. peak hour traffic forecasts under existing plus project conditions.

INTERSECTION OPERATIONS

Table 12 displays the average delay and LOS at the study intersections under existing plus project conditions. Refer to Appendix C for technical calculations.

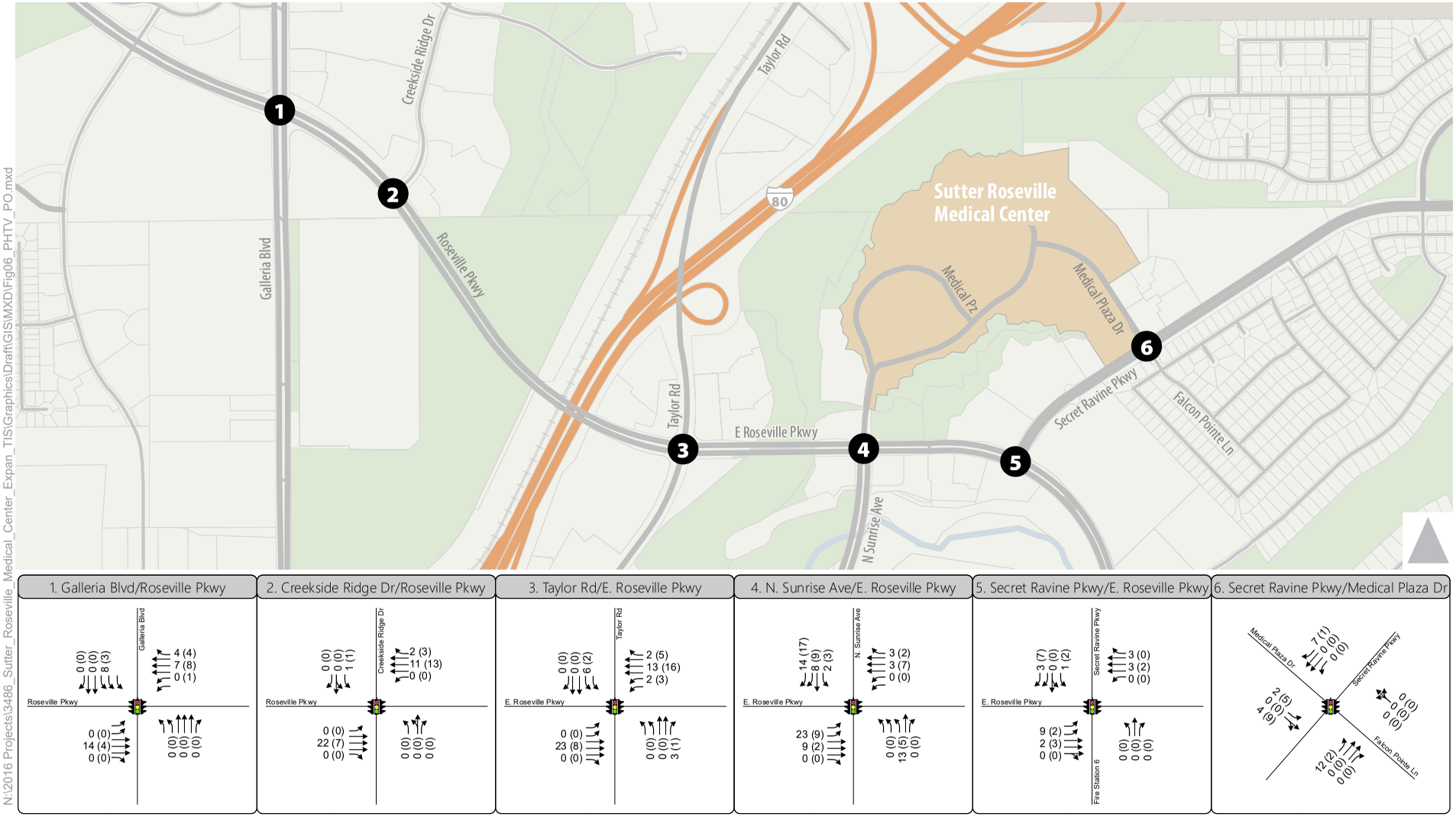


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Figure 6

Peak Hour Project Trips and Lane Configurations - Project Only

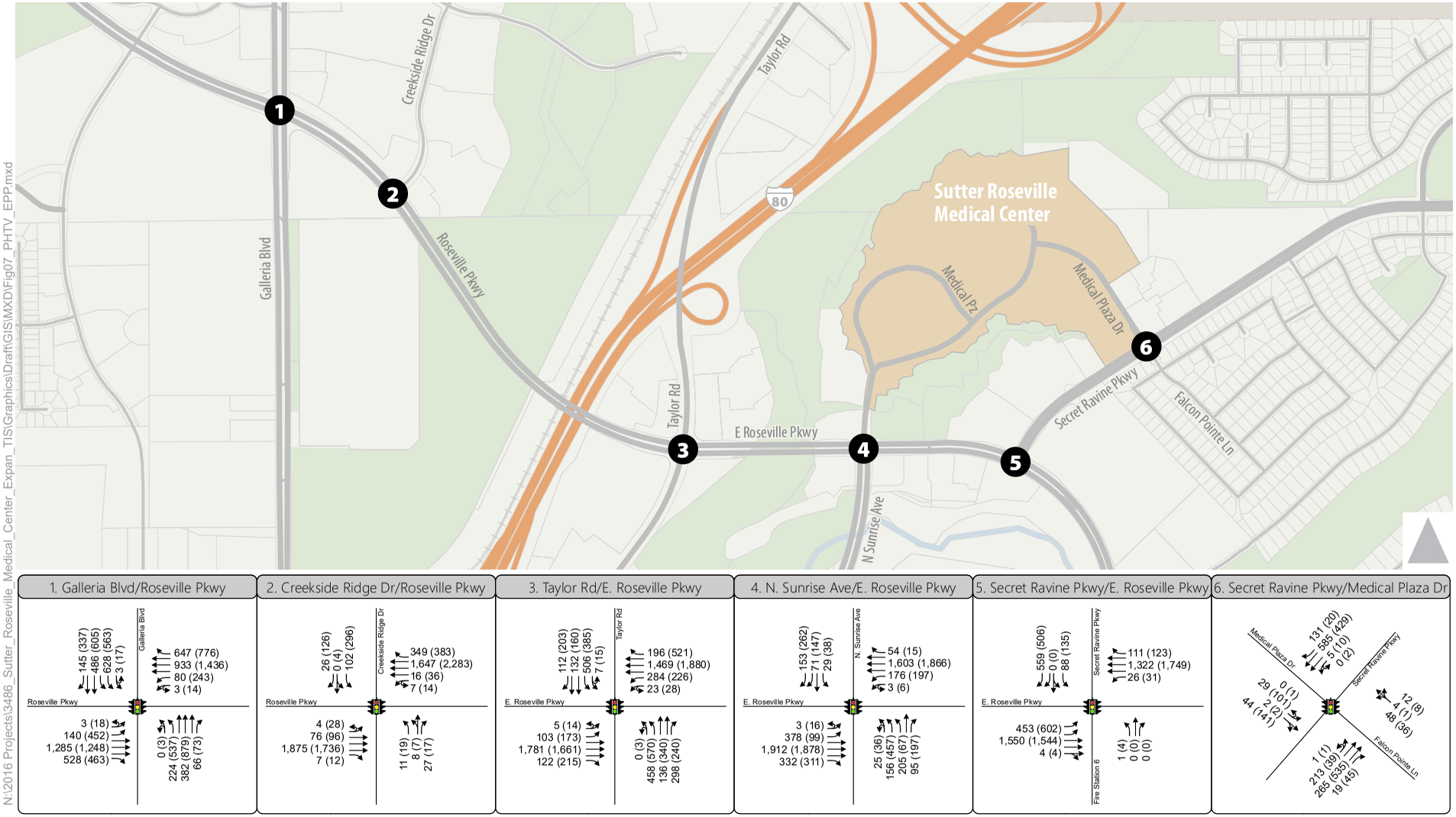

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Figure 7

Peak Hour Traffic Volumes and Lane Configurations - Existing Plus Project Conditions

TABLE 12:
PEAK HOUR INTERSECTION OPERATIONS – EXISTING PLUS PROJECT CONDITIONS

Intersection	Traffic Control	Peak Hour	Existing Conditions		Existing + Project	
			Delay[1]	LOS	Delay[1]	LOS
1. Roseville Parkway/Galleria Boulevard	Signal	A.M.	**38**	**D**	**38**	**D**
		P.M.	**67**	**E**	**72**	**E**
2. Roseville Parkway/Creekside Ridge Drive	Signal	A.M.	18	B	19	B
		P.M.	**50**	**D**	**44**	**D**
3. East Roseville Parkway/Taylor Road	Signal	A.M.	**73**	**E**	**68**	**E**
		P.M.	**66**	**E**	**68**	**E**
4. East Roseville Parkway/North Sunrise Ave.	Signal	A.M.	**48**	**D**	**50**	**D**
		P.M.	**52**	**D**	**54**	**D**
5. East Roseville Parkway/Secret Ravine Pkwy.	Signal	A.M.	29	C	31	C
		P.M.	32	C	35	C
6. Secret Ravine Parkway/Medical Plaza Drive–Falcon Pointe Lane	Signal	A.M.	18	B	19	B
		P.M.	11	B	11	B

Notes: [1]Average delay (rounded to the nearest second) and LOS for signalized intersections is the weighted average for all movements.
All intersections are analyzed in SimTraffic.
BOLD text indicates the intersection operates at LOS D or worse
Source: Fehr & Peers, 2017.

LOS at all intersections will remain unchanged, though delay is expected to increase slightly at some intersections. The results presented in Table 12 show delay decreasing slightly at two intersections: East Roseville Parkway/Taylor Road in the a.m. peak hour and Roseville Parkway/Creekside Ridge Drive in the p.m. peak hour. This slight decrease is the result of variation that occurs when averaging the results of multiple microsimulation model runs. From this, it can be concluded that the effect of project trips is less noticeable than variations in results between model runs.

QUEUING ANALYSIS

Table 13 and Table 14 show the maximum queues for critical movements (i.e., affected by project trips) under existing plus project conditions during the a.m. and p.m. peak hours, respectively. Figure 8 also graphically illustrates these maximum queues for critical movements. To address the limitations of the SimTraffic model noted in the SimTraffic Model Calibration section, this study uses the difference method to forecast how queues would change with the proposed project. The project would not change the maximum queue lengths for most critical movements, such as the northeast left-turn on Secret Ravine Parkway at Medical Plaza Drive and the southbound approach at East Roseville Parkway/North Sunrise

Avenue. However, Table 13 shows that the project would cause the maximum eastbound left-turn queue at the East Roseville Parkway/North Sunrise Avenue intersection to increase from 500 feet to 575 feet. This queue is for a critical movement into the campus that already experiences queuing that extends into the adjacent through lane on the Dry Creek bridge (see page 15). Recommended improvements to address this queuing are provided in the Internal Circulation section (see page 35).

TABLE 13:
QUEUING ANALYSIS – EXISTING PLUS PROJECT CONDITIONS – A.M. PEAK HOUR

Intersection	Movement	Available Storage[1]	Maximum Vehicle Queue			
			Existing Conditions		Existing Plus Project	
			Modeled[2]	Observed[3]	Modeled[2]	Forecasted[4]
East Roseville Parkway/ North Sunrise Avenue	Eastbound Left-Turn	175	**650**	**500**	**725**	**575**
Secret Ravine Parkway/ Medical Plaza Dr.–Falcon Pointe Ln.	Northeast Left-Turn[5]	225	225	**300**	225	**300**

Notes: [1]Storage lengths are shown in feet and based on measurements from aerial imagery.
[2]Modeled queuing results are presented in feet and based on average of 10 SimTraffic runs.
[3]Observed queue data are presented in feet and based on queue counts conducted on Tuesday, November 15, 2016.
[4]Forecasted queuing results are presented in feet and based on the difference between Existing Conditions and Existing Plus Project Conditions model results added to existing observed conditions.
[5]Left-turn movement from northeast-bound Secret Ravine Parkway onto Medical Plaza Drive entering the SRMC campus
BOLD cells indicate that the maximum queue exceeds the available storage.
Source: Fehr & Peers, 2017.

TABLE 14:
QUEUING ANALYSIS – EXISTING PLUS PROJECT CONDITIONS – P.M. PEAK HOUR

Intersection	Movement/ Approach	Available Storage[1]	Maximum Vehicle Queue			
			Existing Conditions		Existing Plus Project	
			Modeled[2]	Observed[3]	Modeled[2]	Forecasted[4]
East Roseville Parkway/ North Sunrise Avenue	Southbound Approach[5]	450	200	400	200	400
Secret Ravine Parkway/ Medical Plaza Dr.–Falcon Pointe Ln.	Southeast Left-Turn[6]	100	125	100	100	100

Notes: [1]Storage lengths are shown in feet and based on measurements from aerial imagery.
[2]Modeled queuing results are presented in feet and based on average of 10 SimTraffic runs.
[3]Observed queue data are presented in feet and based on queue counts conducted on Tuesday, November 15, 2016.
[4]Forecasted queuing results are presented in feet and based on the difference between Existing Conditions and Existing Plus Project Conditions model results added to existing observed conditions.
[5]Southbound approach on North Sunrise Avenue departing the SRMC campus
[6]Southeast left turn from Medical Plaza Drive onto Secret Ravine Parkway departing the SRMC campus
Source: Fehr & Peers, 2017.

Existing AM
Existing PM
Existing Plus Project AM
Existing Plus Project PM

Note: Maximum vehicle queues are shown for the critical movements and time periods at each SRMC access.

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Figure 8

Maximum Vehicle Queues

DAILY ROADWAY TRAFFIC VOLUMES

Table 15 summarizes average daily traffic on roadway segments near the project site under existing plus project conditions. The project's daily trip generation, shown in Table 11, is added to the roadway network in accordance with the trip distribution presented in Figure 5. As shown, the East Roseville Parkway segment from Taylor Road to North Sunrise Avenue would experience the greatest increase in project traffic, increasing by 700 daily vehicles. Roseville Parkway from Galleria Boulevard to Taylor Road would experience the second largest increase, with 500 daily vehicles.

TABLE 15:
ROADWAY AVERAGE DAILY TRAFFIC – EXISTING PLUS PROJECT CONDITIONS

Roadway Segment	Number of Lanes	Daily Traffic Volume[1]		
		Existing Conditions	Project Trips	Existing Plus Project
1. Roseville Parkway: West of Galleria Boulevard	6	47,600	300	47,900
2. Roseville Parkway: Galleria Boulevard to Taylor Road	6	53,800	500	54,300
3. East Roseville Parkway: Taylor Road to N. Sunrise Ave.	6	57,400	700	58,100
4. East Roseville Parkway: North Sunrise Avenue to Secret Ravine Parkway	6	51,500	300	51,800
5. East Roseville Parkway: East of Secret Ravine Parkway	6	41,300	100	41,400
6. Galleria Boulevard: North of Roseville Parkway	6	41,600	100	41,700
7. Taylor Road: North of East Roseville Parkway	4[2]	17,000	100	17,100
8. Taylor Road: South of East Roseville Parkway	4	21,300	100	21,400
9. North Sunrise Avenue: South of East Roseville Parkway	6	15,900	300	16,200
10. Secret Ravine Parkway: East Roseville Parkway to Medical Plaza Drive	4	16,700	200	16,900
11. Secret Ravine Parkway: East of Medical Plaza Drive	4	13,400	100	13,500

Notes: [1]Daily traffic volumes rounded to nearest 100 vehicles.
[2]Taylor Road reduces to 2 lanes approximately 500 feet north of East Roseville Parkway.
Source: Fehr & Peers, 2017.

BICYCLE/PEDESTRIAN FACILITIES

The project will not change the bicycle network. The bicycle network in the study area has been completed in accordance with the 2008 Roseville Bicycle Master Plan.

The project will not change the pedestrian network.

TRANSIT SYSTEM

The project will not change the transit system.

VMT CALCULATIONS

This section describes the methodology used to calculate the average weekday Vehicle Miles of Travel (VMT) associated with the proposed project. VMT is presented for informational purposes in this study. However, the values shown here may be used as inputs to other technical studies such as air quality, noise, and greenhouse gas emissions.

METHODOLOGY

VMT is considered a useful metric in understanding of the overall impacts of a project on the transportation system. VMT is often expressed on a "per capita" or "per employee" basis to understand the relative efficiency of one project versus another. By definition, one VMT occurs when a vehicle is driven one mile. In addition, a given VMT value represents vehicular miles of travel for an entire weekday. Lastly, VMT values in this chapter represent the full length of a given trip, and are not truncated at city, county, or region boundaries.

To estimate the project's effect on VMT, the model-wide change in VMT was calculated by summing all travel on all roadways within the City's travel demand model. This approach enables a change in trip origin or destination (in response to the campus ED expansion) to be reflected. This VMT analysis methodology uses the following formula to calculate the project's effect on VMT:

Project VMT Effect = Plus Project Model-Wide VMT – Existing Conditions Model-Wide VMT

RESULTS

Using the methodology described above, the project would result in an increase of 1,909 VMT on a typical weekday. Refer to Appendix D for VMT calculations.

V. INTERNAL CIRCULATION AND PARKING

This chapter evaluates internal circulation and the project's proposed effect on parking.

INTERNAL CIRCULATION

Access to the ED expansion would be provided from Medical Plaza Drive via the existing access road to the existing emergency department. A new porte-cochère would be constructed approximately 100 feet east of the existing emergency department drop-off. In terms of internal circulation on the campus, traffic flow to and from the emergency department drop-off would remain unchanged.

As described in the existing plus project queuing analysis (see page 30), the project would add traffic to the eastbound left-turn at East Roseville Parkway/North Sunrise Avenue during the a.m. peak hour, causing the maximum queue to increase from 500 feet to 575 feet. The extent of the queuing is primarily a result of imbalanced lane utilization of the two left-turn lanes. More motorists use the outside left-turn lane versus the inside left-turn lane to turn onto northbound North Sunrise Avenue, blocking access to the inside left-turn lane. The imbalanced lane utilization is caused by the intersection at North Sunrise Avenue/Medical Plaza Drive on the SRMC campus where the large majority of drivers entering the campus turn right onto Medical Plaza Drive.

Therefore, the following improvements on the SRMC campus are recommended to address the imbalanced lane utilization and reduce the maximum queue length during the a.m. peak hour for the eastbound left-turn at East Roseville Parkway/North Sunrise Avenue:

- Restripe North Sunrise Avenue north of East Roseville Parkway as follows:
  - Provide two northbound free right-turn lanes at the first internal intersection (Medical Plaza Drive). This will require restriping Medical Plaza Drive to have two receiving lanes by converting the existing center median lane to a receiving lane.
  - Restripe the inside (#1) southbound lane to be the northbound through lane. To accommodate southbound queues at East Roseville Parkway/North Sunrise Avenue, the inside southbound lane would need to be maintained at least to the north end of the bridge over the ravine. Therefore, the northbound through lane should be striped as a pocket with 100 feet of storage and a 60-foot taper.
  - These improvements will require moving the existing channelized right-turn island to accommodate two free right turn lanes. This will also require restriping the pedestrian crosswalk to this new island location.

- To accommodate the new northbound lane configurations on North Sunrise Avenue, the following restriping would need to occur on North Sunrise Avenue north of Medical Plaza Drive:
  - Eliminate the southbound left turn pocket and prohibit the southbound left-turn movement. Existing southbound left-turn movements would be shifted to make a u-turn at the East Roseville Parkway/North Sunrise Avenue intersection.
  - Realign the northbound receiving lane to align with the northbound departure lane
  - Create a new pedestrian island for the realigned crosswalk
  - Use bollards and/or a raised curb along Medical Plaza Drive to direct pedestrians to the new pedestrian island

It is noted that ambulances may use the existing center median lane on Medical Plaza Drive to transport patients to the ED. With the proposed restriping, vehicles would still have ample space to pull over to allow ambulances to pass.

Figure 9 illustrates these improvements. Since the two northbound lanes entering the SRMC campus become two free right-turn lanes onto Medical Plaza Drive, this improvement is anticipated to create a better lane utilization balance for the eastbound left-turn at East Roseville Parkway/North Sunrise Avenue. Table 16 shows that the maximum forecasted queue for the eastbound left-turn at East Roseville Parkway/North Sunrise Avenue would be reduced from 575 feet to 300 feet with the project. While the queue would still exceed the available storage, it would be less than existing conditions and would reduce the maximum queue to just beyond the taper of the 175-foot pocket. It should be noted that this condition would occur a few times during the a.m. peak hour, and typically not during other periods of the day.

TABLE 16:
QUEUING ANALYSIS –
EXISTING PLUS PROJECT CONDITIONS WITH IMPROVEMENTS – A.M. PEAK HOUR

Intersection	Movement	Available Storage[1]	Maximum Vehicle Queue					
			Existing Conditions		Existing Plus Project		Existing + Project with Improvements	
			Modeled[2]	Observed[3]	Modeled[2]	Forecasted[4]	Modeled[2]	Forecasted[4]
E. Roseville Pkwy./ N. Sunrise Ave.	Eastbound Left-Turn	175	**650**	**500**	**725**	**575**	**450**	**300**

Notes: [1]Storage lengths are shown in feet and based on measurements from aerial imagery.
[3]Observed queue data are presented in feet and based on queue counts conducted on Tuesday, November 15, 2016.
[2]Modeled queuing results are presented in feet and based on average of 10 SimTraffic runs.
[4]Forecasted queuing results are presented in feet and based on the difference between Existing Conditions and Existing Plus Project Conditions model results added to existing observed conditions.
BOLD cells indicate that the maximum queue exceeds the available storage.
Source: Fehr & Peers, 2017.

N

20 0 20 40

1" = 40' SCALE

Note: measurements/dimensions shown are approximations based on aerial photography

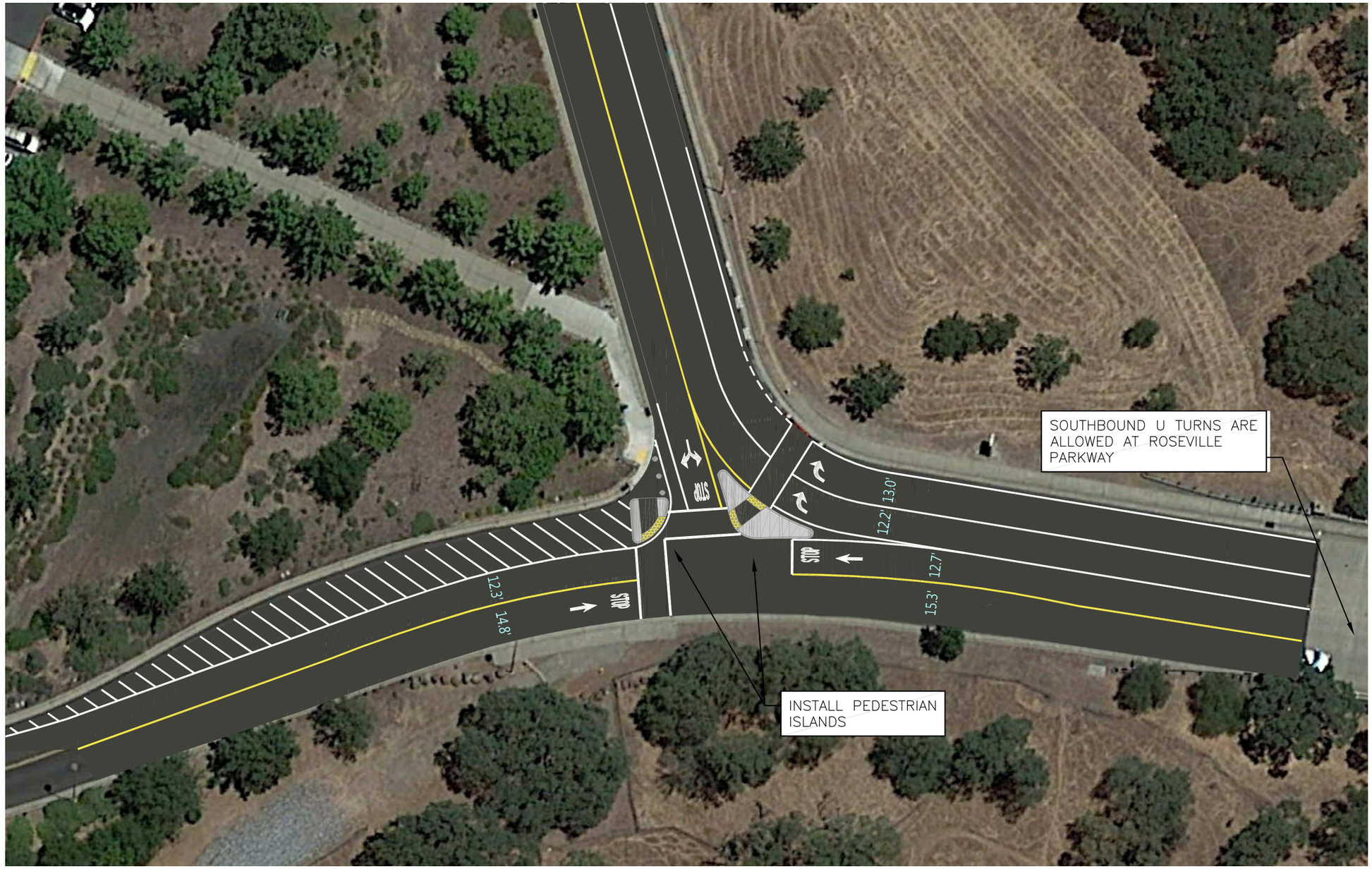

Figure 9

Conceptual Improvements at North Sunrise Avenue/Medical Plaza Drive

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PARKING SUPPLY AND DEMAND

The proposed expansion would occur in the middle of the campus in a planned growth area currently consisting of physician parking. Sutter administrators have indicated that this displaced physician parking would be accommodated by designating existing standard spaces in the adjacent parking garage for physicians.

In addition to the displaced parking, the increased capacity of the emergency department provided by the ED expansion will result in increased parking demand. Sutter administrators provided the following data regarding anticipated patient visitation and staffing for the proposed expansion:

- Sutter Health's Business Plan projects 82,896 annual patient visits to the ED by 2020, which is an approximate 2.8 percent increase over the 2016 total of about 80,600 patient visits. Since patient visits occur throughout the year, this could translate into an additional six patients per day.
- Sutter administrators estimate that an additional 44 employees could eventually work in the expanded ED, additional critical beds, and relocated cardiac catheterization labs, though this estimate is considered preliminary and could change.

Since the ED expansion is not intended to accommodate outpatient visits, or other high turnover activities, it is more reasonable to estimate the parking demand for the ED expansion based on the number of additional patients and staff that will work at it. If it is conservatively assumed that all 44 employees drive alone and are present at 11 a.m., and that additional patient visitation generates the need for 3 spaces at 11 a.m., then the ED expansion peak parking demand would be 47 spaces.

The combination of the displaced parking along with the additional demand generated by the ED expansion would increase parking utilization in the adjacent parking garage and nearby parking lots. The recently completed parking study for the SRMC campus showed that existing peak period parking utilization for the parking areas closest to the ED expansion is 76 percent, and the existing campus-wide parking utilization is 83 percent. For those parking areas closest to the ED expansion, the total peak period parking utilization would increase from 76 to 86 percent. The campus-wide parking utilization would increase from 83 percent to 88 percent.

VI. IMPACTS AND MITIGATION MEASURES

This chapter evaluates the significance of project impacts under existing plus project conditions using the criteria described in the Introduction chapter.

EVALUATION OF INTERSECTION IMPACTS

Table 12 shows that the project would not cause LOS to worsen at any study intersections. Therefore, project impacts to intersection operations are considered less-than-significant and no mitigation is required.

EVALUATION OF BICYCLE IMPACTS

The project would not be inconsistent with any applicable policies and guidelines of Roseville's Bikeway Master Plan in terms of providing bicycle facilities. Therefore, project impacts to bicycle facilities are considered less-than-significant and no mitigation is required.

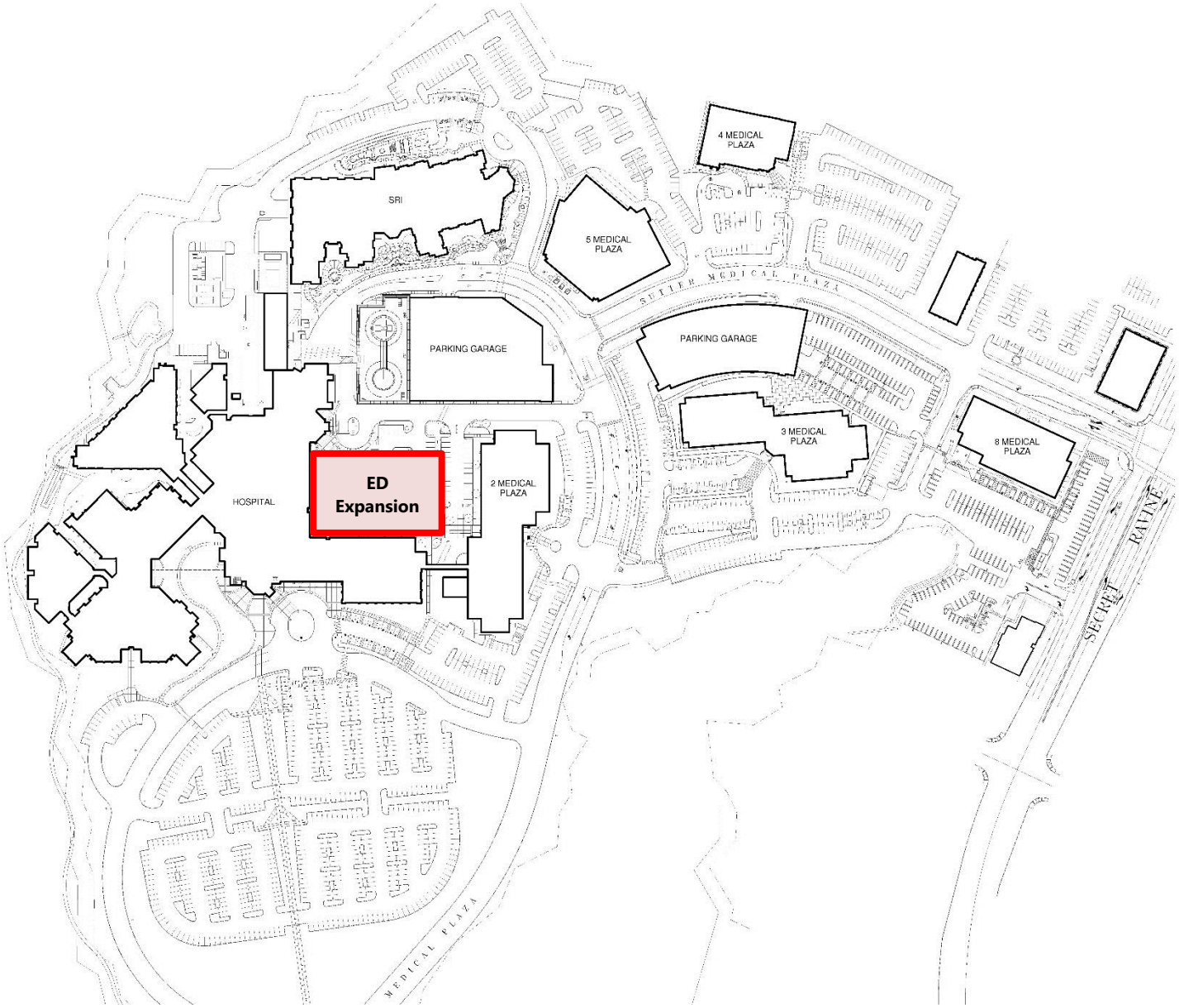
EVALUATION OF PEDESTRIAN IMPACTS

The project would not interfere with the operation of an existing pedestrian facility or preclude the construction of a planned pedestrian facility. Therefore, project impacts to pedestrian facilities are considered less-than-significant and no mitigation is required.

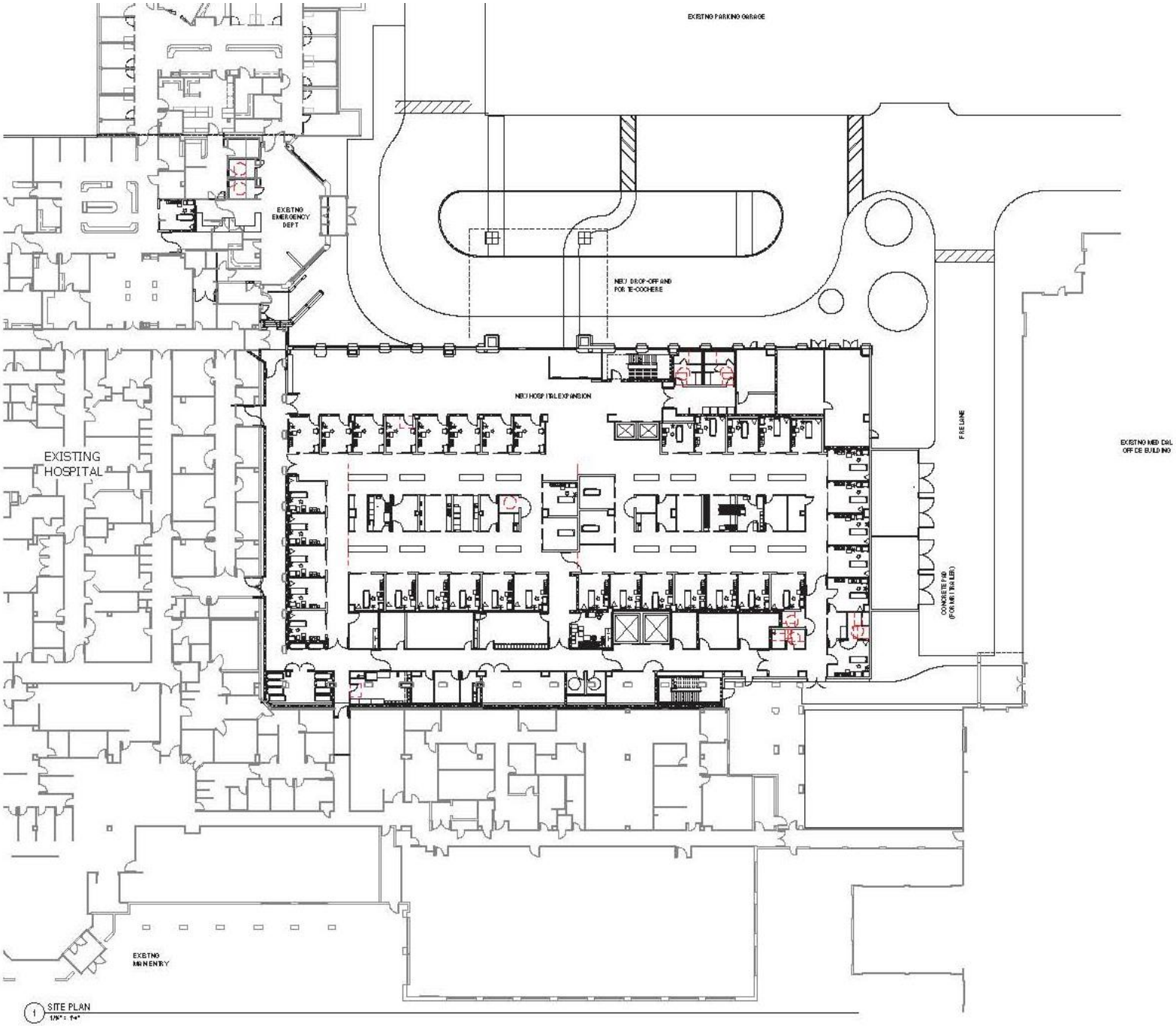
EVALUATION OF TRANSIT IMPACTS

The project would not have a negative impact on transit operations, travel times, and/or circulation. Therefore, project impacts to transit facilities are considered less-than-significant and no mitigation is required.

APPENDIX A:
PROJECT INFORMATION



Sutter Roseville Medical Center Site Plan – ED Expansion Site Shown in Red



Sutter Roseville Medical Center – ED/Critical Care Expansion Architectural Site Plan

APPENDIX B:
EXISTING CONDITIONS TECHNICAL CALCULATIONS

SimTraffic Post-Processor | **Sutter Roseville Medical Center**
Average Results from 10 Runs | **Existing Conditions**
Volume and Delay by Movement | **AM Peak Hour**

Intersection 1 **Galleria Blvd/Roseville Pkwy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	224	202	90.3%	50.3	5.0	D
	Through	382	401	104.9%	39.1	3.9	D
	Right Turn	66	61	92.8%	4.2	0.4	A
	Subtotal	672	664	98.9%	39.4	3.3	D
SB	Left Turn	623	602	96.6%	51.6	6.0	D
	Through	486	447	92.0%	29.1	3.5	C
	Right Turn	145	138	95.0%	2.9	0.2	A
	Subtotal	1,254	1,187	94.6%	37.5	3.5	D
EB	Left Turn	143	127	89.1%	57.8	8.3	E
	Through	1,271	1,253	98.6%	55.7	12.0	E
	Right Turn	528	509	96.4%	4.3	0.5	A
	Subtotal	1,942	1,889	97.3%	42.0	8.3	D
WB	Left Turn	83	67	80.5%	59.6	10.8	E
	Through	926	910	98.2%	46.1	3.5	D
	Right Turn	643	590	91.7%	8.0	0.6	A
	Subtotal	1,652	1,566	94.8%	32.4	2.9	C
Total		5,520	5,306	96.1%	37.8	3.8	D

Intersection 2 **Creekside Ridge Dr/Roseville Pkwy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	11	8	75.9%	35.2	15.5	D
	Through	8	9	113.1%	43.0	22.2	D
	Right Turn	27	24	87.6%	14.2	5.8	B
	Subtotal	46	41	89.3%	26.4	8.1	C
SB	Left Turn	101	95	94.4%	37.5	3.9	D
	Through						
	Right Turn	26	26	101.7%	17.6	8.7	B
	Subtotal	127	122	95.9%	33.1	3.8	C
EB	Left Turn	80	84	104.8%	46.0	4.6	D
	Through	1,853	1,774	95.7%	16.0	3.5	B
	Right Turn	7	8	109.4%	6.5	0.9	A
	Subtotal	1,940	1,865	96.1%	17.3	3.5	B
WB	Left Turn	23	18	78.7%	46.5	20.8	D
	Through	1,636	1,556	95.1%	17.4	3.5	B
	Right Turn	347	316	91.0%	16.1	2.7	B
	Subtotal	2,006	1,890	94.2%	17.4	3.4	B
Total		4,119	3,918	95.1%	17.9	3.3	B

SimTraffic Post-Processor | **Sutter Roseville Medical Center**
Average Results from 10 Runs | **Existing Conditions**
Volume and Delay by Movement | **AM Peak Hour**

Intersection 3 **Taylor Rd/Roseville Pkwy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	458	441	96.2%	86.3	35.3	F
	Through	136	144	105.7%	47.1	8.6	D
	Right Turn	295	274	92.8%	61.5	22.1	E
	Subtotal	889	858	96.5%	72.0	25.3	E
SB	Left Turn	507	445	87.8%	78.5	29.2	E
	Through	132	140	105.7%	45.7	4.6	D
	Right Turn	112	102	90.7%	26.7	4.5	C
	Subtotal	751	686	91.4%	64.3	19.8	E
EB	Left Turn	108	86	79.9%	115.8	40.6	F
	Through	1,758	1,531	87.1%	108.5	48.1	F
	Right Turn	122	96	79.0%	61.4	36.8	E
	Subtotal	1,988	1,714	86.2%	106.3	46.9	F
WB	Left Turn	305	301	98.6%	69.9	10.9	E
	Through	1,456	1,390	95.4%	45.8	6.6	D
	Right Turn	194	198	102.1%	21.1	2.8	C
	Subtotal	1,955	1,888	96.6%	47.0	5.9	D
Total		5,583	5,146	92.2%	72.8	16.8	E

Intersection 4 **Sunrise Ave/Roseville Pkwy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	181	183	100.9%	39.0	5.9	D
	Through	192	184	96.1%	35.5	3.3	D
	Right Turn	95	88	92.7%	3.4	0.6	A
	Subtotal	468	455	97.3%	30.9	3.4	C
SB	Left Turn	27	25	91.5%	47.1	10.0	D
	Through	63	60	95.6%	42.4	6.5	D
	Right Turn	139	135	97.4%	13.4	2.4	B
	Subtotal	229	220	96.2%	25.2	4.1	C
EB	Left Turn	358	311	86.9%	142.9	38.3	F
	Through	1,903	1,680	88.3%	45.9	9.9	D
	Right Turn	332	297	89.4%	24.1	4.8	C
	Subtotal	2,593	2,288	88.2%	56.4	12.8	E
WB	Left Turn	179	173	96.8%	51.1	4.7	D
	Through	1,600	1,584	99.0%	44.7	6.0	D
	Right Turn	51	45	88.7%	14.4	2.3	B
	Subtotal	1,830	1,803	98.5%	44.5	5.2	D
Total		5,120	4,766	93.1%	48.0	6.7	D

SimTraffic Post-Processor | **Sutter Roseville Medical Center**
Average Results from 10 Runs | **Existing Conditions**
Volume and Delay by Movement | **AM Peak Hour**

Intersection 5 **Secret Ravine Pkwy/Roseville Pkwy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	1	1	104.4%	12.6	22.4	B
	Through						
	Right Turn						
	Subtotal	1	1	104.4%	12.6	22.4	B
SB	Left Turn	87	87	99.6%	40.9	5.3	D
	Through						
	Right Turn	556	529	95.1%	15.5	2.0	B
	Subtotal	643	615	95.7%	19.1	1.6	B
EB	Left Turn	444	353	79.4%	46.2	10.9	D
	Through	1,548	1,360	87.9%	36.6	16.2	D
	Right Turn	4	3	87.0%	22.0	22.5	C
	Subtotal	1,996	1,716	86.0%	38.4	14.8	D
WB	Left Turn	26	25	97.7%	57.0	23.0	E
	Through	1,319	1,316	99.8%	22.7	6.8	C
	Right Turn	108	125	115.7%	7.3	1.7	A
	Subtotal	1,453	1,466	100.9%	22.0	6.1	C
Total		4,093	3,799	92.8%	28.8	6.2	C

Intersection 6 **Secret Ravine Pkwy/Medical Plaza Dr-Falcon Pointe Ln** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	202	183	90.8%	32.5	6.9	C
	Through	265	232	87.6%	7.8	4.0	A
	Right Turn	19	15	76.9%	2.1	2.1	A
	Subtotal	486	430	88.5%	18.2	4.1	B
SB	Left Turn	5	5	90.5%	27.8	29.2	C
	Through	585	584	99.9%	18.8	4.0	B
	Right Turn	124	128	103.0%	9.6	2.5	A
	Subtotal	714	717	100.4%	17.3	3.5	B
EB	Left Turn	27	31	113.4%	30.3	5.3	C
	Through	2	3	156.6%	11.9	18.6	B
	Right Turn	40	34	86.1%	8.6	4.1	A
	Subtotal	69	68	98.9%	19.3	3.6	B
WB	Left Turn	48	42	88.5%	34.8	8.7	C
	Through	4	4	104.4%	21.9	22.8	C
	Right Turn	12	14	113.1%	14.0	12.2	B
	Subtotal	64	60	94.1%	30.4	7.3	C
Total		1,333	1,275	95.7%	18.3	3.0	B

SimTraffic Post-Processor | **Sutter Roseville Medical Center**
Average Results from 10 Runs | **Existing Conditions**
Volume and Delay by Movement | **PM Peak Hour**

Intersection 1 **Galleria Blvd/Roseville Pkwy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	540	497	92.0%	101.3	35.0	F
	Through	879	843	95.9%	63.7	7.8	E
	Right Turn	72	71	98.7%	10.2	2.4	B
	Subtotal	1,491	1,410	94.6%	74.7	14.4	E
SB	Left Turn	577	582	100.8%	57.3	7.4	E
	Through	605	587	97.0%	45.3	4.5	D
	Right Turn	337	345	102.3%	3.5	0.3	A
	Subtotal	1,519	1,513	99.6%	40.4	4.4	D
EB	Left Turn	470	450	95.7%	99.0	27.5	F
	Through	1,245	1,216	97.7%	52.3	11.0	D
	Right Turn	463	458	98.8%	3.3	0.6	A
	Subtotal	2,178	2,124	97.5%	51.6	9.6	D
WB	Left Turn	256	203	79.2%	113.2	24.8	F
	Through	1,428	1,189	83.2%	127.6	27.6	F
	Right Turn	772	643	83.3%	41.3	15.5	D
	Subtotal	2,456	2,035	82.8%	99.1	23.8	F
Total		7,644	7,082	92.6%	67.3	7.8	E

Intersection 2 **Creekside Ridge Dr/Roseville Pkwy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	19	16	83.1%	52.2	18.8	D
	Through	7	5	75.2%	31.7	23.6	C
	Right Turn	17	19	112.8%	13.1	2.3	B
	Subtotal	43	40	93.6%	32.3	7.6	C
SB	Left Turn	295	293	99.4%	33.3	4.8	C
	Through	4	2	56.4%	22.5	32.8	C
	Right Turn	126	127	100.9%	23.8	5.4	C
	Subtotal	425	423	99.4%	30.5	5.0	C
EB	Left Turn	124	123	99.2%	61.5	18.1	E
	Through	1,729	1,686	97.5%	25.9	5.4	C
	Right Turn	12	12	100.3%	8.2	1.4	A
	Subtotal	1,865	1,821	97.6%	28.3	5.7	C
WB	Left Turn	50	45	90.2%	62.4	15.0	E
	Through	2,270	1,924	84.8%	70.7	32.7	E
	Right Turn	380	303	79.9%	83.9	54.3	F
	Subtotal	2,700	2,273	84.2%	72.1	34.9	E
Total		5,033	4,556	90.5%	49.9	17.2	D

SimTraffic Post-Processor | **Sutter Roseville Medical Center**
Average Results from 10 Runs | **Existing Conditions**
Volume and Delay by Movement | **PM Peak Hour**

Intersection 3 **Taylor Rd/Roseville Pkwy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	573	476	83.1%	137.7	46.7	F
	Through	340	291	85.5%	82.5	51.7	F
	Right Turn	239	248	103.7%	40.7	21.2	D
	Subtotal	1,152	1,014	88.1%	97.9	34.9	F
SB	Left Turn	398	410	103.1%	67.4	17.4	E
	Through	160	175	109.3%	44.4	7.3	D
	Right Turn	203	197	96.9%	30.9	9.5	C
	Subtotal	761	782	102.7%	53.3	9.4	D
EB	Left Turn	187	187	100.1%	81.5	14.3	F
	Through	1,653	1,623	98.2%	46.4	12.4	D
	Right Turn	215	205	95.1%	21.6	8.1	C
	Subtotal	2,055	2,015	98.1%	47.1	11.4	D
WB	Left Turn	251	232	92.4%	78.1	28.5	E
	Through	1,864	1,710	91.7%	76.0	34.5	E
	Right Turn	516	457	88.5%	59.8	25.6	E
	Subtotal	2,631	2,399	91.2%	73.1	31.7	E
Total		6,599	6,210	94.1%	65.7	13.8	E

Intersection 4 **Sunrise Ave/Roseville Pkwy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	493	488	99.1%	57.6	6.1	E
	Through	62	56	91.0%	35.5	9.2	D
	Right Turn	197	210	106.7%	2.7	0.3	A
	Subtotal	752	755	100.4%	40.7	4.3	D
SB	Left Turn	35	28	79.5%	59.2	19.5	E
	Through	138	141	102.2%	45.1	7.4	D
	Right Turn	245	252	102.7%	22.7	4.0	C
	Subtotal	418	420	100.6%	33.2	4.9	C
EB	Left Turn	106	111	104.6%	68.9	13.5	E
	Through	1,876	1,822	97.1%	52.3	8.2	D
	Right Turn	311	309	99.5%	29.3	7.7	C
	Subtotal	2,293	2,242	97.8%	49.9	8.1	D
WB	Left Turn	203	204	100.6%	67.7	20.0	E
	Through	1,859	1,729	93.0%	64.1	32.2	E
	Right Turn	13	10	78.1%	28.6	20.3	C
	Subtotal	2,075	1,944	93.7%	64.3	30.7	E
Total		5,538	5,361	96.8%	52.3	9.8	D

SimTraffic Post-Processor | **Sutter Roseville Medical Center**
Average Results from 10 Runs | **Existing Conditions**
Volume and Delay by Movement | **PM Peak Hour**

Intersection 5 **Secret Ravine Pkwy/Roseville Pkwy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	4	3	75.2%	25.8	33.2	C
	Through						
	Right Turn						
	Subtotal	4	3	75.2%	25.8	33.2	C
SB	Left Turn	133	141	105.7%	40.5	5.8	D
	Through						
	Right Turn	499	487	97.7%	16.2	3.3	B
	Subtotal	632	628	99.4%	21.7	2.9	C
EB	Left Turn	600	572	95.4%	44.5	6.6	D
	Through	1,541	1,495	97.0%	27.7	9.2	C
	Right Turn	4	2	56.4%	9.1	2.8	A
	Subtotal	2,145	2,070	96.5%	32.3	8.0	C
WB	Left Turn	31	31	99.5%	65.4	10.1	E
	Through	1,747	1,721	98.5%	35.5	17.2	D
	Right Turn	123	125	101.5%	12.4	6.8	B
	Subtotal	1,901	1,876	98.7%	34.5	16.3	C
Total		4,682	4,577	97.8%	31.6	7.5	C

Intersection 6 **Secret Ravine Pkwy/Medical Plaza Dr-Falcon Pointe Ln** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	38	42	110.8%	26.4	9.2	C
	Through	535	508	94.9%	8.6	2.6	A
	Right Turn	45	44	97.8%	2.7	1.0	A
	Subtotal	618	594	96.1%	9.4	2.4	A
SB	Left Turn	12	9	78.3%	20.8	21.7	C
	Through	429	426	99.3%	11.0	1.6	B
	Right Turn	19	18	95.0%	2.5	1.5	A
	Subtotal	460	453	98.6%	10.8	1.7	B
EB	Left Turn	97	103	105.8%	20.1	3.3	C
	Through	2	3	150.4%	3.2	4.6	A
	Right Turn	132	137	103.7%	6.1	1.3	A
	Subtotal	231	243	105.0%	12.0	1.7	B
WB	Left Turn	36	29	80.4%	26.0	10.7	C
	Through	1	2	150.4%	10.2	17.0	B
	Right Turn	8	10	122.2%	7.8	6.8	A
	Subtotal	45	40	89.4%	21.7	8.6	C
Total		1,354	1,330	98.2%	10.7	1.5	B

SimTraffic Post-Processor | **Sutter Roseville Medical Center**
Average Results from 10 Runs | **Existing Conditions**
Queue Length | **AM Peak Hour**

Intersection 4 **Sunrise Ave/Roseville Pkwy** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	U/Left Turns	225	200	27	250	0	0%	0%
	Left Turn	275	550	153	650	158	61%	0%
	Through	1,200	775	181	975	181	17%	0%
	Right Turn	225	150	35	250	0	0%	0%
NB	U/Left Turns	200	75	15	100	23	0%	0%
	Left Turn	1,350	75	14	100	33	0%	0%
	Through	1,350	150	22	250	47	3%	0%
	Right Turn	200	25	13	50	92	0%	0%
SB	U/Left Turns	100	50	11	75	17	1%	0%
	Through	450	50	11	100	20	4%	0%
	Right Turn	450	50	9	100	23	1%	0%
WB	U/Left Turns	275	75	11	125	23	0%	0%
	Left Turn	275	125	31	300	88	0%	0%
	Through	1,000	475	39	550	56	32%	0%
	Right Turn	275	100	60	325	103	0%	0%

SimTraffic Post-Processor | **Sutter Roseville Medical Center**
Average Results from 10 Runs | **Existing Conditions**
Queue Length | **AM Peak Hour**

Intersection 6 **Secret Ravine Pkwy/Medical Plaza Dr-Falcon Pointe Ln** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Left Turn	125	50	5	75	6	0%	0%
	Through/Right	575	25	6	50	9	0%	0%
NB	U/Left Turns	250	150	21	225	33	1%	0%
	Through	550	50	21	100	47	0%	0%
	Right Turn	275	25	6	25	22	0%	0%
SB	Left Turn	250	25	5	25	21	0%	0%
	Through	1,225	175	22	300	78	21%	0%
	Right Turn	125	100	31	150	31	0%	0%
WB	Shared	575	50	11	100	29	0%	0%

SimTraffic Post-Processor **Sutter Roseville Medical Center**
Average Results from 10 Runs **Existing Conditions**
Queue Length **PM Peak Hour**

Intersection 4 **Sunrise Ave/Roseville Pkwy** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	U/Left Turns	225	75	19	125	37	0%	0%
	Left Turn	275	225	43	375	7	0%	0%
	Through	750	475	103	625	117	40%	1%
	Right Turn	225	200	53	250	0	0%	0%
NB	U/Left Turns	200	125	14	200	24	1%	0%
	Left Turn	1,350	200	24	275	61	2%	0%
	Through	1,350	50	12	100	29	0%	0%
SB	U/Left Turns	100	50	16	100	40	1%	0%
	Through	450	125	26	200	47	21%	0%
	Right Turn	450	75	18	125	34	5%	0%
WB	U/Left Turns	275	75	19	125	28	0%	0%
	Left Turn	275	200	75	350	9	0%	0%
	Through	1,000	575	148	775	173	48%	1%
	Right Turn	275	50	42	150	171	0%	0%

SimTraffic Post-Processor | **Sutter Roseville Medical Center**
Average Results from 10 Runs | **Existing Conditions**
Queue Length | **PM Peak Hour**

Intersection 6 **Secret Ravine Pkwy/Medical Plaza Dr-Falcon Pointe Ln** **Signal**

		Storage	Average Queue (ft)		Maximum Queue (ft)		Block Time	
Direction	Lane Group	(ft)	Average	Std. Dev.	Average	Std. Dev.	Pocket	Upstream
EB	U/Left Turns	125	75	7	125	12	2%	0%
	Through/Right	575	50	7	100	32	0%	0%
NB	U/Left Turns	250	50	6	100	23	0%	0%
	Through	550	100	25	175	48	0%	0%
	Right Turn	275	25	4	50	12	0%	0%
SB	U/Left Turns	250	25	5	25	12	0%	0%
	Through	1,225	100	21	150	45	6%	0%
	Right Turn	125	25	3	25	12	0%	0%
WB	Shared	575	50	5	75	20	0%	0%

APPENDIX C:
EXISTING PLUS PROJECT CONDITIONS TECHNICAL CALCULATIONS

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

Sutter Roseville Medical Center
Existing Plus Project Conditions
AM Peak Hour

Intersection 1 **Galleria Blvd/Roseville Pkwy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	224	209	93.2%	50.0	4.4	D
	Through	382	360	94.3%	38.9	3.4	D
	Right Turn	66	73	110.2%	4.0	0.3	A
	Subtotal	672	642	95.5%	38.6	2.2	D
SB	Left Turn	631	625	99.1%	54.0	11.6	D
	Through	486	477	98.2%	30.3	3.1	C
	Right Turn	145	157	108.5%	3.0	0.1	A
	Subtotal	1,262	1,259	99.8%	38.7	6.2	D
EB	Left Turn	143	122	85.2%	66.8	13.3	E
	Through	1,285	1,215	94.5%	56.4	18.7	E
	Right Turn	528	522	98.8%	4.6	0.8	A
	Subtotal	1,956	1,858	95.0%	42.5	12.3	D
WB	Left Turn	83	77	93.1%	58.5	9.6	E
	Through	933	895	95.9%	47.8	6.3	D
	Right Turn	647	584	90.3%	8.5	0.8	A
	Subtotal	1,663	1,556	93.6%	33.5	4.1	C
Total		5,553	5,315	95.7%	38.4	5.0	D

Intersection 2 **Creekside Ridge Dr/Roseville Pkwy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	11	10	94.9%	50.5	27.0	D
	Through	8	7	91.4%	48.0	27.6	D
	Right Turn	27	32	117.3%	14.5	5.4	B
	Subtotal	46	49	107.4%	28.8	6.6	C
SB	Left Turn	102	94	92.5%	36.4	6.1	D
	Through						
	Right Turn	26	30	113.8%	18.1	4.9	B
	Subtotal	128	124	96.8%	32.3	5.3	C
EB	Left Turn	80	75	93.5%	44.9	8.2	D
	Through	1,875	1,782	95.1%	17.0	3.3	B
	Right Turn	7	8	109.4%	6.7	0.9	A
	Subtotal	1,962	1,865	95.1%	18.1	3.3	B
WB	Left Turn	23	16	68.1%	50.7	14.3	D
	Through	1,647	1,534	93.1%	18.9	3.1	B
	Right Turn	349	323	92.4%	15.2	1.7	B
	Subtotal	2,019	1,872	92.7%	18.5	2.6	B
Total		4,155	3,910	94.1%	18.8	2.4	B

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

Sutter Roseville Medical Center
Existing Plus Project Conditions
AM Peak Hour

Intersection 3 **Taylor Rd/Roseville Pkwy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	458	454	99.1%	78.6	25.5	E
	Through	136	129	94.9%	49.2	8.4	D
	Right Turn	298	286	96.0%	64.6	28.3	E
	Subtotal	892	869	97.4%	69.5	18.4	E
SB	Left Turn	513	470	91.6%	64.8	15.3	E
	Through	132	123	93.3%	47.7	4.8	D
	Right Turn	112	103	92.0%	22.9	2.9	C
	Subtotal	757	696	91.9%	55.4	10.9	E
EB	Left Turn	108	89	82.5%	104.2	29.7	F
	Through	1,781	1,507	84.6%	95.4	32.7	F
	Right Turn	122	123	101.0%	48.8	23.4	D
	Subtotal	2,011	1,719	85.5%	92.5	31.5	F
WB	Left Turn	307	258	84.1%	70.1	10.3	E
	Through	1,469	1,390	94.6%	49.7	11.8	D
	Right Turn	196	189	96.6%	22.4	5.3	C
	Subtotal	1,972	1,838	93.2%	50.0	9.6	D
Total		5,632	5,122	90.9%	68.0	11.9	E

Intersection 4 **Sunrise Ave/Roseville Pkwy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	181	185	102.5%	37.9	4.4	D
	Through	205	200	97.4%	36.9	4.0	D
	Right Turn	95	90	94.5%	3.3	0.6	A
	Subtotal	481	475	98.8%	30.9	1.8	C
SB	Left Turn	29	23	78.0%	46.2	13.0	D
	Through	71	62	87.7%	49.6	8.7	D
	Right Turn	153	166	108.7%	15.4	2.8	B
	Subtotal	253	251	99.3%	26.8	3.7	C
EB	Left Turn	381	303	79.6%	150.9	38.7	F
	Through	1,912	1,681	87.9%	49.3	13.4	D
	Right Turn	332	290	87.4%	27.2	11.0	C
	Subtotal	2,625	2,275	86.6%	59.9	14.6	E
WB	Left Turn	179	188	104.8%	51.3	3.3	D
	Through	1,603	1,512	94.3%	47.0	9.0	D
	Right Turn	54	49	90.2%	16.7	5.1	B
	Subtotal	1,836	1,748	95.2%	46.6	8.0	D
Total		5,195	4,749	91.4%	50.3	8.0	D

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

Sutter Roseville Medical Center
Existing Plus Project Conditions
AM Peak Hour

Intersection 5 **Secret Ravine Pkwy/Roseville Pkwy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	1	1	104.4%	10.8	18.5	B
	Through						
	Right Turn						
	Subtotal	1	1	104.4%	10.8	18.5	B
SB	Left Turn	88	85	96.1%	37.5	8.4	D
	Through						
	Right Turn	559	546	97.7%	15.6	3.0	B
	Subtotal	647	631	97.5%	18.5	3.3	B
EB	Left Turn	453	371	81.8%	46.4	14.6	D
	Through	1,550	1,418	91.5%	40.8	16.8	D
	Right Turn	4	2	60.9%	20.9	21.3	C
	Subtotal	2,007	1,791	89.2%	41.9	15.5	D
WB	Left Turn	26	33	125.8%	56.1	14.0	E
	Through	1,322	1,305	98.7%	21.9	5.3	C
	Right Turn	111	105	94.4%	7.1	1.6	A
	Subtotal	1,459	1,442	98.8%	21.5	4.7	C
Total		4,114	3,865	93.9%	30.5	6.6	C

Intersection 6 **Secret Ravine Pkwy/Medical Plaza Dr-Falcon Pointe Ln** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	214	174	81.1%	33.3	5.7	C
	Through	265	215	81.3%	8.0	4.9	A
	Right Turn	19	20	104.4%	1.5	0.7	A
	Subtotal	498	409	82.1%	18.5	3.9	B
SB	Left Turn	5	6	118.3%	29.8	17.9	C
	Through	585	579	98.9%	19.5	4.3	B
	Right Turn	131	129	98.8%	7.7	2.3	A
	Subtotal	721	714	99.0%	17.5	3.9	B
EB	Left Turn	29	29	98.4%	29.5	12.3	C
	Through	2	2	87.0%	9.3	20.8	A
	Right Turn	44	44	98.9%	8.1	2.8	A
	Subtotal	75	74	98.4%	16.4	5.5	B
WB	Left Turn	48	47	98.6%	37.2	5.7	D
	Through	4	3	87.0%	23.2	22.9	C
	Right Turn	12	12	101.5%	16.6	9.8	B
	Subtotal	64	63	98.4%	32.6	6.6	C
Total		1,358	1,260	92.8%	18.5	3.5	B

SimTraffic Post-Processor | **Sutter Roseville Medical Center**
Average Results from 10 Runs | **Existing Plus Project Conditions**
Volume and Delay by Movement | **PM Peak Hour**

Intersection 1 **Galleria Blvd/Roseville Pkwy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	540	470	87.0%	143.2	63.8	F
	Through	879	806	91.7%	70.6	17.8	E
	Right Turn	72	63	86.5%	14.7	9.5	B
	Subtotal	1,492	1,339	89.7%	93.2	32.2	F
SB	Left Turn	580	584	100.7%	67.0	22.8	E
	Through	605	614	101.5%	44.9	4.2	D
	Right Turn	337	345	102.4%	3.6	0.4	A
	Subtotal	1,522	1,543	101.4%	44.4	7.8	D
EB	Left Turn	470	440	93.6%	153.9	63.8	F
	Through	1,249	1,245	99.8%	62.7	11.9	E
	Right Turn	463	472	102.0%	3.8	0.6	A
	Subtotal	2,181	2,157	98.9%	68.1	17.8	E
WB	Left Turn	257	220	85.7%	100.7	18.6	F
	Through	1,436	1,261	87.8%	108.2	14.0	F
	Right Turn	776	688	88.7%	31.6	8.5	C
	Subtotal	2,469	2,170	87.9%	83.3	11.9	F
Total		7,664	7,209	94.1%	72.1	12.2	E

Intersection 2 **Creekside Ridge Dr/Roseville Pkwy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	19	14	71.2%	51.5	16.2	D
	Through	7	5	69.8%	46.3	35.4	D
	Right Turn	17	17	99.5%	19.5	9.4	B
	Subtotal	43	35	82.2%	37.0	5.1	D
SB	Left Turn	296	301	101.7%	32.9	2.7	C
	Through	4	3	84.6%	28.0	33.1	C
	Right Turn	126	133	105.9%	20.6	3.4	C
	Subtotal	426	438	102.8%	29.1	1.7	C
EB	Left Turn	124	120	96.4%	58.5	7.9	E
	Through	1,736	1,725	99.4%	24.3	5.1	C
	Right Turn	12	13	106.5%	6.7	1.3	A
	Subtotal	1,872	1,858	99.2%	26.4	4.8	C
WB	Left Turn	50	49	98.5%	54.3	12.5	D
	Through	2,283	2,098	91.9%	57.7	13.5	E
	Right Turn	383	345	90.0%	69.4	27.0	E
	Subtotal	2,716	2,492	91.7%	59.1	14.9	E
Total		5,057	4,823	95.4%	43.6	6.9	D

SimTraffic Post-Processor | **Sutter Roseville Medical Center**
Average Results from 10 Runs | **Existing Plus Project Conditions**
Volume and Delay by Movement | **PM Peak Hour**

Intersection 3 **Taylor Rd/Roseville Pkwy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	573	524	91.4%	154.5	58.8	F
	Through	340	295	86.8%	90.3	26.8	F
	Right Turn	240	233	97.0%	43.1	17.7	D
	Subtotal	1,153	1,052	91.2%	112.0	32.7	F
SB	Left Turn	400	417	104.2%	65.4	15.7	E
	Through	160	154	96.4%	46.5	6.8	D
	Right Turn	203	206	101.7%	35.7	10.0	D
	Subtotal	763	778	101.9%	54.0	10.0	D
EB	Left Turn	187	168	89.7%	91.4	43.6	F
	Through	1,661	1,616	97.3%	46.8	17.6	D
	Right Turn	215	211	97.9%	20.7	10.8	C
	Subtotal	2,063	1,995	96.7%	47.7	17.0	D
WB	Left Turn	254	247	97.3%	73.7	10.4	E
	Through	1,880	1,830	97.3%	72.3	9.6	E
	Right Turn	521	466	89.4%	60.6	21.7	E
	Subtotal	2,655	2,543	95.8%	70.3	10.6	E
Total		6,634	6,366	96.0%	68.1	7.7	E

Intersection 4 **Sunrise Ave/Roseville Pkwy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	493	488	99.1%	53.7	4.5	D
	Through	67	61	90.4%	39.8	8.0	D
	Right Turn	197	204	103.6%	2.8	0.3	A
	Subtotal	757	753	99.5%	38.8	3.0	D
SB	Left Turn	38	45	117.7%	50.3	9.0	D
	Through	147	149	101.3%	44.1	3.3	D
	Right Turn	262	267	102.0%	22.7	2.8	C
	Subtotal	447	461	103.1%	32.4	1.3	C
EB	Left Turn	115	97	84.7%	78.8	24.2	E
	Through	1,878	1,833	97.6%	61.2	25.4	E
	Right Turn	311	294	94.5%	38.3	24.6	D
	Subtotal	2,304	2,225	96.6%	59.0	25.3	E
WB	Left Turn	203	199	98.2%	63.5	9.8	E
	Through	1,866	1,836	98.4%	58.2	13.8	E
	Right Turn	15	14	92.7%	27.3	10.1	C
	Subtotal	2,084	2,050	98.3%	58.5	13.2	E
Total		5,592	5,488	98.1%	53.7	9.6	D

SimTraffic Post-Processor | **Sutter Roseville Medical Center**
Average Results from 10 Runs | **Existing Plus Project Conditions**
Volume and Delay by Movement | **PM Peak Hour**

Intersection 5 **Secret Ravine Pkwy/Roseville Pkwy** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	4	2	56.4%	23.8	30.4	C
	Through						
	Right Turn						
	Subtotal	4	2	56.4%	23.8	30.4	C
SB	Left Turn	135	140	103.9%	38.0	6.5	D
	Through						
	Right Turn	506	518	102.3%	19.0	2.7	B
	Subtotal	641	658	102.7%	23.0	3.0	C
EB	Left Turn	602	602	99.9%	54.7	10.2	D
	Through	1,544	1,520	98.4%	32.7	17.0	C
	Right Turn	4	3	84.6%	12.0	5.3	B
	Subtotal	2,150	2,125	98.8%	38.8	14.7	D
WB	Left Turn	31	31	99.5%	67.4	19.7	E
	Through	1,749	1,772	101.3%	35.4	9.5	D
	Right Turn	123	124	100.6%	12.4	1.4	B
	Subtotal	1,903	1,927	101.2%	34.4	9.0	C
Total		4,698	4,712	100.3%	34.9	8.0	C

Intersection 6 **Secret Ravine Pkwy/Medical Plaza Dr-Falcon Pointe Ln** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	40	32	80.8%	33.3	9.8	C
	Through	535	546	102.0%	8.9	2.5	A
	Right Turn	45	44	98.6%	2.2	0.5	A
	Subtotal	620	622	100.4%	9.7	2.1	A
SB	Left Turn	12	11	90.9%	27.0	8.6	C
	Through	429	420	97.9%	10.4	1.5	B
	Right Turn	20	17	86.5%	2.9	1.3	A
	Subtotal	461	448	97.2%	10.5	1.5	B
EB	Left Turn	102	98	96.2%	17.5	5.2	B
	Through	2	0	18.8%	5.5	17.4	A
	Right Turn	141	162	115.2%	6.8	1.5	A
	Subtotal	245	261	106.5%	11.0	3.0	B
WB	Left Turn	36	33	91.9%	22.0	5.5	C
	Through	1	2	225.6%	15.9	24.8	B
	Right Turn	8	7	84.6%	5.5	3.0	A
	Subtotal	45	42	93.6%	19.7	4.5	B
Total		1,371	1,374	100.2%	10.5	1.5	B

SimTraffic Post-Processor | **Sutter Roseville Medical Center**
Average Results from 10 Runs | **Existing Plus Project Conditions**
Queue Length | **AM Peak Hour**

Intersection 4 **Sunrise Ave/Roseville Pkwy** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	U/Left Turns	225	200	27	250	0	0%	0%
	Left Turn	275	550	110	725	112	64%	0%
	Through	1,200	800	149	1,000	201	19%	0%
	Right Turn	225	175	52	250	0	0%	0%
NB	U/Left Turns	200	50	12	100	24	0%	0%
	Left Turn	1,350	75	12	100	22	0%	0%
	Through	1,350	150	17	250	30	5%	0%
	Right Turn	200	25	13	50	89	0%	0%
SB	U/Left Turns	100	25	13	75	19	1%	0%
	Through	450	75	12	100	34	3%	0%
	Right Turn	450	50	13	100	25	1%	0%
WB	U/Left Turns	275	75	13	125	30	0%	0%
	Left Turn	275	150	40	300	97	0%	0%
	Through	1,000	475	54	550	76	34%	0%
	Right Turn	275	100	52	350	0	0%	0%

SimTraffic Post-Processor | **Sutter Roseville Medical Center**
Average Results from 10 Runs | **Existing Plus Project Conditions**
Queue Length | **AM Peak Hour**

Intersection 6 **Secret Ravine Pkwy/Medical Plaza Dr-Falcon Pointe Ln** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	Left Turn	125	25	5	50	13	0%	0%
	Through/Right	575	50	4	75	8	0%	0%
NB	U/Left Turns	250	150	26	225	50	2%	0%
	Through	550	50	21	100	80	0%	0%
	Right Turn	275	25	3	25	11	0%	0%
SB	Left Turn	250	25	3	50	5	0%	0%
	Through	1,225	175	42	275	72	21%	0%
	Right Turn	125	75	28	150	37	0%	0%
WB	Shared	575	75	13	100	17	0%	0%

SimTraffic Post-Processor | **Sutter Roseville Medical Center**
Average Results from 10 Runs | **Existing Plus Project Conditions**
Queue Length | **PM Peak Hour**

Intersection 4 **Sunrise Ave/Roseville Pkwy** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	U/Left Turns	225	75	16	125	34	0%	0%
	Left Turn	275	250	89	450	105	0%	0%
	Through	1,200	650	179	825	177	41%	0%
	Right Turn	225	175	44	250	0	0%	0%
NB	U/Left Turns	200	125	11	200	23	0%	0%
	Left Turn	1,350	175	22	250	25	0%	0%
	Through	1,350	75	5	100	15	0%	0%
SB	U/Left Turns	100	50	18	100	39	0%	0%
	Through	450	125	15	200	39	21%	0%
	Right Turn	450	75	20	125	51	4%	0%
WB	U/Left Turns	275	75	10	125	17	0%	0%
	Left Turn	275	200	45	350	1	0%	0%
	Through	1,000	550	127	700	163	47%	0%
	Right Turn	275	50	48	200	176	0%	0%

SimTraffic Post-Processor | **Sutter Roseville Medical Center**
Average Results from 10 Runs | **Existing Plus Project Conditions**
Queue Length | **PM Peak Hour**

Intersection 6 **Secret Ravine Pkwy/Medical Plaza Dr-Falcon Pointe Ln** **Signal**

		Storage	Average Queue (ft)		Maximum Queue (ft)		Block Time	
Direction	Lane Group	(ft)	Average	Std. Dev.	Average	Std. Dev.	Pocket	Upstream
EB	U/Left Turns	125	50	15	100	24	1%	0%
	Through/Right	575	50	13	100	30	1%	0%
NB	U/Left Turns	250	50	9	75	22	0%	0%
	Through	550	100	24	200	48	0%	0%
	Right Turn	275	25	3	50	2	0%	0%
SB	U/Left Turns	250	25	5	50	12	0%	0%
	Through	1,225	75	13	150	26	3%	0%
	Right Turn	125	25	4	50	9	0%	0%
WB	Shared	575	50	3	75	19	0%	0%

SimTraffic Post-Processor | **Sutter Roseville Medical Center**
Average Results from 10 Runs | **Existing Plus Project Mitigated Conditions**
Queue Length | **AM Peak Hour**

Intersection 4 **Sunrise Ave/Roseville Pkwy** **Signal**

Direction	Lane Group	Storage (ft)	Average Queue (ft) Average	Average Queue (ft) Std. Dev.	Maximum Queue (ft) Average	Maximum Queue (ft) Std. Dev.	Block Time Pocket	Block Time Upstream
EB	U/Left Turns	225	150	20	225	29	2%	0%
	Left Turn	275	325	42	425	51	2%	0%
	Through	1,200	500	131	725	151	24%	0%
	Right Turn	225	150	45	250	0	0%	0%
NB	U/Left Turns	200	75	15	100	29	0%	0%
	Left Turn	1,350	75	14	100	18	0%	0%
	Through	1,350	150	15	225	32	4%	0%
	Right Turn	200	25	4	25	32	0%	0%
SB	U/Left Turns	100	50	10	100	33	1%	0%
	Through	450	75	26	125	37	11%	0%
	Right Turn	450	50	13	75	29	1%	0%
WB	U/Left Turns	275	75	13	125	31	0%	0%
	Left Turn	275	150	64	300	94	0%	0%
	Through	1,000	500	89	550	111	35%	0%
	Right Turn	275	125	64	350	0	0%	0%

APPENDIX D:
VMT TECHNICAL CALCULATIONS

Sutter Roseville Medical Center Expansion VMT Comparison				
			Existing	Existing Plus Project
SPEED RANGE			Daily VMT	Daily VMT
>0	<=5	0-5	19,152	19,826
>5	<=10	5-10	191,074	194,979
>10	<=15	10-15	508,353	514,800
>15	<=20	15-20	6,079,408	6,044,060
>20	<=25	20-25	2,233,241	2,234,803
>25	<=30	25-30	3,038,764	3,040,046
>30	<=35	30-35	4,078,525	4,111,242
>35	<=40	35-40	4,480,530	4,455,722
>40	<=45	40-45	3,989,028	4,000,832
>45	<=50	45-50	4,758,061	4,756,510
>50	<=55	50-55	7,519,792	7,534,836
>55	<=60	55-60	3,887,176	3,878,575
>60	<=65	60-65	1,366,810	1,365,315
>65	<=70	65-70	1,784,229	1,784,504
Total VMT			43,934,144	43,936,053
Total Number of Trips			10,429,586	10,430,519
Change in VMT			1,909	
Change in Number of Trips			933	
Average Trip Length*			2.05	

Note:

* This does not imply that Sutter trips have this average trip length. Rather, this trip length is a calculated output from VMT and total trips.

Source: Fehr & Peers, 2016.