Final

Transportation Impact Study for the Sacramento Music Hall and Performing Arts Center Project

Prepared for:
City of Sacramento

March 18, 2022

RS21-4066

FEHR PEERS

EXECUTIVE SUMMARY

PURPOSE

This study analyzes the transportation impacts of the proposed Sacramento Music Hall and Performing Arts Center project, which would be located at 2950 Ramona Avenue in southeast Sacramento. Analyses are conducted for walking, biking, driving, and taking transit to the proposed venue. A thorough review of project access and internal circulation is conducted. Finally, an Event Transportation Management Plan (TMP) has been prepared to accommodate conditions before and after events at the project.

PROJECT DESCRIPTION

The project would have a concert capacity for 2,219 persons. An 8,000 square-foot sit-down restaurant is also proposed, which would be open for lunch and dinner, and also for late night snacks following a live music show. Based on information provided by the applicant, live shows (consisting of multiple performing artists) would typically start around 7:30 PM and end around 10:45 PM. An average of two to three live shows per week is expected with shows ranging from comedy acts, live music, and theatrical events. Refer to Figure 1 for site plan.

In total, a combined 777 on-site and off-site parking spaces would be available for event attendees and employees. Parking would be provided as follows:

- On-Site Parking – 440 spaces
- Remote Parking (3300 Power Inn Road) – 100 spaces situated on the southwest corner of the intersection of Power Inn Road and Cucamonga Avenue.
- Remote Parking (Power Inn Light Rail Station) – 75 spaces situated on the east side of Power Inn Road directly south of the light rail tracks.
- On-Street Parking (Ramona Avenue) – 93 spaces between Power Inn Road and Cucamonga Avenue.
- On-Street Parking (Cucamonga Avenue) – 69 spaces between Power Inn Road and Ramona Avenue.

The project proposes to operate a private shuttle that would transport event attendees and employees between the venue and the Power Inn Light Rail station lot. Attendees that park along Ramona Avenue and Cucamonga Avenue are expected to walk to/from the venue (distance ranges from 0.2 to 0.5 miles).

EXISTING CONDITIONS

Ramona Avenue is a two-lane street that extends southeasterly from Folsom Boulevard to Power Inn Road. In the project vicinity, it is approximately 40 feet wide with no lane striping and has a posted speed limit of 30 mph.

The majority of project vehicle trips would use either of the following intersections to access the venue:

1. Folsom Boulevard/Ramona Avenue
2. Power Inn Road/Cucamonga Avenue

Each of these intersections is controlled by a traffic signal and currently operates at Level of Service (LOS) B or better during the pre-event peak hour, which is defined as 6:30 to 7:30 PM.

A parking restriction (i.e., No Parking from 10 PM to 6 AM) is in effect on Ramona Avenue from north of Cucamonga Avenue to just south of the Ramona Avenue/Brighton Avenue roundabout. This restriction is assumed per City staff to remain in effect under plus project conditions.

Class II bike lanes (on-street with appropriate signing and striping) are provided on Ramona Avenue from Folsom Boulevard to 350 feet south of the Ramona Avenue/Brighton Avenue roundabout. Beyond that point, Ramona Avenue becomes a Class III bike route. The City's *Bicycle Master Plan* proposes a connection from Redding Avenue to Ramona Avenue across the existing rail line. The project would accommodate this future connection through dedication of right-of-way.

A continuous sidewalk is present along the east side of Ramona Avenue from Folsom Boulevard southerly to the roundabout at Brighton Avenue. South of the roundabout, sidewalks are continuous on both sides of Ramona Avenue to Power Inn Road. Sidewalks are also present on both sides of Cucamonga Avenue west of Power Inn Road. See Figure 6 for map of bicycle/pedestrian facilities.

Project attendees could use the Sacramento Regional Transit (RT) Gold Line light rail service via the project's private shuttle service to access the venue. Mondays through Saturdays, the last westbound train departs the Power Inn Station at 12:05 AM and the last eastbound train departs the Power Inn Station at 11:14 PM. This suggests that light rail is a viable mode of travel to and from the site for all evening events with the exception of Sunday nights. Although RT Bus Route 26 operates along Folsom Boulevard near the CSUS campus, its last pick-up is at 10:20 PM, meaning it would not be a viable post-event form of travel for event attendees who intend to stay until the event concludes.

PROJECT TRAVEL CHARACTERISTICS

A variety of sources were consulted to develop estimates of project attendee mode choice, average vehicle occupancy, and percent of attendees arriving during the pre-event peak hour. As shown in Table 3 during the pre-event peak hour,

- 601 vehicles would enter the study area (to either park at the site, park nearby, or drop-off event attendees at the venue) and 131 vehicles would exit the study area.
- 406 vehicles would enter the project site (to either park on-site or drop-off event attendees either as an Uber/Lyft/Taxi or shuttle bus) and 143 trips would depart the project site.

Per the project applicant, it is anticipated that event attendees would typically come from the age 18 to 45 demographic. To understand the spatial distribution of this group across the Sacramento region, data from the American Community Survey (ACS) was obtained. This information was used to derive the trip distribution percentages, which are the directions motorists will be traveling to/from the access the site. The vast majority of trips (75 percent) are expected to pass through the US 50/Howe Avenue interchange, heading south on Power Inn Road to access either remote parking, available on-street parking, or the project site itself.

EXISTING PLUS PROJECT CONDITIONS

Under Existing Plus Project conditions during the pre-event peak hour, the two study intersections would continue operating at LOS C or better. No physical improvements are recommended at either location.

Post-event conditions often pose the greatest challenges to overall circulation for event venues. According to the applicant, specific actions will be taken "to ensure that vehicles leaving the parking lots do so in an organized and metered strategy". To test how these actions could influence exiting traffic, the following scenarios were developed:

- Scenario 1 (Business as Usual) – an assumed 90 percent of attendees depart during the post-event peak hour.
- Scenario 2 (Organized, Metered Exit Strategy) – an assumed 67 percent of attendees depart during the post-event peak hour.

Under Scenario 1, the project site would accommodate 134 inbound vehicle trips and 406 outbound vehicle trips during the post-event peak hour. Scenario 2 would result in a 25 percent reduction in the post-event peak hour trip generation at the project site. Surrounding roadways such as Folsom Boulevard and Power Inn Road, would have plenty of reserve capacity to accommodate post-event project trips. The project site itself is expected to be the primary source of potential post-event congestion. The Event TMP is Chapter IV addresses this issue in detail including recommendations to facilitate the efficient emptying of the project's parking lot.

EVENT TMP

Pre-event peak hour transportation management would consist of four distinct actions, which are described below. For this peak hour, two Traffic Control Officers (TCOs) are recommended, with duties described in Chapter IV. Refer to Figure 10 for illustration of recommendations.

1. Channelized Northbound Left-turn Pocket on Ramona Avenue
2. Temporary No Parking and No Passenger Unloading Signs on Ramona Avenue
3. On-Site Parking and Circulation Management
4. Transportation Management at Ramona Avenue/Cucamonga Avenue

The post-event peak hour consists of six distinct actions, which are described below. Note that two TCOs are also recommended for post-event conditions. Refer to Figure 11 for illustration of recommendations.

1. Dual Outbound Right-Turns from Southerly Driveway
2. Shuttle Bus Loading on Ramona Avenue
3. Passenger Pick-up Zones on South and West Sides of Building
4. Parking Lot Management to Optimize Exiting Flows
5. Temporary No Parking and No Passenger Loading Signs on Ramona Avenue
6. Transportation Management at Ramona Avenue/Cucamonga Avenue

During the post-event peak hour, the two to one lane merge on southbound Ramona Avenue would serve a large volume of traffic, which could become a bottleneck. If this does occur, the following two options could be considered:

- Option 1 – Extend the two southbound lanes southerly to Cucamonga Avenue. This option, which is shown on Figure 11, is considered viable.
- Option 2 – Empty the on-site parking in the northwest corner of the project site using the northerly driveway (allowing outbound left-turns only). This option would require additional study before implementation to confirm its viability.

The Event TMP also includes a monitoring requirement including the two initial events, a first year sold-out event, and ongoing monitoring as warranted. The monitoring will identify the need to adjust, if needed, certain ETMP elements to better accommodate all modes of travel.

I. INTRODUCTION

PURPOSE

This study analyzes the transportation impacts of the Sacramento Music Hall and Performing Arts Center project, which would be located at 2950 Ramona Avenue in southeast Sacramento. Analyses are conducted for walking, biking, driving, and taking transit to the proposed venue. Recommendations are offered to improve conditions for any identified operational or physical deficiencies. Additionally, a thorough review of project access and internal circulation is conducted. Finally, an Event Transportation Management Plan (TMP) has been prepared to accommodate projected conditions before and after events at the proposed project.

OVERVIEW OF PROPOSED PROJECT

According to the most recent project description (November 16, 2021 email from James Switzgable, Assistant Civil Engineer City of Sacramento), the project would have a concert capacity for 2,219 persons. An expected 65 persons would work at the venue during a large event.

An 8,000 square-foot sit-down restaurant is proposed within the venue. It would feature a full kitchen and a seating arrangement for approximately 60 people indoors and 70 people outdoors. The restaurant would be open for lunch and dinner, and also for late night snacks following a live music show.[1]

According to information provided by the applicant (April 30, 2021 Operations Plan Framework), live shows would typically consist of two or three performers. Doors would open to the public between 6 and 7 PM, with music typically starting around 7 or 8 PM. For analysis purposes, the following live event scenario has been developed:

- Weekday event start time of 7:30 PM (for Opening Artist)
- Headlining Artist wraps up around 10:45 PM[2]

An average of two to three live shows per week is expected with shows ranging from comedy acts, live music, and theatrical events.

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[1] According to the project description, restaurant customers will enter from a different entrance from the main ballroom entry. Restaurant customers will not be permitted in the ballroom without a ticket and passing through security. Ballroom attendees will be required to wear a wristband for easy identification.

[2] Show end time depends on show start time and number of artists. A three artist bill starting at 7:30 PM would end around this time. Precise end time does not materially affect conclusions that follow.

A total of 440 on-site parking spaces are proposed. To supplement this parking during busier shows, two off-site parking lots would also be used by patrons (with the project operating a shuttle to deliver them to/from the venue). Additionally, on-street parking to the south of the site would also available. Chapter III discusses this information in much more detail. Refer to **Figure 1** for project site plan.

STUDY AREA, SCENARIOS, AND TIME PERIODS

Through coordination with City of Sacramento staff, it was determined that the following two intersections should be studied (see **Figure 2**):

- Folsom Boulevard/Ramona Avenue
- Power Inn Road/Cucamonga Avenue

These two intersections are the primary access points to the project site. Analysis is performed for Existing and Existing Plus Project conditions at these locations.

The two intersections are analyzed for a weekday pre-event peak hour (i.e., 6:30 – 7:30 PM for an opening act start time of 7:30 PM).

Post-event operations are also evaluated, focusing primarily on the project site itself. Once traffic is able to exit the project site, nearby roadways are lightly traveled and motorists should have little difficulty traveling to their destination.

ANALYSIS METHODOLOGIES

This study uses the SimTraffic microsimulation model to analyze traffic operating conditions (i.e., delay, level of service, and queuing) at the study intersections. This is appropriate given the level of traffic the project could add to each intersection and focus on adequacy of turn pocket storage. The analysis results are consistent with methodologies described in the *Highway Capacity Manual, 6th Edition* (Transportation Research Board, 2016).

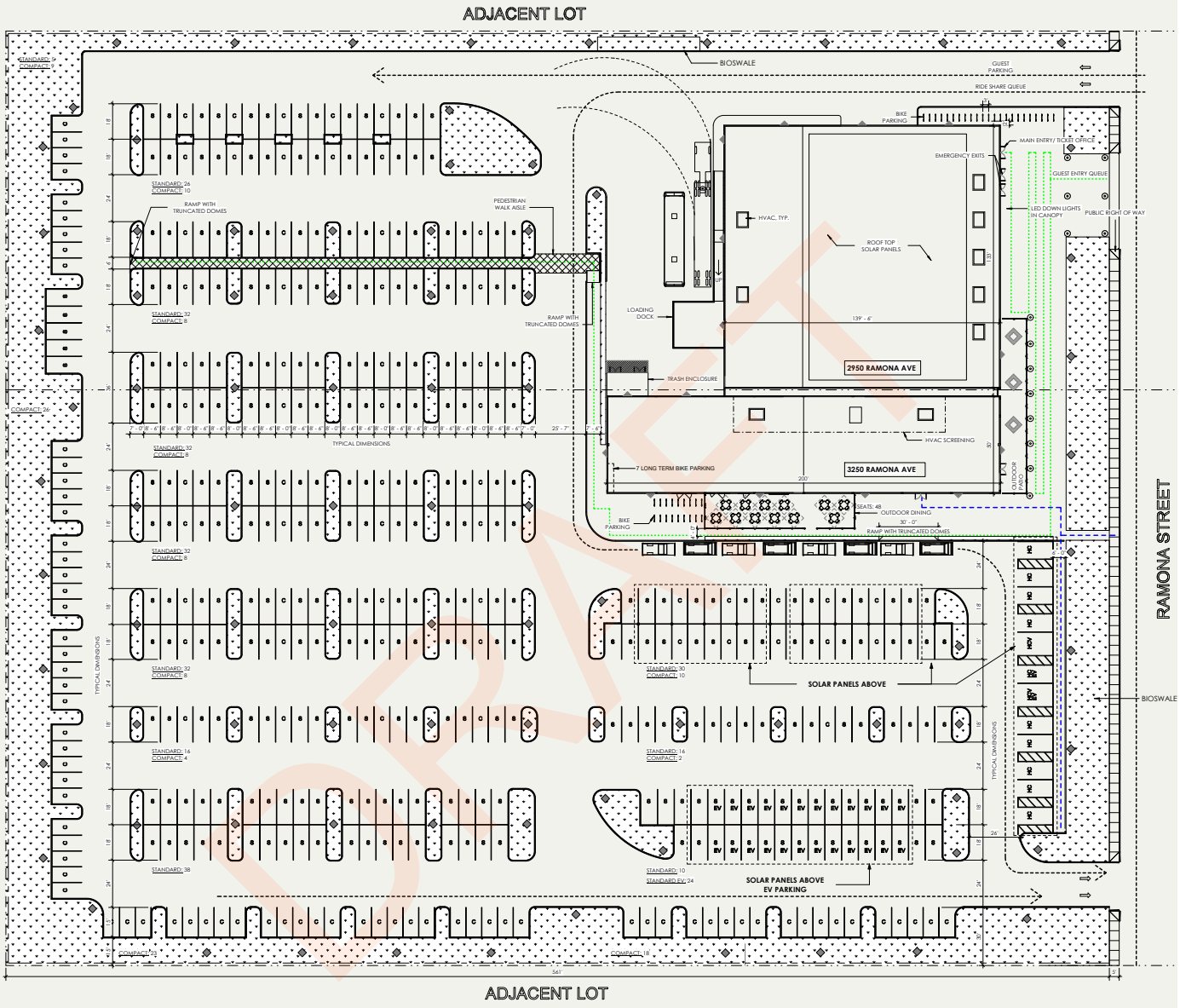


Figure 1

Project Site Plan

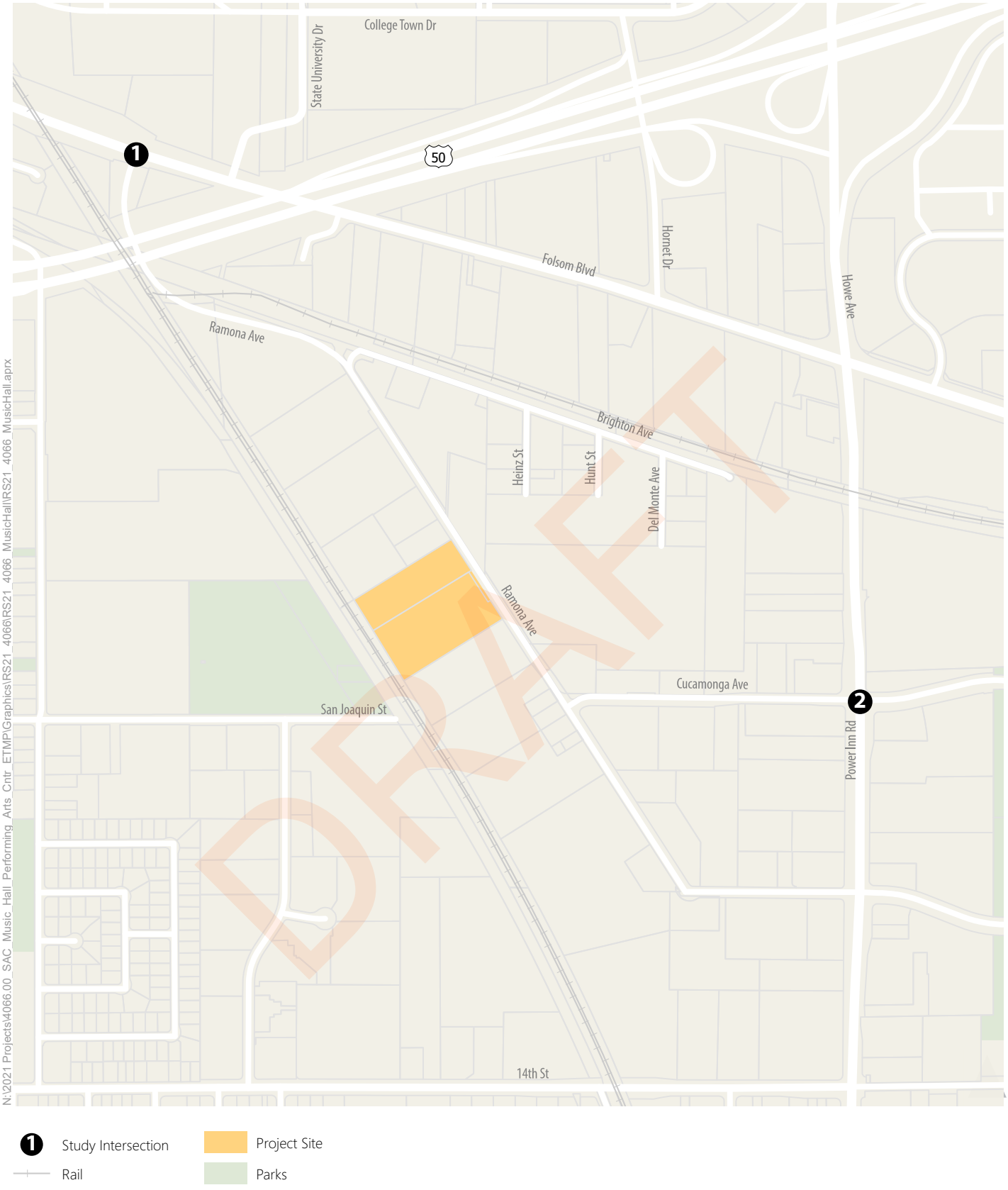


Figure 2

Study Area and Intersections

II. EXISTING CONDITIONS

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

ROADWAY SYSTEM

Regional access to the project is provided by US Highway 50, which extends from West Sacramento easterly into unincorporated Sacramento County, El Dorado County, and beyond. Motorists accessing the site from US 50 will use the Howe Avenue interchange. The following streets provide access to the project site:

- Howe Avenue – is a north-south arterial that extends from the Capital City Freeway southerly to its interchange with US 50. South of US 50, it has three lanes in each direction.
- Power Inn Road – is the southerly extension of Howe Avenue beginning at Folsom Boulevard. From south of Folsom Boulevard to 14th Street, it features three lanes in each direction separated by a raised median with a posted speed limit of 45 miles per hour (mph). It narrows to two lanes in each direction south of 14th Street.
- Folsom Boulevard – begins just east of the Capital City Freeway and parallels US 50 heading easterly. West of Ramona Avenue, it is a two-lane undivided roadway. West of Howe Avenue, it features two lanes in each direction separated by a two-way left-turn lane (TWLTL). It has a posted speed limit of 35 mph.
- Ramona Avenue – begins at Folsom Boulevard and extends in a generally southeast direction, intersecting with Power Inn Road. The portion of Ramona Avenue in the project vicinity is a two-lane street that is approximately 40 feet wide with no lane striping. It has a posted speed limit of 30 mph. See **Image 1** for illustration of current condition.
- Cucamonga Avenue – is an east-west street that extends for about one-quarter mile between Ramona Avenue and Power Inn Road, and continues east beyond Power Inn Road. It does not have a posted speed limit.

The intersections of each of the above roads are controlled by traffic signals with the exception of the Ramona Avenue/Cucamonga Avenue intersection, which features stop-control on the Cucamonga Avenue approach. **Figure 3** displays the existing roadway network including number of lanes and locations of traffic signals and other traffic controls.

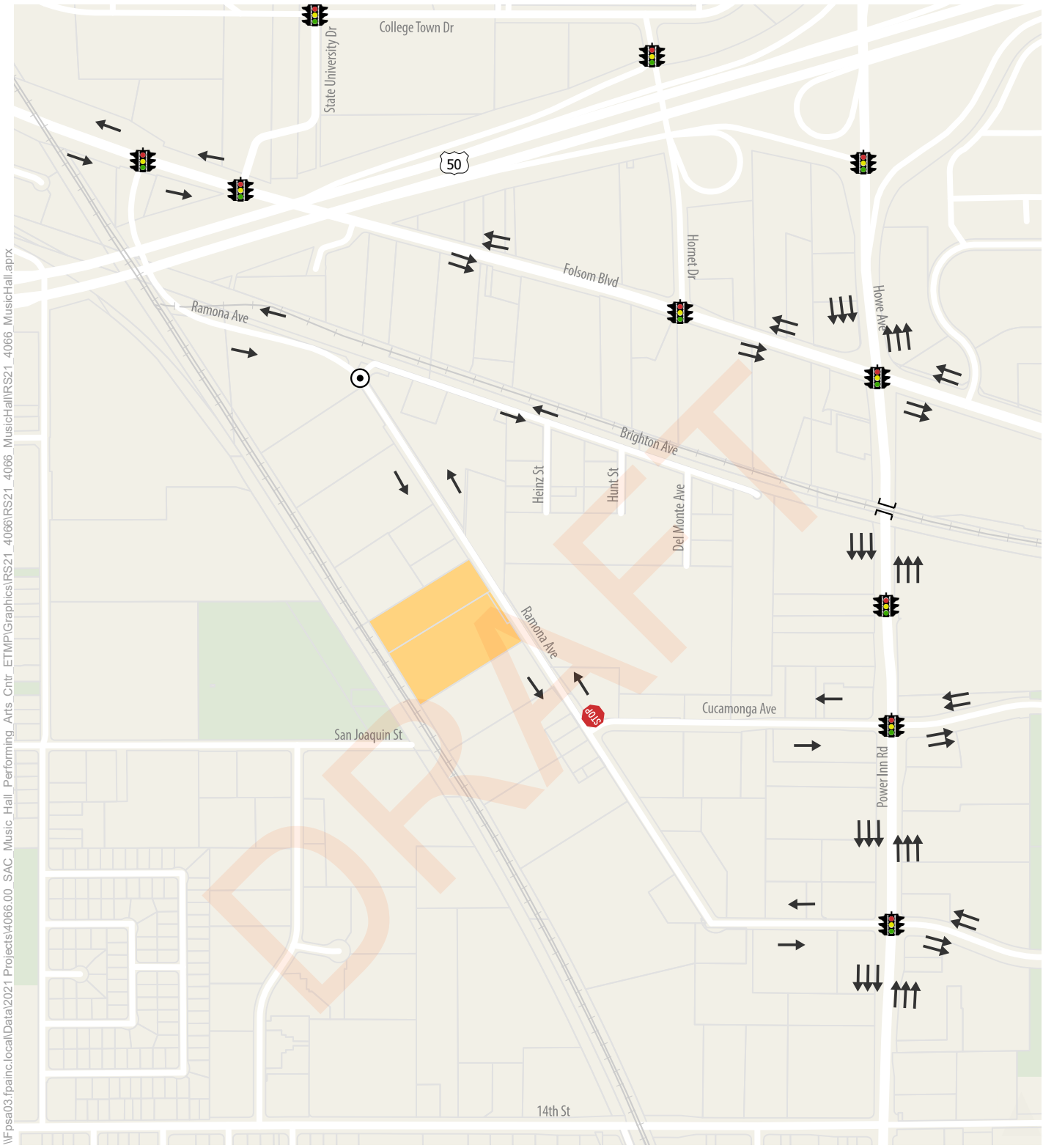


Figure 3

Existing Roadway Network

Image 1 – Looking northbound on Ramona Avenue (project site is along the west side of curb)

Figure 4 shows the permitted curb space utilization along Ramona Avenue and Cucamonga Avenue. As shown, parking is prohibited between the hours of 10 AM and 6 AM along Ramona Avenue from south of Brighton Avenue to Cucamonga Avenue. There are no parking restrictions on Ramona Avenue south of Cucamonga Avenue and on Cucamonga Avenue east of Ramona Avenue.

PEAK HOUR TRAFFIC VOLUMES

Traffic counts during the pre-event peak hour (i.e., 6:30 – 7:30 PM) were collected at the Folsom Boulevard/Cucamonga Avenue intersection in September 2021. The City of Sacramento provided weekday PM peak period (i.e., 4:00 – 6:00 PM) traffic counts at the Folsom Boulevard/Ramona Avenue intersection soon after the Ramona Avenue connection was completed in 2019. Those volumes were adjusted to represent pre-event peak hour conditions using a 24-hour count along this segment of Folsom Boulevard from May 2019. This process was necessary given that in-person attendance and overall travel levels at nearby California State University Sacramento (CSUS) was still likely well below pre-COVID levels.

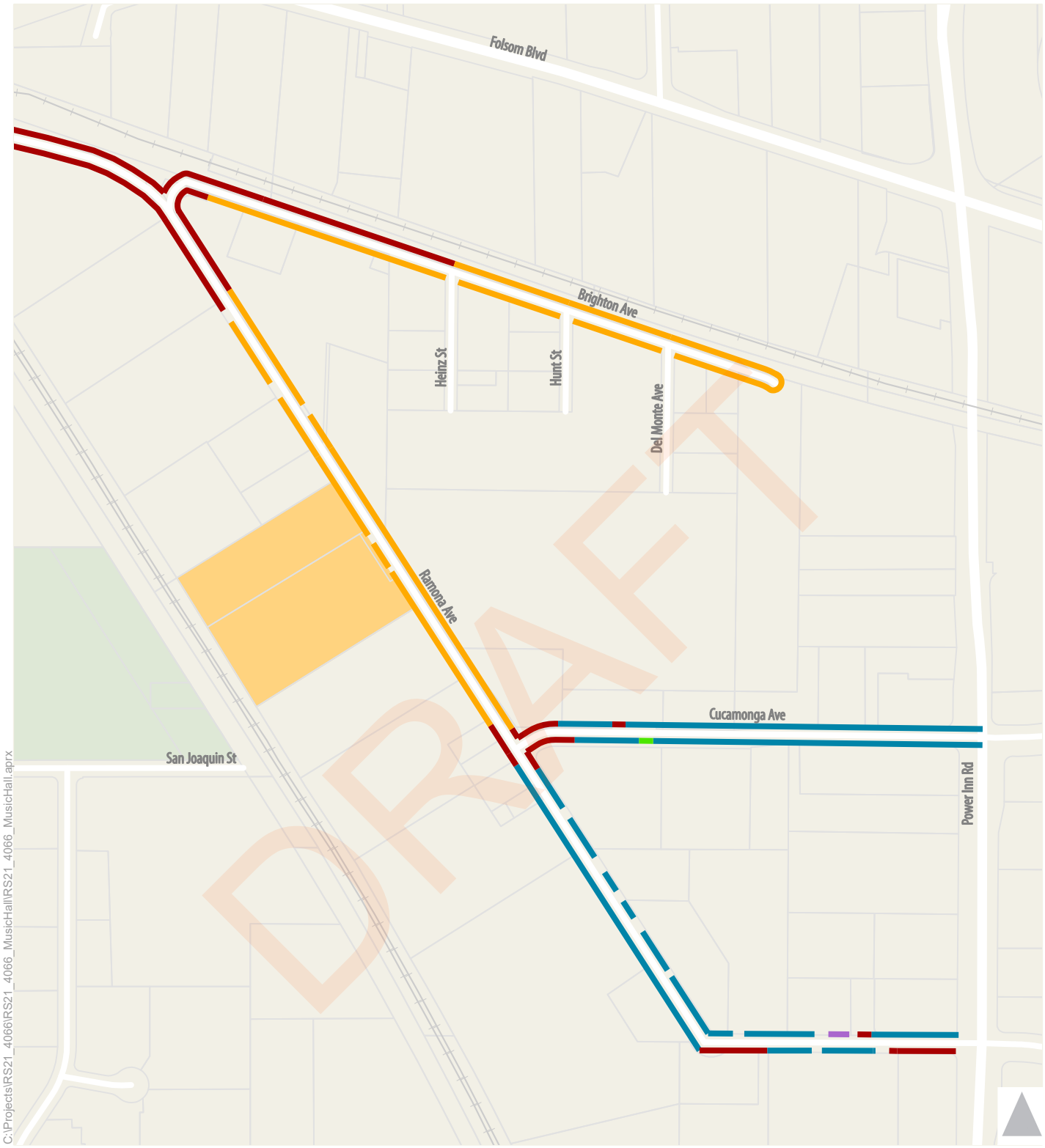


Figure 4

Existing On-Street Parking

Figure 5 displays the existing weekday pre-event peak hour traffic volumes, lane configurations, and traffic controls at each study intersection. As shown, traffic signals are present at both locations.

INTERSECTION OPERATIONS

Table 1 displays the existing intersection LOS and delay during the pre-event peak hour at the two study intersections. Technical calculations are provided in **Appendix A**. As shown, both study intersections currently operate at LOS B or better during the pre-event peak hour.

TABLE 1: PRE-EVENT PEAK HOUR INTERSECTION LEVEL OF SERVICE - EXISTING CONDITIONS

Intersection	Control	Average Delay [1]	LOS [1]
1. Folsom Boulevard / Ramona Avenue	Signal	5 sec/veh	A
2. Power Inn Road / Cucamonga Avenue	Signal	18 sec/veh	B

Notes:

1. All intersections analyzed using SimTraffic microsimulation model. For signalized intersections, average delay is reported for all approaches. All results are rounded to the nearest second.

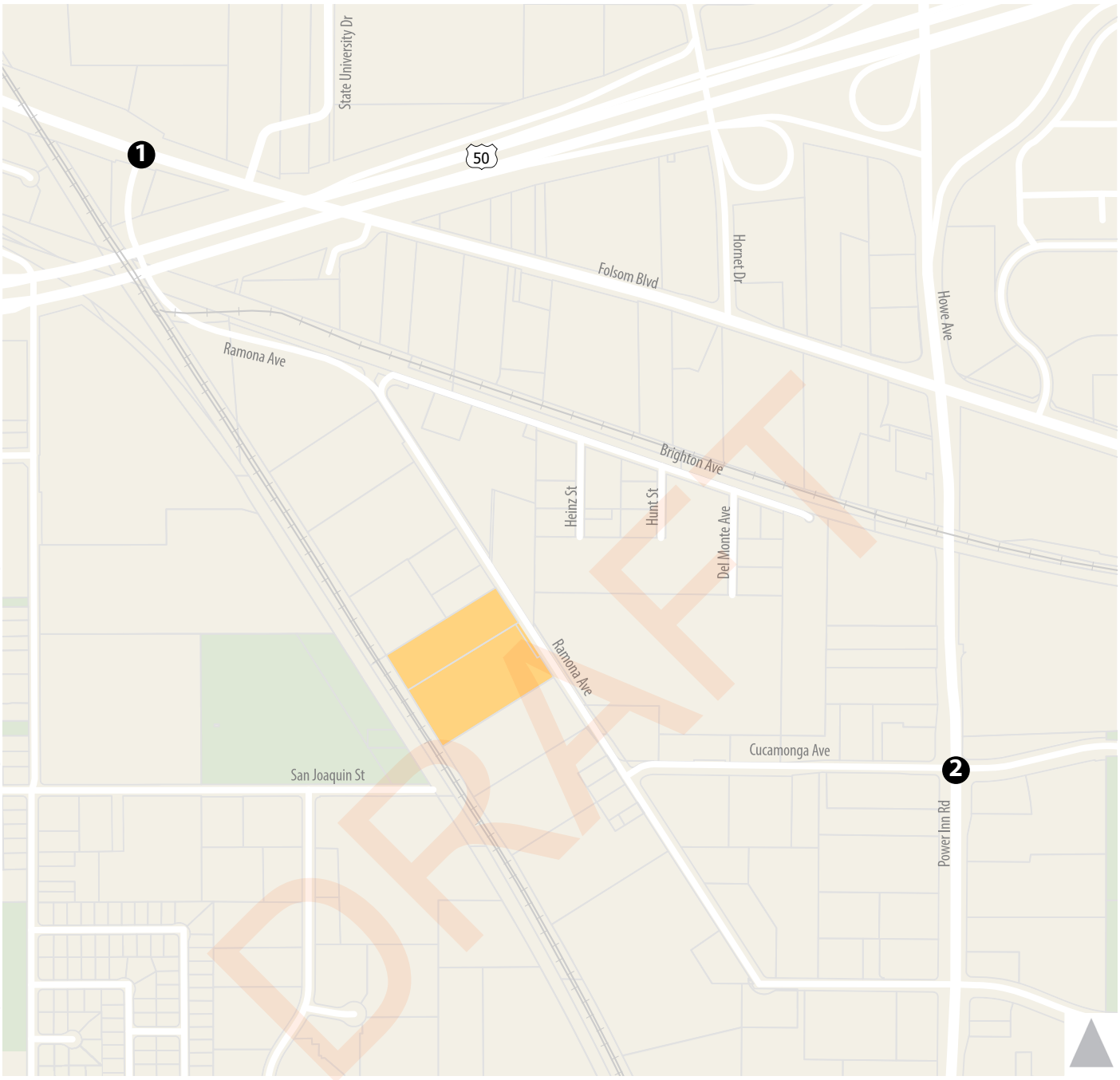
Source: Fehr & Peers, 2021.

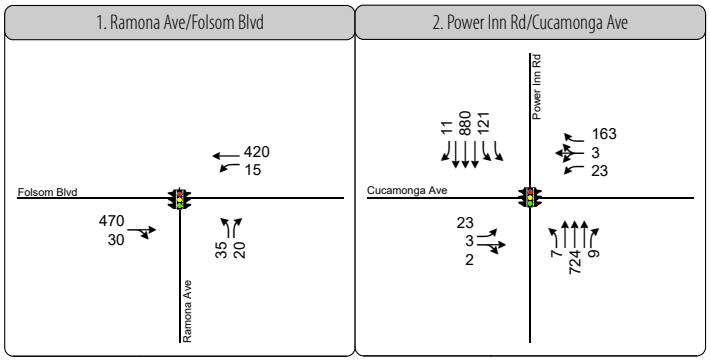
BICYCLE/PEDESTRIAN SYSTEM

Figure 6 displays the existing bicycle and pedestrian and facilities located near the project site. As shown, there are Class II (on-street with appropriate signing and striping) facilities along Ramona Avenue from Folsom Boulevard to 350 feet south of the Ramona Avenue/Brighton Avenue roundabout. Beyond that point, a pair of signs are posted in the southbound direction stating: "Bike Lane End" and "Bikes May Use Full Lane", indicating the presence of a Class III bike route. Additionally, a sharrow pavement marking is located in the westbound direction of Ramona Avenue west of Power Inn Road, indicating a Class III route on westbound/northbound Ramona Avenue.

Class II bike facilities are present along Power Inn Road from Folsom Boulevard to south of 14th Avenue and along Folsom Boulevard from 65th Street easterly beyond Power Inn Road.

The City's Bicycle Master Plan proposes a connection from Redding Avenue to Ramona Avenue across the existing rail line. The project would accommodate this future connection through dedication of right-of-way.





1 Study Intersection

PM Pre-Event Peak Hour (6:30 - 7:30 PM) Traffic Volume

Turn Lane

Traffic Signal

Project Site

Figure 5

Pre-Event Peak Hour Traffic Volumes, Traffic Controls, and Lane Configurations - Existing Conditions

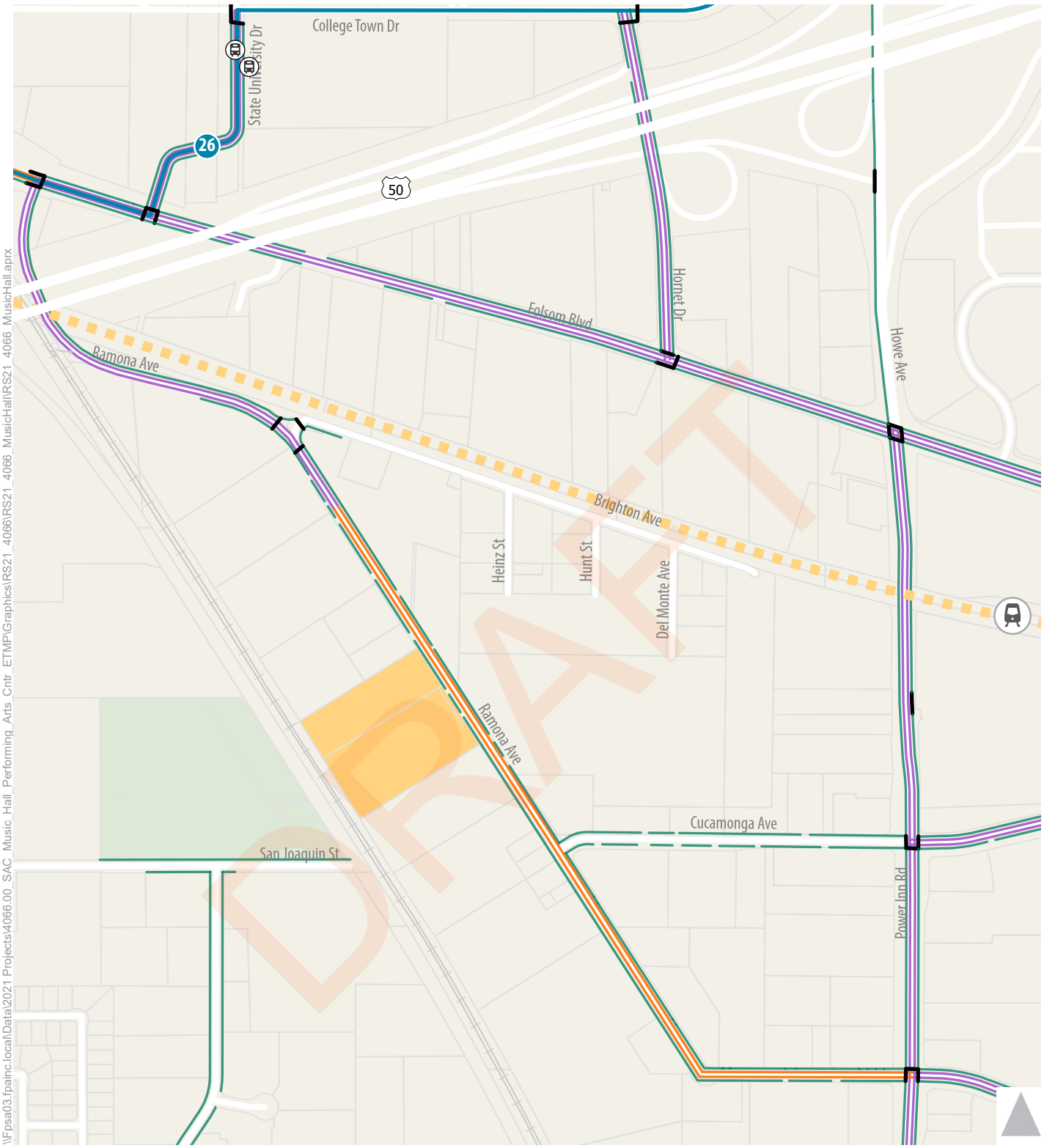


Figure 6

Existing Bicycle, Pedestrian and Transit Facilities

A continuous sidewalk is present along the east side of Ramona Avenue from Folsom Boulevard southerly to the roundabout at Brighton Avenue. South of the roundabout, sidewalks are continuous on both sides of Ramona Avenue to Power Inn Road. Sidewalks are also present on both sides of Cucamonga Avenue west of Power Inn Road.

The traffic signals at the Folsom Boulevard/Ramona Avenue, Power Inn Road/Ramona Avenue, and Power Inn Road/Cucamonga Avenue intersections each feature marked crosswalks with push button pedestrian detection. Crosswalks are also present at the Ramona Avenue/Brighton Avenue roundabout. Notably, marked crosswalks are not present at the unsignalized Ramona Avenue/Cucamonga Avenue intersection.

TRANSIT SYSTEM

Transit service in the study area is provided by Sacramento Regional Transit (RT) Gold Line light rail service, which includes a station on Power Inn Road just south of Folsom Boulevard. RT Bus Route 26 operates along Folsom Boulevard near the CSUS campus. While RT's SmartRide microtransit service is operational in areas near the project vicinity, service does not currently extend to the study area itself.

Gold Line Light Rail service operates between downtown Sacramento and Folsom. On Mondays through Fridays, it operates on 15-minute headways until about 7 PM, shifting to 30-minute headways after that. Mondays through Saturdays, the last westbound train departs the Power Inn Station at 12:05 AM and the last eastbound train departs the Power Inn Station at 11:14 PM. The last eastbound and westbound trains depart this station between 9 and 10 PM on Sundays. These schedules imply that light rail (in combination with private shuttle) is considered a viable mode of travel to travel to and from the project site for all evening events with the exception of those on Sunday nights. The cost of a single ride for the general public (i.e., excluding seniors, K-12 students, and persons with disabilities) is $2.50 per ride.

The nearest RT Route 26 bus stop to the project is on State University Drive north of Folsom Boulevard. This route operates in a generally north-south direction from the 65th Street Light Rail Station to the I-80/Watt Avenue Light Rail Station, running along parts of Howe Avenue and Fulton Avenue. During weekdays, the last northbound bus picks up passengers at this stop around 10:20 PM. This suggests this route would not be a viable post-event form of travel for event attendees who intend to remain at the venue until after the main performance concludes around 10:45 PM.

III. EXISTING PLUS PROJECT CONDITIONS

This chapter analyzes the effects of the proposed project on the existing transportation network. The condition studied in this chapter assumes no traffic management or other event-related activities are in place aside from off-site parking and the shuttle system which are described below.

PROPOSED PARKING SUPPLY AND SHUTTLE SERVICE

The following supply of parking is planned to accommodate event attendees and employees who choose to drive:

- On-Site Parking – 440 spaces
- Remote Parking (3300 Power Inn Road) – 100 spaces situated on the southwest corner of the intersection of Power Inn Road and Cucamonga Avenue.
- Remote Parking (Power Inn Light Rail Station) – 75 spaces situated on the east side of Power Inn Road directly south of the light rail tracks.
- On-Street Parking (Ramona Avenue) – 93 spaces available between Power Inn Road and Cucamonga Avenue.
- On-Street Parking (Cucamonga Avenue) – 69 spaces available between Power Inn Road and Ramona Avenue.

In total, there would be 777 available parking spaces to accommodate event attendees and employees. It is worth noting that the parking restriction (i.e., No Parking from 10 PM to 6 AM) on Ramona Avenue from north of Cucamonga Avenue to just south of the Ramona Avenue/Brighton Avenue roundabout was assumed to remain in place. On-street parking demand along the east-side portion of Ramona Avenue and Cucamonga Avenue was limited to adjacent industrial/office businesses, which would subside by 6:30 PM. The north-south portion of Ramona Avenue south Cucamonga Avenue was observed to be occupied by campers, vehicles, and RVs for overnight stays. It is unknown the extent to which those activities would remain by the time the project would open.

The project proposes to operate a private shuttle that would transport event attendees and employees between the venue and the Power Inn Light Rail Station remote lot. Recommendations for the number of shuttle buses, routing, bus capacity, etc. are provided in the following sub-sections. Attendees that park along Ramona Avenue and Cucamonga Avenue are expected to walk to/from the venue (distance ranges from 0.2 to 0.5 miles).

Finally, it is noted that on-street parking is prohibited from 10 PM to 6 AM for an approximate 1,550-foot section of Ramona Avenue from Cucamonga Avenue northerly to just north of the project site. Because events would typically conclude about 10:45 PM, the analysis assumes event attendees would

not park in this area (which would have capacity for about 110 parked vehicles). The need for enforcement of this no parking zone is discussed later in this report.

PROJECT TRIP GENERATION

Table 2 shows the project's estimated mode split for pre-event peak hour conditions. As shown, 95 percent of event attendees are expected to drive a private vehicle or use a Transportation Network Company (TNC) service such as Uber or Lyft or use a taxi or other drop-off to access the venue. The level of auto usage is similar to mode split survey results observed by Fehr & Peers at the Ace of Spades concert venue in midtown Sacramento on Tuesday, September 14, 2021. Of 100 event attendees that were surveyed at Ace of Spades, 98 percent used a vehicle (either private vehicle or TNC) to access the venue.

TABLE 2: PRE-EVENT PEAK HOUR EVENT ATTENDEE MODE SPLIT

Mode of Travel	Percent
Drive and Park [1]	75%
Uber/Lyft/Taxi/Other Drop-Off [1]	20%
Light Rail [2]	3%
Walk/Bike	2%
Total	100%

Notes:

1. Preference to drive would likely exceed 75 percent if parking supply was not constrained. However, constrained supply of parking would limit "drive and park" mode split for sold-out events (i.e., 2,219 attendees and 2.3 average vehicle occupancy equates to 724 occupied parking spaces, with remaining 53 spaces of the 777 total available spaces used for employee parking).
2. In 2014, Sacramento Republic USL soccer matches were played at Hughes Stadium (adjacent to a SacRT Blue Line station). An average of 5% of attendees were observed using light rail. Given that a shuttle ride is also required to use light rail to access the venue, expected transit mode split was further reduced to 3%.

Source: Fehr & Peers, 2021.

The 20 percent TNC, taxi, or other drop-off mode split was determined after in-depth discussions between City Staff and the event operator. Based on the operator's anticipated audience and the proximity to Sacramento State, TNC use was assumed higher than an average event center; however, the private vehicle mode split was still maintained as the primary mode.

The following other key operational parameter estimates, and assumptions were developed for use in the study based on previous work by Fehr & Peers at other venues:

- During busy and near sell-out events, the on-site restaurant would likely cater primarily to event attendees. While it is conceivable that there may be some outbound trips from the project site associated with persons who were dining at the restaurant prior to the start of the pre-event peak hour, those trips would likely be modest and generally not conflict with the heavy inbound volumes.
- Employee trips are assumed to occur prior to the pre-event peak hour.
- 65 percent of event attendees that drive to the venue arrive during the pre-event peak hour.[3]
- 70 percent of event attendees that travel to the venue via Transportation Network Company (i.e., Uber or Lyft), taxi, or other drop-off arrive during the pre-event peak hour.[4]
- Average occupancy (AVO) is 2.3 event attendees per vehicle for both private vehicles and Uber/Lyft/taxi/drop-offs.[5]

Table 3 shows the project's estimated pre-event peak hour vehicle trip generation based on the above estimates. This table indicates the following for pre-event peak hour conditions:

- 601 vehicles would enter the study area (to either park at the site, park nearby, or drop-off event attendees at the venue) and 131 vehicles would exit the study area.
- 406 vehicles would enter the project itself (to either park at the site or drop-off event attendees either as an Uber/Lyft/Taxi or shuttle bus) and 143 trips would depart the project site.

[3] 66% of attendees to the Bruno Mars Concert at Golden 1 Center in July 2017 arrived from 7-8 PM (for 8 PM start time). Counts in December 2018 at the LA Forum (Fleetwood Mac and Childish Gambino) showed 53% arriving in the hour prior to each show starting. These facilities have nearby food and beverage options that may encourage more dispersed arrivals. Larger events may also have more dispersed arrival patterns due to congested conditions that meter the flow of inbound traffic. In light of the above, 65% of arrivals during pre-event peak hour is expected.

[4] Anecdotal evidence from a number of entertainment venues suggests attendees who use Uber/Lyft may arrive closer to the event start time, due perhaps to having been at a restaurant or bar prior to the event or given the lack of a concern over having to find parking.

[5] The type of entertainer can affect vehicle occupancy. In 2017, 2.4 persons per vehicle was measured at a Janet Jackson Concert at Key Arena in Seattle. In 2018, an average of 2.18 persons per vehicle was measured at four concerts (Fleetwood Mac and Childish Gambino) at the LA Forum in Inglewood, CA. During observations on Tuesday, September 14, 2021 at the Ace of Spades venue in Sacramento, an average of 2.3 persons were dropped off by TNCs. In light of all the above, an average AVO of 2.3 event attendees per vehicle is assumed.

Table 3 – Project Vehicle Trip Generation During Pre-Event Peak Hour					
Trip Generator	**Description**	**Attendees Transported During Pre-Event Peak Hour**	**Vehicle Trips Generated [5]**		
			Inbound	**Outbound**	**Total**
Private Vehicles	Park at Site	606 [1]	263	0	263
Private Vehicles	Park at Remote Lots or On-Street	476 [2]	207	0	207
Uber/Lyft/Taxi	Dropped Off at Site	311 [3]	135	135	270
Shuttle Buses	4 round trips	173 [4]	4	4	8
Total Project Vehicle Trip Generation [6]			**601**	**131**	**732**
Project Site Vehicle Trip Generation [7]			**402**	**139**	**541**

Notes:
1 Calculated as 2,219 persons x 75% mode split x 65% peak hour arrival x 56% of all parking.
2 Calculated as 2,219 persons x 75% mode split x 65% peak hour arrival x 44% of all parking.
3 Calculated as 2,219 persons x 20% mode split x 70% peak hour arrival.
4 2,219 persons x (9% "park and shuttle" + 3% "LRT and shuttle" mode split) x 65% peak hour arrival = 173 shuttle riders. At 45 seats per bus, four bus round trips are required.
5 Average vehicle occupancy is 2.3 event attendees for private vehicles and Uber/Lyft/Taxi.
6 These are vehicle trips that enter/exit the overall study area.
7 These are vehicle trips that enter/exit the project site on Ramona Avenue.
Of those spaces dedicated for event attendees, 408 (55%) would be located at the project site. The remainder would consist of on-street parking (162 spaces, 22%), a nearby off-street lot (100 spaces, 13%) and an off-street remote lots (75 spaces, 10%).
Source: Fehr & Peers, 2022.

TRIP DISTRIBUTION/ASSIGNMENT

Based on discussions with the applicant and City, it is anticipated that event attendees will typically come from the age 18 to 45 demographic. To understand the spatial distribution of this group across the Sacramento region, data from the American Community Survey (ACS) was obtained. Geographic place of residence for persons in this age group was plotted within a 3-mile radius of the project site, and within a 3- to 10-mile radius of the project site. Refer to Appendix B for geographic distribution exhibit. Key observations from this data include:

1. The 3-mile radius is less than 20 percent of the total and is represented by the communities/areas of CSUS, East Sacramento, Oak Park, and Fruitridge.
2. The 3- to 10-mile radius includes a large attendee catchment area including parts of Elk Grove, Downtown/Midtown Sacramento, North Highlands, Carmichael, Arden-Arcade, and Rancho Cordova.

The 3-mile radius distance was specifically chosen because studies of TNC use elsewhere in Sacramento (i.e., Golden 1 Center) indicated that the majority of TNC rides are three miles or less. Accordingly,

separate trip distribution percentages were developed for attendees that drive a private vehicle and park versus attendees that use a TNC, taxi, or other drop-off.

For the private vehicle trip distribution, the entire 10-mile radius was considered. All areas within this radius were assigned one (or occasionally two) specific travel corridors (based on Google maps travel time comparisons among alternate routes). The following specific routes were included: US 50 West to Howe Avenue, US 50 East to Howe Avenue, Howe Avenue North, Power Inn Road South, Folsom Boulevard West, and Jackson Highway/SR 16 East. The aggregated totals (in terms of persons within the 18 to 44 year old target demographic) for each route were then used to develop trip distribution percentages, which are shown on **Figure 7**. As shown, the vast majority of trips (75 percent) are expected to pass through the US 50/Howe Avenue interchange, heading south on Power Inn Road to access either remote parking, available on-street parking, or the project site itself. Another 20 percent of project trips would travel northbound on Power Inn Road from destinations to the south.

For the TNC/Taxi/drop-off vehicle trip distribution, the 3-mile radius was used, with the same methodology as described above being applied. Figure 7 shows the resulting trip distribution percentages, which are considerably different than for private vehicles. The proportion of trips passing through the US 50/Howe Avenue interchange drops considerably, with increases in trips coming from the west on Folsom Boulevard (i.e., CSUS students and other nearby housing) and from the south on Power Inn Road. With regard to the assignment of project trips, there were several important considerations to note:

1. Usage of Five Distinct Parking Areas – the five areas (i.e., project site, two on-street parking areas, and two remote lots) were assumed to be occupied by project attendee vehicles in proportion to their available supply. In other words, lots were assumed to be occupied to the same degree regardless of the direction from which attendees arrived.
2. Use of College Town Drive to State University Drive – The exception to #1 above is a route that some event attendees traveling southbound on Howe Avenue would likely only use to reach the project site. This route consists of traveling westbound on College Town Drive, southbound on State University Drive, and then westbound on Folsom Boulevard to access Ramona Avenue.
3. Circulating to Find Parking – was not assumed to occur. While details of the ticketing and parking space allocation procedures are not known at this time, the analysis assumes that event attendees would not drive from one parking area to another to search for available parking.
4. Relative Use of Ramona Avenue and Cucamonga Avenue for Trips from the South – Two out of every three event attendee vehicles traveling northbound on Power Inn Road were assumed to turn left at Ramona Avenue. This route is marginally faster than continuing straight and then turning left at Cucamonga Avenue because Cucamonga Avenue features a stop sign at Ramona Avenue, giving northbound Ramona Avenue travelers priority right-of-way.

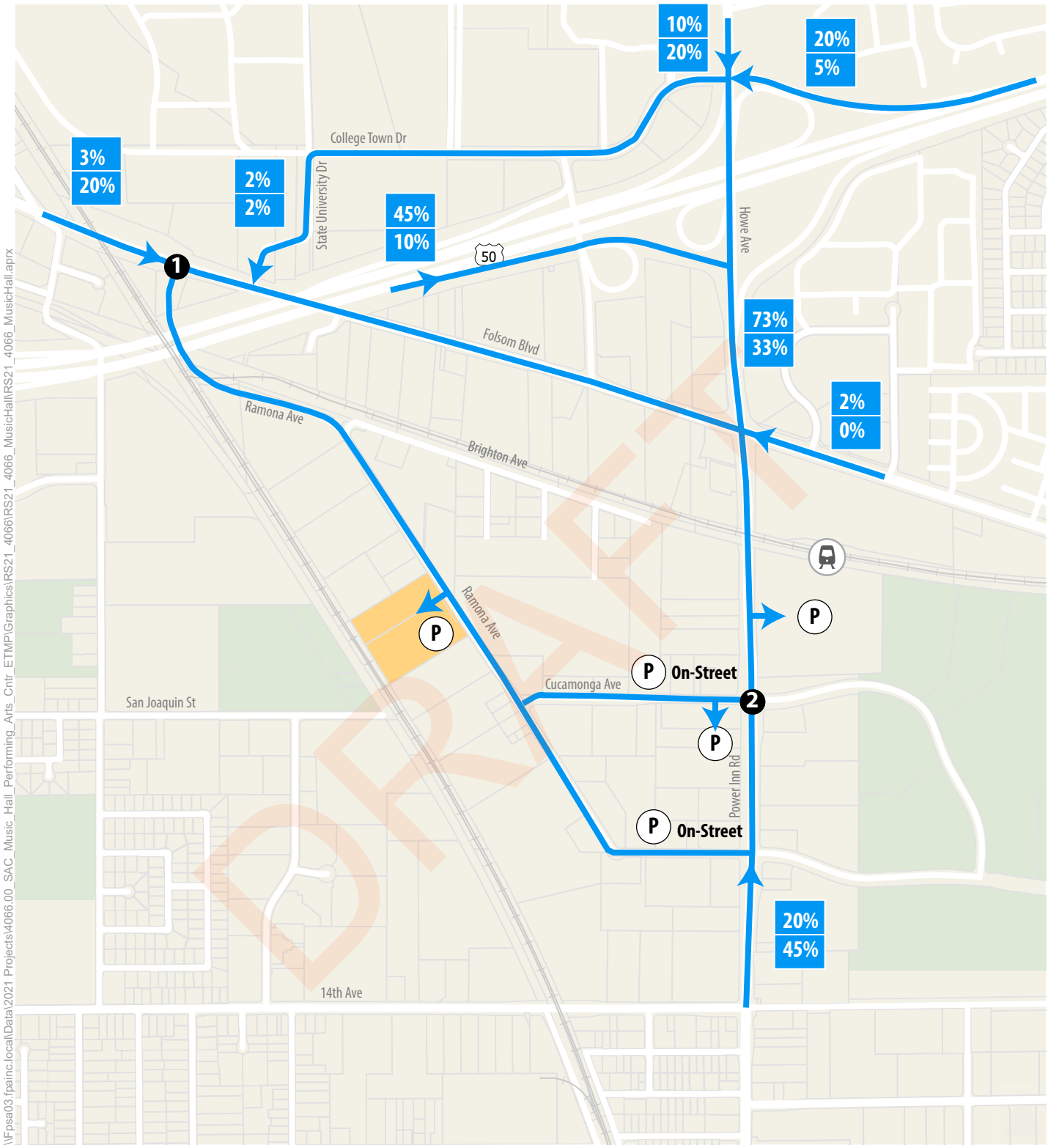


Figure 7

Project Trip Distribution - Pre-Event Peak Hour Conditions

Project trips were assigned to the parking facilities and through the study intersections using the above-described project trip generation, distribution, and assignment procedures. Refer to **Figure 8** for project-only trips at the two study intersections and project driveways.

Project-only trips were added to the existing volumes. **Figure 9** shows the resulting Existing Plus Project pre-event peak hour traffic forecasts at the study intersections and project driveways.

PRE-EVENT PEAK HOUR INTERSECTION OPERATIONS

Table 4 displays intersection LOS and delay during the pre-event peak hour under existing plus project conditions (refer to technical calculations are provided in **Appendix C**). At the time the analysis was being performed, the second remote parking lot was being contemplated along Cucamonga Avenue east of Power Inn Road. That site was subsequently eliminated in favor of the lot in the southwest corner of the Power Inn Road/Cucamonga Avenue intersection.

Table 4 indicates that traffic operations would remain at LOS C or better at each study intersection with the addition of project traffic.

TABLE 4: PRE-EVENT PEAK HOUR INTERSECTION LEVEL OF SERVICE - EXISTING PLUS PROJECT CONDITIONS

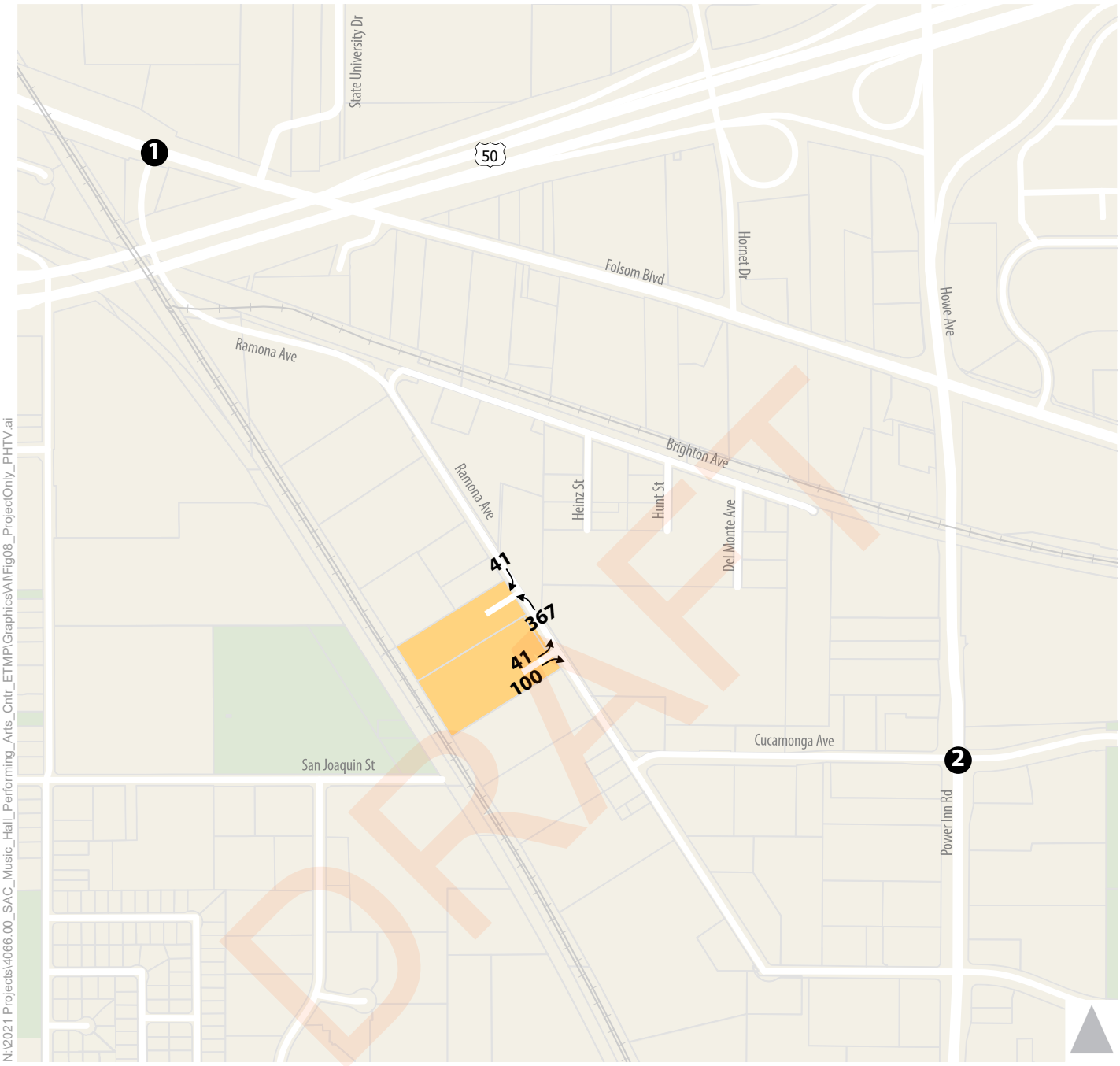
Intersection	Control	Existing Conditions		Existing Plus Project Conditions	
		Average Delay [1]	LOS [1]	Average Delay [1]	LOS [1]
1. Folsom Boulevard / Ramona Avenue	Signal	5 sec/veh	A	8 sec/veh	A
2. Power Inn Road / Cucamonga Avenue	Signal	18 sec/veh	B	23 sec/veh	C

Notes:

1. All intersections analyzed using SimTraffic microsimulation model. For signalized intersections, average delay is reported for all approaches. All results are rounded to the nearest second.

Source: Fehr & Peers, 2021.

Table 5 displays the existing plus project pre-event peak hour maximum queue lengths at critical movements at the two study intersections (refer to **Appendix C** contains the detailed calculations). As shown, the project would not cause vehicle queues to exceed the available storage at any turn lanes at either study intersection. However, as noted in footnote 3 of the table, northbound left-turns and southbound right-turns on Power Inn Road at Cucamonga Avenue would be temporarily blocked from accessing the turn pocket. This result is conveyed via by the SimTraffic illustrations on the following page. Typically, these conditions do not warrant lengthening of a turn lane because it does not involve a potential safety risk, but rather a minor increase in vehicle delay or inconvenience.



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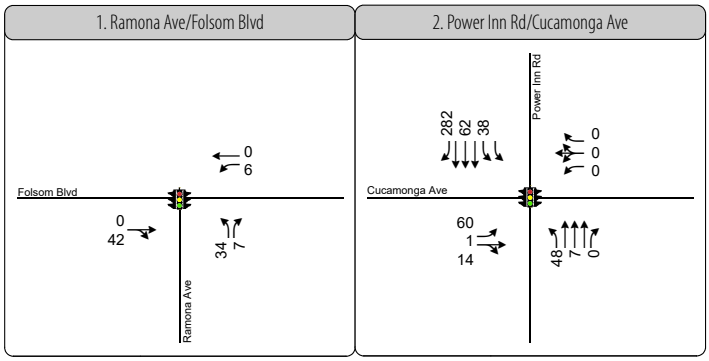
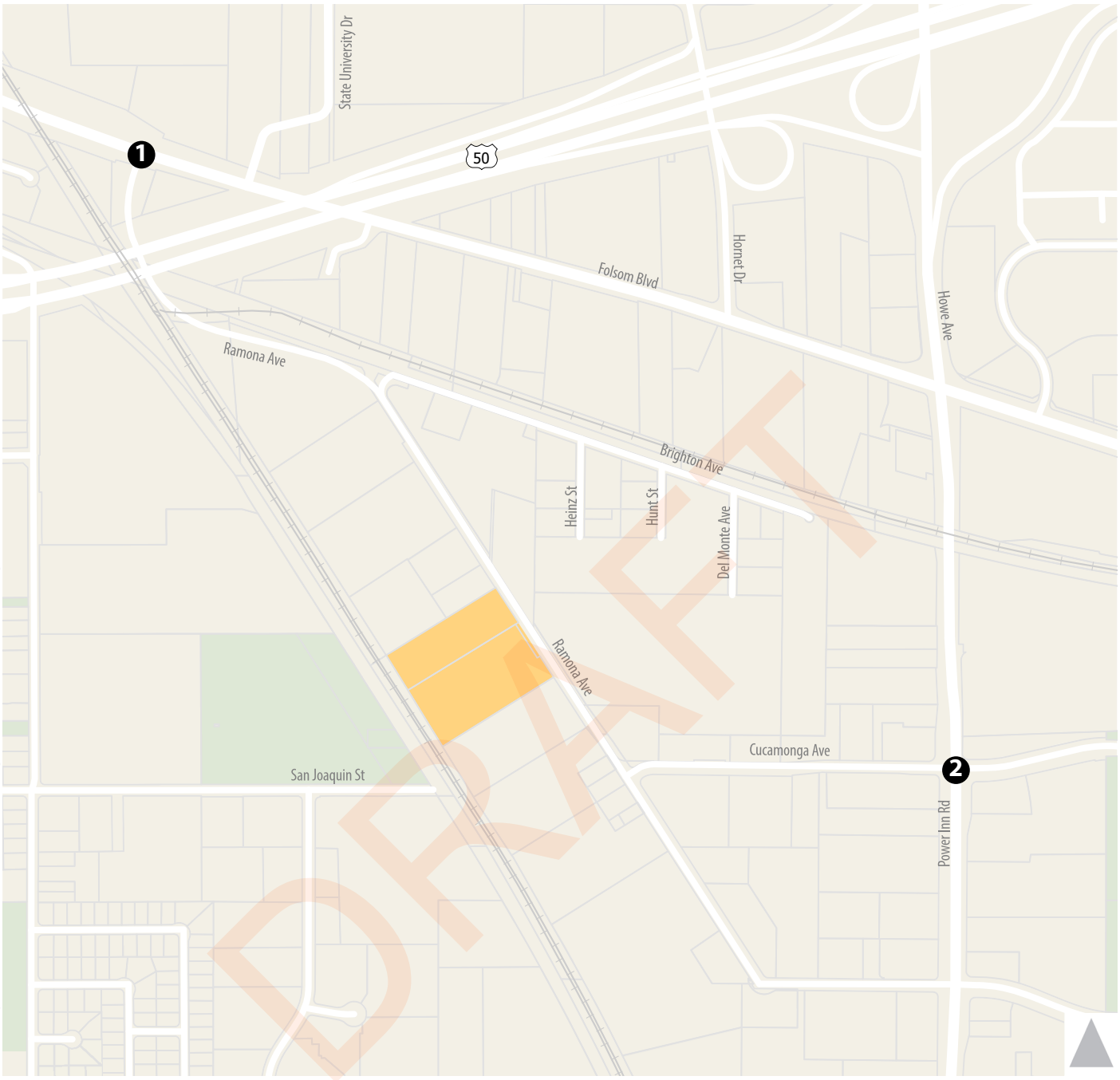
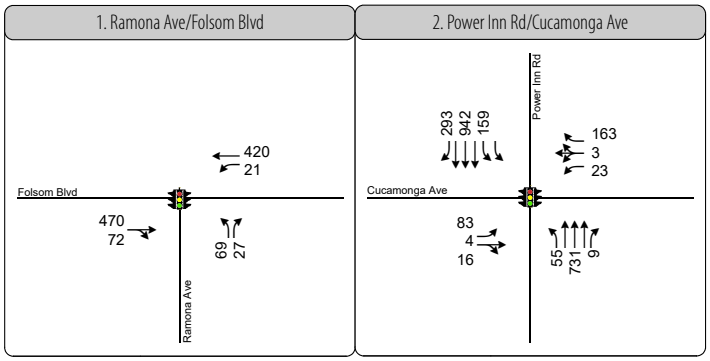


1	Study Intersection
PM	Pre-Event Peak Hour (6:30 - 7:30 PM) Traffic Volume
	Turn Lane
	Traffic Signal
	Project Site

Figure 8

Project-Only Trips During Pre-Event Peak Hour Conditions





1 Study Intersection

PM Pre-Event Peak Hour (6:30 - 7:30 PM) Traffic Volume

Turn Lane

Traffic Signal

Project Site

Figure 9

Pre-Event Peak Hour Traffic Volumes, Traffic Controls, and Lane Configurations - Existing Plus Project Conditions

TABLE 5: PRE-EVENT PEAK HOUR MAXIMUM VEHICLE QUEUES - EXISTING PLUS PROJECT CONDITIONS				
Intersection	**Movement**	**Available Storage (ft.)[1]**	**Maximum Queue (ft.) [2]**	
			Existing Conditions	**Existing Plus Project Conditions**
1. Folsom Boulevard/Ramona Avenue	Eastbound Shared Through/Right	750 feet	100 feet	125 feet
	Westbound Left	125 feet	25 feet	50 feet
	Northbound Left	425 feet	75 feet	125 feet
	Northbound Right	90 feet	50 feet	75 feet
2. Power Inn Road/Cucamonga Avenue	Southbound Through	440 feet	275 feet	300 feet
	Southbound Right	130 feet	25 feet	225 feet [3]
	Northbound Left	110 feet	75 feet	175 feet [3]
	Northbound Through	830 feet	300 feet	300 feet
	Eastbound Left	175 feet	50 feet	125 feet
	Eastbound Through/Right	175 feet	25 feet	50 feet

Notes:
1. Available storage based on turn lane length or measured to the next upstream intersection (or at-grade railroad crossing).
2. Values rounded to the nearest 25 feet. Maximum queue length estimates based on output from SimTraffic model.
3. Maximum queue shown is associated with left or right-turning traffic that is blocked from accessing the turn lane by queued vehicles in the adjacent through lane.
Source: Fehr & Peers, 2021.

Illustration 1: Simtraffic screenshot showing blockage of southbound right-turn by through traffic during pre-event peak hour.

Illustration 2: Simtraffic screenshot showing of northbound left-turn by through traffic during pre-event peak hour.

POST-EVENT PEAK HOUR CONDITIONS

According to the applicant's *Parking, Rideshare, and Vehicular Access Framework* (April 2021), the following three specific actions will be taken "to ensure that vehicles leaving the parking lots do so in an organized and metered strategy":

1. To encourage patrons to remain in the building after the show has ended, house lights will remain in "show mode" and the PA system will continue to play music.
2. The restaurant will remain open, catering to attendees who would prefer to have snacks and refreshments after the show.
3. Security and event staff will remind guests that they are welcome to take their time departing the event space and also that the restaurant remains open for their use.

The applicant's *Parking, Rideshare, and Vehicular Access Framework* indicates that the above methods have been successful elsewhere in avoiding mass exiting of large crowds.[6]

Fehr & Peers has conducted empirical observations of post-event egress at several large event venues, yielding the following results:

- *Bruno Mars Concert at Golden 1 Center in Sacramento (July 2017)*: 85 percent of attendees departed within the one-hour after the show concluded.
- *Janet Jackson Concert at KeyArena in Seattle (September 2017)*: 90 percent of attendees departed within the one-hour after the show concluded.
- *Childish Gambino and Fleetwood Mac Concerts (4 total) at The Forum in Inglewood (December 2018)*: 83 percent of attendees departed within the one-hour after the show concluded.

The proposed project is clearly of a much different scale, and situated in a different geographic setting than the three venues listed above. Nonetheless, given that those three sites had an average of 86 percent of attendees departing during the post-event peak hour, it would be expected that at least this value, if not a higher percentage due to the much smaller venue capacity, could be expected to depart the proposed project during the one-hour after an event concludes.

The following two scenarios were developed to establish a range of potential post-event conditions:

- Scenario 1 (Business as Usual) – an assumed 90 percent of attendees depart during the post-event peak hour.
- Scenario 2 (Organized, Metered Exit Strategy) – an assumed 67 percent of attendees depart during the post-event peak hour.

[6] Fehr & Peers has requested and is awaiting any empirical evidence or further details about staggered departure of attendees.

Table 6 shows the number of vehicle trips entering/exiting the project site during the post-event peak hour under Scenario 1 (Business As Usual). As shown, the project site would accommodate 180 inbound vehicle trips and 545 outbound vehicle trips.

Table 7 shows similar information under Scenario 2 (Organized, Metered Exit Strategy). Under this scenario, the project site would accommodate 134 inbound vehicle trips and 406 outbound vehicle trips during the post-event peak hour. Scenario 2 would result in an approximate 25 percent reduction in the post-event peak hour trip generation at the project site.

Table 6 – Project Vehicle Trip Generation at Project Site During Post-Event Peak Hour Under Scenario 1 (Business As Usual)

Trip Generator	Description	Attendees Departing Project Site During Post-Event Peak Hour	Vehicle Trips Generated [4]		
			Inbound	Outbound	Total
Private Vehicles	Park at Site	839 [1]	0	365	365
Uber/Lyft/Taxi	Pick-Up at Site	399 [2]	174	174	348
Shuttle Buses	6 round trips	480 [3]	6	6	6
Project Site Vehicle Trip Generation [5]			**180**	**545**	**725**

Notes:
1 Calculated as 2,219 persons x 75% mode split x 90% peak hour departure x 56% of all private parking.
2 Calculated as 2,219 persons x 20% mode split x 90% peak hour departure.
3 2,219 persons x (9% "park and shuttle" + 3% "LRT and shuttle" mode split) x 90% peak hour departure = 240 shuttle riders. At 45 seats per bus, 6 bus round trips are required.
4 Average vehicle occupancy is 2.3 event attendees for private vehicles and Uber/Lyft/Taxi.
5 These are vehicle trips that enter/exit the project site on Ramona Avenue.
Scenario 1 (Business As Usual) implies no special activities or encouragement to temporally disperse guest departures.
Source: Fehr & Peers, 2021.

Table 7 – Project Vehicle Trip Generation at Project Site During Post-Event Peak Hour Under Scenario 2 (Organized, Metered Exit Strategy)

Trip Generator	Description	Attendees Departing Project Site During Post-Event Peak Hour	Vehicle Trips Generated [4]		
			Inbound	Outbound	Total
Private Vehicles	Park at Site	625 [1]	0	272	272
Uber/Lyft/Taxi	Pick-Up at Site	297 [2]	130	130	260
Shuttle Buses	8 round trips	357 [3]	4	4	8
Project Site Vehicle Trip Generation [5]			**134**	**406**	**540**

Notes:
1 Calculated as 2,219 persons x 75% mode split x 67% peak hour departure x 56% of all private parking.
2 Calculated as 2,219 persons x 20% mode split x 67% peak hour departure.
3 2,219 persons x (9% "park and shuttle" + 3% "LRT and shuttle" mode split) x 67% peak hour departure = 178 shuttle riders. At 45 seats per bus, 4 bus round trips are required.
4 Average vehicle occupancy is 2.3 event attendees for private vehicles and Uber/Lyft/Taxi.
5 These are vehicle trips that enter/exit the project site on Ramona Avenue.
Scenario 2 (Organized, Metered Exit Strategy) assumes the three actions described on previous page are implemented in order to disperse guest attendees over a greater duration of time.
Source: Fehr & Peers, 2021.

Surrounding roadways such as Folsom Boulevard and Power Inn Road, would have plenty of reserve capacity to accommodate post-event project trips. The project site itself is expected to be the primary source of potential post-event congestion. To illustrate this, consider the following based on Scenario 1 (Business As Usual) conditions:

- Per Table 6, a vehicle would need to exit the southerly outbound-only project driveway every 6.6 seconds (i.e., 545 vehicles in 3,600 seconds) during the post-event peak hour. If this is to be realized, it would represent an exceptionally efficient egress plan. Chapter IV discusses egress options in more detail.

ON-SITE ATTENDEE PICK-UP AFTER EVENTS CONCLUDE

Conditions related to post-event pick-up may also pose on-site operational challenges. Specifically, the site plan shows an approximate 160-foot passenger pick-up area located south of the venue building (with eight stopped vehicles illustrated in the site plan). The site plan shows the path that arriving pick-ups would take. About 20 vehicles could stack on-site without queuing onto Ramona Avenue.

Fehr & Peers recently collaborated with Uber and Lyft regarding post-event pick-up methods as part of a study of another venue. Through those discussions, it is apparent that neither operator can use a "pin-matching" system[7] (i.e., similar to a taxi-stand where passengers wait in line for the next arriving taxi) at most venues for a variety of reasons. This point is made here because the site plan appears to be showing just such an arrangement given the tight spacing of vehicles (i.e., 20 feet per vehicle). Venues like this will need to continue to rely on the more traditional approach where the Uber/Lyft driver travels to the rider's location for the pick-up.

According to Table 6, 174 vehicles would pick-up attendees during the one-hour after the event concludes. This would equate to 2.9 pick-ups per minute if distributed evenly over the course of the hour. But given that there is typically a surge of demand shortly after the event concludes, pick-up (and curb space) demand is likely to be much greater during the first 30 minutes after the event ends.

A 2019 joint Fehr & Peers/Uber Technologies analysis (Curbs of the Future - Fehr & Peers (fehrandpeers.com)) of pre-game and post-game conditions at the Great American Ballpark (home of Major League Baseball Cincinnati Reds) found that the average post-game TNC curb dwell and loading

[7] With a "pin-matching" system, the mobile app provides the passenger with a multi-digit pin code. Upon entering the vehicle, the passenger provides that code to the driver. The driver then enters that code into the driver's mobile app, which specifies the trip destination and route. This system is akin to verbal trip destination instructions given to a taxi driver. The advantage of the pin-matching system is that is does not require a passenger and a specified vehicle to meet. Instead, a passenger is paired with any available vehicle (typically in a queuing network for optimal routing, flow, and space usage).

time was 81 seconds. Furthermore, through that and other studies, a more realistic amount of curb space needed for an unregulated pick-up situation is about 50 feet per vehicle. Thus, the south side of the building would realistically be able to accommodate three simultaneous pick-ups. Given the TNC demand and curbspace dwell time, additional curb space will be needed to handle post-event surges in TNC pick-ups. The Event Transportation Management Plan (TMP) in the following chapter provides recommendations for managing these pick-ups.

IV. EVENT TMP

This chapter presents the Event Transportation Management Plan (TMP). The Event TMP should be implemented for all events for which at least 90 percent of parking spaces within the project site would be occupied. This equates to a total attendance threshold of 1,125 attendees for TMP implementation.[8] Given the location and size of the venue, the Event TMP focuses exclusively on the adjacent segment of Ramona Avenue and within the project site.

PRE-EVENT PEAK HOUR

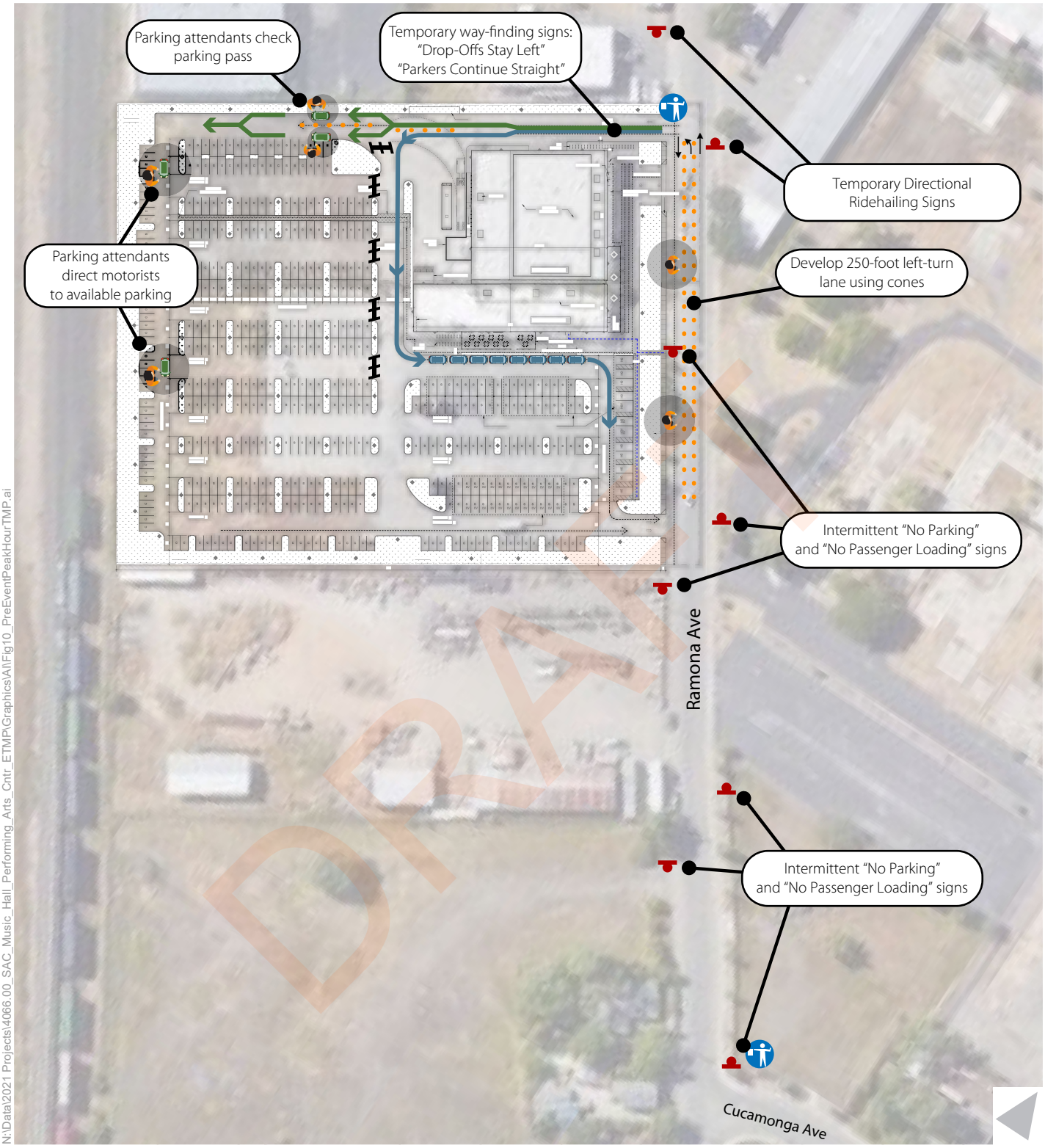
Pre-event peak hour transportation management would consist of four distinct actions, which are described below. For this peak hour, two Traffic Control Officers (TCOs) are recommended, with duties as described below. Refer to **Figure 10** for illustration of recommendations.

PRE-1: CHANNELIZED NORTHBOUND LEFT-TURN POCKET ON RAMONA AVENUE

With a sold-out event, the northbound left-turn volume into the northerly project driveway from Ramona Avenue would have a demand of 370 vehicles during the pre-event peak hour. This amount of left-turn traffic requires a dedicated turn pocket. Ramona Avenue is approximately 40 feet wide, which is sufficient to allow for one lane in the southbound direction, and left and through lanes in the northbound direction (assuming no on-street parking occurs, see PRE-2). The following are recommended:

- Place cones designating the three travel lanes for a distance of 250 feet south of the northerly driveway.
- Situate one TCO on Ramona Avenue at the northerly ingress driveway to monitor traffic operations (including discouraging undesirable passenger drop-offs directly on Ramona Avenue, ensuring shuttle buses can promptly enter the venue to drop-off passengers, and accommodating pedestrians walking on the west side sidewalk).

[8] Calculated as follows: 408 of the 440 on-site spaces are available to attendees, with the remainder being for employees. At 90 percent of those spaces being occupied and 2.3 persons per vehicle, this equates to 845 attendees that drive and park. Per Table 2, 75 percent of all attendees drive and park, which suggests a threshold of 1,125 persons for requiring implementation of the Event TMP.



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Note: Refer to Chapter IV for TCO and parking attendent rules.

Figure 10

Event TMP - Recommended Pre-Event Peak Hour Transportation Management and Equipment Placement

The southerly driveway is recommended to allow both outbound left and right turn movements during pre-event conditions. While the majority of trips are expected to be right-turns, about 40 outbound left-turns are expected. If outbound left-turns were to be prohibited, undesired u-turns would likely occur on Ramona Avenue between the project site and Cucamonga Avenue. Northbound left-turns are not expected to queue back to the southerly driveway.

PRE-2: TEMPORARY NO PARKING AND NO PASSENGER UNLOADING SIGNS ON RAMONA AVENUE

As noted previously, signs are present on both sides of Ramona Avenue from about 620 feet north of the project site to Cucamonga Avenue specifying that parking is prohibited between 10 PM and 6 AM. Vehicle parking or unloading would be undesirable in this area for two reasons during pre-event conditions for the following reasons. First, it would introduce pedestrians that would cross mid-block to access the site. Second, it could introduce u-turns as motorists seek to park or unload on the other side of the street. Third, it would narrow the effective width of Ramona Avenue to about 24 feet, which is insufficient for PRE-1. The following is therefore recommended:

- Place intermittent temporary "No Parking and "No Passenger Unloading" signs on both sides of Ramona Avenue from 620 feet north of the project site to Cucamonga Avenue.
- Situate parking attendants, if necessary, along the project's frontage on Ramona Avenue to deter passenger drop-offs from the southbound through lane. Parking attendants would primarily serve as a visual presence and not be within right-of-way. [9]

The above recommendation leads to several follow-up questions, which are posed and answered below.

1) *Why post the "No Parking" signs during the pre-event peak hour when the restriction does not become effective until 10 PM*? Field observations in this area revealed few, if any, parked vehicles at 6:30 PM. Initiating the parking restriction during the pre-event peak hour would preclude illegal parking (i.e., would occur after 10 PM that evening) while also not adversely affecting neighboring businesses.
2) *Why not allow City Parking Services to enforce this No Parking requirement?* This would place a recurrent, burdensome enforcement requirement upon parking compliance officers, particularly given the site's remote location relative to the rest of the City. Additionally, issuing parking violation tickets for rows of vehicles would not make for a positive fan experience at the venue.

[9] This approach has been successful at other event venues in which Uber/Lyft vehicles would otherwise likely drop off passengers at the curb due to the convenience it provides both the driver and the passenger(s).

3) *Why not consider modifying the parking restriction in this area of Ramona Avenue to allow on-street parking*? City staff has indicated that any modifications to this parking restriction would require supplemental study and formal action from the City Council. It is also noted that the no overnight parking signs were installed sometime between August 2017 and April 2019, meaning the decision to restrict overnight parking was made fairly recently.

4) *How would the temporary No Parking requirement be implemented, particularly if non-event vehicles are lawfully parked prior to 10 PM*? The venue operator would need to coordinate with the City's Public Works and Parking Services divisions to implement the restriction. This would include meeting the public noticing requirement.

PRE-3: ON-SITE PARKING AND CIRCULATION MANAGEMENT

Although the northerly driveway is about 28 feet wide, vehicles would enter it one at a time, making for a single line of incoming vehicles. Once within the parking lot, it is desirable to separate private vehicles that desire to park on-site from vehicles (Uber, Lyft, taxi, and other) that would be dropping off passengers. Additionally, adequate stacking for private vehicles within the site is desirable so that when parking passes/credentials are checked, queued traffic does not spill back onto Ramona Avenue. To accomplish the above, the following is recommended, per Figure 10:

- Place temporary wayfinding signs at the northerly driveway entry stating: "Drop-Offs Stay Left, Parking Keep Straight".
- Place cones for a distance of about 50 feet to the east of the main north-south drive aisle to divide incoming traffic into the two desired groups.
- Place two parking attendants (and a short coning pattern) near the triangular parking aisle endcap to check parking passes.
- Use parking attendants within the parking lot to guide motorists efficiently and systematically to a designated parking space.
- Recommend attendees park their vehicles backed-into spaces for easier post-event departures.
- Place temporary barricades at the eastern edge of the first four most northerly parking aisles (see Figure 10) to eliminate conflicts between parking traffic and drop-off traffic.

PRE-4: TRANSPORTATION MANAGEMENT AT RAMONA AVE/CUCAMONGA AVE

Event attendees would park on Cucamonga Avenue east of Ramona Avenue and walk to the venue. It is desirable to have these attendees, as well as those parking further to the south, cross Ramona Avenue at Cucamonga Avenue (versus a mid-block location closer to the venue) to access the west side sidewalk. The north leg of the Ramona Avenue/Cucamonga Avenue intersection does not have a marked crosswalk. Additionally, a streetlight is not immediately present at this location. Further, under existing

plus project conditions, 400 northbound vehicles and 150 southbound vehicles would traverse this crossing during the pre-event peak hour. Finally, the crossing itself could be expected to have a demand of about 240 pedestrians per hour who parked along Cucamonga Avenue or Ramona Avenue to the south. To accommodate these crossings, the following is recommended:

- Situate a TCO at the north leg of the Ramona Avenue/Cucamonga Avenue intersection to accommodate pedestrians desiring to cross Ramona Avenue.

Further discussions with Public Works and Police Department staff are necessary to determine the appropriate means for handling these crossings (i.e., temporary equipment, signage, etc.). These discussions should occur when the applicant submits an engineer-stamped Management Plan consistent with this report's findings.

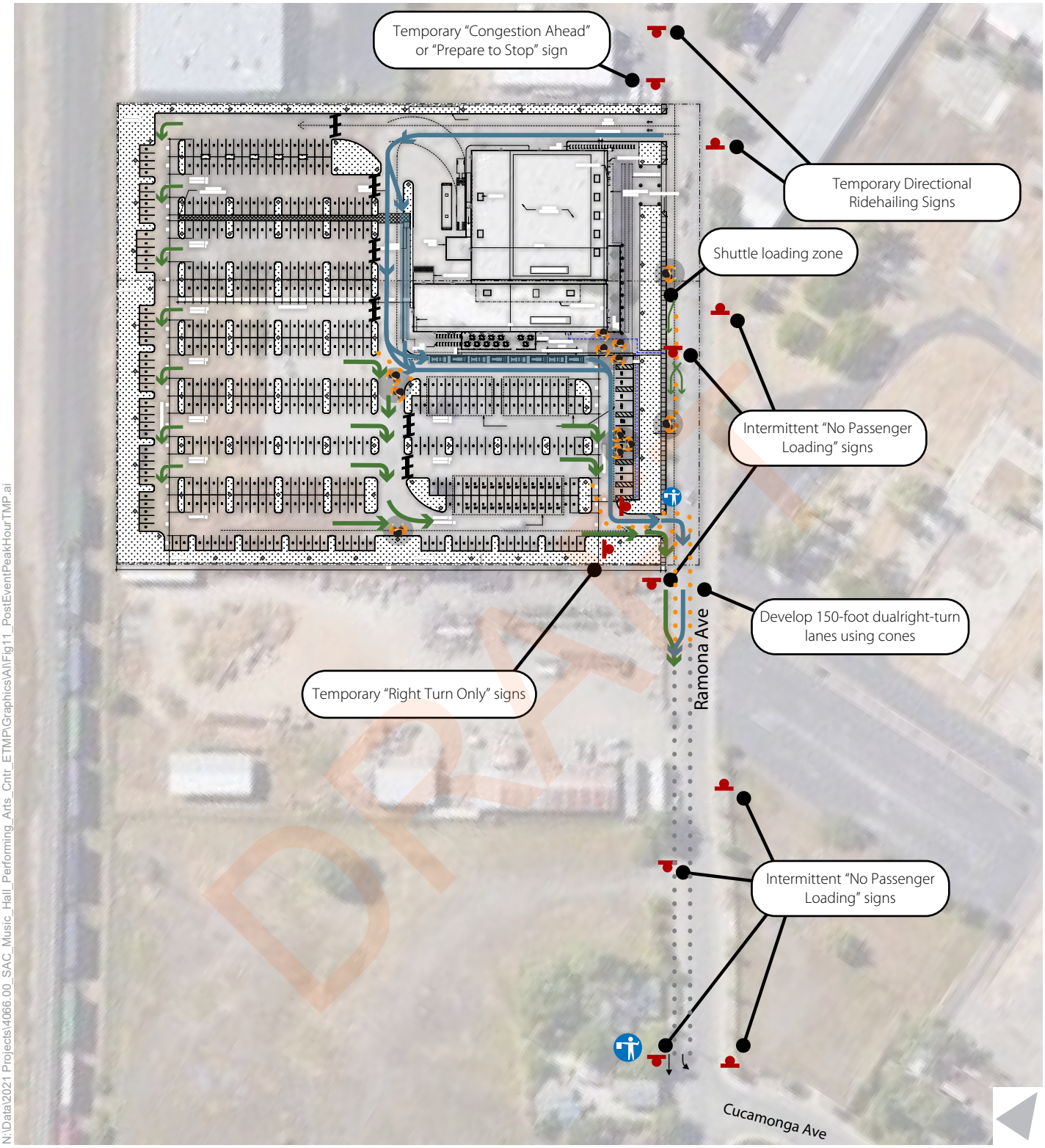
POST-EVENT PEAK HOUR

As with most venues, post-event transportation management is more labor and equipment intensive than pre-event conditions. This is due to the more pronounced surge of departing attendees after the event concludes (versus prior to it starting). The post-event peak hour consists of six distinct actions, which are described below. Note that two TCOs are also recommended for post-event conditions. Refer to **Figure 11** for illustration of recommendations.

POST-1: DUAL OUTBOUND RIGHT-TURNS FROM SOUTHERLY DRIVEWAY

To accommodate the large amount of post-event peak hour exiting traffic (550 vehicles according to Table 6), this 24-foot wide driveway is recommended to be operated as follows:

- Place cones designating two outbound travel lanes that force motorists to turn right onto southbound Ramona Avenue. As shown on Figure 11, the more northerly exiting lane would consist primarily of pick-up vehicles, while the more southerly exiting lane would be comprised of private vehicles that parked at the venue. The two-lane coning pattern would continue for approximately 150 feet, with vehicles then merging into a single lane beyond that point.
- A TCO would be situated in the northwest corner of the driveway to perform the following:
    - Stop the flow of the northerly exiting lane to allow occasional shuttle buses and other through traffic on southbound Ramona Avenue to pass.
    - Regulate pedestrian crossings at this driveway by holding pedestrians until sizeable volumes are present (and then stopping the flow of both outbound lanes to allow pedestrians to cross).



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Parking attendant
Traffic Control Officer (TCO)
Signage
Temporary barricades
Cones
Route for passenger pick-ups
Route for private vehicle parking

Figure 11

Event TMP - Recommended Post-Event Peak Hour Transportation Management and Equipment Placement

Note: Refer to Chapter IV for TCO and parking attendant roles. Grayed out cones on Ramona Avenue represent a potential expanded coning pattern should the lane drop be operationally problematic.

POST-2: SHUTTLE BUS LOADING ON RAMONA AVENUE

The project site plan shows multiple pedestrian connections from the project site to the sidewalk along Ramona Avenue. As indicated in Table 6, 6 shuttle buses would be expected to pick-up passengers during the post-event peak hour. If shuttle buses were to enter the on-site parking lot to pick-up attendees, they would experience delays, which could deter ridership.

To ensure that event attendees who choose to ride light rail or park in a remote lot would not experience excessive delays (caused by the on-site congestion), the following is recommended:

- Shuttle buses would pull to the west curb along the project frontage to pick-up passengers.
- The coning pattern would enable two buses to simultaneously load passengers.
- A variety of temporary signs would be situated along Ramona Avenue as shown in Figure 11 to prevent undesired travel behaviors and advise southbound motorists of congestion ahead.

POST-3: PASSENGER PICK-UP ZONES ON SOUTH AND WEST SIDES OF BUILDING

As described in the previous chapter, the single pick-up zone on the south side of the building would be insufficient to accommodate the expected level of passenger pick-up demand during post-event conditions. Therefore, the following is recommended:

- Operate pick-up zones on the south and west sides of the building.
- Coordinate with Uber and Lyft to determine whether two specific pick-up zones can be specified within their app through a small geofence[10] (i.e., like at some airports).

Each pick-up zone could support three simultaneous passenger pick-ups. Each pick-up zone would occur within a 24- or 25-foot wide drive aisle, which would be sufficiently wide for a vehicle to pass other vehicles waiting at the curb to pick-up passengers. The south and west pick-up zone drive aisles would permit only eastbound and southbound travel, respectively.

The pick-up zone is recommended to be operational for all event types, though it may not be necessary to also utilize the west pick-up zone for smaller events.

[10] A geofence is a specific geographic boundary created by the TNC operator. When the geofence is activated, persons within it can order a ride, and will be prompted to select one of the pre-determined geographic locations to be picked-up. This prevents TNC vehicles from otherwise picking up passengers directly at adjacent to large venues, thereby causing worsened congestion and competition for curb space.

POST-4: PARKING LOT MANAGEMENT TO OPTIMIZE EXITING FLOWS

Figure 11 shows the recommended routing of pick-up vehicles as they enter, pick-up attendees, and then depart the site. This figure also shows that private vehicle routing would make use of the most westerly north-south drive aisle and the most southerly east-west drive aisle to minimize conflicts with pick-up vehicles. This plan is intended to deliver roughly equivalent levels of exiting traffic in each of the two outbound lanes. A variety of cones, temporary barricades, and other wayfinding signs would be necessary to minimize cross-flows between these two groups. Multiple parking attendants would be situated within the parking lot to ensure efficient and orderly movement of vehicles (including passenger pick-ups, egress for vehicles parked in ADA spaces, etc).

POST-5: TEMPORARY NO PARKING AND NO PASSENGER LOADING SIGNS ON RAMONA AVENUE

It is critical during the post-event peak hour that attendees are not picked up directly on Ramona Avenue by Uber, Lyft, taxis, or other vehicles. Such actions can have a variety of undesired consequences such as mid-block pedestrian crossings, u-turns, blockages of travel lanes, delayed shuttle buses, etc. The following is recommended to deter passenger loading directly on Ramona Avenue.

- Place temporary "No Parking and "No Passenger Loading" signs in both directions of Ramona Avenue from 600 feet north of the site to Cucamonga Avenue. Northbound facing signs and southbound facing signs north of the venue could be placed on sidewalks due to limited levels of pedestrian use. It may be desirable to position southbound facing signs in line with other temporary pedestrian travel impedances such as power poles.
- Place temporary wayfinding "Ridesharing Vehicles" signs with appropriate directional arrows in each direction of Ramona Avenue approaching the northerly driveway.

POST-6: TRANSPORTATION MANAGEMENT AT RAMONA AVE/CUCAMONGA AVE

During the post-event peak hour, approximately 400 pedestrians would be expected to cross from the west to east side of Ramona Avenue near Cucamonga Avenue to access nearby on-street parking. Ramona Avenue north of Cucamonga Avenue would accommodate nearly 700 vehicles (both directions combined during the post-event peak hour). To accommodate the pedestrian crossings, the following is recommended:

- Situate a TCO at the north leg of the Ramona Avenue/Cucamonga Avenue intersection to accommodate pedestrians desiring to cross Ramona Avenue.

OTHER CONSIDERATIONS

This sub-section discusses several important topics not previously evaluated or discussed above.

- **Alternative Post-Event Traffic Flow Strategies** – During the post-event peak hour, the lane merge on southbound Ramona Avenue would serve a projected 570 vehicles (average of one vehicle every 4.7 seconds if the lot could be emptied in 45 minutes). Given that this is a considerable volume to handle in a single lane merge, it could very well become the overall egress bottleneck. If this does occur, the following two options could be considered:
  - Option 1 – extend the two southbound lanes southerly to Cucamonga Avenue. From there, the inside lane would turn left onto Cucamonga Avenue, while the outside lane would continue straight on Ramona Avenue. This options, which is depicted on Figure 11, is considered viable.
  - Option 2 – Empty the on-site parking in the northwest corner of the project site using the northerly driveway (allowing outbound left-turns only). This would introduce conflicts with inbound pick-up vehicles turning left from northbound Ramona Avenue. But it would reduce the travel demand at the southerly driveway and the downstream lane drop. Additional review of this option would be necessary to determine its viability and operational benefits/drawbacks.

- **Pedestrian Flows on Ramona Avenue** – The most substantial pedestrian flows would occur along the west side of Ramona Avenue south of the venue during the post-event peak hour. Assuming 90 percent of attendees depart during the post-event peak hour, the approximate five-foot wide sidewalk would accommodate 540 pedestrians during the post-event peak hour. This demand would not cause pedestrians to consistently need to walk in the street (though occasional use of the street may occur to pass slower pedestrians).

- **Bicycle Flows and Parking** – Bicyclists can use Class II bike lanes on Power Inn Road or Folsom Boulevard to access Ramona Avenue. They may ride directly on Ramona Avenue, which is designated as a Class III bike route. Once on site, bicyclists can use one of the 7 long-term bike parking spaces, or one of the 80 short-term bike parking spaces situated northeast and southwest of the building.

- **Paratransit** – The site plan shows a 30-foot wide segment of curb south of the building that would consist of an ADA ramp with truncated domes. Paratransit vehicles would presumably stop at this location to drop-off or pick-up passengers with disabilities.

- **Handicapped Parking Spaces** – The project site plan shows nine handicapped spaces situated south of the building along the vehicular route to be used for passenger drop-off and pick-up. During the post-event condition, it may be particularly challenging to exit these spaces due to continuously queued vehicles. Parking attendant(s) should be situated in this area to help facilitate these movements.

- **Compact Parking Spaces on the South and West Edges of Property** – The project site plan shows that 76 of 81 parking spaces situated in the south and west edges of the property would be designed for compact vehicles. These spaces would be 8-feet wide by 15-feet deep. They would also be adjacent to landscaped areas, thereby potentially limiting vehicle overhang. Such conditions could normally be potentially problematic from the perspective of parked vehicles encroaching into the drive aisle and/or occupying more than one space. But circumstances here are unique. First, these will be amongst the least used spaces given their remote location. Second, the recommended one-way directional flow of event-related travel reduces the importance of maintaining 22- to 24-feet of continuously available pavement width. Finally, parking attendants could proactively direct compact cars to these spaces if needed.

- **East-West Parking Aisle Directly South of Pick-up Zone** – A total of 19 parking spaces are situated closest to the south side of the building's pick-up zone. After events conclude, vehicles attempting to exit these spaces could have considerable challenges exiting the spaces. The drive aisle is 24-feet wide, of which 8-feet would be occupied by passenger loading vehicles. The remaining 16 feet of travel way would be frequently used by eastbound motorists exiting the site. It is particularly important that these spaces be occupied by backed-in vehicles and/or by vehicles that do not depart until well after the show concludes.

- **Trucks** – The project site plan shows a loading dock in the rear (i.e., to the west) of the building. The loading dock area would have sufficient width to simultaneously accommodate an entertainer's tour bus plus a heavy vehicle with stage gear and other equipment. Most event-related trucks arrive at the venue mid-day and depart late the same night after the show has concluded. Thus, they do not often interact with passenger vehicles containing event attendees. The site plan does not show the swept path of travel for these trucks, nor the truck size. It is recommended that the applicant prepare a set of truck turning templates that demonstrates that proposed truck sizes would work with on-site parking aisle dimensions.

MONITORING

The project applicant shall retain a transportation consultant to monitor venue operations during large events and to coordinate with the City to adjust the Event TMP as needed.

Initial Events Monitoring Plan

The Initial Events Monitoring Plan will identify the initial weaknesses of ETMP elements and to implement improvements as soon as possible to enable a safe and more enjoyable experience for attendees traveling to and from the venue. The monitoring will identify areas for improvement in the event planning/operations and recommend measures that can be quickly implemented to resolve these issues.

Field observations will be performed during the first event (regardless of size) and the first near-capacity event (i.e., greater than 2,000 attendees). This effort will consist of collecting observational data to assess which elements of the ETMP need to be immediately modified in advance of subsequent events. Prior to each scheduled monitoring event, a meeting will be held with the City and venue operator to identify the specific monitoring locations, durations, and staffing responsibilities. A follow-up meeting will occur during the week immediately following each event to discuss the monitoring observations and identity what modifications to the ETMP should be implemented for subsequent events. A written record of observations, and suggested improvements after each monitoring event will be prepared and be available for public review at City offices.

First Year Typical Events Monitoring Plan

Field observations will be performed at one (1) maximum capacity event between six and twelve months after the venue is operational. By waiting until this timeframe, travel patterns and behavior will have normalized so that a representative sample can be observed. It also allows for the benefits of the initial event monitoring and any associated ETMP refinements to take effect.

Prior to monitoring the event, a meeting will be held with the City and venue operator to identify the specific monitoring locations, durations, and staffing responsibilities. The monitoring effort will focus on the ETMP elements and performance standards contained in this document. The monitoring effort will include both observational and empirical data collection (i.e., traffic and pedestrian counts).

On-Going Monitoring

Like other event transportation management plans, the ETMP should be updated as necessary to respond to changing attendee travel patterns, new transportation technologies, and substantial changes to surrounding land uses and transportation system. For example, redevelopment of the east side of Ramona Avenue could trigger the need to revisit certain traffic management elements.

Appendix A – Existing Technical Calculations

SimTraffic Post-Processor **SAC Music Hall**
Average Results from 10 Runs **Pre-Event Conditions**
Volume and Delay by Movement **PM Peak Hour**

Intersection 1 **Ramona Ave/Folsom Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	35	38	109.7%	32.1	9.3	C
	Through						
	Right Turn	20	21	104.0%	6.2	1.6	A
	Subtotal	55	59	107.6%	23.5	8.3	C
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	470	468	99.6%	3.3	0.8	A
	Right Turn	30	26	88.0%	1.5	0.6	A
	Subtotal	500	494	98.9%	3.2	0.8	A
WB	Left Turn	15	17	112.0%	30.8	15.5	C
	Through	420	397	94.6%	2.9	1.5	A
	Right Turn						
	Subtotal	435	414	95.2%	4.1	1.6	A
Total		990	968	97.7%	4.8	1.0	A

Intersection 2 **Power Inn Rd/Cucamonga Ave** **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	7	6	80.0%	48.9	37.1	D
	Through	724	720	99.5%	18.5	3.9	B
	Right Turn	9	9	102.2%	5.0	4.8	A
	Subtotal	740	735	99.4%	18.6	4.1	B
SB	Left Turn	121	120	99.5%	49.7	15.1	D
	Through	880	866	98.4%	12.8	6.1	B
	Right Turn	11	10	90.9%	2.4	2.4	A
	Subtotal	1,012	996	98.4%	17.2	6.4	B
EB	Left Turn	23	26	114.8%	52.1	10.3	D
	Through	3	2	66.7%	6.7	15.9	A
	Right Turn	2	3	160.0%	2.3	2.5	A
	Subtotal	28	32	112.9%	47.0	10.3	D
WB	Left Turn	23	15	66.1%	45.5	20.8	D
	Through	3	1	40.0%	21.2	42.9	C
	Right Turn	163	166	101.8%	11.0	4.9	B
	Subtotal	189	182	96.5%	14.2	6.8	B
Total		1,969	1,945	98.8%	17.9	4.5	B

Intersection: 1: Ramona Ave & Folsom Blvd

Movement	EB	WB	WB	NB	NB
Directions Served	TR	L	T	L	R
Maximum Queue (ft)	87	28	92	68	35
Average Queue (ft)	34	12	28	35	16
95th Queue (ft)	93	32	99	78	43
Link Distance (ft)	1575		414	1494	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		120			100
Storage Blk Time (%)			1	1	
Queuing Penalty (veh)			0	0	

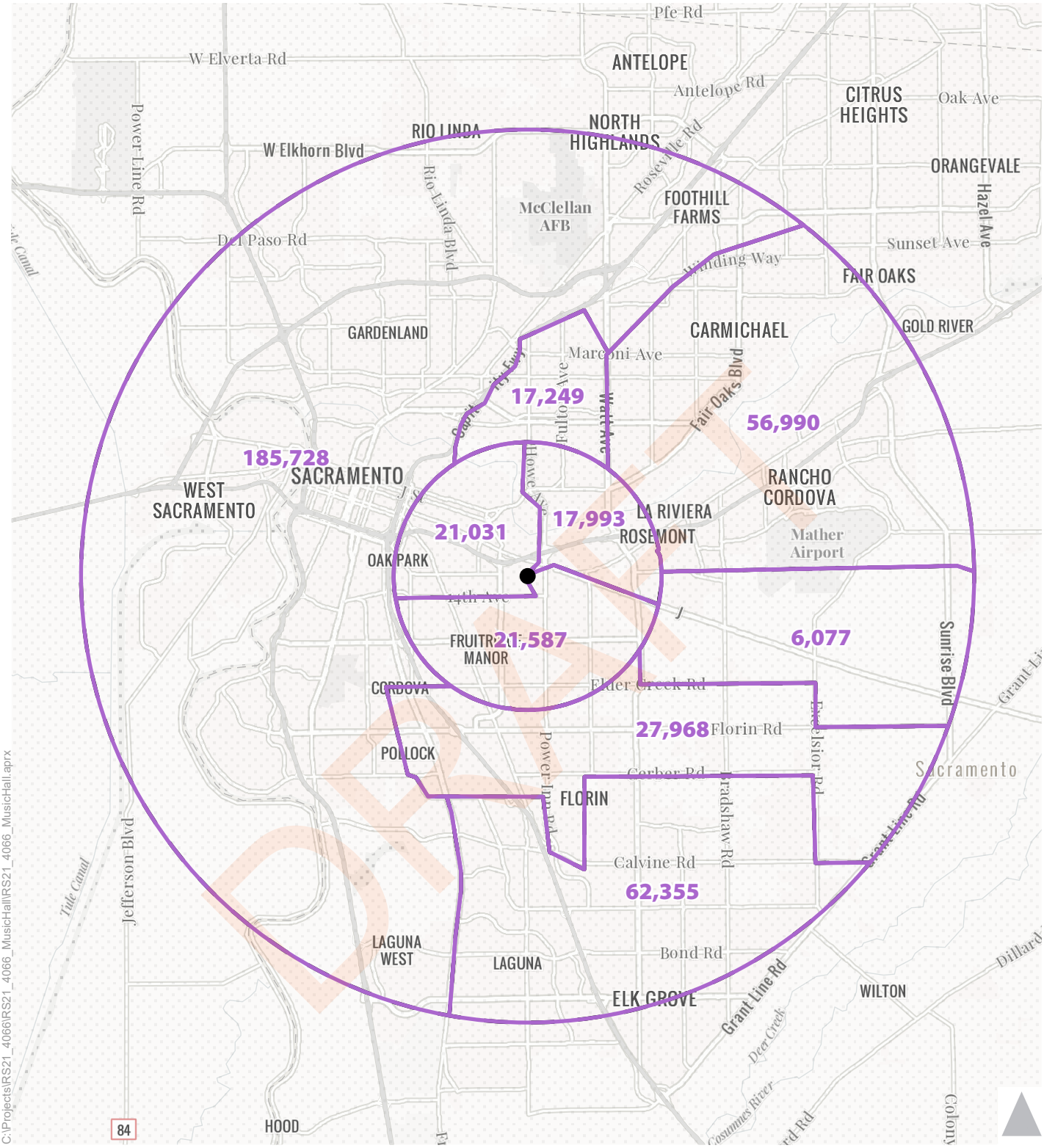
Intersection: 2: Cucamonga Ave & Power Inn Rd

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	L	TR	L	LTR	R	L	T	T	T	R	L	L
Maximum Queue (ft)	50	11	22	104	46	59	290	247	168	25	95	113
Average Queue (ft)	25	3	2	52	18	11	151	127	89	4	38	68
95th Queue (ft)	54	14	14	114	52	66	294	253	186	22	94	118
Link Distance (ft)	689			1034	1034		885	885	885			
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		90	160			110				150	160	160
Storage Blk Time (%)				0			15		3		0	1
Queuing Penalty (veh)				0			1		0		0	2

Intersection: 2: Cucamonga Ave & Power Inn Rd

Movement	SB	SB	SB	SB
Directions Served	T	T	T	R
Maximum Queue (ft)	188	214	227	14
Average Queue (ft)	87	110	124	3
95th Queue (ft)	199	232	265	16
Link Distance (ft)	487	487	487	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				130
Storage Blk Time (%)	3		10	
Queuing Penalty (veh)	4		1	

Appendix B – Population Distribution Map



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● Project Site

x,xxx Total Population (18 to 44 years)

Figure x

Population Distribution of Persons Ages 18-44 within a 10 Mile Radius

Appendix C – Existing Plus Project Technical Calculations

SimTraffic Post-Processor **SAC Music Hall**
Average Results from 10 Runs **Existing + Project**
Volume and Delay by Movement **PM Peak Hour**

Intersection 1 **Ramona Ave/Folsom Blvd** **Signal**

Direction	Movement	Demand Volume (vph)	Served Volume (vph) Average	Served Volume (vph) Percent	Total Delay (sec/veh) Average	Total Delay (sec/veh) Std. Dev.	LOS
NB	Left Turn	69	75	108.4%	38.0	10.4	D
	Through						
	Right Turn	27	30	109.6%	8.1	2.6	A
	Subtotal	96	104	108.8%	29.4	8.1	C
SB	Left Turn						
	Through						
	Right Turn						
	Subtotal						
EB	Left Turn						
	Through	470	470	100.0%	5.1	1.0	A
	Right Turn	72	67	93.3%	3.0	1.5	A
	Subtotal	542	537	99.1%	4.8	1.0	A
WB	Left Turn	21	23	108.6%	50.6	11.8	D
	Through	420	426	101.3%	3.6	1.7	A
	Right Turn						
	Subtotal	441	448	101.7%	5.9	2.7	A
Total		1,079	1,090	101.0%	7.7	1.8	A

Intersection 2 **Power Inn Rd/Cucamonga Ave** **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	55	56	102.5%	64.8	11.8	E
	Through	731	753	103.0%	22.4	4.2	C
	Right Turn	9	8	84.4%	5.0	4.8	A
	Subtotal	795	817	102.8%	25.0	3.8	C
SB	Left Turn	159	156	98.4%	42.5	8.9	D
	Through	942	940	99.7%	18.6	4.4	B
	Right Turn	293	285	97.2%	9.3	2.2	A
	Subtotal	1,394	1,381	99.1%	19.4	3.3	B
EB	Left Turn	83	84	100.7%	56.4	9.8	E
	Through	4	4	100.0%	24.7	21.9	C
	Right Turn	16	15	95.0%	11.1	7.4	B
	Subtotal	103	103	99.8%	49.1	9.0	D
WB	Left Turn	23	26	111.3%	62.1	21.8	E
	Through	3	2	80.0%	36.6	48.0	D
	Right Turn	163	154	94.7%	18.4	6.9	B
	Subtotal	189	182	96.5%	25.0	9.3	C
Total		2,481	2,483	100.1%	22.8	2.8	C

Intersection: 1: Ramona Ave & Folsom Blvd

Movement	EB	WB	WB	NB	NB
Directions Served	TR	L	T	L	R
Maximum Queue (ft)	132	41	98	104	58
Average Queue (ft)	51	19	31	64	27
95th Queue (ft)	129	47	94	126	65
Link Distance (ft)	1575		414	1494	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		120			100
Storage Blk Time (%)			0	4	0
Queuing Penalty (veh)			0	1	0

Intersection: 2: Cucamonga Ave & Power Inn Rd

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	L	TR	L	LTR	R	L	T	T	T	R	L	L
Maximum Queue (ft)	128	37	42	137	69	165	272	248	206	21	98	120
Average Queue (ft)	72	9	8	76	23	69	185	160	128	4	50	82
95th Queue (ft)	133	31	47	150	75	167	300	268	219	22	104	126
Link Distance (ft)	689			1034	1034		885	885	885			
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		90	160			110				150	160	160
Storage Blk Time (%)	10		0	1		3	17		5		0	0
Queuing Penalty (veh)	2		0	0		6	10		0		0	0

Intersection: 2: Cucamonga Ave & Power Inn Rd

Movement	SB	SB	SB	SB
Directions Served	T	T	T	R
Maximum Queue (ft)	264	235	273	169
Average Queue (ft)	140	155	171	111
95th Queue (ft)	271	268	302	212
Link Distance (ft)	487	487	487	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				130
Storage Blk Time (%)	5		13	0
Queuing Penalty (veh)	7		39	1