Attachment 5

City of Hercules

Draft

Hercules Safeway Project

Transportation Impact Assessment

Prepared by

FEHR & PEERS

2201 Broadway
Suite 400
Oakland, CA 94612

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Hercules Safeway Project

Transportation Impact Assessment

Draft

Prepared for:
City of Hercules

July 2017

OK16-0151

FEHR & PEERS

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1.0 INTRODUCTION

This report presents the analysis and findings of the Transportation Impact Assessment for the Hercules Safeway development (Project) located in the City of Hercules in Contra Costa County. This chapter discusses the Transportation Assessment purpose, analysis methods, criteria used to identify impacts, and report organization.

1.1 STUDY PURPOSE

The study's purpose is to conduct site-specific impact analysis at new and existing study intersections and evaluate the proposed Project's access, circulation, and parking. The Project site is located in the City of Hercules and is bounded by San Pablo Avenue to the west, and Interstate 80 (I-80) to the east, John Muir Parkway to the north, and Sycamore Avenue to the south. **Figure 1** shows the Project site vicinity. The site is currently vacant and was previously used as the City of Hercules' Transit Center, which has since re-located to the east on Willow Avenue near the State Route 4 (SR 4) interchange. The proposed Project includes a Safeway supermarket, a retail pad, and a 20-pump fuel center as shown on **Figure 2** (see Chapter 3 Project Characteristics for further details).

Regional access to the site is provided from SR 4 and I-80, with interchanges north and east of the site. Regional access is also provided from San Pablo Avenue that forms the western border of the site. Local access is provided from Sycamore Avenue. Four driveways are proposed to serve the site, including two new right-in/right-out driveways on San Pablo Avenue, an existing signalized full access on San Pablo Avenue, and an existing right-in/right-out driveway on Sycamore Avenue.

1.2 PROJECT BACKGROUND

The Project site is also referred to as the "PNR Parcel," in reference to its prior use as a "park-and-ride" facility. The site is part of the Hercules New Town Center (HNTC) planning area. In 2008, the City of Hercules prepared an Environmental Impact Report (EIR) that evaluated the potential transportation and traffic impacts that could result from implementation of the General Plan and Zoning Ordinance Amendments for the HNTC planning area. That analysis evaluated off-site intersections under existing (2008) and cumulative (2035) scenarios and identified the transportation impacts of the proposed HNTC development. The EIR was approved by the City Council and certified in 2009 (State Clearinghouse No. 2007062002).

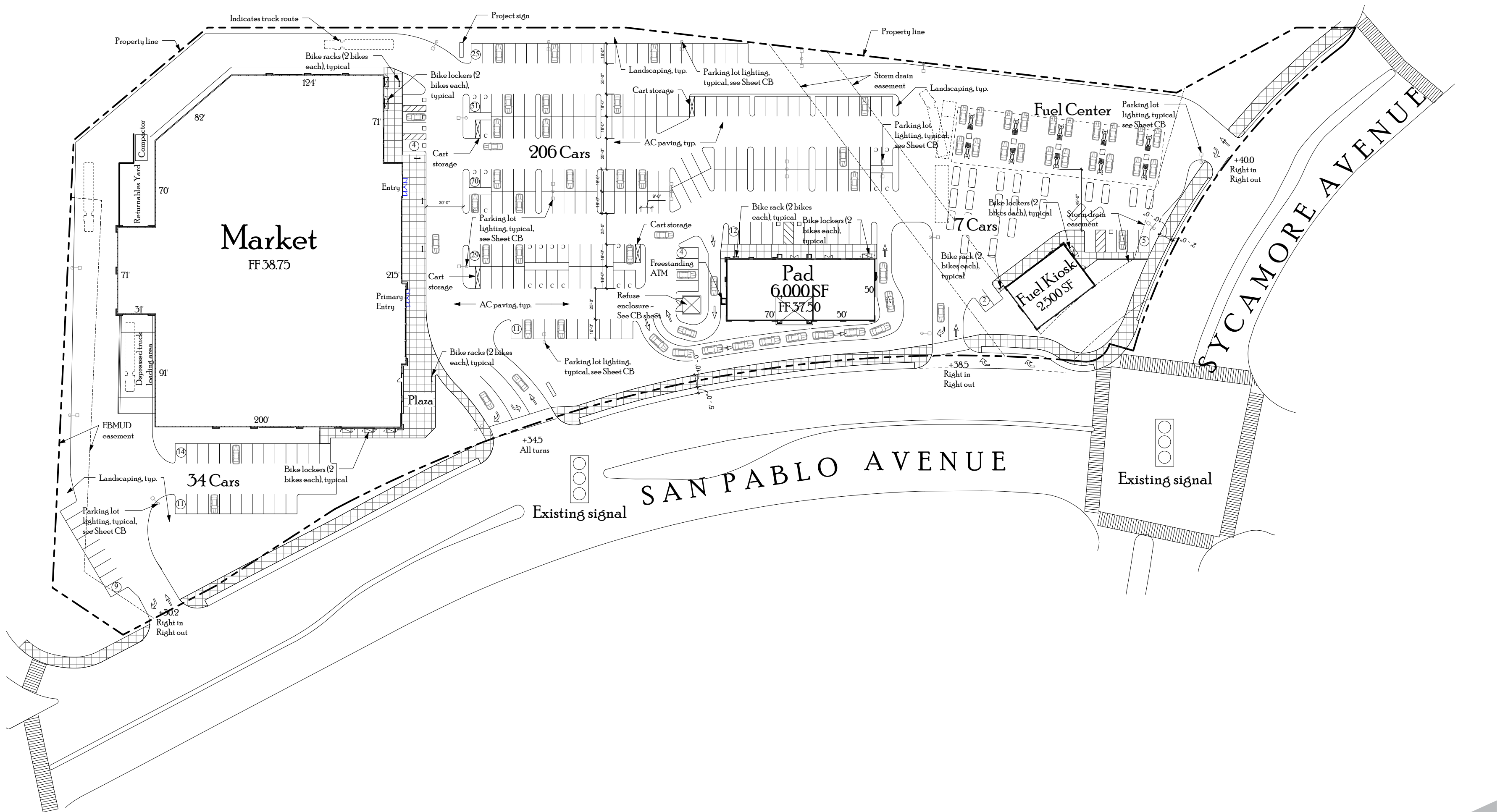
LEGEND

Project Site

Figure 1

Project Site Vicinity

OK16-0151_1_ProjSite



Site Plan Source: Johnson Lyman Architects, July 12, 2017

Figure 2

Project Site Plan

The current 2017 Project land use combined with approved development projects within the HNTC planning area are expected to generate less weekday AM and PM peak hour trips than were assumed in the *Hercules New Town Center Environmental Impact Report* (City of Hercules, Certified 2009). Therefore, the current Project land use is not expected to result in new significant impacts that were not disclosed in the 2009 EIR.

1.3 STUDY LOCATIONS AND ANALYSIS SCENARIOS

As the regional impacts of development on the site were evaluated under the HNTC EIR (a summary of the analysis results is presented in Section 1.5.2 below), this analysis focuses on intersections immediately surrounding the Project site, including the site access intersections. The resulting study intersections, listed below and shown on **Figure 3**, were selected in coordination with City of Hercules staff:

1. San Pablo Avenue/John Muir Parkway/SR 4 Ramps
2. San Pablo Avenue/Sycamore Avenue
3. San Pablo Avenue/Tsushima Street
4. Willow Avenue/Sycamore Avenue
5. Willow Avenue/I-80/SR 4 Ramps
6. Creekside Center/Sycamore Avenue
7. Turquoise Drive/Sycamore Avenue
8. Sycamore Avenue/Refugio Valley Road
9. San Pablo Avenue/North Project Driveway
10. San Pablo Avenue/Central Project Driveway
11. San Pablo Avenue/South Project Driveway
12. Sycamore Avenue/Project Driveway
13. San Pablo Avenue/Shopping Center Driveway (Future Sycamore Crossing Driveway)

For this study, the following scenarios were evaluated during the typical weekday morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak periods:

- ***Existing*** – Existing (2017) conditions based on February 2017 traffic counts.
- ***Existing with Project*** – Existing (2017) conditions plus Project-related traffic.
- ***Existing Plus Background without Project*** – Existing (2017) conditions plus approved projects within the study area that could be constructed over the next five to 10 years.
- ***Existing Plus Background with Project*** – Existing Plus Background conditions plus Project-related traffic.
- ***Cumulative without Project*** – Forecasts for the cumulative scenario based on year 2040 forecasts prepared for the upcoming *City of Hercules Circulation Element Update*.
- ***Cumulative with Project*** – Year 2040 forecast conditions plus Project-related traffic.

LEGEND

Project Site | Study Intersection | Project Driveway

Figure 3

Study Intersections

OK16-0151_3_StudyInts

1.4 ANALYSIS METHODS

The operations of roadway facilities are described with the term "level of service" (LOS). LOS is a qualitative description of traffic flow from a vehicle driver's perspective based on factors such as speed, travel time, delay, and freedom to maneuver. Six levels of service are defined ranging from LOS A (free flow operating conditions) to LOS F (congested operating conditions). LOS E corresponds to operations "at capacity." When volumes exceed capacity, stop-and-go conditions result and operations are designated LOS F. In Hercules, the maximum level of acceptable delay is associated with LOS D (around 55 seconds of delay) with the exception of intersections along San Pablo Avenue, where the Congestion Management Program (CMP) for Contra Costa County has adopted LOS E (around 80 seconds of delay) as the maximum.

1.4.1 SIGNALIZED INTERSECTIONS

Traffic conditions at signalized intersections were evaluated using methodologies proposed by the Transportation Research Board (TRB), as documented in the 2010 *Highway Capacity Manual* (2010 HCM) for vehicles. The HCM 2010 methods calculates control delay at an intersection based on inputs such as traffic volumes, lane geometry, signal phasing and timing, pedestrian crossing times, and peak hour factors. Control delay is defined as the delay directly associated with the traffic control device (i.e., a stop sign or a traffic signal) and specifically includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. These delay estimates are considered meaningful indicators of driver discomfort and frustration, fuel consumption, and lost travel time. The relationship between LOS and control delay is summarized in **Table 1-1**.

1.4.2 UNSIGNALIZED INTERSECTIONS

For unsignalized (all-way stop controlled and side-street stop controlled) intersections, the 2010 HCM method for unsignalized intersections was used. With this method, operations are defined by the average control delay per vehicle (measured in seconds). The control delay incorporates delay associated with deceleration, acceleration, stopping, and moving up in queue. Table 1-1 summarizes the relationship between LOS and delay for unsignalized intersections. At side-street stop controlled intersections, the delay is calculated for each stop-controlled movement, the left turn movement from the major street, as well as the intersection average. The intersection average delay and highest movement/approach delay are reported for side-street stop controlled intersections.

TABLE 1-1
SIGNALIZED AND UNSIGNALIZED INTERSECTION LOS CRITERIA

Level of Service	Description	Signalized Criteria (Delay in Seconds)[1]	Unsignalized Criteria (Delay in Seconds)[1]
A	Progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	< 10.0	≤ 10.0
B	Progression is good, cycle lengths are short, or both. More vehicles stop than with LOS A, causing higher levels of average delay.	> 10.0 to 20.0	> 10.0 to 15.0
C	Higher congestion may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level, though many still pass through the intersection without stopping.	> 20.0 to 35.0	> 15.0 to 25.0
D	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	> 35.0 to 55.0	> 25.0 to 35.0
E	This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	> 55.0 to 80.0	> 35.0 to 50.0
F	This level is considered unacceptable with oversaturation, which is when arrival flow rates exceed the capacity of the intersection. This level may also occur at high V/C ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to such delay levels.	> 80.0	> 50.0

Notes:
1. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and acceleration delay.

Source: *Highway Capacity Manual,* Chapter 19 (Signalized Intersections), Chapter 20 and 21 (Unsignalized Intersections), Transportation Research Board, 2010.

1.5 REGULATORY SETTING

1.5.1 CITY OF HERCULES

The Project would have a significant impact on the environment if it would cause an increase in traffic which is substantial in relation to the traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, or delay and congestion at intersections), or change the condition of an existing street (e.g., street closures, changing direction of travel) in a manner that would substantially impact access or traffic load and capacity of the street system. Significance criteria are used to determine whether a Project impact is considered significant and therefore requires mitigation. The City of Hercules strives to maintain LOS D operations at signalized intersections, with the exception of San Pablo Avenue where LOS E is the threshold.

1.5.2 REGIONAL AGENCIES

The Contra Costa Transportation Authority (CCTA) serves as the Congestion Management Agency (CMA) for Contra Costa County. CCTA adopted the County's first Congestion Management Program (CMP) in October 1991. The most recent CMP is referred to as the 2015 CMP. The 2015 CMP requires an analysis of any project that is expected to generate more than 100 peak hour vehicle trips. Within the CMP there are Action Plans for specific regions that identify multi-modal traffic service objectives (MTSOs) for specific freeways and roadway segments. The *West County Action Plan for Routes of Regional Significance-Update 2014* includes the City of Hercules. Discretionary projects that impact Routes of Regional Significance by generating greater than 100 trips shall comply with the requirements of the adopted Action Plans. Freeway segments and roadways in the project study area designated as Routes of Regional Significance include SR 4 (John Muir Parkway), I-80, and San Pablo Avenue.

Based on the Project trip generation detailed in Chapter 3, the Project would not increase vehicle trip generation in the area more than what was addressed in the *Hercules New Town Center Environmental Impact Report* (City of Hercules, Certified 2009). Therefore, it does not meet the 100 peak period threshold for requiring additional analysis.

The HNTC EIR evaluated traffic impacts on San Pablo Avenue, SR 4, and I-80. Chapter 6 summarizes the HNTC EIR mitigation measures identified for the San Pablo Avenue/John Muir Parkway intersection (#1). The HNTC EIR also identified project impacts to I-80, however those impacts were considered significant and unavoidable since there were no feasible mitigation measures that could be recommended at the time of the EIR development.

1.5.3 SIGNIFICANCE CRITERIA

The following thresholds will be considered in the evaluation of the Project from a transportation perspective:

- Would the operations of a signalized study intersection (except those along San Pablo Avenue) decline from LOS D or better to LOS E or F, based on the HCM LOS method, with the addition of Project traffic?
- Would the operations of a signalized study intersection along San Pablo Avenue decline from LOS E or better to LOS F, based on the HCM LOS method, with the addition of Project traffic?
- Would the operations of an unsignalized study intersection decline from an overall acceptable level to an overall unacceptable level with the addition of Project traffic, and would the installation of a traffic signal at an unsignalized intersection, based on the *Manual on Uniform Traffic Control Devices* (MUTCD) Peak Hour Signal Warrant (Warrant 3), be warranted?
- Would the Project increase traffic volumes on a street beyond the expected capacity limits and would the increase in traffic be noticeable to existing residents?
- Would the Project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?
- Would the Project substantially increase traffic hazards to motor vehicles, bicycles, or pedestrians due to a design feature (e.g., sharp curves or dangerous intersections) that does not comply with Caltrans design standards or incompatible uses (e.g., farm equipment)?
- Would construction traffic from the Project have a significant, though temporary, impact on the environment, or would Project construction substantially affect traffic flow and circulation, parking, and pedestrian safety?
- Would the Project fundamentally conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle routes)?
- Would the Project generate parking demands that are inconsistent with adopted municipal code requirements or otherwise cause parking deficiencies that impact uses outside the Project area?

1.6 REPORT ORGANIZATION

This report is divided into seven chapters as described below:

- **Chapter 1 – Introduction** discusses the purpose and organization of the report.

- **Chapter 2 – Existing Conditions** describes the transportation system in the Project vicinity, including the surrounding roadway network morning and evening peak period intersection turning movement volumes, existing bicycle, pedestrian, and transit facilities, and intersection operations.
- **Chapter 3 – Project Characteristics** presents relevant Project information, including the Project components and Project trip generation, distribution, and assignment.
- **Chapter 4 – Existing with Project Conditions** addresses the existing conditions plus the Project, and discusses Project vehicular impacts.
- **Chapter 5 – Existing Plus Background Conditions** addresses the near-term future condition, both without and with the Project, and discusses Project vehicular impacts.
- **Chapter 6 – Cumulative Conditions** addresses the long-term future condition, both without and with the Project, and discusses Project vehicular impacts.
- **Chapter 7 – Site Plan Review** describes Project access and circulation for all travel modes, and provides recommendations to improve project site access. Fuel center circulation, parking, and sight distance recommendations are also included.

2.0 EXISTING CONDITIONS

This chapter describes transportation facilities in the Project study area, including the surrounding roadway network, transit, pedestrian, and bicycle facilities in the Project site vicinity. Existing intersection operations are also described.

2.1 ROADWAY SYSTEM

Regional access to the Project site is provided by ***Interstate 80 (I-80)***. The I-80 freeway connects the San Francisco Bay Area with the Sacramento region, and further east. Near the Project site, I-80 is oriented in a northeast/southwest direction and provides four lanes in each direction, including a high occupancy vehicle (HOV) lane. Access between I-80 and the Project site is provided via the I-80/SR 4 interchange at Willow Avenue and the SR 4/I-80 interchange and John Muir Parkway. I-80 is designated as a Route of Regional Significance. The posted speed limit is 65 miles per hour (mph).

John Muir Parkway/State Route 4 (SR 4) provides regional access to the Project site. SR 4 has an east/west orientation from the eastern border of the City of Hercules to its termination at San Pablo Avenue, where it becomes John Muir Parkway, which continues to and terminates at Bayfront Boulevard. SR 4 is a four-lane freeway (two lanes in each direction) with a partial-stack interchange at I-80 and a posted speed limit of 65 miles per hour. West of San Pablo Avenue, John Muir Parkway is a four-lane surface street with a posted speed limit of 35 miles per hour to Alfred Nobel Drive. SR 4 is designated as a Route of Regional Significance between I-80 and Cummings Skyway.

San Pablo Avenue extends in a northeast/southwest direction through the City of Hercules and provides regional and local access to the Project site. It begins in the City of Rodeo within Contra Costa County and continues through the City of Hercules terminating in the City of Oakland in Alameda County. In the study area, San Pablo Avenue provides two-to-three lanes in each direction with additional turning movement capacity at intersections. Bicycle lanes are provided through the study area on both sides of the street. Sidewalks are provided on the south side of the street from SR 4/John Muir Parkway to Hercules Avenue; however, no sidewalks are provided on the north side of the street between SR 4/John Muir Parkway and Tsushima Street. On-street parking is prohibited on San Pablo Avenue, and the posted speed limit through the City of Hercules is 40 miles per hour. The posted speed limit to the west when approaching the City of Pinole is 25 miles per hour. San Pablo Avenue is designated as a Route of Regional Significance.

Sycamore Avenue is an east-west roadway that provides access to the Project site as well as the residential communities west of the Project site. It also provides access to retail and residential land use on the east side of I-80. From Refugio Valley Road through San Pablo Avenue, Sycamore Avenue provides two-to-three travel lanes in each direction with additional turning movement capacity at intersections and a posted speed limit of 35 miles per hour.

From San Pablo Avenue through Tsushima Street until its western terminus, Sycamore Avenue provides one travel lane in each direction with no additional turning movement capacity at intersections and a posted speed limit of 25 miles per hour. Bicycle lanes are provided from Refugio Valley Road to the east and from San Pablo Avenue to South Front Street. Sidewalks are generally provided on both sides of Sycamore Avenue throughout the study area, with the exception of the northeast side of the Sycamore Avenue segment between the Creekside Center driveway and Willow Avenue. On-street parking is prohibited east of San Pablo Avenue and permitted to the west. Angled parking stalls are provided between South Front Street and Tsushima Street, and parallel spots are provided west of Tsushima Street.

Refugio Valley Road is primarily a north-south roadway that connects Sycamore Avenue to Bonaire Avenue. It provides access to the residential communities, schools, and parks southeast of Sycamore Avenue. From Sycamore Avenue to Pheasant Drive, Refugio Valley Road provides two travel lanes in each direction with additional turning movement capacity at intersections and a posted speed limit of 25 miles per hour. From Pheasant Drive to County Run, Refugio Valley Road provides two lanes in the northbound direction and one lane in the southbound direction. South of Country Run, Refugio Valley Road provides one lane per direction with additional turning movement capacity at intersections and a posted speed limit ranging from 25 to 35 miles per hour. Bicycle lanes are provided along both directions of Refugio Valley Road between Partridge Drive and Hercules Middle School/High School campuses. A multi-use pedestrian and bicycle trail is provided along the northeast side of Refugio Valley Road; sidewalks are provided along select segments on the southwest side. On-street parking is prohibited along Refugio Valley Road.

Tsushima Street is a north-south roadway that connects San Pablo Avenue to John Muir Parkway. At present, left-turn access to and from the unsignalized intersection of Tsushima Street and San Pablo Avenue is restricted by soft-hit posts in the striped median of San Pablo Avenue. One travel lane is provided in each direction with no additional turning movement capacity at intersections. No bicycle lanes are provided. Sidewalks are provided on both sides of the street north of Sycamore Avenue, but only on the west side to the south. The posted speed limit is 25 miles per hour.

Turquoise Drive is primarily a north-south roadway that connects Sycamore Avenue to Pheasant Drive. It provides access to the residential communities southeast of Sycamore Avenue. Between Sycamore Avenue and Cinnabar Way, two travel lanes are provided in each direction with additional turning movement capacity provided at select intersections; one lane in each direction is provided south of Cinnabar Way. Sidewalks are generally provided along both sides, with some gaps on the northeast side south of Emerald

Way. On-street parking is generally allowed south of Crystal Circle. The posted speed limit is 25 miles per hour.

Willow Avenue is primarily an east/west roadway within the City of Hercules. It extends from Sycamore Avenue to the east, providing access to the I-80/SR 4 interchange ramps and to the Hercules Transit Center within the Project study area but continues over the SR 4 and connects back to an interchange at I-80 on the northerly city limits adjacent to Rodeo. Between Sycamore Avenue and the Hercules Transit Center, two-travel lanes are generally provided in the westbound direction and one travel lane is provided in the eastbound direction, with additional left turn movement capacity provided at intersections. The posted speed limit is 35 miles per hour.

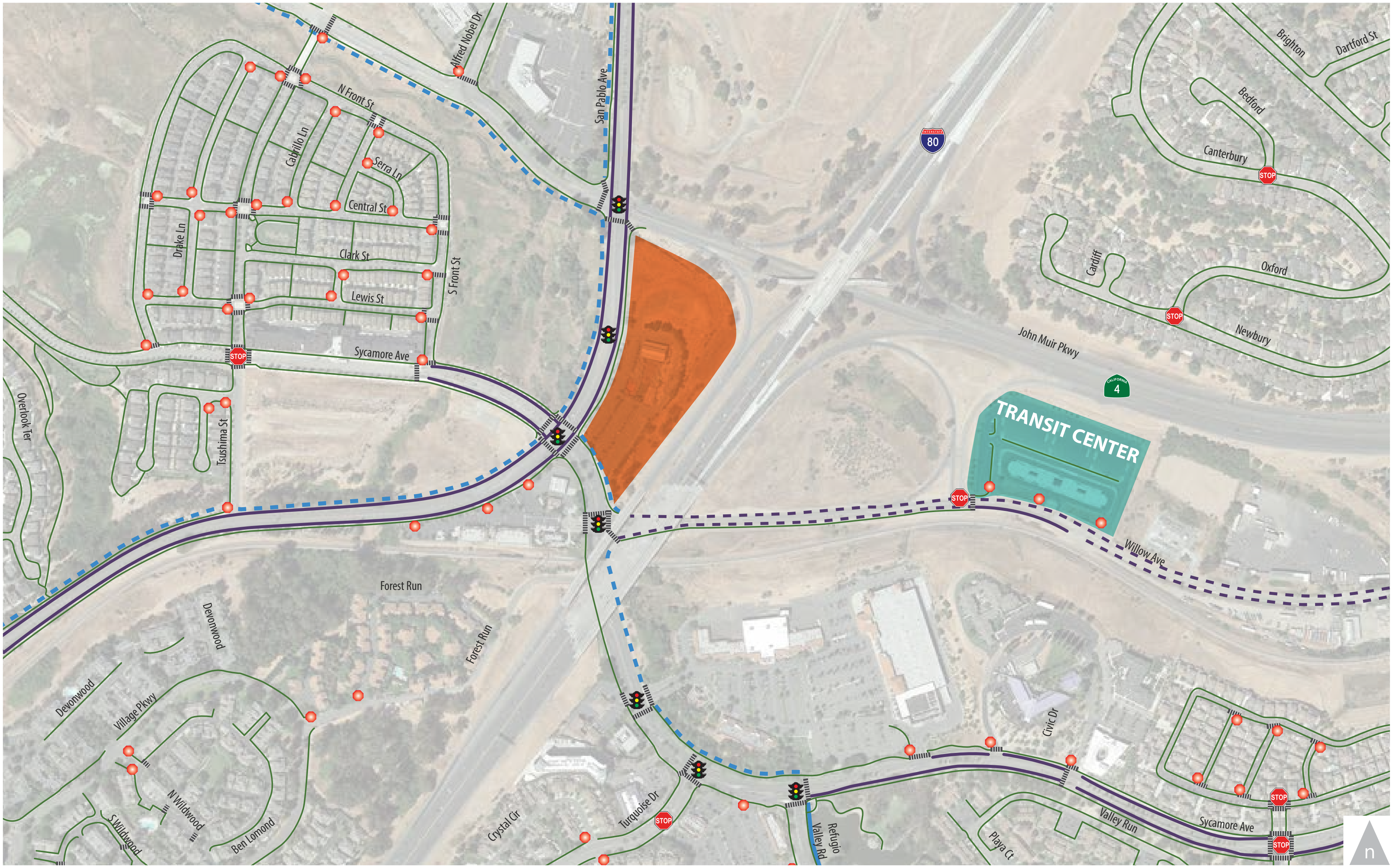
2.2 EXISTING PEDESTRIAN AND BICYCLE FACILITIES

Pedestrian volumes in the Project site vicinity during the weekday AM and PM vehicle peak hours are low to moderate (volumes range from 2 to 51 pedestrian crossings at intersections), which is consistent with the suburban character of the area. Most pedestrian activity was observed along Sycamore Avenue, south of San Pablo Avenue, where three shopping centers are located. Pedestrians were also observed to walk on Sycamore Avenue to and from the Hercules Transit Center on Willow Avenue.

As shown on **Figure 4**, pedestrian facilities in the vicinity of the project site include sidewalks, crosswalks, and pedestrian signals. Local roadways in the study area provide sidewalks on both sides of the street with the exception of the west side of San Pablo Avenue along the opposite side of the Project frontage from John Muir Parkway to Tsushima Street and the east side of Tsushima Street between San Pablo Avenue and Sycamore Avenue. Crosswalks are provided across all legs of the Sycamore Avenue/San Pablo Avenue intersection. With the exception of the Tsushima Street/San Pablo Avenue (#3) and San Pablo Avenue/Central Project Driveway (#10) intersections where no crosswalks are provided, crosswalks are provided for at least one leg of each study intersection. Pedestrian countdown signals are provided at all of the signalized study intersections, except at the San Pablo Avenue/Central Project Driveway intersection (#10).

Bicycle volumes in the Project site vicinity during the weekday AM and PM vehicle peak hours are low (less than 10 bicycle crossings at study intersections), which is consistent with the current suburban character of the area. Bicycle facilities include the following:

- **Multi-Use Trails/Paths (Class I)** – These facilities are located off-street and can serve both bicyclists and pedestrians. Recreational trails can be considered Class I facilities. Class I paths are typically 8 to 10 feet wide excluding shoulders and are generally paved.



LEGEND

Sidewalk | Class I Bike Path | Planned Class I Bike Path | Class II Bike Lane | Planned Class II Bike Lane | Crosswalk | Traffic Signal

Approach is All-Way Stop-Controlled | Approach is Stop-Controlled | Project Site

Figure 4

Existing Bicycle and Pedestrian Facilites

OK16-0151_4_PedBikeFac

- **Bike lanes (Class II)** – These facilities provide a dedicated area for bicyclists within the paved street width using striping and appropriate signage. These facilities are typically 5 to 6 feet wide.
- **Bike routes (Class III)** – These facilities are along streets that do not provide sufficient width for dedicated bicycle lanes. Signage and pavement markings inform drivers to expect bicyclists.
- **Separated Bikeway (Class IV)** – These facilities provide a dedicated area for bicyclists within the paved street width through physical separation from vehicle traffic. Separation may include, but are not limited to, grade separation, flexible posts, physical barriers, or on-street parking.

The existing bicycles facilities in the study area are shown on Figure 4. San Pablo Avenue provides Class II bike lanes along both directions within the study area. Sycamore Avenue Class II facilities on two non-continuous segments, one between San Pablo Avenue and South Front Street (along both directions of Sycamore Avenue), and one from Refugio Valley Road to the east (along both directions of Sycamore Avenue). Willow Avenue provides a short Class II bike lane along the eastbound direction across from the Hercules Transit Center. A Class I multi-use trail is also provided on the northeast side of Refugio Valley Road.

The *Contra Costa Countywide Bicycle and Pedestrian Plan* (CCTA, 2009) identifies the following proposed bicycle facilities within the study area:

- Class I bike path along San Pablo Avenue between Hercules Avenue and northern City Limit
- Class I bike path on Sycamore Avenue between San Pablo Avenue and Refugio Valley Road
- Class I bike path along John Muir Parkway between San Pablo Avenue and Bayfront Boulevard
- Class II bike lanes on Willow Avenue between Sycamore Avenue and the westbound SR 4 ramps

Funding for the new facilities has not been identified, and there is no time-line for their installation.

2.3 EXISTING TRANSIT SERVICE

The primary transit provider in the study area is Western Contra Costa County Transit Authority (WestCAT), who provides the following public transit service in the City of Hercules and surrounding areas:

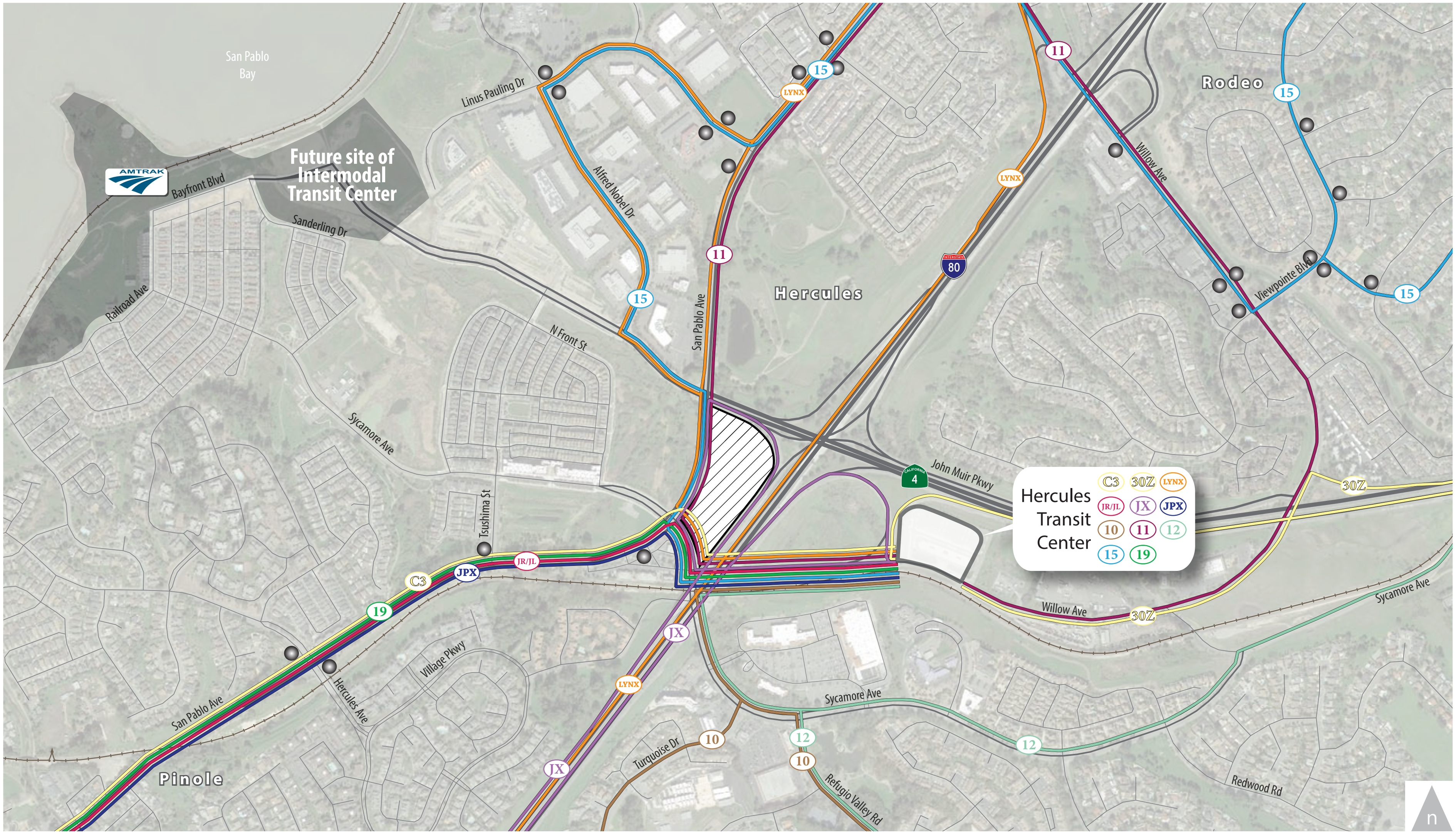
- Local fixed routes 10, 11, 12, 15, and 19
- Regional fixed routes C3 and 30Z
- BART station routes JL, JR, JX, and JPX
- Transbay route LYNX

The WestCAT routes are summarized in **Table 2-1** and shown on **Figure 5**. Local and regional cash fares, as of June 2017, are $1.75 for adults and $0.75 for seniors or persons with disabilities; children under six years are free. Transbay fares are $5.00 for adults and $2.00 for seniors or persons with disabilities. Single day, 10-day and monthly passes are also available.

TABLE 2-1
WESTCAT SERVICE SUMMARY

Route	Description	Nearest Bus Stop	Weekdays		Weekends	
			Hours	Headways	Hours	Headways
Local Fixed Routes						
10	Hercules Transit Center to Hercules Middle/High School	Hercules Transit Center	6:10 a.m. to 7:50 p.m.	30 to 55 minutes	N/A	N/A
11	Hercules Transit Center to Crockett	Hercules Transit Center	5:40 a.m. to 9:40 p.m.	30 to 50 minutes	9:00 a.m. to 7:40 p.m.	40 to 60 minutes
12	Hercules Transit Center to Refugio Valley Road/Bonaire Avenue	Hercules Transit Center	5:30 a.m. to 8:20 p.m.	30 to 60 minutes	N/A	N/A
15	Hercules Transit Center to Willow Avenue Shopping Center	Hercules Transit Center	6:00 a.m. to 8:00 p.m.	30 to 45 minutes	N/A	N/A
19	Hercules Transit Center to Hilltop Mall	Hercules Transit Center	N/A	N/A	8:20 a.m. to 8:40 p.m.	40 to 75 minutes
Regional Fixed Routes						
C3	Hercules Transit Center to Contra Costa College	San Pablo Avenue at Sycamore Avenue	7:30 a.m. to 8:40 p.m.	60 to 80 minutes	N/A	N/A
30Z	Hercules Transit Center to Martinez Amtrak Station	Hercules Transit Center	6:20 a.m. to 7:40 p.m.	30 to 80 minutes	N/A	N/A
BART Station Routes						
JL/JR	Hercules Transit Center to El Cerrito Del Norte BART	San Pablo Avenue at Sycamore Avenue	4:40 a.m. to 12:30 a.m.	20 to 60 minutes	6:00 a.m. to 11:30 p.m.	40 to 60 minutes
JX/JPX	Hercules Transit Center to El Cerrito Del Norte BART	San Pablo Avenue at Sycamore Avenue	5:20 a.m. to 8:00 p.m.	10 to 75 minutes	N/A	N/A
Transbay Route						
Lynx	Hercules Transit Center to Transbay Terminal	Hercules Transit Center	5:00 a.m. to 9:50 p.m.	15 to 95 minutes	N/A	N/A

Source: WestCAT website, June 2017.



Note: Transit service is provided by Western Contra Costa County Transit (WestCAT).

LEGEND

- C3 Regional Route
- 30Z Regional Route
- LYNX Transbay Route
- JX Express Route
- JR/JL Express Route
- JPX Route
- 10 Route
- 11 Route
- 12 Route
- 15 Route
- 19 Route
- Bus Stop
- Private Railroad
- AMTRAK Potential Future Station
- Project Site

Figure 5

Existing Transit Service

2.4 EXISTING VEHICLE COUNTS

Weekday morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak-period intersection turning movement counts, including separate counts of pedestrians and bicyclists, were collected at all existing study intersections. All intersection data, except for the driveway counts at the Shopping Center Driveway at San Pablo Avenue west of Sycamore Avenue (intersection #13), were collected on Tuesday, February 14, 2017, a typical weekday with local schools in session and with moderate weather and no observed traffic incidents. The Shopping Center Driveway counts at San Pablo Avenue were collected on Thursday, November 7, 2013. For the study intersections, the single hour with the highest traffic volumes during the count periods was identified. The AM peak hour in the study area is generally from 7:45 to 8:45 AM and the PM peak hour is generally from 5:00 to 6:00 PM. Minor adjustments were made to the raw vehicle counts for balancing of trips between adjacent intersections. Peak hour intersection volumes are summarized on **Figure 6** along with existing lane configuration and traffic control. The raw traffic counts for existing conditions are provided in **Appendix A**.

2.5 EXISTING INTERSECTION OPERATIONS

Existing operations were evaluated using the methods described in Chapter 1 for the weekday AM and PM peak hours at the study intersections, as summarized in **Table 2-2**. The analysis was based on the volumes, lane configurations, and traffic control presented in Figure 6. City of Hercules staff provided the signal timing and phasing sheets for all signalized study intersections; the timing sheets were incorporated into the intersection analysis. Observed peak hour factors[1] were used at all intersections for the existing analysis. Pedestrian and bicycle activity were factored into the analysis. Detailed intersection LOS calculation worksheets are presented in **Appendix B**.

As shown, all intersections operate at overall acceptable levels of service during the AM and PM peak hours. It is important to recognize that San Pablo Avenue is a reliever route for I-80. When incidents occur on I-80, traffic diversions to San Pablo Avenue occur, resulting in atypical traffic conditions that are not representative of local travel demand and worse operations than presented in Table 2-2. The side-street stop-controlled approach of the San Pablo Avenue/Shopping Center Driveway intersection (#13) operates at LOS F during the AM and PM peak hours, due to high vehicle delay for northbound left-turn vehicles departing the retail center waiting for acceptable gaps in vehicle traffic along San Pablo Avenue.

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[1] The peak hour factor is the relationship between the peak 15-minute flow rate and the full hourly volume: PHF = Hourly volume / (4 x (volume during the peak 15 minutes of flow)). The analysis level of service is based on peak rates of flow occurring within the peak hour because substantial short term fluctuations typically occurring during an hour.

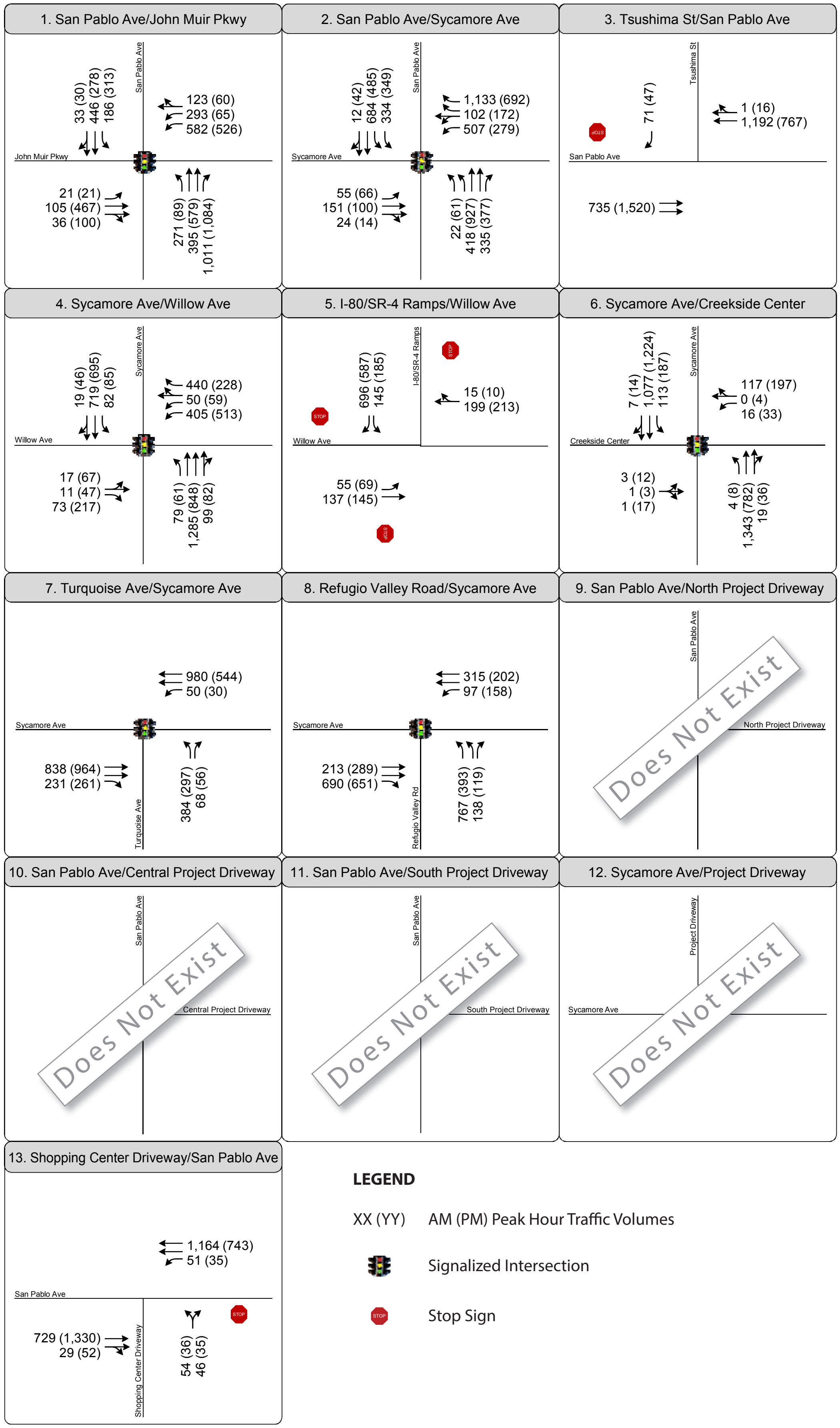


Figure 6

Existing (2017)

Peak Hour Volumes, Lane Configurations and Traffic Controls

OK16-0151_6_Vol-Existing

TABLE 2-2
EXISTING PEAK HOUR INTERSECTION LOS[1, 2]

ID	Intersection	Peak Hour	Control[3]	Delay	LOS
1.	San Pablo Avenue/John Muir Parkway/SR-4 Ramps	AM PM	Signal	29 37	C D
2.	San Pablo Avenue/Sycamore Avenue	AM PM	Signal	46 49	D D
3.	San Pablo Avenue/Tsushima Street	AM PM	SSSC	1 (16) 1 (12)	A (C) A (B)
4.	Willow Avenue/Sycamore Avenue	AM PM	Signal	15 25	B C
5.	Willow Avenue/I-80/SR 4 Ramps	AM PM	AWSC	11 11	B B
6.	Creekside Center/Sycamore Avenue	AM PM	Signal	7 10	A A
7.	Turquoise Drive/Sycamore Avenue	AM PM	Signal	11 8	B A
8.	Sycamore Avenue/Refugio Valley Road	AM PM	Signal	34 30	C C
13.	San Pablo Avenue/Shopping Center Driveway	AM PM	SSSC	4 (**67**) 5 (**>120**)	A (**F**) A (**F**)

Notes:
1. Analysis results present delay (seconds per vehicle) and LOS based on delay thresholds published in the HCM (Transportation Research Board, 2010). For side-street stop controlled intersections, average delay is listed first, followed by the delay for the worst movement in parentheses. Average delay is listed for signalized and all-way stop control intersections.
2. **Bold text** indicates deficient intersection operations. Deficient operations are LOS E or LOS F, with the exception of intersections along San Pablo Avenue where LOS F is deficient (LOS E is acceptable along San Pablo Avenue).
3. AWSC = all-way stop control, SSSC = side-street stop control, Signal = traffic signal control.

Source: Fehr & Peers, July 2017.

2.5.1 INTERSECTION PEAK HOUR QUEUING ANALYSIS

In addition to evaluating intersection delay and LOS, this study also evaluates the AM and PM peak hour 95th percentile queues using estimates from the Synchro 9.0 software, which were validated through field observations for reasonableness. The Synchro 9.0 software primarily reports queues for signalized intersections and has a limited ability to estimate queues for unsignalized intersections; furthermore, the Synchro 9.0 software evaluates intersections in isolation and does not account for potential queuing impacts of adjacent intersections. The 95th percentile queue length means that the queue would be less than or equal to that length 95 percent of the time; intersections are typically designed to meet the 95th percentile queue lengths. The Existing Conditions AM and PM peak hour 95th percentile queuing summary is presented in **Table C-1** in **Appendix C**. The AM and PM Peak hour queuing is also shown on **Figure 7**. The key queuing observations for Existing Conditions are summarized below.

2.5.1.1 AM Peak Hour Queuing

Fehr & Peers observed extensive queuing on westbound Sycamore Avenue between Willow Avenue and San Pablo Avenue during the morning peak hour. Left-turn and right-turn lane queues along westbound Sycamore Avenue at San Pablo Avenue often extend to Willow Avenue and occasionally beyond Willow Avenue. Although westbound queues generally dissipated during every signal cycle, maximum queue lengths normally blocked the Project site driveway during the AM peak hour. The distance between San Pablo Avenue and Willow Avenue is approximately 320 feet, which is relatively short for the high westbound approach volume (more than 1,700 vehicles) during the AM peak hour. In addition, several WestCAT buses departing the Hercules Transit Center utilize the westbound Sycamore Avenue segment between San Pablo Avenue and Willow Avenue (as shown on **Figure 5**), which also contribute to the long queue lengths during the AM peak hour.

The northbound right-turn movement queue at the San Pablo Avenue/John Muir Parkway intersection (#1) typically extended upstream to the existing Project site driveway location on San Pablo Avenue; however, the maximum queue was also observed to extend upstream to the Sycamore Avenue intersection on a single occasion during the AM peak hour.

The 95th percentile queue lengths at all other study intersections were generally contained within the provided storage during the AM peak hour, with the exception of some left-turn lanes at study intersections. However, queues generally cleared during every traffic signal cycle.

LEGEND

Existing without Project AM Queue Length

Existing with Project AM Queue Length

Study Intersection

Project Driveway

Figure 7A

Existing Conditions
95th Percentile Queuing – AM Peak Hour

OK16-0151_7A_Queues-AM

LEGEND

Existing without Project PM Queue Length

Existing with Project PM Queue Length

Study Intersection

Project Driveway

Figure 7B

Existing Conditions

95th Percentile Queuing – PM Peak Hour

OK16-0151_7B_Queues-PM

2.5.1.2 PM Peak Hour Queuing

Fehr & Peers observed extensive queuing on northbound San Pablo Avenue between John Muir Parkway and Tsushima Street during the PM peak hour. Intersection turning movement counts (see Figure 6) show that more than 1,000 vehicles turn right from northbound San Pablo Avenue onto the SR 4 and I-80 ramps during the PM peak hour. The high demand for the northbound right-turn movement at the San Pablo Avenue/John Muir Parkway/SR 4/I-80 intersection exceeds the capacity of the available single right-turn lane. The queue in the third lane (i.e., the right most lane which turns onto John Muir Parkway) on northbound San Pablo Avenue spills back more than a half-mile to south of Tsushima Street throughout the PM peak hour; the northbound queues normally block the proposed Project driveways on San Pablo Avenue during the PM peak hour. However, the queues in the first and second lanes were not observed to spillback to Sycamore Avenue. Although maximum queues were long along northbound San Pablo Avenue, the queues were generally served within the traffic signal cycles towards the end of the PM peak hour.

The southbound left-turn movement queue at the San Pablo Avenue/Sycamore Avenue intersection (#2) occasionally extended beyond the available storage during the PM peak hour. The 95th percentile queue lengths at all other study intersections were generally contained within the provided storage during the PM peak hour, with the exception of some left-turn lanes at study intersections. However, queues generally cleared during every traffic signal cycle.

2.5.2 INTERSECTION PEAK HOUR SIGNAL WARRANT ANALYSIS

The peak hour volume traffic signal warrant (Warrant 3A) for urban conditions, found in the *California Manual on Uniform Traffic Control Devices* (MUTCD) was evaluated for the unsignalized study intersections. As shown on **Table 2-3**, the San Pablo Avenue/Shopping Center Driveway intersection (#13) meets the peak hour signal warrant; this intersection is planned to be reconfigured and signalized with development of the site on the north side of San Pablo Avenue. Detailed signal warrant calculations are provided in **Appendix D**.

TABLE 2-3
EXISTING INTERSECTION PEAK HOUR SIGNAL WARRANT ANALYSIS

Location	Control[1]	Peak Hour Warrant Met?
3. San Pablo Avenue/Tsushima Street	SSSC	No
5. Willow Avenue/I-80/SR-4 Ramps	AWSC	No
13. San Pablo Avenue/Shopping Center Driveway	SSSC	**Yes**

Notes:
1. SSSC = side-street stop-control; AWSC = all-way stop-control
Source: Fehr & Peers, July 2017.

3.0 PROJECT CHARACTERISTICS

This chapter provides an overview of the proposed Project components and addresses the proposed Project trip generation, distribution, and assignment characteristics, allowing for an evaluation of Project impacts on the surrounding roadway network. The amount of traffic associated with the Project was estimated using a three-step process:

1. **Trip Generation** – The *amount* of vehicle traffic entering/exiting the Project site was estimated.
2. **Trip Distribution** – The *direction* trips would use to approach and depart the site was projected.
3. **Trip Assignment** – Trips were then *assigned* to specific roadway segments and intersection turning movements.

3.1 PROJECT DESCRIPTION

The Project would consist of the following development:

- 57,100-square foot Safeway supermarket
- 4,000 square foot bank with drive through
- 2,000 square foot coffee shop with drive through
- 20-pump fuel center with 2,500 square-foot kiosk

The Project site plan is shown on Figure 2.

3.2 PROJECT TRIP GENERATION

For this study, several sources of information were reviewed in the development of trip generation estimates, including trip generation rates from the Institute of Transportation Engineers (ITE) *Trip Generation Manual* (9th Edition) and trip generation surveys conducted by Fehr & Peers for Safeway Supermarket and Safeway Fuel Center uses; the Safeway survey data is provided in **Appendix E**. ITE, which is the industry standard for trip-generation data, recommended that local trip generation rates be used, when available and appropriate. Trip generation methods and factors were also extensively reviewed with City of Hercules staff.

ITE *Trip Generation Manual* includes trip generation rates for a variety of land uses based on surveys of land uses located in typically suburban contexts throughout the United States. The corresponding ITE *Trip*

Generation Handbook includes rates for internal trips and pass-by trips for various land uses. Trip generation data collected previously by Fehr & Peers for Safeway supermarkets resulted in lower peak hour trip rates than ITE. Therefore, the 9th Edition ITE rates were applied to the supermarket, bank and coffee shop land uses to estimate daily and peak hour vehicle trip generation.

Safeway fuel centers have atypical (higher) trip generation characteristics when compared to an average gasoline/service station (ITE Code 944) due largely to the discounted fuel prices and Safeway Club Card rewards program. In 2012, Fehr & Peers collected trip generation rates at the Safeway fuel centers in the cities of Livermore and Dublin, which are suburban locations in Alameda County in the San Francisco Bay Area. The rates for these two fuel centers were averaged to create an estimate of 22.44 trips per pump per weekday PM peak hour whereas ITE presents a rate of 13.87; the weekday PM peak hour survey data is provided in Appendix E. Since daily or AM peak hour trip generation data was not collected at either location, the daily and AM peak hour rates were extrapolated from the Gasoline/Service Station (ITE Code 944) daily-to-PM peak hour and AM-to-PM peak hour ratios of ITE rates; these ratios were then multiplied by the observed PM peak hour rate to estimate the 272.71 weekday trips per pump rate and the 19.67 AM peak hour trips per pump rate. These rates represent a conservative (i.e., high) estimate of trip generation specific to Safeway fuel centers.

Table 3-1 shows the trip generating potential of the proposed Project. However, not all trips generated by the Project are expected to be vehicle trips, and not all trips are expected to be new trips generated by the proposed project. Although ITE trip generation rates account for pedestrian, bicycling and transit trips, ITE data is generally based on data collected at single-use suburban sites and the methodology tends to overestimate the automobile trip generation for mixed-use developments located in urban environments with surrounding pedestrian, bicycle, and transit infrastructure. Given the existing and planned pedestrian and bicycle infrastructure, and access to 11 existing transit routes near the site, five percent of supermarket, bank, and coffee-shop trips calculated using the ITE methodology are expected to be walk/bike/transit trips; the multimodal reduction is consistent with other transportation impact assessments prepared for other projects within the City of Hercules. Approximately seven percent of trips are expected to be internal trips on a daily basis and during the AM and PM peak hours, meaning that a patron of one store would visit another such as someone purchasing fuel as well as visiting the grocery store. The internalization reduction is based on the ITE *Trip Generation Handbook* (3rd Edition) and consistent with the internalization reductions assumed in the *Final Sycamore Crossing Transportation Assessment* (Fehr & Peers, November 2014), which was approved by the City of Hercules.

TABLE 3-1
PROPOSED PROJECT TRIP GENERATION ESTIMATE

Land Use	Size[1]	Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Supermarket[2]	57.1 KSF	5,840	120	74	194	262	252	514
Bank with Drive-Through[3]	4.0 KSF	590	27	21	48	49	49	98
Coffee Shop with Drive-Through[4]	2.0 KSF	1,640	103	98	201	43	43	86
Gas/Service Station[5]	20 Pumps	5,450	201	193	394	224	224	448
Subtotal Net Raw Project Trips		***13,520***	***451***	***386***	***837***	***578***	***568***	***1,146***
Walk/Bike/Transit Reduction (5%) – Supermarket		*-300*	*-6*	*-4*	*-10*	*-13*	*-13*	*-26*
Walk/Bike/Transit Reduction (5%) – Bank		*-30*	*-1*	*-1*	*-2*	*-2*	*-2*	*-4*
Walk/Bike/Transit Reduction (5%) – Coffee Shop		*-90*	*-5*	*-5*	*-10*	*-2*	*-2*	*-4*
Net Trips After Mode Split Reduction – Supermarket		5,540	114	70	184	249	239	488
Net Trips After Mode Split Reduction – Bank		560	26	20	46	47	47	94
Net Trips After Mode Split Reduction – Coffee Shop		1,550	98	93	191	41	41	82
Net Trips After Mode Split Reduction – Gas Station		5,450	201	193	394	224	224	448
Subtotal After Modal Split Reductions		***13,100***	***439***	***376***	***815***	***561***	***551***	***1,112***
Internalization Reduction (7%) – Supermarket		*-400*	*-7*	*-6*	*-13*	*-17*	*-17*	*-34*
Internalization Reduction (7%) – Bank		*-40*	*-2*	*-1*	*-3*	*-4*	*-3*	*-7*
Internalization Reduction (7%) – Coffee Shop		*-110*	*-7*	*-7*	*-14*	*-3*	*-3*	*-6*
Internalization Reduction (7%) – Gas Station		*-370*	*-15*	*-12*	*-27*	*-15*	*-15*	*-30*
Net External Trips – Supermarket		5,140	107	64	171	232	222	454
Net External Trips – Bank		520	24	19	43	43	44	87
Net External Trips – Coffee Shop		1,440	91	86	177	38	38	76
Net External Trips – Gas Station		5,080	186	181	367	209	209	418
Net External Trips (Total Driveway Volumes)		***12,180***	***408***	***350***	***758***	***522***	***513***	***1,035***
Pass-By Rate (36% Daily/AM/PM) – Supermarket		*-1,850*	*-39*	*-23*	*-62*	*-84*	*-80*	*-164*
Pass-By Rate (29% Daily/29% AM/35% PM) – Bank		*-150*	*-7*	*-6*	*-13*	*-15*	*-15*	*-30*
Pass-By Rate (40% Daily/70% AM/40% PM) – Coffee Shop		*-580*	*-64*	*-60*	*-124*	*-15*	*-15*	*-30*
Pass-By Rate (56% Daily/62% AM/56% PM) – Gas Station		*-2,840*	*-115*	*-112*	*-227*	*-117*	*-117*	*-234*
Net New External Trips – Supermarket		3,290	68	41	109	148	142	290
Net New External Trips – Bank		370	17	13	30	28	29	57
Net New External Trips – Coffee Shop		860	27	26	53	23	23	46
Net New External Trips – Gas Station		2,240	71	69	140	92	92	184
Net New External Total Trips[6]		**6,760**	**183**	**149**	**332**	**291**	**286**	**577**

Notes:
1. KSF = 1,000 square feet, Pump = gas pump/fueling station
2. ITE Trip Generation land use category (850) - Supermarket
Daily: T = 102.24 (X)
AM Peak Hour: T = 3.40 (X) (62% in, 38% out)
PM Peak Hour: Ln (T) = 0.74 * Ln (X) + 3.25 (51% in, 49% out)
Where T = Trips generated, X = Size (in KSF)
3. ITE Trip Generation land use category (912) – Drive-In Bank
Daily: T = 148.15(X)
AM Peak Hour: T = 12.08(X) (57% in, 43% out)
PM Peak Hour: T = 24.3(X) (50% in, 50% out)
4. ITE Trip Generation land use category (937) – Coffee Shop w/ Drive-Thru
Daily: T = 818.58(X)
AM Peak Hour: T = 100.58(X) (51% in, 49% out)
PM Peak Hour: T = 42.8(X) (50% in, 50% out)
5. PM is based on Fehr & Peers collected survey data at Safeway specific fuel centers in Livermore and Dublin, California (see Appendix E for survey data). Daily and AM rates are extrapolated from Gasoline/Service Station (Land Use Code 944) ratios based on the observed PM peak hour trip generation rate.
Daily: T = 272.71 (X)
AM Peak Hour: T = 19.67 (X); Enter = 51%; Exit = 49%
PM Peak Hour: T = 22.44 (X); Enter = 50%; Exit = 50%
6. Net new external trips are new vehicle trips added to the surrounding roadway network after accounting for mode split, internalization, and pass-by reductions.
Sources: *ITE Trip Generation Manual, 9th Edition,* Fehr and Peers, 2017.

Pass-by trips are trips attracted to the Project site from adjacent roadways as an intermediate stop on the way to a final destination. Pass-by trips alter travel patterns in the immediate study area but do not add new vehicle trips to the roadway network, and should therefore be excluded from the net-new vehicle trip generation estimates but are included at the driveways and roadways providing immediate access to and from the Project site. The following pass-by reductions were assumed based on data provided in the ITE *Trip Generation Handbook* (3rd Edition):

- Supermarket: 36% for the Daily, AM and PM peak hours
- Bank (with Drive-Through): 29% – Daily, 29% – AM peak hour, 35% – PM peak hour
- Coffee Shop (with Drive-Through): 40% – Daily, 70% – AM peak hour, 40% – PM peak hour
- Gasoline/Service Station : 56% – Daily, 62% – AM peak hour, 56% – PM peak hour

If daily pass-by data was not available in the ITE *Trip Generation Handbook* (3rd Edition), the minimum pass-by rate between the AM and PM peak hour was assumed for the daily trip generation estimate. As shown on **Table 3-1**, the Project is expected to generate 6,760 new external daily trips, 332 AM new external peak hour trips and 577 new external PM peak hour trips. The net new external trips are new vehicle trips added to the surrounding roadway network after accounting for mode split, internalization, and pass-by reductions.

3.3 PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

Project trip distribution percentages were assigned as summarized in **Table 3-2**, as well as shown on **Figure 8**. The trip distribution percentages are based on existing travel patterns, data from the CCTA Countywide Travel Forecasting Model, and input from City of Hercules staff. Project trips were then assigned to the roadway network based on the directions of approach and departure for the morning peak hour and evening peak hour, as presented on **Figure 9.**

TABLE 3-2
PROJECT TRIP DISTRIBUTION

Roadway	Percent of Trips to/from Project Site
San Pablo Avenue West	25%
Sycamore Avenue West	10%
San Pablo Avenue East	10%
SR4/I-80 Interchange via San Pablo Avenue	15%
SR 4/I-80 Interchange via Willow Avenue	5%
Willow Avenue Northeast	10%
Refugio Valley Road South	5%
Turquoise Drive South	5%
Sycamore Avenue East	5%
John Muir Parkway West	10%
Total	**100%**

Source: Fehr & Peers, July 2017.

3.4 TRIP GENERATION COMPARISON WITH HERCULES NEW TOWN CENTER (HNTC) EIR

The Project site, also referred to as the "PNR Parcel," is part of the HNTC planning area. In 2008, the City of Hercules prepared an Environmental Impact Report (EIR) that evaluated the potential transportation and traffic impacts that could result from implementation of the General Plan and Zoning Ordinance

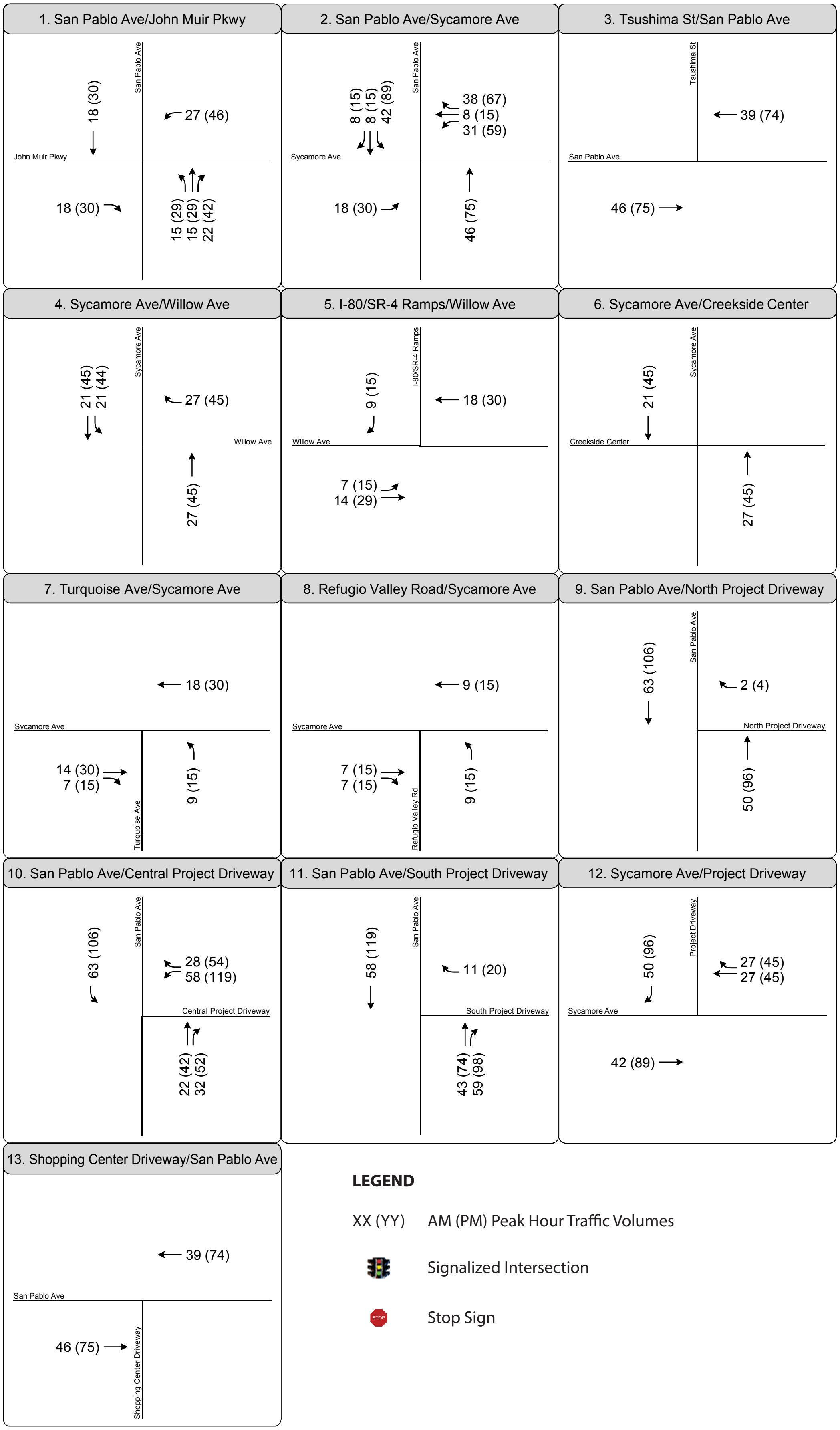
LEGEND

Project Site | # Study Intersection | # Project Driveway | XX% Project Trip Distribution

Figure 8

Project Trip Distribution

OK16-0151_8_TripDistro



LEGEND

XX (YY) AM (PM) Peak Hour Traffic Volumes

Signalized Intersection

Stop Sign

Figure 9

Project Trip Assignment

Amendments for the HNTC planning area. That analysis assumed that the "PNR Parcel" would be developed with up to 400 multi-family dwelling units, 60,000 square feet of retail space, and 80,000 square feet of office space, which differs from the currently proposed Project.

Table 3-3 compares the current Project trip generation to the EIR trip generation estimate for the "PNR Parcel" and the entire HNTC planning area. As shown on **Table 3-3**, the current Project is expected to generate an additional 2,147 daily trips, including 39 AM peak hour trips and 249 PM peak hour trips more than what was assumed for the PNR parcel in the HNTC EIR. However, according to City staff, other developments within the HNTC planning area have not yet been approved. When compared to the HNTC total planning area trip generation assumptions in the 2009 certified EIR, the current Project is expected to generate 13,453 less daily trips, 776 less AM peak hour trips and 758 less PM peak hour trips. The Project trip generation is still within the trip generation thresholds evaluated in the HNTC EIR. Therefore, if the Hercules Safeway project is implemented, the HNTC planning area would have a remaining budget of 13,453 daily trips to remain within the HNTC EIR trip generation total. However, at least one of the remaining HNTC planning area parcels would have to be developed at lower density to remain within the trip generation thresholds of the HNTC EIR. Future projects proposed within the HNTC area will be reviewed to determine if the overall trip generation remains below the level that was evaluated in the HNTC EIR and future analysis may be required.

TABLE 3-3
PROPOSED PROJECT TRIP GENERATION ESTIMATE

Land Use Scenario	Daily	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Current (2017) Hercules Safeway Project	6,760	183	149	332	299	294	593
HNTC EIR – PNR Parcel	4,613	139	154	293	165	179	344
Difference Between Hercules Safeway Project and PNR Parcel Assumptions in HNTC EIR	*+2,147*	*+44*	*-5*	*+39*	*+126*	*+107*	*+233*
HNTC EIR – Total HNTC Planning Area	20,213	452	656	1,108	707	644	1,351
Difference Between Hercules Safeway Project and HNTC Planning Area Assumptions in HNTC EIR	*-13,453*	*-269*	*-507*	*-776*	*-416*	*-358*	*-774*

Sources: *Hercules New Town Center Environmental Impact Report* (Fehr & Peers, October 2008), Fehr and Peers, June 2017.

4.0 EXISTING WITH PROJECT CONDITIONS

This chapter addresses the existing conditions plus the Project, and discusses Project vehicular impacts.

4.1 EXISTING WITH PROJECT VOLUMES AND GEOMETRY

The Project vehicle volumes in Figure 9 were added to the existing peak hour traffic volumes from Figure 6 and pass-by trips were applied at the project driveways to estimate the Existing with Project peak hour traffic volumes, as shown on **Figure 10**. The following roadway improvements were assumed as they are proposed as part of the Project:

- A new right-in/right-out driveway on San Pablo Avenue (study intersection #9) south of John Muir Parkway. The driveway would primarily serve as the truck access driveway to facilitate deliveries of goods to and from the Project site.
- A signalized full-access driveway located on San Pablo Avenue (study intersection #10). The driveway currently exists and is signalized, however the Project site is currently fenced off on the east side of the intersection. The Project would maintain the traffic signal and the 125 foot southbound left-turn lane. The northbound approach would provide two through lanes and a shared through/right-turn lane; the westbound approach would provide a left-turn lane and a right-turn lane to facilitate vehicles exiting the Project site. This is the only full access driveway that would be provided on-site and is expected to be the primary access driveway for the site.
- A new right-in/right-out driveway on San Pablo Avenue (study intersection #11) north of Sycamore Avenue Parkway. The driveway would provide primary access to the proposed gas station, bank, and coffee shop from San Pablo Avenue. The driveway would provide a 100 foot right-turn lane along the northbound San Pablo Avenue approach.
- An existing right-in/right-out driveway located on Sycamore Avenue (study intersection #12) between San Pablo Avenue and Willow Avenue. The driveway would provide primary access to the proposed supermarket and gas station from Sycamore Avenue.

The proposed lane configurations and traffic controls at each of the Project site driveways are shown on Figure 10. The Existing with Project Conditions analysis assumes the same signal timings as current conditions, with the exception of the timings at the San Pablo Avenue/Central Project Driveway intersection (#10), which was assumed to be retimed as part of the Project.

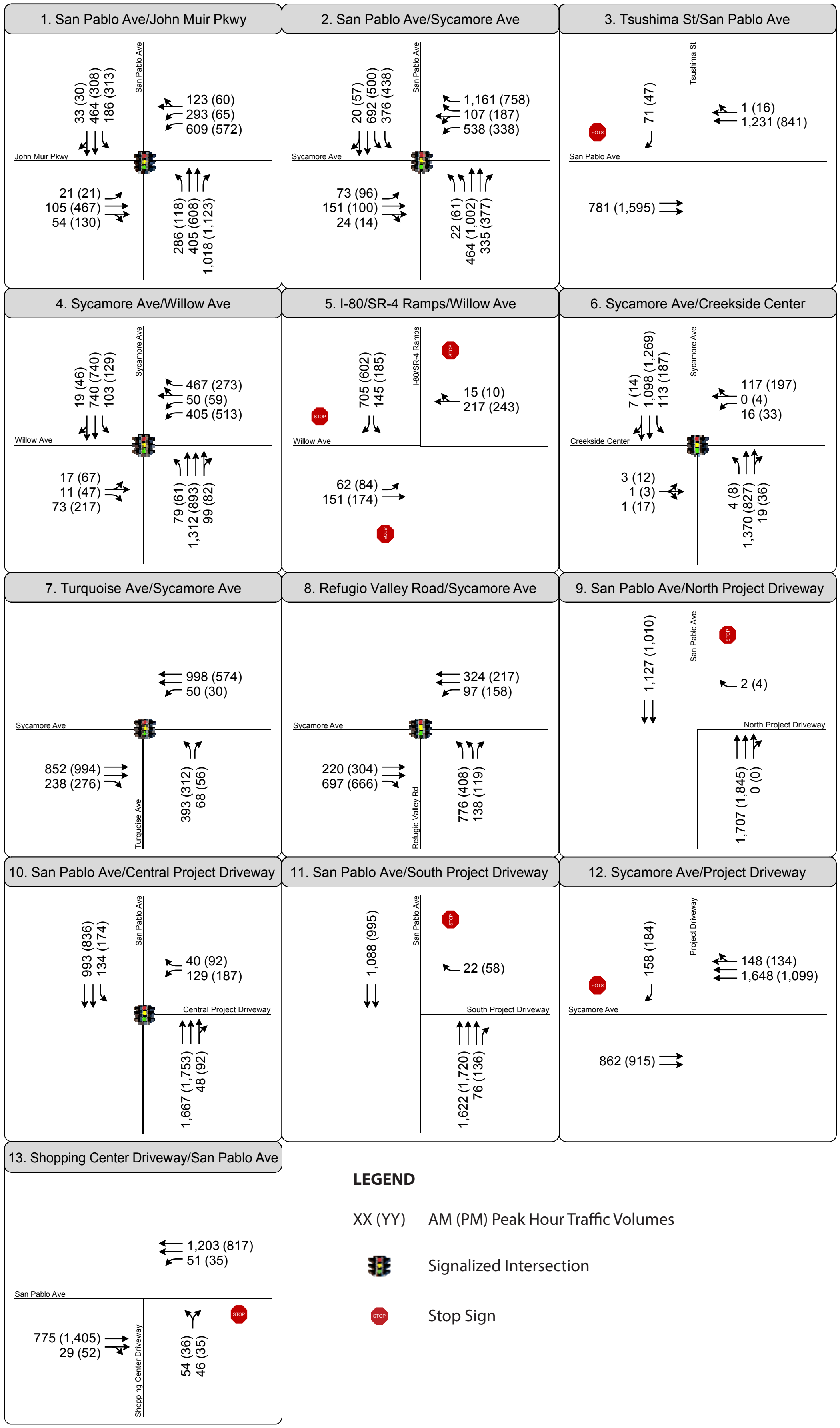


Figure 10

Existing (2017) with Project
Peak Hour Volumes, Lane Configurations and Traffic Controls

4.2 EXISTING WITH PROJECT INTERSECTION OPERATIONS

Existing with Project conditions were evaluated using the same methods described in Chapter 1. The Existing with Project analysis results are presented on **Table 4-1**, based on the vehicle volumes presented on Figure 10. Table 4-1 also includes the operations results for Existing conditions for reference purposes. Detailed intersection LOS calculation worksheets are presented in **Appendix F**.

As shown on Table 4-1, all study intersections are projected to operate at an overall acceptable level of service with the addition of project traffic. The San Pablo Avenue/Sycamore Avenue intersection is expected to degrade from LOS D to LOS E during the PM peak hour with the Project which is considered acceptable for this intersection. Side-street movements at the following intersections are expected to operate at unacceptable LOS under Existing with Project Conditions:

- The stop-controlled southbound right-turn movement at the Sycamore Avenue/Project Driveway intersection (#12) is expected to operate at LOS F during the AM peak hour due to the high vehicle delay for the right-turn vehicles departing the Project site trying to find an acceptable gap in vehicle traffic along westbound Sycamore Avenue.
- The stop-controlled approach at the San Pablo Avenue/Shopping Center Driveway intersection (#13) currently operates at a deficient LOS F during the AM and PM peak hours; the addition of project traffic would slightly worsen delay. The intersection is planned to be signalized with construction of the Sycamore Crossing development.

TABLE 4-1
EXISTING AND EXISTING WITH PROJECT PEAK HOUR INTERSECTION LOS[1, 2]

ID	Intersection	Peak Hour	Control[3]	Existing		Existing With Project		Significant Impact?
				Delay	LOS	Delay	LOS	
1.	San Pablo Avenue/John Muir Parkway/SR-4 Ramps	AM PM	Signal	29 37	C D	31 41	C D	No No
2.	San Pablo Avenue/Sycamore Avenue	AM PM	Signal	46 49	D D	50 74	D E	No No
3.	San Pablo Avenue/Tsushima Street	AM PM	SSSC	1 (16) 1 (12)	A (C) A (B)	1 (16) 1 (12)	A (C) A (B)	No No
4.	Willow Avenue/Sycamore Avenue	AM PM	Signal	15 25	B C	16 26	B C	No No
5.	Willow Avenue/I-80/SR 4 Ramps	AM PM	AWSC	11 11	B B	11 11	B B	No No
6.	Creekside Center/Sycamore Avenue	AM PM	Signal	7 10	A A	7 10	A A	No No
7.	Turquoise Drive/Sycamore Avenue	AM PM	Signal	11 8	B A	11 9	B A	No No
8.	Sycamore Avenue/Refugio Valley Road	AM PM	Signal	34 30	C C	34 30	C C	No No
9.	San Pablo Avenue/North Project Driveway	AM PM	SSSC	-	-	1 (21) 1 (23)	A (C) A (C)	No No
10.	San Pablo Avenue/Central Project Driveway	AM PM	Signal	-	-	11 14	B B	No No
11.	San Pablo Avenue/South Project Driveway	AM PM	SSSC	-	-	1 (22) 1 (30)	A (C) A (D)	No No
12.	Sycamore Avenue/Project Driveway	AM PM	SSSC	-	-	4 (**66**) 2 (29)	A (**F**) A (D)	No No
13.	San Pablo Avenue/Shopping Center Driveway	AM PM	SSSC	4 (**67**) 5 (**>120**)	A (**F**) A (**F**)	4 (**86**) 7 (**>120**)	A (**F**) A (**F**)	No No

Notes:
1. Analysis results present delay (seconds per vehicle) and LOS based on delay thresholds published in the HCM (Transportation Research Board, 2010). For side-street stop controlled intersections, average delay is listed first, followed by the delay for the worst movement in parentheses. Average delay is listed for signalized and all-way stop control intersections.
2. **Bold text** indicates deficient intersection operations. Deficient operations are LOS E or LOS F, with the exception of intersections along San Pablo Avenue where LOS F is deficient (LOS E is acceptable along San Pablo Avenue).
3. AWSC = all-way stop control, SSSC = side-street stop control, Signal = traffic signal control.

Source: Fehr & Peers, July 2017.

4.2.1 INTERSECTION PEAK HOUR QUEUING ANALYSIS

The Existing with Project Conditions AM and PM peak hour 95th percentile queuing summary is presented in **Table C-1** in Appendix C. The Existing with Project AM and PM peak hour queuing is also shown on Figure 7. As shown in Table C-1 and Figure 7**,** the addition of Project traffic to the area is expected to worsen vehicle queues.

4.2.1.1 AM Peak Hour Queuing

The 95th percentile queues during the morning peak hour are expected to increase between 20 and 80 feet at study intersections surrounding the Project site. The northbound 95th percentile queue that develops at the San Pablo Avenue/John Muir Parkway intersection (#1) is expected to continue to extend upstream and potentially block all three proposed Project driveways on San Pablo Avenue during the AM peak hour; the Project is estimated to increase the 95th percentile queue length at this movement by approximately 20 feet relative to without Project conditions. In addition, the westbound Sycamore Avenue queue that develops from the San Pablo Avenue/Sycamore Avenue intersection (#2) is expected to continue to block the proposed Project driveway on Sycamore Avenue during the AM peak hour; the Project is expected to increase the 95th percentile queue length on the westbound approach by about 80 feet relative to without Project conditions.

The 95th percentile queues along the southbound left-turn lane and westbound approach at the Central Project Driveway are expected to be accommodated within the storage capacity during the AM peak hour. The 95th percentile queue lengths at the three right-turn out Project driveways are estimated to be less than 100 feet at each driveway during the AM peak hour.

4.2.1.2 PM Peak Hour Queuing

The 95th percentile queues during the evening peak are expected to increase between 20 and 120 feet at study intersections surrounding the project site. The largest increase in queue length during the PM peak hour is estimated to be 120 feet along the southbound left-turn movement from San Pablo Avenue to eastbound Sycamore Avenue (intersection #2).

The northbound 95th percentile queue that develops at the San Pablo Avenue/John Muir Parkway intersection (#1) is expected to continue to extend upstream and potentially block all three proposed Project driveways on San Pablo Avenue during the PM peak hour; the Project is estimated to increase the 95th percentile queue length at this movement by approximately 80 feet relative to without Project conditions. In addition, the westbound Sycamore Avenue queue that develops from the San Pablo Avenue/Sycamore Avenue intersection (#2) is expected to continue to block the proposed Project driveway on Sycamore

Avenue during the PM peak hour; the Project is expected to increase the 95th percentile queue length on the westbound approach by about 60 feet relative to without Project conditions.

The 95th percentile queue along the southbound left-turn lane at the Central Project Driveway is expected to be accommodated within the 125-foot storage capacity during the AM and PM peak hours. The 95th percentile queue length exiting the Central Project Driveway is estimated to be about 140 feet during the PM peak hour; the proposed driveway throat depth is about 120 feet. The 95th percentile queue lengths at the three right-turn out Project driveways are estimated to be less than 100 feet at each driveway during the PM peak hour.

4.2.2 INTERSECTION PEAK HOUR SIGNAL WARRANT ANALYSIS

The peak hour volume traffic signal warrant (Warrant 3A) for urban conditions, found in the *California Manual on Uniform Traffic Control Devices* (MUTCD), was evaluated for the unsignalized study intersections. As shown on **Table 4-2**, the following study intersections would meet the peak hour signal warrant under Existing with Project Condition:

- Sycamore Avenue/Project Driveway (#12)
- San Pablo Avenue/Shopping Center Driveway intersection (#13)

Detailed signal warrant calculations are provided in Appendix D.

TABLE 4-2
EXISTING WITH PROJECT INTERSECTION PEAK HOUR SIGNAL WARRANT ANALYSIS

Location	Control[1]	Peak Hour Warrant Met? (Existing Conditions)	Peak Hour Warrant Met? (Existing with Project Conditions)
3. San Pablo Avenue/Tsushima Street	SSSC	No	No
5. Willow Avenue/I-80/SR-4 Ramps	AWSC	No	No
9. San Pablo Avenue/North Project Driveway	SSSC	N/A	No
11. San Pablo Avenue/South Project Driveway	SSSC	N/A	No
12. Sycamore Avenue/Project Driveway	SSSC	N/A	**Yes**
13. San Pablo Avenue/Shopping Center Driveway	SSSC	**Yes**	**Yes**

Notes:
1. SSSC = side-street stop-control; AWSC = all-way stop-control
Source: Fehr & Peers, July 2017.

4.3 EXISTING WITH PROJECT IMPACTS AND MITIGATION MEASURES

As shown on Table 4-1, the Project is expected to increase delay at study intersections, but the increases in delay would not trigger significant impacts based on the City of Hercules significance criteria. The LOS standards were adopted as part of the City's General Plan; as stated in the Policies and Proposals section of the City's Circulation Element, one of the goals of the LOS objectives is to "maintain acceptable local circulation on arterial streets/intersections and on local collector streets." Furthermore, the City's Growth Management Element also states that "traffic service standards apply to signalized intersections because current traffic engineering analysis methods do not provide an estimate of overall LOS for unsignalized intersections." Although analysis methods are now available to estimate LOS at unsignalized intersections, the significance criteria is interpreted to apply to arterials and local streets only, but does not apply to unsignalized driveways that provide access to developments from arterial or collector streets.

The side-street movement from the Sycamore Avenue/Project Driveway intersection (#12) is expected to operate at LOS F during the AM peak hour under Existing with Project Conditions. However, the AM peak hour operations at this location are not considered significant since the delay is only associated with vehicles exiting the Project driveway (the significance criteria are assumed not to apply to unsignalized development driveways for reasons described above). This delay could influence driver behavior such that some drivers exit the site via the full-access and signalized San Pablo Avenue/Central Project Driveway intersection (#10); the signalized driveway has the available capacity to adequately accommodate a re-distribution of volume from the unsignalized driveway on Sycamore Avenue during peak hours. Therefore the Project impact to the Sycamore Avenue/Project Driveway intersection (#12) is considered less-than-significant and no changes to the driveway design are recommended.

5.0 EXISTING PLUS BACKGROUND CONDITIONS

This chapter discusses Existing Plus Background vehicle conditions both without and with the Project. The Existing Plus Background conditions analysis considers approved projects within the study area that have the likely expectation of being constructed and occupied in the near-term.

5.1 EXISTING PLUS BACKGROUND FORECASTS

Fehr & Peers coordinated with City of Hercules staff to identify approved development projects that are expected to be constructed and occupied in the near-term. The following list of approved projects was provided by City staff on March 8, 2017:

- Hilltown Project – 131 townhomes/condos
- Bayfront Project – 159 apartments, 16 townhomes/condos and 6,000 square feet of retail
- Sycamore North Project – 8,200 square feet of retail
- Sycamore Crossing Project – 136,000 square feet of retail and 18-pump gas station
- Muir Pointe Project – 144 single-family homes

The trip generation and trip distribution for each of the development projects listed above was estimated based on the information provided in each project's respective transportation impact study. The trips were then assigned and added to the 2017 existing vehicle volumes from Figure 6 to provide the basis for the Existing Plus Background analysis, as presented on **Figure 11**. The trip generation assumptions for these near-term projects are provided in **Appendix G**. The Project vehicle volumes in Figure 9 were added to the peak hour traffic volumes from Figure 11, and pass-by trips were applied to estimate the Existing Plus Background with Project peak hour traffic volumes, as shown on **Figure 12**.

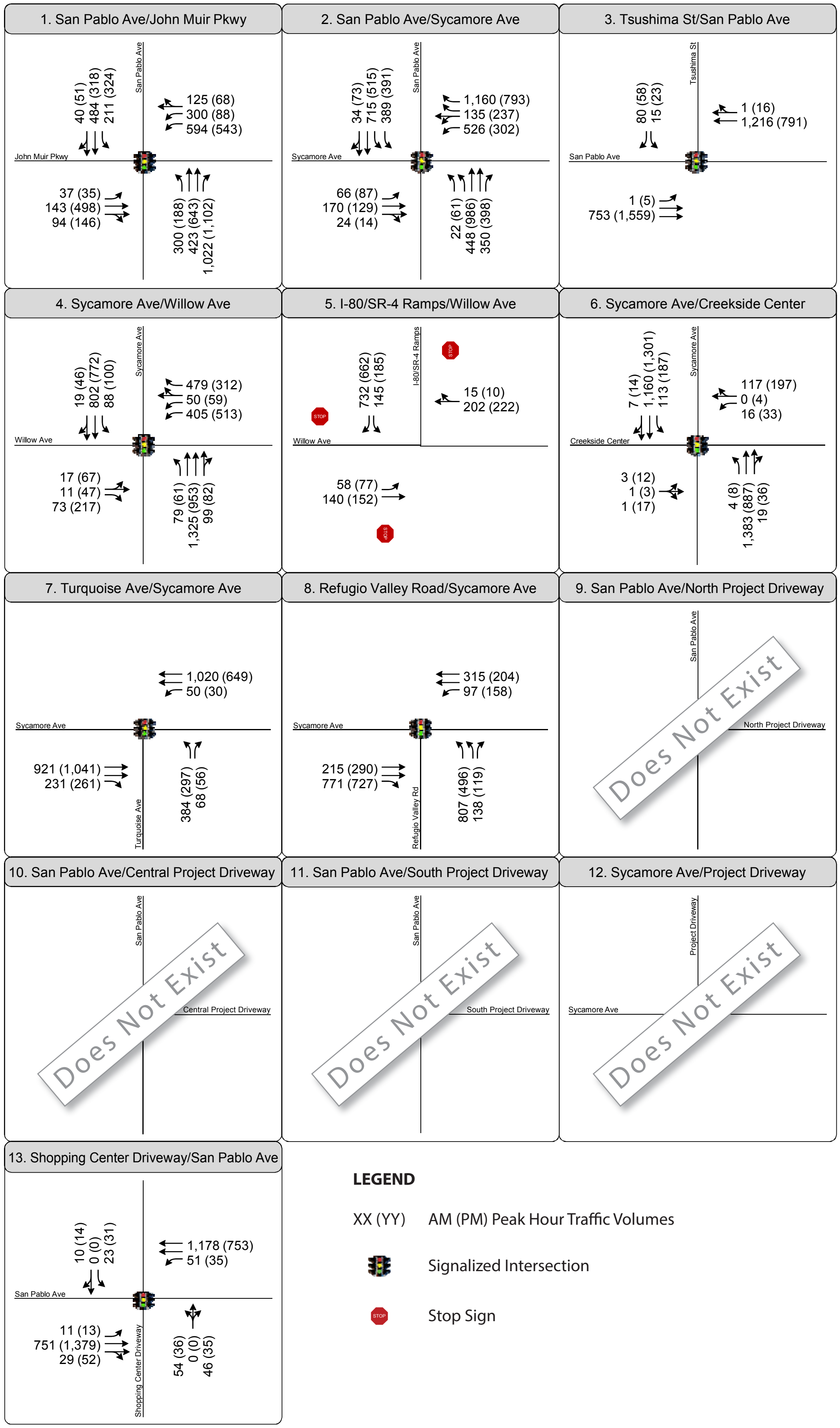


Figure 11

Existing Plus Background without Project
Peak Hour Volumes, Lane Configurations and Traffic Controls

OK16-0151_11_Vol-NearTerm

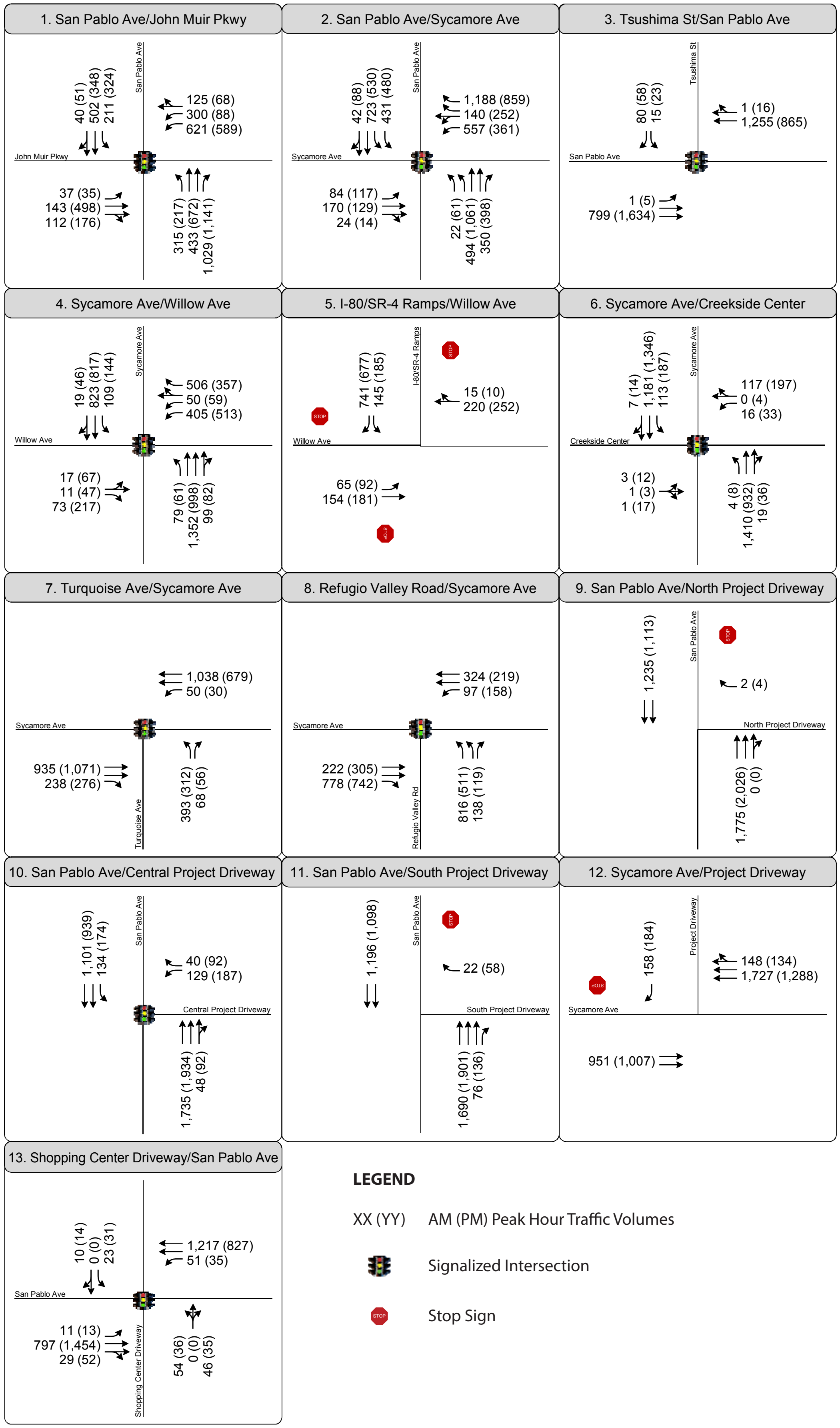


Figure 12

Existing Plus Background with Project
Peak Hour Volumes, Lane Configurations and Traffic Controls

5.2 EXISTING PLUS BACKGROUND ROADWAY ASSUMPTIONS

The following planned and funded roadway improvements were assumed for the analysis of Existing Plus Background without and with Project Conditions, based on input from City of Hercules staff:

- Signalization of the San Pablo Avenue/Tsushima Street intersection (#3) and provision of left-turn lanes along the southbound and eastbound approaches; and
- Signalization of the San Pablo Avenue/Shopping Center Driveway intersection (#13) and construction of a new driveway for the Sycamore Crossing development.

The improvements listed above will be implemented as part of the planned Sycamore Crossing project, which is adjacent to the Project site. In addition, recommended AM and PM peak hour signal timing updates identified as part of the I-80 SMART Corridor Project were assumed for the following intersections: San Pablo Avenue/John Muir Parkway (intersection #1) and San Pablo Avenue/Sycamore Avenue (intersection #2). The Existing Plus Background intersection lane configurations and traffic controls are shown on Figure 11, the Existing Plus Background with Project intersection lane configurations and traffic controls are shown on Figure 12.

5.3 EXISTING PLUS BACKGROUND INTERSECTION OPERATIONS

Existing Plus Background without and with Project Conditions were evaluated using the same methods described in Chapter 1. The intersection analysis results are presented on **Table 5-1**, based on the vehicle volumes presented on Figure 11 and Figure 12. Detailed intersection LOS calculation worksheets are presented in **Appendix H**.

As shown on Table 5-1, all study intersections are expected the operate at acceptable LOS under Existing Plus Background without and with Project Conditions. The side-street movement at the following intersection is expected to operate at unacceptable LOS under Existing Plus Background with Project Conditions:

- The stop-controlled southbound right-turn movement at the Sycamore Avenue/Project Driveway intersection (#12) is expected to operate at LOS F during the AM peak hour and at LOS E during the PM peak hour due to the high vehicle delay for the right-turn vehicles departing the Project site trying to find an acceptable gap in vehicle traffic along westbound Sycamore Avenue.

TABLE 5-1
EXISTING PLUS BACKGROUND PEAK HOUR INTERSECTION LOS[1, 2]

ID	Intersection	Peak Hour	Control[3]	Existing Plus Background without Project		Existing Plus Background with Project		Significant Impact?
				Delay	LOS	Delay	LOS	
1.	San Pablo Avenue/John Muir Parkway/SR-4 Ramps	AM PM	Signal	38 61	D E	40 71	D E	No No
2.	San Pablo Avenue/Sycamore Avenue	AM PM	Signal	48 44	D D	52 54	D D	No No
3.	San Pablo Avenue/Tsushima Street	AM PM	Signal	4 3	A A	4 3	A A	No No
4.	Willow Avenue/Sycamore Avenue	AM PM	Signal	15 24	B C	16 25	B C	No No
5.	Willow Avenue/I-80/SR 4 Ramps	AM PM	AWSC	11 11	B B	11 11	B B	No No
6.	Creekside Center/Sycamore Avenue	AM PM	Signal	7 10	A A	7 10	A A	No No
7.	Turquoise Drive/Sycamore Avenue	AM PM	Signal	10 8	A A	11 8	B A	No No
8.	Sycamore Avenue/Refugio Valley Road	AM PM	Signal	38 33	D C	38 33	D C	No No
9.	San Pablo Avenue/North Project Driveway	AM PM	SSSC	-	-	1 (22) 1 (26)	A (C) A (D)	No No
10.	San Pablo Avenue/Central Project Driveway	AM PM	Signal	-	-	11 14	B B	No No
11.	San Pablo Avenue/South Project Driveway	AM PM	SSSC	-	-	1 (23) 1 (37)	A (C) A (E)	No No
12.	Sycamore Avenue/Project Driveway	AM PM	SSSC	-	-	4 (**79**) 3 (**40**)	A (**F**) A (**E**)	No No
13.	San Pablo Avenue/Shopping Center Driveway	AM PM	Signal	8 8	A A	8 8	A A	No No

Notes:
1. Analysis results present delay (seconds per vehicle) and LOS based on delay thresholds published in the HCM (Transportation Research Board, 2010). For side-street stop controlled intersections, average delay is listed first, followed by the delay for the worst movement in parentheses. Average delay is listed for signalized and all-way stop control intersections.
2. **Bold text** indicates deficient intersection operations. Deficient operations are LOS E or LOS F, with the exception of intersections along San Pablo Avenue where LOS F is deficient (LOS E is acceptable along San Pablo Avenue).
3. AWSC = all-way stop control, SSSC = side-street stop control, Signal = traffic signal control.

Source: Fehr & Peers, July 2017.

5.3.1 INTERSECTION PEAK HOUR QUEUING ANALYSIS

The Existing Plus Background without and with Project Conditions AM and PM peak hour 95th percentile queuing summary is presented in **Table C-2** in Appendix C. The Existing Plus Background without Project queue lengths are expected to be greater than or equal to the queue lengths observed under Existing Conditions.

The 95th percentile queues along westbound Sycamore Avenue at San Pablo Avenue (intersection #2) are expected to continue to extend upstream to the Willow Avenue intersection without and with the Project during the AM peak hour. In addition, the northbound right-turn 95th percentile queue at the San Pablo Avenue/John Muir Parkway intersection (#1) is expected to extend upstream near Sycamore Avenue during the AM peak hour without and with the Project, the queue is expected to be longer during the PM peak hour (without and with the Project).

The 95th percentile queues are generally expected to increase between 20 and 100 feet at study intersections surrounding the project site. The largest AM peak hour increase in queue length due to the Project is estimated to be 60 feet along the westbound Sycamore Avenue approach to the San Pablo Avenue intersection (#2). The largest PM peak hour increase in queue length due to the Project is estimated to be 100 feet along the southbound left-turn movement from San Pablo Avenue to eastbound Sycamore Avenue (intersection #2).

The northbound 95th percentile queue that develops at the San Pablo Avenue/John Muir Parkway intersection (#1) is expected to extend upstream and potentially block all three proposed Project driveways on San Pablo Avenue during the AM and PM peak hours. In addition, the westbound Sycamore Avenue queue that develops from the San Pablo Avenue/Sycamore Avenue intersection (#2) is expected to block the proposed Project driveway on Sycamore Avenue during the AM and PM peak hours.

The 95th percentile queue along the southbound left-turn lane at the Central Project Driveway is expected to be accommodated within the 125-foot storage capacity during the AM and PM peak hours. The 95th percentile queue length exiting the Central Project Driveway is estimated to be about 100 feet during the AM peak hour and 160 feet during the PM peak hour, the proposed driveway throat depth is about 120 feet. The 95th percentile queue lengths at the three right-turn out Project driveways are estimated to be less than 100 feet at each driveway during the AM and PM peak hours.

5.3.2 INTERSECTION PEAK HOUR SIGNAL WARRANT ANALYSIS

The peak hour volume traffic signal warrant (Warrant 3A) for urban conditions, found in the *California Manual on Uniform Traffic Control Devices* (MUTCD) was evaluated for the unsignalized study intersections.

As shown on **Table 5-2**, the Sycamore Avenue/Project Driveway intersection (#12) would meet the peak hour signal warrant under Existing Plus Background with Project Conditions. Detailed signal warrant calculations are provided in Appendix D.

TABLE 5-2
EXISTING PLUS BACKGROUND INTERSECTION PEAK HOUR SIGNAL WARRANT ANALYSIS

Location	Control[1]	Peak Hour Warrant Met? (Existing Plus Background Conditions)	Peak Hour Warrant Met? (Existing Plus Background with Project Conditions)
5. Willow Avenue/I-80/SR-4 Ramps	AWSC	No	No
9. San Pablo Avenue/North Project Driveway	SSSC	N/A	No
11. San Pablo Avenue/South Project Driveway	SSSC	N/A	No
12. Sycamore Avenue/Project Driveway	SSSC	N/A	**Yes**

Notes: 1. SSSC = side-street stop-control; AWSC = all-way stop-control
Source: Fehr & Peers, July 2017.

5.4 EXISTING PLUS BACKGROUND WITH PROJECT IMPACTS AND MITIGATION MEASURES

As shown on Table 5-1, the Project is expected to increase delay at study intersections, but the increases in delay would not trigger significant impacts based on the City of Hercules significance criteria. The side-street movement from the Sycamore Avenue/Project Driveway intersection (#12) is expected to operate at LOS F during the AM peak hour and at LOS E during the PM peak hour under Existing Plus Background with Project Conditions. However, the peak hour operations at this location are not considered significant since the delay is only associated with vehicles exiting the Project driveway (the significance criteria are assumed not to apply to unsignalized development driveways for reasons described previously). This delay could influence driver behavior such that some drivers exit the site via the full-access and signalized San Pablo Avenue/Central Project Driveway intersection (#10); the signalized driveway has the available capacity to adequately accommodate a re-distribution of volume from the unsignalized driveway on Sycamore Avenue during peak hours. Therefore the Project impact to the Sycamore Avenue/Project Driveway intersection (#12) is considered less-than-significant and no changes to the driveway design are recommended.

6.0 CUMULATIVE CONDITIONS

This chapter discusses Cumulative (year 2040) vehicle traffic conditions both without and with the Project. The future conditions analysis considers development within the City of Hercules, consistent with the development assumptions incorporated into the City's upcoming General Plan Circulation – Element Update.

6.1 CUMULATIVE FORECASTS

Cumulative 2040 intersection turning movement forecasts were developed by DKS Associates in March 2017. The 2040 forecasts are consistent with the turning movement forecasts assumed in the upcoming City of Hercules General Plan – Circulation Element Update, which account for the current land use growth within the City anticipated by year 2040. The 2040 forecasts developed for the Circulation Element Update assume some level of development at the current Project site; however, the forecasts were not adjusted to subtract the growth anticipated from the Project site. As a result, the Cumulative without Project forecasts account for some growth associated with development of the Project site, thus giving a conservative (i.e., high) evaluation. The Cumulative without Project forecasts are presented on **Figure 13**. The Project vehicle volumes in Figure 9 were added to the peak hour traffic volumes from Figure 13 and pass-by trips were applied to estimate the Cumulative with Project peak hour traffic volumes, as shown on **Figure 14.**

6.2 CUMULATIVE ROADWAY ASSUMPTIONS

In addition to the roadway improvements assumed under Existing Plus Background Conditions, the *Hercules New Town Center Environmental Impact Report* (City of Hercules, Certified in 2009) identifies the following mitigation measures within the study area:

- On Page 4.14-41, "Mitigation TR1: Sycamore Avenue between Willow Avenue and San Pablo Avenue shall be widened from a six-lane to a seven-lane cross-section by widening the Project site frontage on Sycamore Avenue by about 12 feet (the width of a travel lane)." The widening would extend the existing lane configuration storage lengths. In the addition, the mitigation measures assumes that the westbound left-turn lane at the Willow Avenue/Sycamore Avenue intersection (#4) would be extended to 300 feet, and that the traffic signals at San Pablo Avenue/Sycamore Avenue (intersection #2) and at Willow Avenue/Sycamore Avenue (intersection #4) would be optimized.

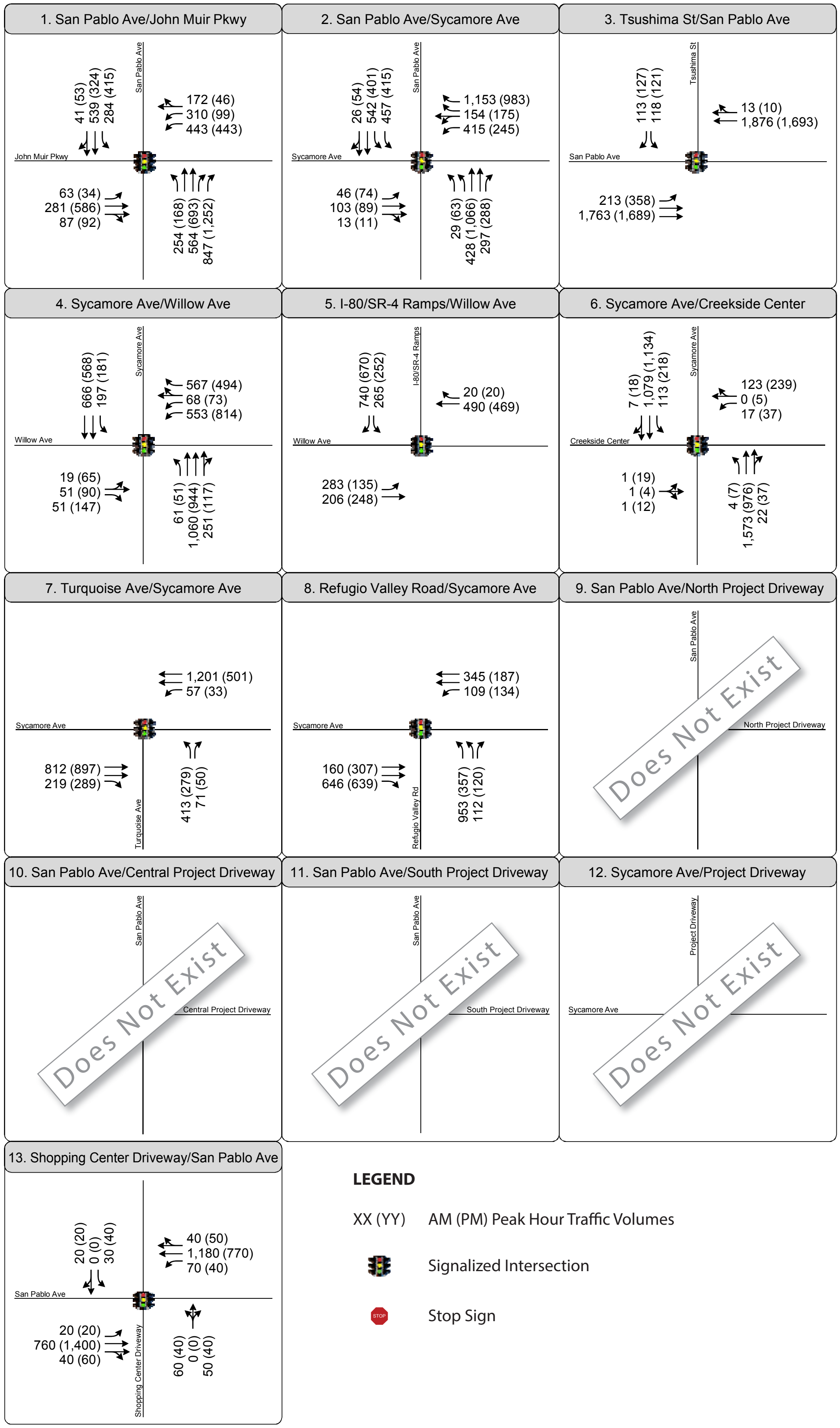


Figure 13

Cumulative without Project

Peak Hour Volumes, Lane Configurations and Traffic Controls

OK16-0151_13_Vol-Cumu

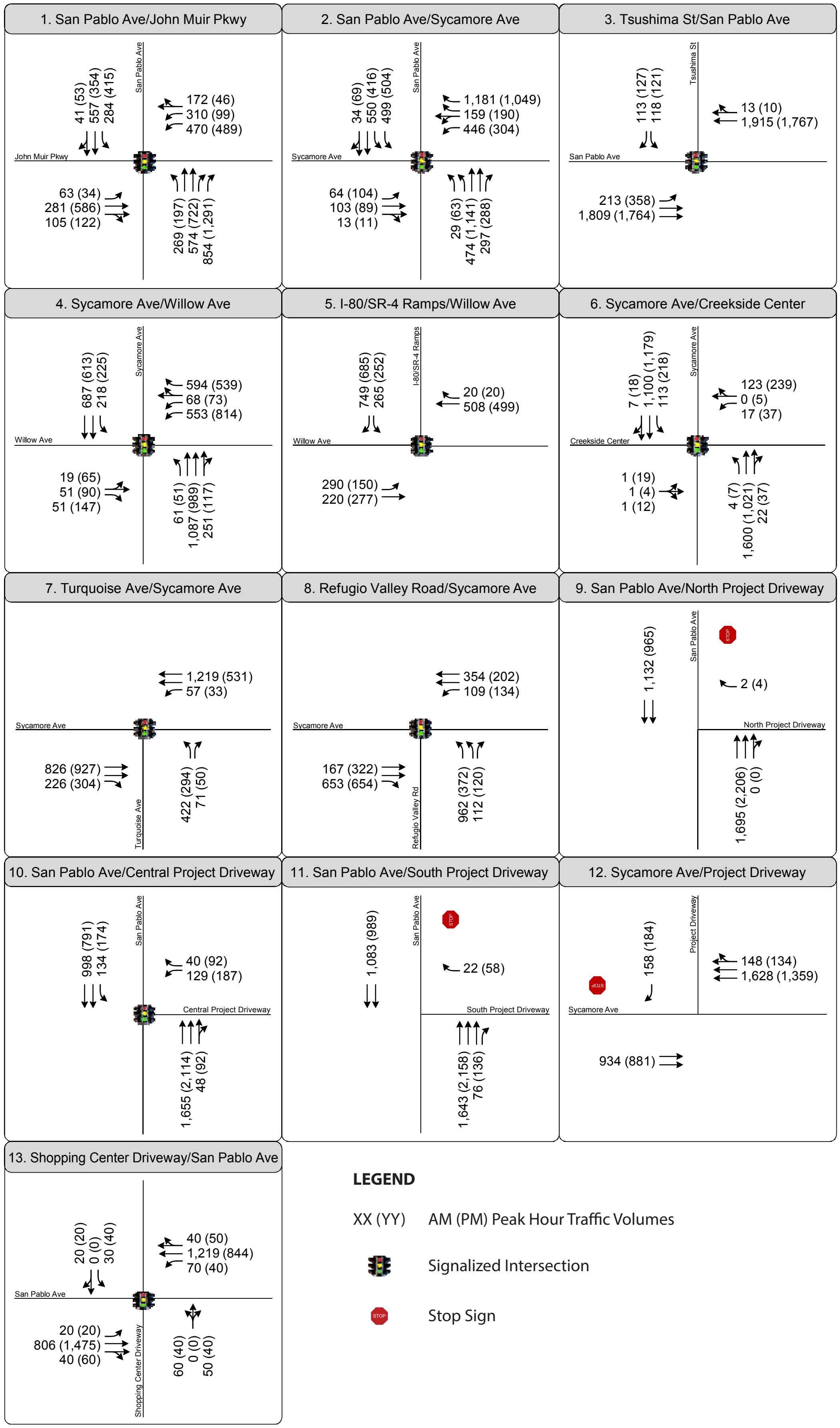


Figure 14

Cumulative with Project
Peak Hour Volumes, Lane Configurations and Traffic Controls

- On Page 4.14-43, "Mitigation TR3: The Willow Avenue/I-80/SR 4 Ramps intersection (#5) shall be signalized, a 300 foot westbound right-turn pocket from Willow Avenue onto the SR 4 eastbound on-ramp shall be installed, and the Willow Avenue eastbound left-turn lane to the SR 4 eastbound on-ramp shall be extended to 300 feet. The lane addition and extension would require widening the intersection by 12 to 14 feet."
- On Page 4.14-66, "Mitigation TR11: A second right-turn lane shall be provided from northbound San Pablo Avenue to eastbound John Muir Parkway (study intersection #1). The second right-turn lane shall be extended along the PNR frontage to the San Pablo Avenue/PNR Driveway intersection" *(study intersection #10)*. "EB (*eastbound*) John Muir Parkway shall be widened to four lanes from San Pablo Avenue to the SR 4 and I-80 ramps. This widened segment of John Muir Parkway would allow the two NB (*northbound*) San Pablo Avenue right-turn lanes to have exclusive receiving lanes that serve the I-80 westbound on-ramp (this would also require widening the I-80 westbound on-ramp from one to two lanes)."

According to the City of Hercules, the mitigation measures described above are planned and expected to be funded and constructed by year 2040, whether or not the current Project would receive approval from the City. Therefore the improvements listed above are assumed in the Cumulative without and with Project analysis. The Cumulative without Project intersection lane configurations and traffic controls are shown on Figure 13, the Cumulative with Project intersection lane configurations and traffic controls are shown on Figure 14.

6.3 CUMULATIVE CONDITIONS INTERSECTION OPERATIONS

Cumulative without and with Project Conditions were evaluated using the same methods described in Chapter 1. The intersection analysis results are presented on **Table 6-1**, based on the vehicle volumes presented on Figure 13 and Figure 14. Detailed intersection LOS calculation worksheets are presented in **Appendix I**.

As shown on Table 6-1, all study intersections are projected to operate at an overall acceptable level of service with the addition of Project traffic. The San Pablo Avenue/Sycamore Avenue intersection is expected to degrade from LOS D to LOS E during the PM peak hour with the Project which is considered acceptable for this intersection. The side-street movement at the following intersection is expected to operate at unacceptable LOS under Cumulative with Project Conditions:

TABLE 6-1
CUMULATIVE PEAK HOUR INTERSECTION LOS[1, 2]

ID	Intersection	Peak Hour	Control[3]	Cumulative without Project		Cumulative with Project		Significant Impact?
				Delay	LOS	Delay	LOS	
1.	San Pablo Avenue/John Muir Parkway/SR-4 Ramps	AM PM	Signal	71 63	E E	72 70	E E	No No
2.	San Pablo Avenue/Sycamore Avenue	AM PM	Signal	48 45	D D	54 56	D E	No No
3.	San Pablo Avenue/Tsushima Street	AM PM	Signal	12 28	B C	12 31	B C	No No
4.	Willow Avenue/Sycamore Avenue	AM PM	Signal	27 31	C C	30 36	C D	No No
5.	Willow Avenue/I-80/SR 4 Ramps	AM PM	Signal	17 12	B B	18 13	B B	No No
6.	Creekside Center/Sycamore Avenue	AM PM	Signal	8 12	A B	8 12	A B	No No
7.	Turquoise Drive/Sycamore Avenue	AM PM	Signal	12 8	B A	12 8	B A	No No
8.	Sycamore Avenue/Refugio Valley Road	AM PM	Signal	36 28	D C	36 28	D C	No No
9.	San Pablo Avenue/North Project Driveway	AM PM	SSSC	-	-	1 (21) 1 (29)	A (C) A (D)	No No
10.	San Pablo Avenue/Central Project Driveway	AM PM	Signal	-	-	11 15	B B	No No
11.	San Pablo Avenue/South Project Driveway	AM PM	SSSC	-	-	1 (23) 1 (49)	A (C) A (E)	No No
12.	Sycamore Avenue/Project Driveway	AM PM	SSSC	-	-	4 (**63**) 3 (**46**)	A (**F**) A (**E**)	No No
13.	San Pablo Avenue/Shopping Center Driveway	AM PM	Signal	9 8	A A	9 9	A A	No No

Notes:
1. Analysis results present delay (seconds per vehicle) and LOS based on delay thresholds published in the HCM (Transportation Research Board, 2010). For side-street stop controlled intersections, average delay is listed first, followed by the delay for the worst movement in parentheses. Average delay is listed for signalized and all-way stop control intersections.
2. **Bold text** indicates deficient intersection operations. Deficient operations are LOS E or LOS F, with the exception of intersections along San Pablo Avenue where LOS F is deficient (LOS E is acceptable along San Pablo Avenue).
3. AWSC = all-way stop control, SSSC = side-street stop control, Signal = traffic signal control.

Source: Fehr & Peers, July 2017.

- The stop-controlled southbound right-turn movement at the Sycamore Avenue/Project Driveway intersection (#12) is expected to operate at LOS F during the AM peak hour and at LOS E during the PM peak hour due to the high vehicle delay for the southbound right-turn vehicles departing the Project site trying to find an acceptable gap in vehicle traffic along westbound Sycamore Avenue.

6.3.1 INTERSECTION PEAK HOUR QUEUING ANALYSIS

The Cumulative without and with Project Conditions AM and PM peak hour 95th percentile queuing summary is presented in **Table C-3** in Appendix C.

The northbound right-turn 95th percentile queue length at the San Pablo Avenue/John Muir Parkway intersection (#1) is expected to decrease substantially with implementation of the second northbound right-turn lane. The 95th percentile queue length is expected to be contained within the provided storage during the AM peak hour under Cumulative without and with the Project Conditions. The PM peak hour 95th percentile queue length is expected to extend 800 feet upstream of the intersection under Cumulative without Project Conditions, the Project would increase the 95th percentile queue length by about 40 feet. The northbound queue length would potentially block access to vehicles exiting the Project site at all three driveways on San Pablo Avenue during the PM peak hour.

The 95th percentile queues along westbound Sycamore Avenue at San Pablo Avenue (intersection #2) are expected to continue to extend upstream to the Willow Avenue intersection without and with the Project during the AM and PM peak hours. The westbound Sycamore Avenue queue is also expected to block the proposed Project driveway on Sycamore Avenue during the AM and PM peak hours.

Overall, the 95th percentile queues are generally expected to increase between 20 and 100 feet with the Project at study intersections surrounding the Project site. The 95th percentile queue along the southbound left-turn lane at the Central Project Driveway is expected to be accommodated within the 125-foot storage capacity during the AM and PM peak hours. The 95th percentile queue length exiting the Central Project Driveway is estimated to be about 100 feet during the AM peak hour and 160 feet during the PM peak hour, the proposed driveway throat depth is about 120 feet. The 95th percentile queue lengths at the three right-turn out Project driveways are estimated to be less than 100 feet at each driveway during the AM and PM peak hours.

6.3.2 INTERSECTION PEAK HOUR SIGNAL WARRANT ANALYSIS

The peak hour volume traffic signal warrant (Warrant 3A) for urban conditions, found in the *California Manual on Uniform Traffic Control Devices* (MUTCD) was evaluated for the unsignalized study intersections.

As shown on **Table 6-2**, the Sycamore Avenue/Project Driveway intersection (#12) would meet the peak hour signal warrant under Cumulative with Project Conditions. Detailed signal warrant calculations are provided in Appendix D.

TABLE 6-2
CUMULATIVE INTERSECTION PEAK HOUR SIGNAL WARRANT ANALYSIS

Location	Control[1]	Peak Hour Warrant Met? (Cumulative without Project Conditions)	Peak Hour Warrant Met? (Cumulative with Project Conditions)
9. San Pablo Avenue/North Project Driveway	SSSC	N/A	No
11. San Pablo Avenue/South Project Driveway	SSSC	N/A	No
12. Sycamore Avenue/Project Driveway	SSSC	N/A	**Yes**

Notes:
1. SSSC = side-street stop-control.
Source: Fehr & Peers, July 2017.

6.4 CUMULATIVE WITH PROJECT IMPACTS AND MITIGATION MEASURES

As shown on Table 6-1, the Project is expected to increase delay at study intersections, but the increases in delay would not trigger significant impacts based on the City of Hercules significance criteria. The side-street movement from the Sycamore Avenue/Project Driveway intersection (#12) is expected to operate at LOS F during the AM peak hour and at LOS E during the PM peak hour under Cumulative with Project Conditions. However, the peak hour operations at this location are not considered significant since the delay is only associated with vehicles exiting the Project driveway (the significance criteria are assumed not to apply to unsignalized development driveways for reasons described previously). This delay could influence driver behavior such that some drivers exit the site via the full-access and signalized San Pablo Avenue/Central Project Driveway intersection (#10); the signalized driveway has the available capacity to adequately accommodate a re-distribution of volume from the unsignalized driveway on Sycamore Avenue during peak hours. Therefore the Project impact to the Sycamore Avenue/Project Driveway intersection (#12) is considered less-than-significant and no changes to the driveway design are recommended.

7.0 SITE PLAN REVIEW

This chapter presents a description of the proposed San Pablo street design, evaluates site access and circulation for all modes of travel, reviews fuel center circulation and parking requirements, and analyzes sight distance for the San Pablo Avenue/South Project Driveway and Sycamore Avenue/Project Driveway intersections. This review is based on the site plan presented on Figure 2.

7.1 SAN PABLO AVENUE DESIGN

Along the Project site frontage, San Pablo Avenue provides two travel lanes in the southbound direction and three travel lanes in the northbound direction (one of the northbound travel lanes becomes a dedicated right-turn lane at the San Pablo Avenue/John Muir Parkway intersection) with a 40 mile per hour speed limit). Adjacent to the Project site, it currently carries about 2,700 vehicles per hour (in both directions combined) during both the AM and PM peak hours. About 61-66% of these (or 1,700 vehicles) travel in the peak commute direction which is northbound in the morning and evening. The remaining 34-39% (or 1,000 vehicles) travel in the off-peak direction.

Under Cumulative (year 2040) with Project Conditions, San Pablo Avenue is projected to carry approximately 2,900 vehicles during the AM peak hour and 3,200 vehicles during the PM peak hour (in both directions combined). Given the existing and forecasted peak hour volumes along San Pablo Avenue, maintaining the existing number of travel lanes within the study is recommended as the existing capacity is necessary to meet the City's level of service objectives for San Pablo Avenue. In addition, San Pablo Avenue plays a regional role as a reliever route for I-80. The current speed limit is 40 miles per hour and this design speed is expected to decrease with the addition of urban land use, sidewalks, pedestrian scale design elements such as street lighting, signals, and crosswalks due to planned development at the Project site and the adjacent Sycamore Crossing site.

The highest turning movement volume along the corridor is the northbound right-turn volume from San Pablo Avenue to eastbound John Muir Parkway, which is forecasted to be about 1,300 vehicles during the PM peak hour under Cumulative with Project Conditions. As described in Chapter 6, the City of Hercules has a planned improvement to add a second right-turn lane from northbound San Pablo Avenue to eastbound John Muir Parkway (study intersection #1). The lane would extend along the Project site frontage from the San Pablo Avenue/Central Project Driveway (study intersection #10). Providing the second northbound right-turn lane is also necessary to meet the City's level of service objectives for San Pablo Avenue.

7.2 VEHICLE SITE ACCESS AND CIRCULATION

Access to the Project site is provided from the following four driveways:

- A new right-in/right-out driveway on San Pablo Avenue (study intersection #9) south of John Muir Parkway. The driveway would primarily serve as the truck access driveway to facilitate deliveries of goods to and from the Project site.
- A signalized full-access driveway located on San Pablo Avenue (study intersection #10). The driveway currently exists and is signalized, however the Project site is currently fenced off on the east side of the intersection. The Project would maintain the traffic signal and the 125 foot southbound left-turn lane. The northbound approach would provide two through lanes and a shared through/right-turn lane, the westbound approach would provide a left-turn lane and a right-turn lane to facilitate vehicles exiting the Project site. This is the only full access driveway that would be provided on-site and is expected to be the primary access driveway for the site.
- A new right-in/right-out driveway on San Pablo Avenue (study intersection #11) north of Sycamore Avenue Parkway. The driveway would provide primary access to the proposed gas station, bank and coffee shop from San Pablo Avenue. The driveway would provide a 100 foot right-turn lane along the northbound San Pablo Avenue approach.
- An existing right-in/right-out driveway located on Sycamore Avenue (study intersection #12) between San Pablo Avenue and Willow Avenue. The driveway would provide primary access to the proposed supermarket and gas station from Sycamore Avenue.

Intersection operations, LOS and 95th percentile queuing at these four access points are summarized in previous chapters.

> ***Recommendation 1:*** Ensure that proposed site improvements along the Project frontage on San Pablo Avenue would not preclude the planned construction of the second northbound right-turn lane at the San Pablo Avenue/John Muir Parkway intersection (#1); the second right-turn lane would extend between John Muir Parkway and the Central Project Driveway on San Pablo Avenue.

> ***Recommendation 2:*** Ensure that proposed site improvements along the Project frontage on Sycamore Avenue would not preclude the planned widening from a six-lane to a seven-lane cross-section between Willow Avenue and San Pablo Avenue. The widening would extend the existing lane configuration storage lengths.

The Project site plan shows a dead-end drive aisle with a turn-around area in the isolated parking lot provided on the west side of the Safeway building, adjacent to the San Pablo Avenue/North Project

Driveway intersection (#9). The proposed drive aisles throughout the site conform to adopted roadway design standards (minimum 25 feet for drive aisles with 90 degree parking stalls) of the Hercules Zoning Ordinance (Table 32-3).

7.2.1 FUEL CENTER

The proposed Project would construct a fuel center with 20 fueling positions and a 2,500 square-foot convenience retail kiosk on the south end of the site. As shown on the site plan presented on Figure 2, queuing space for about 23 vehicles, in addition to vehicles at each fueling station, would be provided. Conservatively, the following recommendations reflect a Safeway fuel center which is considered a "worst-case" scenario in terms of trip generation and queuing.

Recommendation 3:

- Consider replacing hardscape features, such as landscape islands, around the fuel center with more flexible, temporary spaces (softscape features) such as painted islands or potted plant barriers, to allow for additional site modifications to be made, if needed, without reconstructing the parking area.
- Monitor and reevaluate fuel center operations and queuing at three month and six month periods.
- Provide fuel ambassadors on-site to direct vehicle queues in times of high demand as well as in the opening months.

Based on queuing study performed at the Pleasant Hill Safeway fuel center location in 2014, 20 fueling stations were estimated to generate an average queue of 12-13 vehicles and maximum queue of 22-23 vehicles, in addition to vehicles at each fueling station, during periods of typical demand. Therefore the proposed queuing space of 23 vehicles is expected to adequately serve the average and maximum queue lengths during typical peak demand periods.

The Safeway fuel centers can experience abnormally high demand. Depending on the monitoring reports developed after the three month and six months periods, additional precautions that provide an appropriate margin of safety in the event that queuing problems occur may be needed.

7.2.2 DELIVERY TRUCKS

For the Safeway supermarket, heavy truck access is provided via all three Project driveways on San Pablo Avenue. The current site plan indicates heavy trucks accessing the Safeway supermarket would enter the site via the signalized San Pablo Avenue/Central Project Driveway intersection (#10), drive through the front of the supermarket and around the building, then back-up into one of two dedicated loading spaces. To exit the site, trucks would pull forward and exit out the right-turn in/right-turn out only San Pablo Avenue/North Project Driveway (intersection #9) to access eastbound SR 4 or westbound I-80.

Delivery trucks for the gas station would enter site via the San Pablo Avenue/Central Project Driveway (intersection #10) or the San Pablo Avenue/South Project Driveway (intersection #11) and then pull forward to proposed tank locations to refill with gasoline. To exit the site, trucks would pull forward, travel through the Supermarket parking lot, and exit out of the right-turn in/right-turn out only San Pablo Avenue/North Project Driveway (intersection #9) to access eastbound SR 4 or westbound I-80.

7.2.3 EMERGENCY VEHICLE ACCESS

Several factors determine whether a project has sufficient access for emergency vehicles, including:

1. Number of access points (both public and emergency access only)
2. Width of access points
3. Width of internal roadways

The Project site would be accessible to emergency vehicles via three driveways on San Pablo Avenue and one driveway on Sycamore Avenue. The Project entry points provide sufficient width (minimum 25 feet) to accommodate turning movements of large emergency vehicles.

> ***Recommendation 4:*** The fire department should review the site plan for fire hydrant placement and emergency vehicle access.

As stated previously, the interior Project drive aisles conform to adopted City of Hercules roadway design standards (minimum 25 feet for drive aisles with 90 degree parking stalls). Therefore, it is unlikely that an emergency vehicle would be blocked or obstructed while driving within the Project site.

7.3 PEDESTRIAN ACCESS AND CIRCULATION

The Project proposes a 10-foot Class I multi-use path along the Project frontage on San Pablo Avenue and Sycamore Avenue, the facility would be shared with pedestrians and bicyclists. In compliance with the *Regulating Code for the Central Hercules Plan* (City of Hercules, July 2001), a landscape strip with a width of five-feet is provided along San Pablo Avenue separating pedestrians from vehicular traffic; a landscape strip with a width of two-feet is provided along Sycamore Avenue. The use of at least 10-foot sidewalks/multi-use trail separated from the street is a best practice, providing a high degree of comfort to pedestrians.

The Central Hercules Plan identifies Sycamore Avenue as a "Four-Lane Avenue" street type, which recommends a minimum combined sidewalk and landscaping strip width of 12-feet. The site plan does not specify proposed curb ramps and crosswalks at any of the four Project driveways.

> ***Recommendation 5:*** Modify the Central Hercules cross-section for "Four-Lane Avenue" to reflect the appropriate bikeways to resolve inconsistencies with the *Contra Costa Countywide Bicycle and Pedestrian Plan* (CCTA, 2009) to allow for a 10-foot Class I multi-use path along the Sycamore Avenue and San Pablo Avenue frontage with landscaping strip between the Class I path and the roadway, to be consistent with the Central Hercules Plan design guidelines. Alternatively, the sidewalk could be reduced and a Class II bicycle facility provided on the Sycamore Avenue frontage.

> ***Recommendation 6:*** Provide American Disability Act (ADA) directional curb ramps and crosswalks at all four Project driveways.

Pedestrian circulation within the site is provided with internal sidewalks and paths, crosswalks, and pedestrian refuge areas. One area of concern adjacent to the Project site is the crosswalk provided across San Pablo Avenue on the north side of the intersection with Sycamore Avenue (study intersection #2). The Project is expected to increase the pedestrian crossings at this crosswalk to/from residential developments on the west side of San Pablo Avenue. Two right-turn lanes are provided from westbound Sycamore Avenue onto northbound San Pablo Avenue, which would conflict with pedestrians crossing the northern crosswalk. It may be difficult for drivers in the inner right-turn lane to see pedestrians on the crosswalk in the event that vehicle queues in the outer right-turn lane block the visibility to the crosswalk, and vice versa.

> ***Recommendation 7:*** Update the traffic signal phasing at the San Pablo Avenue/Sycamore Avenue intersection (#2) to provide a pedestrian leading interval phase prior to the westbound Sycamore Avenue movement phase. The pedestrian leading interval would allow pedestrians to enter the crosswalk before the vehicles on the westbound right-turn lanes; this improvement would increase the visibility of pedestrians in the crosswalk to drivers making a right-turn.

Another area of concern is the pedestrian crossing at the channelized northbound right-turn lane of the San Pablo Avenue/John Muir Parkway intersection (#1), the existing channelized island encourages vehicles to maneuver the right-turn at higher speeds compared to a 90-degree turn.

> ***Recommendation 8:*** Provide high-visibility cross-walk striping along the east leg and south leg of the San Pablo Avenue/John Muir Parkway intersection (#1) to increase driver awareness of pedestrian crossings at the intersection.

Recommendation 9: As part of the planned improvements to provide a second northbound right-turn lane at the San Pablo Avenue/John Muir Parkway intersection (see Section 6.2 for more information), maintain the right-turn channelized island and install a pedestrian/bicycle actuated signal to allow pedestrians (and bicyclists) to safely cross the dual northbound right-turn lanes.

7.4 BICYCLE ACCESS AND CIRCULATION

Bicycle access is provided to the Project site by the Class II bike lanes on San Pablo Avenue and discontinuous Class II bike lanes on Sycamore Avenue, as presented on Figure 4. Bicycles would also be permitted in the vehicular travel way on-site. As described in Chapter 2 and shown on Figure 4, the *Contra Costa Countywide Bicycle and Pedestrian Plan* (CCTA, 2009) identifies planned Class I bike paths along the Project frontage on San Pablo Avenue and Sycamore Avenue. The existing Class II bike lanes along both directions of San Pablo Avenue would also remain on-street for the more avid bicyclists. The proposed 10-foot Class I multi-use paths along San Pablo Avenue and Sycamore Avenue would provide lower stress bicycle facilities and maintain compliance with the Countywide Bicycle Plan.

The site plan shows at least 28 bicycle parking spaces, 14 in securable bike lockers and 14 in bike racks, with the total spaces equivalent to at least ten percent of the total vehicle spaces within the parking lot.

7.5 TRANSIT ACCESS ADJACENT TO THE SITE

As summarized in Table 2-1 and shown on Figure 5, the Western Contra Costa County Transit Authority (WestCAT) operates several local, regional and Transbay routes within the vicinity of the project site. The nearest transit stops are located at the Hercules Transit Center, on northbound San Pablo Avenue just south of Sycamore Avenue, and on southbound San Pablo Avenue just south of Tsushima Street. If desired by WestCAT and City of Hercules staff, new bus stops along the Project site frontage can be considered at the locations specified in Recommendation 10 below.

Recommendation 10: Consider providing a bus stop island (minimum eight feet wide and 40 feet long) along southbound San Pablo Avenue just north of the Central Project Driveway (intersection #10) and along northbound San Pablo Avenue just north of the South Project Driveway (intersection #11). The bus stop islands would be designed to ADA standards, would not conflict with the existing Class II bicycle lanes on San Pablo Avenue, and would allow buses to stop in-line along both directions of San Pablo Avenue.

In-line bus stops can only be implemented on the condition that the speed limit is reduced to 30 mph or less along San Pablo Avenue (the speed limit is currently set at 40 mph). Bus stop pull-outs are not recommended along the Project frontage due to existing queue lengths that would block the bus stops and make it difficult for buses to maneuver from the bus stop into the travel lane; in addition, the existing wetlands on the west side of San Pablo Avenue would preclude widening the roadway to provide a bus-stop pull out along southbound San Pablo Avenue. The bus stop on the west side of San Pablo Avenue can only be provided when the City is able to secure funding to construct a sidewalk on the west side of San Pablo Avenue, north of Sycamore Avenue. Draft roadway layouts with proposed bus stop design should be provided to WestCAT and the City of Hercules staff for review.

Additional transit bus service is planned in the vicinity of the Project with the construction of the City's Intermodal Transit Center 0.5 miles to the northwest of the Project site. Additionally, the Hercules Transit Center is located about 0.5 miles east of the Project site on Willow Avenue. Continuous sidewalks are provided between the Project site and the Hercules Transit Center. The Hercules Transit Center is served by WestCAT, providing travel within Hercules, to regional shopping, to BART stations, and to San Francisco. With additional retail in the area, it is expected that demand for transit would increase.

7.6 PARKING

City of Hercules requirements for parking were reviewed based on information provided in Section 32.300 of the City of Hercules Zoning Ordinance. **Table 7-1** summarizes the minimum parking requirement for the Project and the proposed parking supply, which is calculated at four parking spaces per 1,000 square feet of retail in shopping centers less than 100,000 square feet for banks, convenience retail (kiosk), and retail stores/sales. Local/family restaurants would require 10 spaces per 1,000 square feet. The Project is required to provide 274 parking spaces; in addition the City of Hercules Zoning Ordinance requires a minimum of two loading spaces. Based on the current site plan, the Project proposes to provide 247 parking spaces and two loading spaces, resulting in a parking deficit of 27 spaces. The minimum parking requirements for the proposed coffee shop are 10 spaces per 1,000 square feet but would be 17 spaces per 1,000 square feet if considered a fast food/drive-through use.

TABLE 7-1
CITY OF HERCULES ZONING ORDINANCE OFF-STREET PARKING REQUIREMENTS

Land Use	Size[1]	Rate	Total Spaces
Supermarket	57.1 KSF	4 Spaces per 1 KSF	228
Bank	4.0 KSF	4 Spaces per 1 KSF	16
Coffee Shop – Local/Family	2.0 KSF	10 Spaces per 1 KSF	20
Gas Station Kiosk	2.5 KSF	4 Spaces per 1 KSF	10
		Total without Parking Reduction	***274***
		Total with 10% Parking Reduction[2]	***247***
		Parking Supply	***247***
		Parking Surplus (Deficit)	***0***

Notes:
1. KSF = 1,000 feet.
2. 10 percent parking reduction was applied to account for internal trips and trips that would be made via transit, walking or biking.

Source: Fehr & Peers, July 2017.

Although the Project would provide less parking than required, the City of Hercules Zoning Ordinance (Chapter 45, Minor Exceptions) allows a 10 percent reduction in minimum parking requirements, taking into account internal trips and trips that would be made via transit, walking or biking. With the 10 percent allowance, the Project would only be required to provide 247 spaces; the Project currently proposes 247 spaces resulting in no surplus of spaces.

A drive-through option would typically be expected to reduce on-site parking demand, the inclusion of a drive-through for the proposed coffee shop would be classified as a fast food facility, which has a much higher minimum parking requirement (17 spaces per 1,000 square feet) compared to other land uses. With the drive-through, the total minimum number of spaces would be 288. Even allowing for a 10% reduction, the minimum number of required spaces would be 259, in which case the project would have a deficit of 12 spaces.

> ***Recommendation 11:*** Provide parking as listed above per the City of Hercules Zoning Ordinance Chapter 32, allowing for a 10 percent reduction (as provided in a minor exception process) due to visitors that would access the site via transit, walking or biking.

The City of Hercules Zoning Ordinance requires minimum parking stall dimensions of nine feet by 18 feet and minimum drive aisle widths of 25 feet for two-way traffic. The Project proposes 25-foot drive aisles throughout the site and most parking stall dimensions are nine feet by 18 feet; however the Project also proposes 23 compact parking spaces that are nine feet wide and range between 15 and 16 feet in length (up to 40 percent of all on-site parking may be compact per City Code). All parking dimensions and drive aisles shown on the Project site plan should meet the minimum design standards required by the Central Hercules Plan.

> ***Recommendation 12:*** To be consistent with the City of Hercules Zoning Ordinance requirements, all parking stall dimensions should be a minimum of nine feet by 18 feet with minimum drive aisle widths of 25 feet (for two-way traffic) throughout the site but allowing for up to 40 percent of all on-site parking spaces to be compact stalls (Zoning Ordinance Section 32.300.1).

7.7 SIGHT DISTANCE ANALYSIS

A stopping sight distance (SSD) and corner sight distance (CSD) evaluation for the San Pablo Avenue/South Project Driveway (intersection #11) and the Sycamore Avenue/Project Driveway (intersection #12) was conducted due to concerns of the driveway spacing with adjacent intersections. Chapter 400 of the *Caltrans Highway Design Manual* (HDM) defines the minimum required sight distances for different design speeds. The HDM defines two kinds of sight distance: SSD and CSD. SSD is the distance required by the driver of a vehicle, traveling at a given speed, to bring the vehicle to a stop after an object on the road becomes visible and in advance of reaching the object. CSD is the intersection line of sight maintained between the driver of a vehicle waiting at the crossroad and the driver of an approaching vehicle. Failure to meet the minimum sight distances could warrant the installation of traffic control.

7.7.1 SAN PABLO AVENUE/SOUTH PROJECT DRIVEWAY (#11)

San Pablo Avenue has a posted speed limit of 40 mph within the study area. A 40 mph design speed has a minimum SSD of 300 feet and a minimum CSD of 440 feet, based on the HDM. CSD at the proposed San Pablo Avenue southern driveway is about 500 feet, which provides adequate SSD for vehicles on northbound San Pablo Avenue and adequate CSD for vehicles exiting the project site at San Pablo Avenue. Furthermore, the proposed San Pablo Avenue southern driveway is about 125 feet north of Sycamore Avenue, which provides adequate SSD for vehicles turning right onto northbound San Pablo Avenue from Sycamore Avenue assuming a 20 mph turning speed (minimum SSD is 125 feet); a 20 mph turning speed assumption is conservative, most vehicle turning speeds would likely range between 9 and 15 mph.

7.7.2 SYCAMORE AVENUE/PROJECT DRIVEWAY (#12)

Sycamore Avenue has a posted speed limit of 35 mph within the study area. A 35 mph design speed has a minimum SSD of 250 feet and a minimum CSD requirement of 385 feet, based on the HDM. CSD at the

Sycamore Avenue driveway is about 400 feet, which provides adequate SSD for vehicles on westbound Sycamore Avenue, and adequate CSD for vehicles exiting the project site at Sycamore Avenue. In addition, the proposed Sycamore Avenue driveway is greater than 125 feet west of Willow Avenue, which provides adequate SSD for vehicles turning right onto westbound Sycamore Avenue from Willow Avenue assuming a 20 mph design speed (minimum SSD requirement is 125 feet).

The current driveway location would provide about 150 feet between the proposed driveway and San Pablo Avenue on Sycamore Avenue; therefore, vehicles that exit the Sycamore Avenue driveway and then wish to turn left onto San Pablo Avenue or drive through on Sycamore Avenue would have 150 feet to weave across two lanes. As described in Chapter 2, vehicle queues along the westbound left-turn and through lanes at the San Pablo Avenue/Sycamore Avenue intersection (#2) often extend upstream to Willow Avenue during peak hours, which will block access to the left-turn and through lanes for vehicles exiting the proposed driveway. Therefore, providing right-out access at the Sycamore Driveway would likely increase the number of vehicles that block the westbound right-turn lanes approaching the San Pablo Avenue intersection during peak hours.

> ***Recommendation 13:*** Provide "Keep Clear" pavement striping on westbound Sycamore Avenue at the Project Driveway. The "Keep Clear" sign should extend 45 feet from the driveway centerline to west of the driveway. The pavement striping would provide a sufficient gap along the westbound Sycamore Avenue queuing so that vehicles exiting the Project driveway can turn into one of the approach lanes at the San Pablo Avenue/Sycamore Avenue intersection (#2).

> ***Recommendation 14:*** Maintain landscaping along San Pablo Avenue and Sycamore Avenue to avoid sight distance conflicts (shrubs should not be higher than approximately 30 inches and tree canopies should be no less than six feet from the ground).

> ***Recommendation 15:*** Ensure monument signage on San Pablo Avenue and Sycamore Avenue does not interfere with sight distance for drivers at all four Project driveways.

7.8 OTHER THRESHOLDS

7.8.1 CHANGE IN AIR TRAFFIC PATTERNS

The discussion of changes in air traffic patterns is based on an application of applicable significance standards. The Buchanan Field Airport in Concord, CA is the closest to the Project site and is located about 14 miles east of the site. The proposed building heights are not expected to interfere with current flight patterns of Buchanan Field Airport or other nearby airports. Therefore, the project would not result in change in air traffic patterns. The project would result in a less-than significant impact on air traffic patterns.

7.8.2 TRANSPORTATION HAZARDS

The discussion of transportation hazards is based on application the applicable significance standards. The Project site plan provides only conceptual drawings; the final project design will be reviewed to ensure consistency with applicable design standards, such as adequate sight distance for pedestrians and vehicles at project driveways.

The proposed Project would provide three access points on San Pablo Avenue and one on Sycamore Avenue. The project would also upgrade the pedestrian and bicycle infrastructure along the Project frontage. The final design for the project is expected to minimize potential conflicts between various modes and provide safe and efficient pedestrian, bicycle, and vehicle circulation within the site and between the Project and the surrounding circulation systems. This is a less-than-significant impact, and no mitigation measures are required.

7.8.3 CONSTRUCTION PERIOD IMPACTS

Off-site intersection impacts of the proposed project were found to be less-than-significant based on the significance criteria. However, there could be temporary, although significant impacts during the construction phase of the project. The discussion of construction-period impacts is based on an application of significance standards.

It is expected that the majority of construction truck related traffic will use I-80 and/or SR 4 to access the Project site as it provides the most direct and quickest access to the regional roadway network. Truck traffic that occurs during the weekday peak commute hours (7:00 to 9:00 a.m. and 4:00 to 6:00 p.m.) may result in worse LOS and higher delays at study intersections during the construction period.

> ***Recommendation 16:*** The Project applicant shall develop a Construction Traffic Management Plan as part of a larger Construction Management Plan to address potentially significant impacts during the project’s construction.

Thus, with the implementation of Recommendation 16, the proposed project would not result in a substantial, though temporary, adverse effect on the circulation system during construction of the project. This is a less-than-significant impact, and no mitigation measures are required.

7.8.4 CONSISTENCY WITH ADOPTED POLICIES AND PLANS OR PROGRAMS SUPPORTING ALTERNATIVE TRANSPORTATION

The discussion of consistency with adopted policies, plans or programs supporting alternative transportation is based on an application of the applicable significance standards. The Project would be consistent with these policies, plans and programs; this is a less-than-significant impact.

7.9 CONCLUSION

The Project is not expected to cause significant impacts to the transportation system surrounding the Project site; therefore, the analysis presented in this report did not identify any new significant impacts that were not disclosed as part of the *Hercules New Town Center Environmental Impact Report* (City of Hercules, Certified 2009).