Appendix K1

Trip Generation Assessment

DRAFT Memorandum

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Subject: Aquabella Master Plan Development Project Trip Generation Assessment

OC22-0948

This memorandum documents a trip generation assessment conducted by Fehr & Peers in support of the Aquabella Specific Plan Amendment (Project) located in Moreno Valley, California. The purpose of this memorandum is to document the methodology used to estimate the number Project trips and is inclusive of the trip reductions associated with internalization and proposed project features that will further reduce the number of trips generated by the Project.

Executive Summary

Fehr & Peers applied a combination of the following to develop trip generation estimates for the project:

- Institute of Transportation Engineers (ITE) Trip Generation 11th edition rates to estimate total vehicle trips
- The Environmental Protection Agency's (EPA's) MXD (mixed-used development) methodology to determine the projected trip internalization for the Project
- California Air Pollution Control Officers Association (CAPCOA) methodology to quantify vehicle trip reductions associated with Project Transportation Demand Management (TDM) strategies

Table ES-1 summarizes the Project trip generation estimates, internalization reductions, and reductions applied for proposed TDM measures.

Table ES-1: Final Project Trip Generation Estimate

TDM Measure	Daily	AM In	AM Out	AM Total	PM In	PM Out	PM Total
Total Project Trips	105,000	3,841	6,519	10,360	4,941	3,369	8,310
Total Internalization Trips	(22,575)	(1,777)	(1,777)	(3,554)	(856)	(856)	(1,712)
Residential Trip TDM Reductions	(4,853)	(62)	(203)	(265)	(242)	(148)	(390)
Employee Commute Trip TDM Reductions	(42)	(7)	(3)	(10)	(1)	(3)	(4)
Project-Generated Trip TDM Reductions	(1,116)	(29)	(66)	(95)	(55)	(34)	(89)
Final Net External Trip Generation	**76,414**	**1,966**	**4,470**	**6,436**	**3,787**	**2,328**	**6,115**

Source(s):

1. *Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition, 2021.*
2. *MXD+, Fehr & Peers, 2023.*
3. *California Air Pollution Control Officers Association (CAPCOA), 2021.*
4. *TDM+, Fehr & Peers, 2023.*

Project Description

The Project site is located on 637 acres of vacant land in the southeast area of Moreno Valley. Under maximum build-out of the Project, it would consist of the following land uses:

- 7,500 multifamily low-rise residential dwelling units (DUs)
- 7,500 multifamily mid-rise residential DUs
- Four acres of commercial (49,900 sq. ft.)
- 300-room hotel
- Three elementary schools (3,995 students)
- One middle school/junior high school (2,049 students)
- 25 acres of Active Sports Park
- 15 acres of Park and Lake Promenade

The commercial square footage was estimated at an approximate 0.25 floor-area-ratio. Student counts were estimated based on the Moreno Valley Unified School District student generation factors.

The Project is programmatic in nature and does not contain specifics regarding internal street design, site access, or building site plans. However, the following design aspects are assumed in the plan and will be included in the project description:

- The internal street network will follow a grid pattern with approximately 600-foot block lengths to provide a street network similar to a downtown, urban area. Increased intersection density is a proxy for street connectivity improvements, which help to facilitate a greater number of shorter trips including those made by walking, biking, scooter, etc
- The internal street network will contain an extensive bike network with Class II, buffered Class II and off-street paths, and will connect to the broader Moreno Valley bike network and support proposed micromobility modes (bikeshare, electric scooter)
- The internal street network will provide a comprehensive sidewalk network to facilitate walking

The Project proposes eleven design features that will help reduce the vehicle trips generated by the Project. These design features are known as Transportation Demand Management (TDM) measures and promote non-automotive modes of transportation such as walking, biking, scooter, public transit, and ridesharing. The following TDM measures are documented in the California Air Pollution Control Officers Association (CAPCOA) and are proposed by the Project:

- Residential Trip Reduction Measures:
    - Community-Based Travel Planning
    - Unbundle Residential Parking Costs from Property Costs
- Employee Commute Trip Reduction Measures:
    - Commute Trip Reduction (CTR) Program Marketing
    - Rideshare Program
    - End-of-Trip Bicycle Facilities
    - Discounted Transit Program for Work Trips
- Project-Generated Trip Reduction Measures:
    - Micromobility on-site and connecting to adjacent uses, such as schools and medical centers:
        - Non-Electric Bikeshare Program
        - Electric Scootershare Program

- Transit Network Improvements:
  - Extend Transit Network Coverage to existing and future employment centers, such as World Logistics Center
  - Extend Transit Hours for All Shift Times, such as the midnight shift change at World Logistics Center
  - Increase Transit Service Frequency
  - Bus Rapid Transit (BRT) along Alessandro Boulevard
  - A state-of-the-art mobility hub is proposed on-site to bolster the effectiveness active transportation options (mobility hubs are places of connectivity that bring together multiple modes of travel and strengthen first-mile/last-mile connections to transit)

The Project TDM measures are described in more detail in the Trip Generation TDM Reductions section of the memorandum.

Trip Generation

Trip generation refers to the process of estimating the amount of vehicular traffic a project would add to the surrounding roadway system. Estimates for the Project were created for the daily condition and for the peak one-hour period during the morning and evening commutes when traffic volumes on the adjacent streets are typically the highest.

Weekday morning and evening peak hour trips were estimated for most Project land uses using methods published in *Trip Generation, 11th Edition (Institute of Transportation Engineers [ITE], 2021)*. The following ITE trip generation rates were used to estimate Project trips:

- ITE Code 220 – Multifamily Housing (Low Rise)
- ITE Code 221 – Multifamily Housing (Mid-Rise)
- ITE Code 821 – Shopping Plaza (40 - 150 KSF)
- ITE Code 310 – Hotel
- ITE Code 520 – Elementary School
- ITE Code 522 – Middle School/Junior High School
- ITE Code 411 – Public Park

For the Active Sports Park, the ITE trip generation rates for park (ITE Code 411) were not applicable. The Active Sports Park will have facilities such as ball or soccer fields and is anticipated to generate more trips than a typical park. Fehr & Peers referenced the daily trip generation rate for a park in *Brief Guide of Vehicular Traffic Generation Rates for San Diego Region (San Diego Association of Governments ([SANDAG], 2002)*. The SANDAG daily trip generation rate (50.00) was combined with ITE Code 411's relationship between peak hour rates (AM peak hour rate = 0.02 and PM peak hour rate = 0.11) and the daily rate (0.78) to develop trip generation rates for the Active Sports Park.

Table 1 summarizes the trip generation rates used to develop the total trip generation estimates for Project, which are shown in **Table 2**.

Table 1: ITE Trip Generation Rates

Land Use	ITE Code	Quantity	Units	Daily Rate	AM In	AM Out	AM Rate	PM In	PM Out	PM Rate
Multifamily Housing (Low Rise)	220	7,500	DUs	6.74	24%	76%	0.40	63%	37%	0.51
Multifamily Housing (Mid-Rise)	221	7,500	DUs	4.54	23%	77%	0.37	61%	39%	0.39
Shopping Center (40 - 150 KSF)[1]	821	49.9	KSF	67.52	62%	38%	1.73	49%	51%	5.19
Hotel	310	300	Rooms	7.99	56%	44%	0.46	51%	49%	0.59
Elementary School	520	3,995	Students	2.27	54%	46%	0.74	46%	54%	0.16
Middle School/Junior High School	522	2,049	Students	2.10	54%	46%	0.67	48%	52%	0.15
Park and Lake Promenade	411	15	AC	0.78	59%	41%	0.02	55%	45%	0.11
Active Sports Park	-	25	AC	50.00	50%	50%	1.28[2]	50%	50%	7.05[3]

Note:
1. ITE Code 821 rates do not include a supermarket.
2. Active sports park AM rate = (SANDAG Daily Rate for Park) * (ITE Code 411 AM peak hour rate / ITE Code 411 Daily Rate).
3. Active sports park PM rate = (SANDAG Daily Rate for Park) * (ITE Code 411 PM peak hour rate / ITE Code 411 Daily Rate).

Source(s):
1. *Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition, 2021.*
2. *San Diego Association of Governments (SANDAG)'s Brief Guide of Vehicular Traffic Generation Rates for San Diego Region, 2002.*

Table 2: Total Trip Generation

Land Use	ITE Code	Quantity	Units	Daily Trips	AM In	AM Out	AM Total	PM In	PM Out	PM Total
Multifamily Housing (Low Rise)	220	7,500	DUs	50,550	720	2,280	3,000	2,410	1,415	3,825
Multifamily Housing (Mid-Rise)	221	7,500	DUs	34,050	638	2,137	2,775	1,784	1,141	2,925
			Residential Trips Subtotal	*84,600*	*1,358*	*4,417*	*5,775*	*4,194*	*2,556*	*6,750*
Shopping Center (40 - 150 KSF)[1]	821	49.9	KSF	3,369	53	33	86	127	132	259
Hotel	310	300	Rooms	2,397	77	61	138	90	87	177
Elementary School	520	3,995	Students	9,069	1,596	1,360	2,956	294	345	639
Middle School/Junior High School	522	2,049	Students	4,303	741	632	1,373	147	160	307
Park and Lake Promenade	411	15	AC	12	0	0	0	1	1	2
Active Sports Park	-[2]	25	AC	1,250	16	16	32	88	88	176
			Non-Residential Trips Subtotal	*20,400*	*2,483*	*2,102*	*4,585*	*747*	*813*	*1,560*
			Total Trip Generation	**105,000**	**3,841**	**6,519**	**10,360**	**4,941**	**3,369**	**8,310**

Note:

1. ITE Code 821 rates do not include a supermarket.

Source(s):

1. *Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition, 2021.*
2. *San Diego Association of Governments (SANDAG)'s Brief Guide of Vehicular Traffic Generation Rates for San Diego Region, 2002.*

Trip Generation Reductions

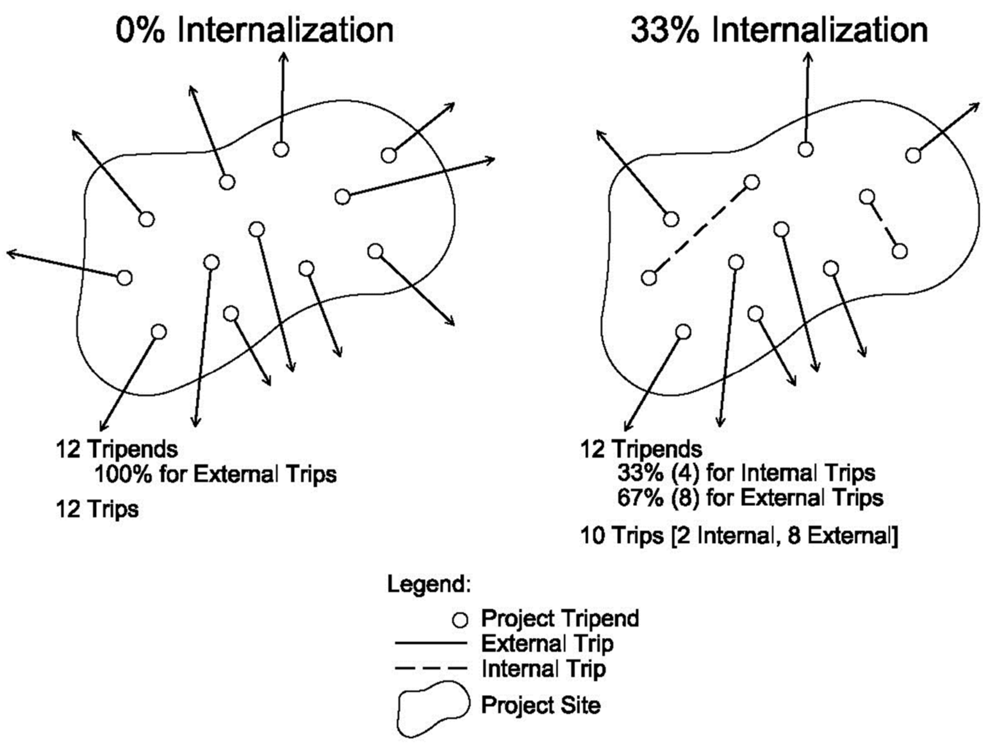
Below are summaries of the trip generation reductions that were applied to the Project.

Internal Capture Reductions

Given the mixed-use nature of the Project, it will not generate traffic in a similar manner to what is typically evaluated for most transportation studies. As such, the analysis evaluates the combined effects of the Project's mix of uses, regional location, demographics, and development scale that contribute to a reduction in off-site average weekday vehicle "trips" known as internalization, which accounts for trips beginning and ending on the project site.

The Environmental Protection Agency's (EPA's) MXD (mixed-used development) methodology was used to determine the projected trip internalization for the Project. This method more accurately estimates internalization of project trips compared to the traditional Institute of Transportation Engineers' (ITE) internalization methodology. The MXD model is more refined for the study area because it accounts for various attributes, such as density of the site, distance to transit, density of intersections, employment, household size, and variables that reduce vehicle trip-making behavior. Given the statistical robustness of the MXD method, it is more appropriate for estimating internalization of Project trips. Fehr & Peers' MXD+ tool (which incorporates the MXD methodology) was used to develop trip internalization for the Project.

Internal capture represents the percentage of Project tripends for trips that would remain internal to the Project site, which differs from the overall percentage of the net number of Project trips that remain internal to the Project site. In layman's terms, since each trip has two tripends (i.e., the beginning of the trip and the end of the trip), if a project generates 100 internalized trip ends, this represents 50 trips that are internal to the Project site (i.e., 100 tripends/2 tripends per trip = 50 trips). As such, when the number of trips is applied to the tripends component of the project, the total internal capture is roughly twice that which would otherwise be accounted for in the trips component. An example of the relationship between tripends and trips is provided in the following illustration:



In addition to within the Aquabella site, it is anticipated that a significant number of trips will be captured between the Project and neighboring complimentary uses at the high school and medical centers such that these should be taken into account when applying net external trip reductions. To estimate the full effect of potential internal capture for the Project, these uses were included in the MXD model to estimate internalization percentage to be applied to the total net external Project trip generation estimate.

Table 3 shows the Fehr & Peers MXD+ tool inputs used to generate the internalization estimates. **Table 4** shows the Project trip generation estimates with internalization reductions. MXD+ worksheets are provided in **Attachment A**.

Table 3: MXD Model Inputs

Input Variable	Input Value	Source
Developed Area (acres)	870	Includes the Project site area and adjacent Vista del Lago High School (3,500 students), Riverside University Health System Medical Center, and Kaiser Permanente Medical Center (1.5 MSF of total buildout of the two medical centers)
Transit Available	Yes	Existing RTA stops at Nason Street and Alessandro Blvd
Intersections per Square Mile	80	The Project proposes a grid network with approximately 600’ block lengths
Employment within 1 mile of Project Site (employees)	2,890	Riverside County Model (RIVCOM) Future Year (2045)
Site Average Household Size (residents)	2.87	Riverside County Model (RIVCOM) Future Year (2045)

Source(s):

1. *Fehr & Peers, 2023.*

Table 4: Trip Generation with Internalization Reduction

Trips	Daily	AM In	AM Out	AM Total	PM In	PM Out	PM Total
Total Project Trips	105,000	3,841	6,519	10,360	4,941	3,369	8,310
Internalization Reduction (%)	21.5%		34.3%			20.6%	
Total Internalization Trips	(22,575)	(1,777)	(1,777)	(3,554)	(856)	(856)	(1,712)
Net External Trip Generation	**82,425**	**2,064**	**4,742**	**6,806**	**4,085**	**2,513**	**6,598**

Source(s):

1. *Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition, 2021.*
2. *MXD+, Fehr & Peers, 2023.*

Travel Demand Management Reductions

The Project proposes to implement TDM measures that will reduce the number of vehicle trips generated by the Project. CAPCOA provides methodologies to quantify the effect implementing TDM measures will have on Vehicle Miles Traveled (VMT) reductions. The CAPCOA guidelines include a variety of strategies including some strategies (such as destination accessibility, density, diversity of land uses, etc.) that are already included in the MXD+ assessment above. As such, those strategies are not included in this TDM assessment to ensure those reductions are not double counted.

The CAPCOA guidelines specify reductions associated with VMT reduction for purposes of quantifying GHG reduction potential. The adjustment factor from VMT reduction to vehicle trip reduction is 1.0 for all non-active transportation measures. This assumes that all vehicle trips will average out to typical trip length. Thus, it can be assumed that a percentage reduction in vehicle trips will equal the same percentage reduction in VMT. For bicycle and pedestrian measure reductions in this study, the VMT percent reductions from CAPCOA were conservatively applied as trip reductions (1.0 factor) as this would be an underestimate of trip reductions associated with the short bicycle and pedestrian trips used to calculate VMT.

Trip generation reductions were applied to Project trip generation estimates using the percent VMT reductions associated with each measure. VMT reductions were calculated using Fehr & Peers' TDM+ tool, which applies CAPCOA methodology, for all proposed TDM measures. It should be noted that a Mobility Hub concept is not specifically documented in CAPCOA. Although, the proposed Mobility Hub is expected to enhance and support the effectiveness of the other measures, as a conservative approach, additional reductions were not applied for this measure. TDM+ worksheets are provided in **Attachment B**.

The proposed TDM measures and associated VMT reductions are described below. They are grouped into the following three categories, which indicate the vehicle trip type the measure will reduce:

- Residential trip reductions – TDM measures that reduce trips generated by Project residential land uses
- Employee commute trip reductions – TDM measures that reduce Project employee trips generated by non-residential land uses
- Project-generated trip reductions – TDM measures that are available to the Project as well as adjacent communities

Duplicative dampening, which occurs when multiple TDM measures are applied that target the same users, reduces the effectiveness of some measures when they are implemented together. Therefore, the percent reductions are not additive. To ensure reductions are not over-estimated, Fehr & Peers applied the CAPCOA methodology to conservatively decrease the total percent VMT reduction associated with each group, thus analyzing the groups as a "package" of Project features and not individually consistent with the CAPCOA methodology to account for duplicative dampening.

Lastly, CAPCOA provides a range of reduction potential for each measure based on trends and data observed in research and case studies. Environmental factors, such as place type and the intensity of application of the measure, determine how effective each measure will be for a project. **Table 5** summarizes each of the proposed TDM measures and the maximum reduction potential, which would typically be in an urban area or urban core. While the Project is being designed with densities and block lengths similar to an urban area, this assessment recognizes that the Project is in a suburban setting and applies a conservatively low range of reductions appropriate for the Project place type.

Table 5: Project TDM Measures

TDM Measure	Max Reduction Potential	Project Reduction
Residential Trip Reductions		
Community-Based Travel Planning	2.30%	1.50%
Unbundle Residential Parking Costs from Property Costs	15.70%	5.20%
Employee Commute Trip Reductions		
Commute Trip Reduction (CTR) Program Marketing	4.00%	2.00%
Rideshare Program	8.00%	1.30%
End-of-Trip Bicycle Facilities	4.40%	0.30%
Discounted Transit Program for Work Trips Only	5.50%	0.04%
Project-Generated Trip Reductions		
Non-Electric Bikeshare Program	0.02%	0.01%
Scootershare Program	0.07%	0.01%
Extend Transit Network - Coverage and/or Hours for All Shift Times	4.60%	1.01%
Increase Transit Service Frequency	11.30%	0.25%
Bus Rapid Transit (BRT)	13.80%	0.16%

Source(s):

1. *California Air Pollution Control Officers Association (CAPCOA), 2021.*
2. *TDM+, Fehr & Peers, 2023.*

Residential Trip Reduction TDM Measures

Residential trip reductions are applied to trips generated by residents on the Aquabella site.

Community-Based Travel Planning (CAPCOA ID: T-23)

CAPCOA states, "This measure will target residences in the plan/community with community-based travel planning (CBTP). CBTP is a residential-based approach to outreach that provides households with customized information, incentives, and support to encourage the use of transportation alternatives in place of single occupancy vehicles, thereby reducing household VMT and associated GHG emissions."

Implementation of this measure in the Project will consist teams of trained travel advisors visiting all households within the Project upon move-in and having tailored conversations about residents' travel needs, and educating residents about the various transportation options available to them.

Unbundle Residential Parking Costs from Property Costs (CAPCOA ID: T-16)

CAPCOA states, "This measure will unbundle, or separate, a residential project's parking costs from property costs, requiring those who wish to purchase parking spaces to do so at an additional cost. On the assumption that parking costs are passed through to the vehicle owners/drivers utilizing the parking spaces, this measure results in decreased vehicle ownership and, therefore, a reduction in VMT and GHG emissions. Unbundling may not be available to all residential developments, depending on funding sources. Parking costs must be passed through to the vehicle owners/drivers utilizing the parking spaces for this measure to result in decreased vehicle ownership."

Implementation of this measure in the Project will consist of parking spaces costing approximately $100-$150 as a separate monthly cost from the unit.

Reductions

The percent VMT reductions for this group of measures are summarized in **Table 6**, and household trip reductions are shown in **Table 7**.

Table 6: Residential Reduction Percentages

TDM Measure	Daily	AM Peak	PM Peak
Community-Based Travel Planning	1.50%	1.50%	1.50%
Unbundle Residential Parking Costs from Property Costs	5.20%	5.20%	5.20%
Residential Reduction[1]	**6.62%**	**6.62%**	**6.62%**

Note(s):

1. Duplicative dampening applied for package of measures.

Source(s):

1. *California Air Pollution Control Officers Association (CAPCOA), 2021.*
2. *TDM+, Fehr & Peers, 2023.*

Table 7: Residential Trip Reductions

TDM Measure	Daily	AM In	AM Out	AM Total	PM In	PM Out	PM Total
Residential Trips with Internalization	73,312	940	3,058	3,998	3,662	2,232	5,894
Residential VMT Reduction	6.62%		6.62%			6.62%	
Residential Trip TDM Reductions	**(4,853)**	**(62)**	**(203)**	**(265)**	**(242)**	**(148)**	**(390)**

Source(s):
1. *Fehr & Peers, 2023.*

Employee Commute Trip Reduction TDM Measures

Employee commute trip reductions are applied to trips of people employed on the Aquabella project site and are typically implemented by employers on site. Employee commute trips were estimated using Fehr & Peers' MXD+ tool, which incorporates the MXD methodology and provides an estimate of home-based-work trips and VMT. **Table 3** shows the Fehr & Peers MXD+ tool information used to generate the employee commute trip estimates. **Table 8** summarizes the employee commute trip types and associated internalization to estimate net external employee commute trips.

Table 8: Employee Commute Trip Estimates

TDM Measure	Daily	AM In	AM Out	AM Total	PM In	PM Out	PM Total
Employee Commute Trips	2,671	383	96	479	98	147	245
Internalization Reductions	(1,478)	(149)	(37)	(186)	(54)	(80)	(134)
Net External Employee Commute Trips	**1,193**	**234**	**59**	**293**	**44**	**67**	**111**

Source(s):
1. *MXD+, Fehr & Peers, 2023.*

Commute Trip Reduction (CTR) Program Marketing (CAPCOA ID: T-7)

CAPCOA states, "This measure will implement a marketing strategy to promote the project site employer's CTR program. Information sharing and marketing promote and educate employees about their travel choices to the employment location beyond driving such as carpooling, taking transit, walking, and biking, thereby reducing VMT and GHG emissions."

Implementation of this measure in the Project will consist of:

- Onsite or online commuter information services
- Employee transportation coordinators
- Onsite or online transit pass sales
- Guaranteed ride home service

Rideshare Program (CAPCOA ID: T-8)

CAPCOA states, "This measure will implement a ridesharing program and establish a permanent transportation management association with funding requirements for employers. Ridesharing encourages carpooled vehicle trips in place of single-occupied vehicle trips, thereby reducing the number of trips, VMT, and GHG emissions."

Implementation of this measure in the Project will consist of employers promoting the following:

- Designating a certain percentage of desirable parking spaces for ridesharing vehicles
- Designating adequate passenger loading and unloading and waiting areas for ridesharing vehicles
- Providing an app or website for coordinating rides

Discounted Transit Program for Work Trips Only (CAPCOA ID: T-9-B)

CAPCOA states, "This measure will provide subsidized or discounted, or free transit passes for employees. Reducing the out-of-pocket cost for choosing transit improves the competitiveness of transit against driving, increasing the total number of transit trips and decreasing vehicle trips. This decrease in vehicle trips results in reduced VMT and thus a reduction in GHG emissions. The project should be accessible either within 1 mile of high-quality transit service (rail or bus with headways of less than 15 minutes), 0.5 mile of local or less frequent transit service, or along a designated shuttle route providing last-mile connections to rail service. If a well-established bikeshare service (Measure T-22-A) is available, the site may be located up to 2 miles from a high-quality transit service."

Implementation of this measure in the Project will be provided by on-site employers. As detailed in other parts of this memorandum, transit service will be expanded with implementation of the Project:

- Bus Rapid Transit (BRT) is proposed on Alessandro Boulevard that would provide high-quality transit service
- Bus service will provide direct connections to the Moreno Valley / March Field Metrolink Train Station

- Bikeshare will be available to support this program

End-of-Trip Bicycle Facilities (CAPCOA ID: T-10)

CAPCOA states, "This measure will install and maintain end-of-trip facilities for employee use. End-of-trip facilities include bike parking, bike lockers, showers, and personal lockers. The provision and maintenance of secure bike parking and related facilities encourages commuting by bicycle, thereby reducing VMT and GHG emissions."

Implementation of this measure in the Project will be sized to encourage bicycling by providing facilities to accommodate 10-20% of the forecast 804 employees staffed daily on the Project site. Implementation of this measure will also be regularly maintained by employers.

Reductions

The percent VMT reductions for this group of measures are summarized in **Table 9**, and employee commute trip reductions are shown in **Table 10**.

Table 9: Employee Commute Reduction Percentages

TDM Measure	Daily	AM Peak	PM Peak
CTR Program Marketing	2.00%	2.00%	2.00%
Rideshare Program	1.25%	1.25%	1.25%
Discounted Transit Program for Work Trips	0.04%	0.04%	0.04%
End-of-Trip Bicycle Facilities	0.30%	0.30%	0.30%
Employee Commute Reduction[1]	**3.55%**	**3.55%**	**3.55%**

Note(s):
1. Duplicative dampening applied for package of measures.

Source(s):
1. *California Air Pollution Control Officers Association (CAPCOA), 2021.*
2. *TDM+, Fehr & Peers, 2023.*

Table 10: Employee Commute Trip Reductions

TDM Measure	Daily	AM In	AM Out	AM Total	PM In	PM Out	PM Total
Net External Employee Commute Trips	1,193	234	59	293	44	67	111
Employee Commute VMT Reduction	3.55%		3.55%			3.55%	
Employee Commute Trip TDM Reductions	**(42)**	**(7)**	**(3)**	**(10)**	**(1)**	**(3)**	**(4)**

Source(s):

1. *Fehr & Peers, 2023.*

Project-Generated Trip Reduction TDM Measures

Non-Electric Bikeshare Program (CAPCOA ID: T-22-A)

CAPCOA states, "This measure will establish a bikeshare program. Bikeshare programs provide users with on-demand access to bikes for short-term rentals. This encourages a mode shift from vehicles to bicycles, displacing VMT and thus reducing GHG emissions."

Implementation of this measure in the Project will require the Project applicant to establish the bikeshare program within the Project area.

Scootershare Program (CAPCOA ID: T-22-C)

CAPCOA states, "This measure will establish a scootershare program. Scootershare programs provide users with on-demand access to electric scooters for short-term rentals. This encourages a mode shift from vehicles to scooters, displacing VMT and thus reducing GHG emissions."

Implementation of this measure in the Project will require the Project applicant to establish the scootershare program within the Project area.

Extend Transit Network – Coverage and/or Hours for All Shift Times (CAPCOA ID: T-25)

CAPCOA states, "This measure will expand the local transit network by either adding or modifying existing transit service or extending the operation hours to enhance the service near the project site. Starting services earlier in the morning and/or extending services to late-night hours can accommodate the commuting times of alternative-shift workers. This will encourage the use of transit and therefore reduce VMT and associated GHG emissions."

Implementation of this measure in the Project will require the Project applicant to coordinate with the Riverside Transit Agency (RTA) to update bus service routes and service times to serve the new community.

Assumes a 100% increase (doubling the network coverage and expanding times) in network coverage by covering the east side of the City in addition to new routes to the west.

Increase Transit Service Frequency (CAPCOA ID: T-26)

CAPCOA states, "This measure will increase transit frequency on one or more transit lines serving the plan/community. Increased transit frequency reduces waiting and overall travel times, which improves the user experience and increases the attractiveness of transit service. This results in a mode shift from single occupancy vehicles to transit, which reduces VMT and associated GHG emissions."

Implementation of this measure in the Project will require the Project applicant to coordinate with the Riverside Transit Agency (RTA) to update bus service routes and service times to serve the new community. This would also include working with RTA to establish BRT on Alessandro Boulevard and providing direct bus connections to the Moreno Valley / March Field Metrolink Train Station. The Aquabella and World Logistics Project teams are committed to expanding transit service between these uses to account for all shift times.

Assumes 200% increase in frequency in the area (currently served at 1 hour frequencies, will provide 15-min headways during peak hours to provide high-quality transit.

Bus Rapid Transit (BRT)

CAPCOA states, "This measure will convert an existing bus route to a Bus Rapid Transit (BRT) system. BRT includes the following additional components, compared to traditional bus service: exclusive right-of-way (e.g., busways, queue jumping lanes) at congested intersections, increased limited-stop service (e.g., express service), intelligent transportation technology (e.g., transit signal priority, automatic vehicle location systems), advanced technology vehicles (e.g., articulated buses, low-floor buses), enhanced station design, efficient fare-payment smart cards or smartphone apps, branding of the system, and use of vehicle guidance systems. BRT can increase the transit mode share in a community due to improved travel times, service frequencies, and the unique components of the BRT system. This mode shift reduces VMT and the associated GHG emissions."

Consistent with the City of Moreno Valley and RTA plans, BRT is proposed along Alessandro Boulevard which will significantly increase transit frequency and service in the area.

Implementation of this measure should include improved travel times from transit signal prioritization, increased service frequency, and a full-featured BRT service operating on a fully segregated running way with a specialized vehicles, attractive stations, and efficient fare collection practices.

Assumes 50% increase in frequency to provide 15-minute headways. Assumes level of implementation is 25% (represents number of lines this influences).

Mobility Hub

Mobility Hubs provide a centralized location for non-automotive transportation modes to connect users to their destinations. There are limited benefits to implementing a stand-alone Mobility Hub, as the facility is meant to promote and support alternative transportation modes. Mobility Hubs should be supplemented with additional strategies or programs that provide increased public transit, bicycle, and pedestrian access and improvements.

Implementation of this project would require coordination with RTA, Metrolink and the City of Moreno Valley. The Project would construct the mobility hub at or near the Project.

Though, the proposed Mobility Hub is not included in CAPCOA, many of the characteristics of the Mobility Hub (increased transit accessibility, increased bicycling accessibility, etc) are part of other TDM strategies outlined in CAPCOA. The mobility hub is anticipated to strengthen the effectiveness of other proposed TDM strategies. However, to provide a conservative approach to trip generation, additional reductions were not applied for the mobility hub in this assessment.

Reductions

The percent VMT reductions for this group of measures are summarized in **Table 11**, and project-generated trip reductions are shown in **Table 12**. Since these TDM measures reduce overall Project trips, this group's total percent VMT reduction was applied after taking the reductions associated with the other measures, ensuring this group's effect on the Project are not overestimated.

Table 11: Project-Generated Reduction Percentages

TDM Measure	Daily	AM Peak	PM Peak
Non-Electric Bikeshare Program	0.01%	0.01%	0.01%
Scootershare Program	0.01%	0.01%	0.01%
Extend Transit Network	1.01%	1.01%	1.01%
Increase Transit Services	0.25%	0.25%	0.25%
Bus Rapid Transit (BRT)	0.16%	0.16%	0.16%
Project-Generated Reduction[1]	**1.44%**	**1.44%**	**1.44%**

Note(s):
1. Duplicative dampening applied for package of measures.

Source(s):
1. *California Air Pollution Control Officers Association (CAPCOA), 2021.*
2. *TDM+, Fehr & Peers, 2023.*

Table 12: Project-Generated Trip Reductions

TDM Measure	Daily	AM In	AM Out	AM Total	PM In	PM Out	PM Total
Net External Trip Generation	82,425	2,064	4,742	6,806	4,085	2,513	6,598
Residential Trip TDM Reductions	(4,853)	(62)	(203)	(265)	(242)	(148)	(390)
Employee Commute Trip TDM Reductions	(42)	(7)	(3)	(10)	(1)	(3)	(4)
Trip Generation with Internalization, Residential and Employee Commute TDM Reductions Subtotal	*77,530*	*1,995*	*4,536*	*6,531*	*3,842*	*2,362*	*6,204*
Project-Generated VMT Reduction	1.44%	1.44%			1.44%		
Project-Generated Trip TDM Reductions	**(1,116)**	**(29)**	**(66)**	**(95)**	**(55)**	**(34)**	**(89)**

Source(s):
1. *Fehr & Peers, 2023.*

Pass-By Reductions Considerations

The MXD+ model considers the relationship of internal capture between complimentary uses on site. To avoid double counting of reductions, no pass-by reductions were applied in addition to internal capture and TDM.

Conclusion

ITE Trip Generation 11th edition rates were used to estimate the Project trip generation. Due to the mixed-use characteristics of the site, Fehr & Peers used MXD methodology to estimate internalization reductions. Furthermore, the Project proposes to implement TDM measures to reduce vehicle trips generated by the site. CAPCOA methodology, which quantifies the effect TDM strategies have on VMT reduction, were used to estimate the reduction in vehicle trips associated with the proposed measures. The final tip generation estimates are shown in **Table 13**.

Table 13: Final Project Trip Generation Estimate

TDM Measure	Daily	AM In	AM Out	AM Total	PM In	PM Out	PM Total
Total Project Trips	105,000	3,841	6,519	10,360	4,941	3,369	8,310
Total Internalization Trips	(22,575)	(1,777)	(1,777)	(3,554)	(856)	(856)	(1,712)
Residential Trip TDM Reductions	(4,853)	(62)	(203)	(265)	(242)	(148)	(390)
Employee Commute Trip TDM Reductions	(42)	(7)	(3)	(10)	(1)	(3)	(4)
Project-Generated Trip TDM Reductions	(1,116)	(29)	(66)	(95)	(55)	(34)	(89)
Final Net External Trip Generation	**76,414**	**1,966**	**4,470**	**6,436**	**3,787**	**2,328**	**6,115**

Source(s):

1. *Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition, 2021.*
2. *MXD+, Fehr & Peers, 2023.*
3. *California Air Pollution Control Officers Association (CAPCOA), 2021.*
4. *TDM+, Fehr & Peers, 2023.*

Attachments

Attachment A – MXD+ Internalization Estimation Worksheets

Attachment B – TDM+ Trip Reduction Estimation Worksheets

Attachment C – MXD+ Employee Trip Estimates

Attachment A:
MXD+ Internalization Estimation Worksheets

Model Inputs

Input Variable	Input Value	Source
MXD specific inputs		
Project Area (Acres)	870	GIS
Intersections per Square Mile	80	custom
Employment within 1 mile of Project Site	2890	custom
Share of regional employment within a 30 minute trip by transit	0.000001	City Model 2035
Surrounding Household Size	3.14	ACS 2012 (5-year) - All Housing Types
Surrounding Vehicle Ownership	2.10	ACS 2012 (5-year) - All Housing Types
Site Household Size	2.87	custom
Site Vehicle Ownership	2.10	ACS 2012 (5-year) - All Housing Types
Average Vehicle Occupancy (HBW Trips)	1.1	NCHRP 758
Average Vehicle Occupancy (HBO Trips)	1.1	NCHRP 758
Average Vehicle Occupancy (NHB Trips)	1.1	NCHRP 758

Model Outputs (Vehicle Trips)

Land Use	Units[1]	ITE Code	Quantity	Daily	AM Peak Hour			PM Peak Ho	
					In	Out	Total	In	Out
Net New Uses									
(411) - Public Park (Adj Streets, 7-9A, 4-6P)	Acres	411[2]	15	12	0	0	0	1	1
(821) ShoppingPlaza (40-150k)-Supermarket -No (Adj Streets, 7-9A, 4-6P)	1000 Sq. Ft. GLA	821[3]	49.9	3369	53	33	86	127	132
(610) Hospital (Adj Streets, 7-9A, 4-6P)	1000 Sq. Ft. GFA	610[4]	1500	16155	824	406	1230	451	839
(525) - High School (Adj Streets, 7-9A, 4-6P)	Students	525[5]	3158	6127	1117	525	1642	212	230
(220) Multifamily Housing (Low- Rise) Not Close toRail Transit (Adj Streets, 7-9A, 4-6P)	Dwelling Units	220[6]	7500	50550	720	2280	3000	2410	1415
Custom	Custom	000[7]	25	1250	19	19	38	88	88
(520) - Elementary School (Adj Streets, 7-9A, 4-6P)	Students	520[8]	3995	9069	1596	1360	2956	294	345
(522) - Middle School/Junior High School (Adj Streets, 7-9A, 4-6P)	Students	522[9]	2049	4303	741	632	1373	147	160
(221) Multifamily Housing (Mid- Rise) Not Close toRail Transit (Adj Streets, 7-9A, 4-6P)	Dwelling Units	221[10]	7500	34050	638	2137	2775	1784	1141
(310) Hotel (Adj Streets, 7-9A, 4-6P)	Rooms	310[11]	300	2397	77	61	138	90	87
Reductions									
Internal Capture				-24,030	-1,846	-2,378	-4,224	-1,010	-800
External Walk, Bike, and Transit				-3,253	-138	-179	-317	-144	-114
Total Reductions				-27,283	-1,984	-2,557	-4,541	-1,154	-914
Net New Project Trips				99,999	3,801	4,896	8,697	4,450	3,524

1. **DU = dweling units. KSF = 1000 square feet**
2. **ITE Trip Generation land use category (411) - Public Park (Adj Streets, 7-9A, 4-6P)**
    - **Daily: T = 0.78(X)**
    - **AM Peak Hour: T = 0.02(X) (56.00000000000001% in, 44% out)**
    - **PM Peak Hour: T = 0.11(X) (56.99999999999999% in, 43% out)**
3. **ITE Trip Generation land use category (821) ShoppingPlaza (40-150k)-Supermarket -No (Adj Streets, 7-9A, 4-6P)**
    - **Daily: T = 67.52(X)**
    - **AM Peak Hour: T = 1.73(X)**
    - **PM Peak Hour: T = 5.19(X)**
4. **ITE Trip Generation land use category (610) Hospital (Adj Streets, 7-9A, 4-6P)**
    - **Daily: T = 10.77(X)**
    - **AM Peak Hour: T = 0.82(X) (72% in, 28.000000000000004% out)**
    - **PM Peak Hour: T = 0.86(X) (33% in, 67% out)**
5. **ITE Trip Generation land use category (525) - High School (Adj Streets, 7-9A, 4-6P)**
    - **Daily: T = 1.94(X)**
    - **AM Peak Hour: T = 0.52(X)**
    - **PM Peak Hour: T = 0.14(X)**
6. **ITE Trip Generation land use category (220) Multifamily Housing (Low- Rise) Not Close toRail Transit (Adj Streets, 7-9A, 4-6P)**
    - **Daily: T = 6.74(X)**
    - **AM Peak Hour: T = 0.40(X) (20% in, 80% out)**
    - **PM Peak Hour: T = 0.51(X) (65% in, 35% out)**
7. **ITE Trip Generation land use category Custom**
    - **Daily: T = 0.00(X)**
    - **AM Peak Hour: T = 0.00(X)**
    - **PM Peak Hour: T = 0.00(X)**
8. **ITE Trip Generation land use category (520) - Elementary School (Adj Streets, 7-9A, 4-6P)**
    - **Daily: T = 2.27(X)**
    - **AM Peak Hour: T = 0.74(X) (0% in, 0% out)**
    - **PM Peak Hour: T = 0.16(X) (49% in, 51% out)**
9. **ITE Trip Generation land use category (522) - Middle School/Junior High School (Adj Streets, 7-9A, 4-6P)**
    - **Daily: T = 2.10(X)**
    - **AM Peak Hour: T = 0.67(X) (0% in, 0% out)**
    - **PM Peak Hour: T = 0.15(X) (45% in, 55.00000000000001% out)**
10. **ITE Trip Generation land use category (221) Multifamily Housing (Mid- Rise) Not Close toRail Transit (Adj Streets, 7-9A, 4-6P)**
    - **Daily: T = 4.54(X)**
    - **AM Peak Hour: T = 0.37(X) (21% in, 79% out)**
    - **PM Peak Hour: T = 0.39(X) (65% in, 35% out)**
11. **ITE Trip Generation land use category (310) Hotel (Adj Streets, 7-9A, 4-6P)**
    - **Daily: T = 7.99(X)**
    - **AM Peak Hour: T = 0.46(X) (57.99999999999999% in, 42% out)**
    - **PM Peak Hour: T = 0.59(X) (49% in, 51% out)**
12. **Reductions based on application of MXD+ model:**
    - **Total Reductions: Daily = 21.5%, AM Peak Hour = 34.3%, PM Peak Hour = 20.6%**
    - **Internal Capture: Daily = 18.9%, AM Peak Hour = 31.9%, PM Peak Hour = 18%**
    - **External Walk, Bike, and Transit: Daily = 2.6%, AM Peak Hour = 2.4%, PM Peak Hour = 2.6%**
13. **Sources:**
    - ***ITE Trip Generation Manual*, 9th and 10th Edition**
    - **Fehr and Peers**
14. **Person Trips:**
    - **Person Trips derived using the following average vehicle occupancy rates, applied to ITE Vehicle Trip Generation:**
    - **HBW AVO:1.05**
    - **HBO AVO:1.05**
    - **NHW AVO:1.05**

Model Outputs (Person Trips)

Land Use	Units[1]	ITE Code	Quantity	Daily	AM Peak Hour			PM Peak Ho	
					In	Out	Total	In	Out
Net New Uses									
(411) - Public Park (Adj Streets, 7-9A, 4-6P)	Acres	411[2]	15	13	0	0	0	1	1
(821) ShoppingPlaza (40-150k)-Supermarket -No (Adj Streets, 7-9A, 4-6P)	1000 Sq. Ft. GLA	821[3]	49.9	3,537	56	35	90	133	139
(610) Hospital (Adj Streets, 7-9A, 4-6P)	1000 Sq. Ft. GFA	610[4]	1,500	16,963	865	426	1,292	474	881
(525) - High School (Adj Streets, 7-9A, 4-6P)	Students	525[5]	3,158	6,433	1,173	551	1,724	223	241
(220) Multifamily Housing (Low- Rise) Not Close toRail Transit (Adj Streets, 7-9A, 4-6P)	Dwelling Units	220[6]	7,500	53,078	756	2,394	3,150	2,531	1,486
Custom	Custom	000[7]	25	1,313	20	20	40	92	92
(520) - Elementary School (Adj Streets, 7-9A, 4-6P)	Students	520[8]	3,995	9,522	1,676	1,428	3,104	309	362
(522) - Middle School/Junior High School (Adj Streets, 7-9A, 4-6P)	Students	522[9]	2,049	4,518	778	664	1,442	154	168
(221) Multifamily Housing (Mid- Rise) Not Close toRail Transit (Adj Streets, 7-9A, 4-6P)	Dwelling Units	221[10]	7,500	35,753	670	2,244	2,914	1,873	1,198
(310) Hotel (Adj Streets, 7-9A, 4-6P)	Rooms	310[11]	300	2,517	81	64	145	95	91
Net Raw Project Trips				133,647	6,075	7,826	13,901	5,885	4,659
Reductions									
Internal Capture				-25,230	-1,938	-2,496	-4,434	-1,062	-841
External Walk, Bike, and Transit				-3,417	-145	-187	-332	-151	-119
Total Reductions				-28,647	-2,083	-2,683	-4,766	-1,212	-960
Net New Project Trips				105,000	3,992	5,143	9,135	4,673	3,699

1. **DU = dweling units. KSF = 1000 square feet**
2. **ITE Trip Generation land use category (411) - Public Park (Adj Streets, 7-9A, 4-6P)**
    - **Daily: T = 0.78(X)**
    - **AM Peak Hour: T = 0.02(X) (56.00000000000001% in, 44% out)**
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3. **ITE Trip Generation land use category (821) ShoppingPlaza (40-150k)-Supermarket -No (Adj Streets, 7-9A, 4-6P)**
    - **Daily: T = 67.52(X)**
    - **AM Peak Hour: T = 1.73(X)**
    - **PM Peak Hour: T = 5.19(X)**
4. **ITE Trip Generation land use category (610) Hospital (Adj Streets, 7-9A, 4-6P)**
    - **Daily: T = 10.77(X)**
    - **AM Peak Hour: T = 0.82(X) (72% in, 28.000000000000004% out)**
    - **PM Peak Hour: T = 0.86(X) (33% in, 67% out)**
5. **ITE Trip Generation land use category (525) - High School (Adj Streets, 7-9A, 4-6P)**
    - **Daily: T = 1.94(X)**
    - **AM Peak Hour: T = 0.52(X)**
    - **PM Peak Hour: T = 0.14(X)**
6. **ITE Trip Generation land use category (220) Multifamily Housing (Low- Rise) Not Close toRail Transit (Adj Streets, 7-9A, 4-6P)**
    - **Daily: T = 6.74(X)**
    - **AM Peak Hour: T = 0.40(X) (20% in, 80% out)**
    - **PM Peak Hour: T = 0.51(X) (65% in, 35% out)**
7. **ITE Trip Generation land use category Custom**
    - **Daily: T = 0.00(X)**
    - **AM Peak Hour: T = 0.00(X)**
    - **PM Peak Hour: T = 0.00(X)**
8. **ITE Trip Generation land use category (520) - Elementary School (Adj Streets, 7-9A, 4-6P)**
    - **Daily: T = 2.27(X)**
    - **AM Peak Hour: T = 0.74(X) (0% in, 0% out)**
    - **PM Peak Hour: T = 0.16(X) (49% in, 51% out)**
9. **ITE Trip Generation land use category (522) - Middle School/Junior High School (Adj Streets, 7-9A, 4-6P)**
    - **Daily: T = 2.10(X)**
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    - **AM Peak Hour: T = 0.37(X) (21% in, 79% out)**
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    - **Internal Capture: Daily = 18.9%, AM Peak Hour = 31.9%, PM Peak Hour = 18%**
    - **External Walk, Bike, and Transit: Daily = 2.6%, AM Peak Hour = 2.4%, PM Peak Hour = 2.6%**
13. **Sources:**
    - ***ITE Trip Generation Manual*, 9th and 10th Edition**
    - **Fehr and Peers**
14. **Person Trips:**
    - **Person Trips derived using the following average vehicle occupancy rates, applied to ITE Vehicle Trip Generation:**
    - **HBW AVO:1.05**
    - **HBO AVO:1.05**
    - **NHW AVO:1.05**

Attachment B:
TDM+ Trip Reduction Estimation Worksheets

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TDM+

Project Information

General Project Info		Common Variables (selecting this will set all measures with this variable to the same value)	
Project Name:	OC22-0947 Aquabella Planning	Select the Core-Based Statistical Area for the project.	Riverside-San Bernardino-Ontario
Project Address:			
Project Type:	Mixed-Use		
Locational Context:	Suburban		

TDM Strategy Available (strategies that can combine their reductions are the same color)

TDM ID	Strategy Name	Strategy Type	VMT Type
T-1	Increase Residential Density	Land Use	Project-generated trips
T-2	Increase Job Density	Land Use	Project-generated trips
T-3	Provide Transit-Oriented Development	Land Use	Project-generated trips
T-4	Integrate Affordable and Below Market Rate Housing	Land Use	Project-generated trips
T-5	Implement Commute Trip Reduction Program (Voluntary)	Trip Reduction Programs	Employee commute trips
T-6	Implement Commute Trip Reduction Program (Mandatory Implementation and Monitoring)	Trip Reduction Programs	Employee commute trips
T-7	Implement Commute Trip Reduction Marketing	Trip Reduction Programs	Employee commute trips
T-8	Provide Ridesharing Program	Trip Reduction Programs	Employee commute trips
T-9-A	Implement Subsidized or Discounted Transit Program - All Trips	Trip Reduction Programs	Project-generated trips
T-9-B	Implement Subsidized or Discounted Transit Program - Work Trips Only	Trip Reduction Programs	Employee commute trips
T-10	Provide End-of-Trip Bicycle Facilities	Trip Reduction Programs	Employee commute trips
T-11	Provide Employer-Sponsored Vanpool	Trip Reduction Programs	Employee commute trips
T-12	Price Workplace Parking	Trip Reduction Programs	Employee commute trips
T-13	Implement Employee Parking Cash-Out	Trip Reduction Programs	Employee commute trips
T-15	Limit Residential Parking Supply	Parking or Road Pricing/Management	Project-generated trips
T-16	Unbundle Residential Parking Costs from Property Cost	Parking or Road Pricing/Management	Project-generated trips
T-17	Improve Street Connectivity	Land Use	All neighborhood/city trips
T-18	Provide Pedestrian Network Improvement	Neighborhood Design	Household trips
T-19-A	Construct or Improve Bike Facility	Neighborhood Design	All neighborhood/city trips
T-19-B	Construct or Improve Bike Boulevard	Neighborhood Design	All neighborhood/city trips
T-20	Expand Bikeway Network	Neighborhood Design	Employee commute trips
T-21-A	Implement Conventional Carshare Program	Neighborhood Design	All neighborhood/city trips
T-22-A	Implement Pedal (Non-Electric) Bikeshare Program	Neighborhood Design	All neighborhood/city trips
T-22-B	Implement Electric Bikeshare Programs	Neighborhood Design	All neighborhood/city trips
T-22-C	Implement Scootershare Program	Neighborhood Design	All neighborhood/city trips
T-23	Provide Community-Based Travel Planning	Trip Reduction Programs	Household trips
T-24	Implement Market Price Public Parking (On-Street)	Parking or Road Pricing/Management	All neighborhood/city trips
T-25	Extend Transit Network Coverage or Hours	Transit	All neighborhood/city trips
T-26	Increase Transit Service Frequency	Transit	All neighborhood/city trips
T-27	Implement Transit-Supportive Roadway Treatments	Transit	All neighborhood/city trips
T-28	Provide Bus Rapid Transit	Transit	All neighborhood/city trips
T-29	Reduce Transit Fares	Transit	All neighborhood/city trips

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Source: Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity (GHG Handbook), California Air Pollution Control Officers Association (2021).

https://www.caleemod.com/handbook/full_handbook.html

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TDM+

TDM Strategy Results

TDM ID	Strategy Name	Strategy Type	VMT Type	Change in VMT
T-1	Increase Residential Density	Land Use	Project-generated trips	-
T-2	Increase Job Density	Land Use	Project-generated trips	-
T-3	Provide Transit-Oriented Development	Land Use	Project-generated trips	-
T-4	Integrate Affordable and Below Market Rate Housing	Land Use	Project-generated trips	-
T-5	Implement Commute Trip Reduction Program (Voluntary)	Trip Reduction Programs	Employee commute trips	-
T-6	Implement Commute Trip Reduction Program (Mandatory Implementation and Monitoring)	Trip Reduction Programs	Employee commute trips	-
T-7	Implement Commute Trip Reduction Marketing	Trip Reduction Programs	Employee commute trips	-2.0%
T-8	Provide Ridesharing Program	Trip Reduction Programs	Employee commute trips	-1.3%
T-9-A	Implement Subsidized or Discounted Transit Program - All Trips	Trip Reduction Programs	Project-generated trips	-0.3%
T-9-B	Implement Subsidized or Discounted Transit Program - Work Trips Only	Trip Reduction Programs	Employee commute trips	0.0%
T-10	Provide End-of-Trip Bicycle Facilities	Trip Reduction Programs	Employee commute trips	-0.3%
T-11	Provide Employer-Sponsored Vanpool	Trip Reduction Programs	Employee commute trips	-
T-11-FP	Provide Employer-Sponsored Van pool (FP version)	Trip Reduction Programs	Employee commute trips	-
T-12	Price Workplace Parking	Trip Reduction Programs	Employee commute trips	-
T-13	Implement Employee Parking Cash-Out	Trip Reduction Programs	Employee commute trips	-
T-15	Limit Residential Parking Supply	Parking or Road Pricing/Management	Project-generated trips	-
T-16	Unbundle Residential Parking Costs from Property Cost	Parking or Road Pricing/Management	Project-generated trips	-5.2%
T-17	Improve Street Connectivity	Land Use	All neighborhood/city trips	-
T-18	Provide Pedestrian Network Improvement	Neighborhood Design	Household trips	-
T-19-A	Construct or Improve Bike Facility	Neighborhood Design	All neighborhood/city trips	0.0%
T-19-B	Construct or Improve Bike Boulevard	Neighborhood Design	All neighborhood/city trips	0.0%
T-20	Expand Bikeway Network	Neighborhood Design	Employee commute trips	-
T-21-A	Implement Conventional Carshare Program	Neighborhood Design	All neighborhood/city trips	-
T-22-A	Implement Pedal (Non-Electric) Bikeshare Program	Neighborhood Design	All neighborhood/city trips	-0.01%
T-22-B	Implement Electric Bikeshare Programs	Neighborhood Design	All neighborhood/city trips	-
T-22-C	Implement Scootershare Program	Neighborhood Design	All neighborhood/city trips	-0.01%
T-23	Provide Community-Based Travel Planning	Trip Reduction Programs	Household trips	-1.5%
T-24	Implement Market Price Public Parking (On-Street)	Parking or Road Pricing/Management	All neighborhood/city trips	-
T-25	Extend Transit Network Coverage or Hours	Transit	All neighborhood/city trips	-1.0%
T-26	Increase Transit Service Frequency	Transit	All neighborhood/city trips	-0.3%
T-27	Implement Transit-Supportive Roadway Treatments	Transit	All neighborhood/city trips	-
T-28	Provide Bus Rapid Transit	Transit	All neighborhood/city trips	-0.2%
T-29	Reduce Transit Fares	Transit	All neighborhood/city trips	-

TDM Reduction Summary

Land Use	**Project Site**	**Project-generated trips**		**0.0%**
Land Use	**Plan/Community**	**All neighborhood/city trips**		**0.0%**
Trip Reduction Programs	**Project Site**	**Employee commute trips**	**(multiplicative dampening applied)**	**-3.6%**
Trip Reduction Programs	**Project Site**	**Project-generated trips**		**-0.3%**
Trip Reduction Programs	**Plan/Community**	**Household trips**		**-1.5%**
Parking or Road Pricing/Management	**Project Site**	**Project-generated trips**		**-5.2%**
Parking or Road Pricing/Management	**Plan/Community**	**All neighborhood/city trips**		**0.0%**
Neighborhood Design	**Plan/Community**	**All neighborhood/city trips**	**(multiplicative dampening applied)**	**0.0%**
Neighborhood Design	**Plan/Community**	**Employee commute trips**		**0.0%**
Neighborhood Design	**Plan/Community**	**Household Trips**		**0.0%**
Transit	**Plan/Community**	**All neighborhood/city trips**	**(multiplicative dampening applied)**	**-1.4%**

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Trip Reduction Programs - T-7. Implement Commute Trip Reduction Marketing

Locational Context	**Urban, Suburban**
Scale of Application	**Project/Site**
Type of VMT affected:	**Employee commute trips**
Max VMT reduction:	**4.00%**

This measure will implement a marketing strategy to promote the project site employer's CTR program. Information sharing and marketing promote and educate employees about their travel choices to the employment location beyond driving such as carpooling, taking transit, walking, and biking, thereby reducing VMT and GHG emissions.

The following features (or similar alternatives) of the marketing strategy are essential for effectiveness.

- Onsite or online commuter information services.
- Employee transportation coordinators.
- Onsite or online transit pass sales.
- Guaranteed ride home service.

Percent of employees eligible for program	40.0%	**percent**	user input (default value = 0-1)
Percent reduction in employee commute vehicle trips	-5.0%	**percent**	constant (default value = -0.04)
Adjustment from vehicle trips to VMT	1.000	**unitless**	constant (default value = 1)
Change in VMT	**-2.00%**	**percent reduction**	

Formula: % Change in VMT = Percent of employees eligible for program * Percent reduction in employee commute vehicle trips

Sources:
(1) Transportation Research Board (TRB). 2010. Traveler Response to Transportation System Changes Handbook, Third Edition: Chapter 19, Employer and Institutional TDM Strategies. June. Available: http://www.trb.org/Publications/Blurbs/163781.aspx. Accessed: January 2021.

FEHR & PEERS

Trip Reduction Programs - T-8. Provide Ridesharing Program

Locational Context	**Urban, Suburban**
Scale of Application	**Project/Site**
Type of VMT affected:	**Employee commute trips**
Max VMT reduction:	**8.00%**

This measure will implement a ridesharing program and establish a permanent transportation management association with funding requirements for employers. Ridesharing encourages carpooled vehicle trips in place of single-occupied vehicle trips, thereby reducing the number of trips, VMT, and GHG emissions.

Ridesharing must be promoted through a multi-faceted approach.
Examples include the following.
- Designating a certain percentage of desirable parking spaces for ridesharing vehicles.
- Designating adequate passenger loading and unloading and waiting areas for ridesharing vehicles.
- Providing an app or website for coordinating rides.

Select the Place Type for the project.	Suburban		Appendix C. T-8.1
Percent of employees eligible for program	25.0%	**percent**	user input (default value = 0-1)
Percent reduction in employee commute VMT	-5.0%	**percent**	constant (default value = -0.04--0.08)
Change in VMT	**-1.25%**	**percent reduction**	

Formula: % Change in VMT = Percent of employees eligible for program * Percent reduction in employee commute VMT

Sources:
(1) San Diego Association of Governments (SANDAG). 2019. Mobility Management VMT Reduction Calculator Tool–Design Document. June. Available: https://www.icommutesd.com/docs/defaultsource/planning/tool-design-document_final_7-17-19.pdf?sfvrsn=ec39eb3b_2. Accessed: January 2021.

FEHR PEERS

Trip Reduction Programs - T-9-A. Implement Subsidized or Discounted Transit Program - All Trips

Locational Context	**Urban, Suburban**
Scale of Application	**Project/Site**
Type of VMT affected:	**Project-generated trips**
Max VMT reduction:	**5.50%**

This measure will provide subsidized or discounted, or free transit passes for employees and/or residents. Reducing the out-of-pocket cost for choosing transit improves the competitiveness of transit against driving, increasing the total number of transit trips and decreasing vehicle trips. This decrease in vehicle trips results in reduced VMT and thus a reduction in GHG emissions. The project should be accessible either within 1 mile of high-quality transit service (rail or bus with headways of less than 15 minutes), 0.5 mile of local or less frequent transit service, or along a designated shuttle route providing last-mile connections to rail service. If a well-established bikeshare service (Measure T-22-A) is available, the site may be located up to 2 miles from a high-quality transit service.

Select the Core-Based Statistical Area for the project.	Riverside-San Bernardino-Ontario		Appendix C. T-3.1
Average transit fare without subsidy	$5.00	dollar	user input (default value = 0-1000)
Subsidy amount	$2.00	dollar	user input (default value = 0-1000)
Percent of employees/residents eligible for subsidy	50.0%	percent	user input (default value = 0-1)
Percent of project-generated VMT from employees/residents	70.0%	percent	user input (default value = 0-1)
Transit mode share of all trips	10.0%	percent	optional (default value = 0.0137-0.1138)
Elasticity of transit boardings with respect to transit fare price	-0.430	unitless	constant (default value = -0.43)
Percent of transit trips that would otherwise be made in a vehicle	50.0%	percent	constant (default value = 0.5)
Conversion factor of vehicle trips to VMT	1.000	unitless	constant (default value = 1)
Change in VMT	**-0.30%**	percent reduction	

Formula: % Change in VMT = (Subsidy amount / Average transit fare without subsidy * Elasticity of transit boardings with respect to transit fare price) * Percent of employees/residents eligible for subsidy * Percent of project-generated VMT from employees/residents * Transit mode share of all trips * Percent of transit trips that would otherwise be made in a vehicle * Conversion factor of vehicle trips to VMT

Sources:

(1) Federal Highway Administration (FHWA). 2017. National Household Travel Survey – 2017 Table Designer. Travel Day PMT by TRPTRANS by HH_CBSA, Workers by WRKTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(2) Handy, L., Boarnet, S. 2013. Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions. Available: http://www.arb.ca.gov/cc/sb375/policies/transitservice/transit_brief.pdf. Accessed: January 2021.

(3) Litman, T. 2020a. Transit Price Elasticities and Cross-elasticities. Victoria Transport Policy Institute. April. Available: https://www.vtpi.org/tranelas.pdf. Accessed: January 2021.

(4) Taylor, B., Miller, D., Iseki, H., & Fink, C. 2008. Nature and/or Nurture? Analyzing the Determinants of Transit Ridership Across US Urbanized Areas. Transportation Research Part A: Policy and Practice, 43(1), 60-77. Available: https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.367.5311&rep=rep1&type=pdf. Accessed: January 2021.

FEHR PEERS

Trip Reduction Programs - T-9-B. Implement Subsidized or Discounted Transit Program - Work Trips Only

Locational Context	**Urban, Suburban**
Scale of Application	**Project/Site**
Type of VMT affected:	**Employee commute trips**
Max VMT reduction:	**5.50%**

This measure will provide subsidized or discounted, or free transit passes for employees. Reducing the out-of-pocket cost for choosing transit improves the competitiveness of transit against driving, increasing the total number of transit trips and decreasing vehicle trips. This decrease in vehicle trips results in reduced VMT and thus a reduction in GHG emissions. The project should be accessible either within 1 mile of high-quality transit service (rail or bus with headways of less than 15 minutes), 0.5 mile of local or less frequent transit service, or along a designated shuttle route providing last-mile connections to rail service. If a well-established bikeshare service (Measure T-22-A) is available, the site may be located up to 2 miles from a high-quality transit service.

Select the Core-Based Statistical Area for the project.	Riverside-San Bernardino-Ontario		Appendix C. T-9.1
Average transit fare without subsidy	$5.00	**dollar**	user input (default value = 0-1000)
Subsidy amount	$2.00	**dollar**	user input (default value = 0-1000)
Percent of employees/residents eligible for subsidy	50.0%	**percent**	user input (default value = 0-1)
Percent of project-generated VMT from employees/residents	75.0%	**percent**	user input (default value = 0-1)
Transit mode share of all work trips	1.1%	**percent**	optional (default value = 0.0112-0.256)
Elasticity of transit boardings with respect to transit fare price	-0.430	**unitless**	constant (default value = -0.43)
Percent of transit trips that would otherwise be made in a vehicle	50.0%	**percent**	constant (default value = 0.5)
Conversion factor of vehicle trips to VMT	1.000	**unitless**	constant (default value = 1)
Change in VMT	**-0.04%**	**percent reduction**	

Formula: % Change in VMT = (Subsidy amount / Average transit fare without subsidy * Elasticity of transit boardings with respect to transit fare price) * Percent of employees/residents eligible for subsidy * Percent of project-generated VMT from employees/residents * Transit mode share of all work trips * Percent of transit trips that would otherwise be made in a vehicle * Conversion factor of vehicle trips to VMT

Sources:

(1) Federal Highway Administration (FHWA). 2017. National Household Travel Survey – 2017 Table Designer. Travel Day PMT by TRPTRANS by HH_CBSA, Workers by WRKTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(2) Handy, L., Boarnet, S. 2013. Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions. Available: http://www.arb.ca.gov/cc/sb375/policies/transitservice/transit_brief.pdf. Accessed: January 2021.

(3) Litman, T. 2020a. Transit Price Elasticities and Cross-elasticities. Victoria Transport Policy Institute. April. Available: https://www.vtpi.org/tranelas.pdf. Accessed: January 2021.

(4) Taylor, B., Miller, D., Iseki, H., & Fink, C. 2008. Nature and/or Nurture? Analyzing the Determinants of Transit Ridership Across US Urbanized Areas. Transportation Research Part A: Policy and Practice, 43(1), 60-77. Available: https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.367.5311&rep=rep1&type=pdf. Accessed: January 2021.

FEHR & PEERS

Trip Reduction Programs - T-10. Provide End-of-Trip Bicycle Facilities

Locational Context	**Urban, Suburban**
Scale of Application	**Project/Site**
Type of VMT affected:	**Employee commute trips**
Max VMT reduction:	**4.40%**

This measure will install and maintain end-of-trip facilities for employee use. End-of-trip facilities include bike parking, bike lockers, showers, and personal lockers. The provision and maintenance of secure bike parking and related facilities encourages commuting by bicycle, thereby reducing VMT and GHG emissions.

Select the Core-Based Statistical Area for the project.	Riverside-San Bernardino-Ontario		Appendix C. T-10.1
Bike mode adjustment factor	4.860	**unitless**	constant (default value = 1.78-4.86)
Existing bicycle trip length for all trips in region	2.2	**mile**	optional (default value = 1.7-2.9)
Existing vehicle trip length for all trips in region	11.7	**mile**	optional (default value = 9.7-19.1)
Existing bicycle mode share for work trips in region	0.4%	**percent**	optional (default value = 0.004-0.041)
Existing vehicle mode share for work trips in region	95.3%	**percent**	optional (default value = 0.671-0.953)
Change in VMT	**-0.30%**	**percent reduction**	

Formula: % Change in VMT = (Existing bicycle trip length for all trips in region * (Existing bicycle mode share for work trips in region - (Bike mode adjustment factor * Existing bicycle mode share for work trips in region))) / (Existing vehicle trip length for all trips in region * Existing vehicle mode share for work trips in region)

Sources:

(1) Buehler, R. 2012. Determinants of bicycle commuting in the Washington, DC region: The role bicycle parking, cyclist showers, and free car parking at work. Transportation Research Part D, 17, 525– 531. Available: http://www.pedbikeinfo.org/cms/downloads/DeterminantsofBicycleCommuting.pdf. Accessed: January 2021.

(2) Federal Highway Administration (FHWA). 2017a. National Household Travel Survey – 2017 Table Designer. Travel Day PT by TRPTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(3) Federal Highway Administration (FHWA). 2017b. National Household Travel Survey – 2017 Table Designer. Workers by WRKTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

FEHR PEERS

Parking or Road Pricing/Management - T-16. Unbundle Residential Parking Costs from Property Cost

Locational Context	**Urban, Suburban**
Scale of Application	**Project/Site**
Type of VMT affected:	**Project-generated trips**
Max VMT reduction:	**15.70%**

This measure will unbundle, or separate, a residential project's parking costs from property costs, requiring those who wish to purchase parking spaces to do so at an additional cost. On the assumption that parking costs are passed through to the vehicle owners/drivers utilizing the parking spaces, this measure results in decreased vehicle ownership and, therefore, a reduction in VMT and GHG emissions. Unbundling may not be available to all residential developments, depending on funding sources. Parking costs must be passed through to the vehicle owners/drivers utilizing the parking spaces for this measure to result in decreased vehicle ownership.

Annual parking cost per space	$1,200.00	dollar	user input (default value = 0-3600)
Average annual vehicle cost	$9,282.00	dollar	constant (default value = 9282)
Elasticity of vehicle ownership with respect to total vehicle cost	-0.400	unitless	constant (default value = -0.4)
Adjustment factor from vehicle ownership to VMT	1.010	unitless	constant (default value = 1.01)
Change in VMT	**-5.22%**	**percent reduction**	

Formula: % Change in VMT = (Annual parking cost per space / Average annual vehicle cost) * Elasticity of vehicle ownership with respect to total vehicle cost * Adjustment factor from vehicle ownership to VMT

Sources:

(1) AAA. 2019. Your Driving Costs. September. Available: https://exchange.aaa.com/wpcontent/uploads/2019/09/AAA-Your-Driving-Costs-2019.pdf. Accessed: January 2021.

(2) Federal Highway Administration (FHWA). 2017. National Household Travel Survey – 2017 Table Designer. Annual VMT / Vehicle by Count of Household Vehicles in California. Available: https://nhts.ornl.gov/. Accessed: March 2021.

(3) Litman, T. 2020. Parking Requirement Impacts on Housing Affordability. June. Available: https://www.vtpi.org/park-hou.pdf. Accessed: January 2021.

FEHR PEERS

Neighborhood Design - T-19-A. Construct or Improve Bike Facility

Locational Context	**Urban, Suburban**
Scale of Application	**Plan/Community**
Type of VMT affected:	**All neighborhood/city trips**
Max VMT reduction:	**0.80%**

This measure will construct or improve a single bicycle lane facility (only Class I, II, or IV) that connects to a larger existing bikeway network. Providing bicycle infrastructure helps to improve biking conditions within an area. This encourages a mode shift on the roadway parallel to the bicycle facility from vehicles to bicycles, displacing VMT and thus reducing GHG emissions. When constructing or improving a bicycle facility, a best practice is to consider local or state bike lane width standards. A variation of this measure is provided as T-19-B, Construct or Improve Bike Boulevard.

Select the Core-Based Statistical Area for the project.	Riverside-San Bernardino-Ontario		Appendix C. T-10.1
Select existing annual average daily traffic of the facility	30,001+		Appendix C. T-19.1
Select the length of the proposed bike facility	> 2 miles		Appendix C. T-19.1
What is the city popultion?	211,600		
Is the proposed facility in an university town?	Yes		
Select number of key destinations between 1/4 to 1/2 mile of facility	3		Appendix C. T-19.2
Select number of key destinations within 1/4 mile of facility	4 to 6		Appendix C. T-19.2
Select the proposed facility type	New Class II bike lane		Appendix C. T-19.3
Percent of plan/community VMT on parallel roadway	**50.0%**	**percent**	user input (default value = 0-1)
Active transportation adjustment factor	**0.000**	**unitless**	constant (default value = 0.0052-0.0207)
Credits for key destinations near project	**0.003**	**unitless**	constant (default value = 0-0.0015)
Growth factor adjustment for facility type	**1.000**	**unitless**	constant (default value = 0.54-1.54)
Annual days of use of new facility	**320**	**day**	optional (default value = 252-365)
Existing regional average one-way bicycle trip length	**2.2**	**mile**	optional (default value = 1.7-2.9)
Existing regional average one-way vehicle trip length	**11.7**	**mile**	optional (default value = 9.7-19.1)
Days per year	**365**	**day**	constant (default value = 365)
Change in VMT	**-0.02%**	**percent reduction**	

Formula: % Change in VMT = -Percent of plan/community VMT on parallel roadway * (((Annual days of use of new facility / Days per year) * (Active transportation adjustment factor + Credits for key destinations near project) * Growth factor adjustment for facility type * Existing regional average one-way bicycle trip length) / Existing regional average one-way vehicle trip length)

Sources:
(1) California Air Resources Board (CARB). 2020. Quantification Methodology for the Strategic Growth Council's Affordable Housing and Sustainable Communities Program. September. Available: https://ww2.arb.ca.gov/sites/default/files/classic/cc/capandtrade/auctionproceeds/draft_sgc_ahsc_q m_091620.pdf. Accessed: January 2021.

(2) Federal Highway Administration (FHWA). 2017. National Household Travel Survey–2017 Table Designer. Travel Day PT by TRPTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(3) National Oceanic and Atmospheric Administration (NOAA). 2021. Global Historical Climatology Network–Daily (GHCN-Daily), Version 3. 2015-2019 Average of Days Per Year with Precipitation >0.1 Inches. Available: https://www.ncei.noaa.gov/access/search/data-search/dailysummaries?bbox=38.922,-120.071,38.338,-119.547&place=County:1276&dataTypes=PRCP&startDate=2015-01- 01T00:00:00&endDate=2019-01-01T23:59:59. Accessed: May 2021.

FEHR PEERS

Neighborhood Design - T-19-B. Construct or Improve Bike Boulevard

Locational Context	**Urban, Suburban**
Scale of Application	**Plan/Community**
Type of VMT affected:	**All neighborhood/city trips**
Max VMT reduction:	**0.20%**

Construct or improve a single bicycle boulevard that connects to a larger existing bikeway network. Bicycle boulevards are a designation within Class III Bikeway that create safe, low-stress connections for people biking and walking on streets. This encourages a mode shift from vehicles to bicycles, displacing VMT and thus reducing GHG emissions. A variation of this measure is provided as T-19-A, Construct or Improve Bike Facility, which is for Class I, II, or IV bicycle infrastructure.

The following roadway conditions must be met.
- Functional classification: local and collector if there is no more than a single general-purpose travel lane in each direction.
- Design speed: <= 25 miles per hour.
- Design volume <= 5,000 average daily traffic.
- Treatments at major intersections: both directions have traffic signals (or an effective control device that prioritizes pedestrian and bicycle access such as rapid flashing beacons, pedestrian hybrid beacons, high-intensity activated crosswalks, TOUCANs), bike route signs, "sharrowed" roadway markings, and pedestrian crosswalks.

Select the Core-Based Statistical Area for the project.	Riverside-San Bernardino-Ontario		Appendix C. T-10.1
Percent of plan/community VMT on roadway to have bicycle boulevard	50.0%	**percent**	user input (default value = 0-1)
Bike mode adjustment factor	1.140	**unitless**	constant (default value = 1.14)
Existing bicycle trip length for all trips in region	2.2	**mile**	optional (default value = 1.7-2.9)
Existing vehicle trip length for all trips in region	11.7	**mile**	optional (default value = 9.7-19.1)
Existing bicycle mode share for work trips in region	0.4%	**percent**	optional (default value = 0.004-0.041)
Existing vehicle mode share for work trips in region	95.3%	**percent**	optional (default value = 0.671-0.953)
Change in VMT	**-0.01%**	**percent reduction**	

Formula: % Change in VMT = Percent of plan/community VMT on roadway to have bicycle boulevard * ((Existing bicycle trip length for all trips in region * (Existing bicycle mode share for work trips in region - (Bike mode adjustment factor * Existing bicycle mode share for work trips in region))) / (Existing vehicle trip length for all trips in region * Existing vehicle mode share for work trips in region))

Sources:

(1) Federal Highway Administration (FHWA). 2017a. National Household Travel Survey–2017 Table Designer. Travel Day PT by TRPTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(2) Federal Highway Administration (FHWA). 2017b. National Household Travel Survey–2017 Table Designer. Workers by WRKTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(3) Schwartz, S. 2021. Planning for Stress Free Connections: Estimating VMT Reductions. February.

FEHR & PEERS

Neighborhood Design - T-22-A. Implement Pedal (Non-Electric) Bikeshare Program

Locational Context	**Urban, Suburban**
Scale of Application	**Plan/Community**
Type of VMT affected:	**All neighborhood/city trips**
Max VMT reduction:	**0.02%**

This measure will establish a bikeshare program. Bikeshare programs provide users with on-demand access to bikes for short-term rentals. This encourages a mode shift from vehicles to bicycles, displacing VMT and thus reducing GHG emissions. Variations of this measure are described in Measure T-22-B, Implement Electric Bikeshare Program, and Measure T-22-C, Implement Scootershare Program. Access to bikesharing is measured as the percent of residences in the plan/community within 0.25 mile of a bikeshare station. For dockless bikes, assume that all residences within 0.25 mile of the designated dockless service area would have access.

Select the Core-Based Statistical Area for the project.	Riverside-San Bernardino-Ontario		Appendix C. T-10.1
Percent of residences in plan/community with access to bikeshare system without measure	40.0%	**percent**	user input (default value = 0-1)
Percent of residences in plan/community with access to bikeshare system with measure	75.0%	**percent**	user input (default value = 0-1)
Daily bikeshare trips per person	0.021	**trip**	constant (default value = 0.021)
Vehicle to bikeshare substitution rate	19.6%	**percent**	constant (default value = 0.196)
Bikeshare average one-way trip length	1.4	**mile**	optional (default value = 1.4)
Daily vehicle trips per person	2.700	**trip**	constant (default value = 2.7)
Regional average one-way vehicle trip length	11.7	**mile**	optional (default value = 9.7-19.1)
Change in VMT	**-0.01%**	**percent reduction**	

Formula: % Change in VMT = -1 * (((Percent of residences in plan/community with access to bikeshare system with measure - Percent of residences in plan/community with access to bikeshare system without measure) * Daily bikeshare trips per person * Vehicle to bikeshare substitution rate * Bikeshare average one-way trip length) / (Daily vehicle trips per person * Regional average one-way vehicle trip length))

Sources:
(1) Federal Highway Administration (FHWA). 2017. National Household Travel Survey–2017 Table Designer. Travel Day PT by TRPTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(2) Federal Highway Administration (FHWA). 2018. Summary of Travel Trends 2017–National Household Travel Survey. July. Available: https://www.fhwa.dot.gov/policyinformation/documents/2017_nhts_summary_travel_trends.pdf. Accessed: January 2021.

(3) Lazarus, J., J. Pourquier, F. Feng, H. Hammel, and S. Shaheen. 2019. Bikesharing Evolution and Expansion: Understanding How Docked and Dockless Models Complement and Compete – A Case Study of San Francisco. Paper No. 19-02761. Annual Meeting of the Transportation Research Board: Washington, D.C. Available: https://trid.trb.org/view/1572878. Accessed: January 2021.

(4) McQueen, M., G. Abou-Zeid, J. MacArthur, and K. Clifton. 2020. Transportation Transformation: Is Micromobility Making a Macro Impact on Sustainability? Journal of Planning Literature. November. Available: https://doi.org/10.1177/0885412220972696. Accessed: March 2021.

(5) Metropolitan Transportation Commission (MTC). 2017. Plan Bay Area 2040 Final Supplemental Report–Travel Modeling Report. July. Available: http://2040.planbayarea.org/files/2020-02/Travel_Modeling_PBA2040_Supplemental%20Report_7-2017.pdf. Accessed: January 2021.

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Neighborhood Design - T-22-C. Implement Scootershare Program

Locational Context	**Urban, Suburban**
Scale of Application	**Plan/Community**
Type of VMT affected:	**All neighborhood/city trips**
Max VMT reduction:	**0.07%**

This measure will establish a scootershare program. Scootershare programs provide users with on-demand access to electric scooters for short-term rentals. This encourages a mode shift from vehicles to scooters, displacing VMT and thus reducing GHG emissions. Variations of this measure are described in Measure T-22-A, Implement Pedal (Non-Electric) Bikeshare Program, and Measure T-22-B, Implement Electric Bikeshare Program. Access to scootersharing is measured as the percent of residences in the plan/community within 0.25-mile of a scootershare station. For dockless scooters, assume that all residences within 0.25-mile of the designated dockless service area would have access.

Select the Core-Based Statistical Area for the project.	Riverside-San Bernardino-Ontario		Appendix C. T-10.1
Percent of residences in plan/community with access to scootershare system without measure	10.0%	**percent**	user input (default value = 0-1)
Percent of residences in plan/community with access to scootershare system with measure	20.0%	**percent**	user input (default value = 0-1)
Daily scootershare trips per person	0.021	**trip**	constant (default value = 0.021)
Vehicle to scootershare substitution rate	38.5%	**percent**	constant (default value = 0.385)
Scootershare average one-way trip length	2.1	**mile**	optional (default value = 2.14)
Daily vehicle trips per person	2.700	**trip**	constant (default value = 2.7)
Regional average one-way vehicle trip length	11.7	**mile**	optional (default value = 9.7-19.1)
Change in VMT	**-0.01%**	**percent reduction**	

Formula: % Change in VMT = -1 * (((Percent of residences in plan/community with access to scootershare system with measure - Percent of residences in plan/community with access to scootershare system without measure) * Daily scootershare trips per person * Vehicle to scootershare substitution rate * Scootershare average one-way trip length) / (Daily vehicle trips per person * Regional average one-way vehicle trip length))

Sources:

(1) Federal Highway Administration (FHWA). 2017. National Household Travel Survey–2017 Table Designer. Travel Day PT by TRPTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(2) Federal Highway Administration (FHWA). 2018. Summary of Travel Trends 2017–National Household Travel Survey. July. Available: https://www.fhwa.dot.gov/policyinformation/documents/2017_nhts_summary_travel_trends.pdf. Accessed: January 2021.

(3) Metropolitan Transportation Commission (MTC). 2017. Plan Bay Area 2040 Final Supplemental Report–Travel Modeling Report. July. Available: http://2040.planbayarea.org/files/2020-02/Travel_Modeling_PBA2040_Supplemental%20Report_7-2017.pdf. Accessed: January 2021.

(4) McQueen, M., G. Abou-Zeid, J. MacArthur, and K. Clifton. 2020. Transportation Transformation: Is Micromobility Making a Macro Impact on Sustainability? Journal of Planning Literature. November. Available: https://doi.org/10.1177/0885412220972696. Accessed: March 2021. (5) Portland Bureau of Transportation (PBOT). 2021. Portland Bureau of Transportation E-Scooter Dashboard. Available: https://public.tableau.com/profile/portland.bureau.of.transportation#!/vizhome/PBOTEScooterTripsDashboard/ScooterDashboard. Accessed: March 2021.

FEHR & PEERS

Trip Reduction Programs - T-23. Provide Community-Based Travel Planning

Locational Context	**Urban, Suburban**
Scale of Application	**Plan/Community**
Type of VMT affected:	**Household trips**
Max VMT reduction:	**2.30%**

This measure will target residences in the plan/community with community-based travel planning (CBTP). CBTP is a residential-based approach to outreach that provides households with customized information, incentives, and support to encourage the use of transportation alternatives in place of single occupancy vehicles, thereby reducing household VMT and associated GHG emissions.

Residences in plan/community	15000	**residence**	user input (default value = 0-99999)
Residences in plan/community targeted with CBTP	15000	**residence**	user input (default value = 0-99999)
Percent of targeted residences that participate	15.0%	**percent**	constant (default value = 0.19)
Percent vehicle trip reduction by participating residences	10.0%	**percent**	constant (default value = 0.12)
Adjustment factor from vehicle trips to VMT	1.000	**unitless**	constant (default value = 1)
Change in VMT	**-1.50%**	**percent reduction**	

Formula: % Change in VMT = - (Residences in plan/community targeted with CBTP / Residences in plan/community) * Percent of targeted residences that participate * Percent vehicle trip reduction by participating residences * Adjustment factor from vehicle trips to VMT

Sources:

(1) Metropolitan Transportation Commission (MTC). 2021. Plan Bay Area 2050, Supplemental Report. (forthcoming)

FEHR PEERS

Transit - T-25. Extend Transit Network Coverage or Hours

Locational Context	**Urban, Suburban**
Scale of Application	**Plan/Community**
Type of VMT affected:	**All neighborhood/city trips**
Max VMT reduction:	**4.60%**

This measure will expand the local transit network by either adding or modifying existing transit service or extending the operation hours to enhance the service near the project site. Starting services earlier in the morning and/or extending services to late-night hours can accommodate the commuting times of alternative-shift workers. This will encourage the use of transit and therefore reduce VMT and associated GHG emissions.

Select the Core-Based Statistical Area for the project.	Riverside-San Bernardino-Ontario		Appendix C. T-3.1
Total transit service miles or service hours in plan/community before expansion	15.0	mile	user input (default value = 0-9999)
Total transit service miles or service hours in plan/community after expansion	30.0	mile	user input (default value = 0-9999)
Transit mode share in plan/community	2.5%	percent	optional (default value = 0.0137-0.1138)
Elasticity of transit demand with respect to service miles or service hours	0.700	unitless	constant (default value = 0.7)
Statewide mode shift factor	57.8%	percent	constant (default value = 0.578)
Ratio of vehicle trip reduction to VMT	1.000	unitless	constant (default value = 1)
Change in VMT	**-1.01%**	**percent reduction**	

Formula: % Change in VMT = -1 * ((Total transit service miles or service hours in plan/community after expansion - Total transit service miles or service hours in plan/community before expansion) / Total transit service miles or service hours in plan/community before expansion) * Transit mode share in plan/community * Elasticity of transit demand with respect to service miles or service hours * Statewide mode shift factor * Ratio of vehicle trip reduction to VMT

Sources:

(1) Handy, S., Lovejoy, K., Boarnet, M., Spears, S. 2013. Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions. October. Available: https://ww2.arb.ca.gov/sites/default/files/2020- 06/Impacts_of_Transit_Service_Strategies_on_Passenger_Vehicle_Use_and_Greenhouse_Gas_Emi ssions_Policy_Brief.pdf. Accessed: January 2021.

(2) Federal Highway Administration (FHWA). 2017. National Household Travel Survey – 2017 Table Designer. Average Vehicle Occupancy by HHSTFIPS. Available: https://nhts.ornl.gov/. Accessed: January 2021.

FEHR & PEERS

Transit - T-26. Increase Transit Service Frequency

Locational Context	**Urban, Suburban**
Scale of Application	**Plan/Community**
Type of VMT affected:	**All neighborhood/city trips**
Max VMT reduction:	**11.30%**

This measure will increase transit frequency on one or more transit lines serving the plan/community. Increased transit frequency reduces waiting and overall travel times, which improves the user experience and increases the attractiveness of transit service. This results in a mode shift from single occupancy vehicles to transit, which reduces VMT and associated GHG emissions.

Select the Core-Based Statistical Area for the project.	Riverside-San Bernardino-Ontario		Appendix C. T-3.1
Percent increase in transit frequency	200.0%	percent	user input (default value = 0-3)
Level of implementation	30.0%	percent	user input (default value = 0-1)
Elasticity of transit ridership with respect to frequency of service	0.500	unitless	constant (default value = 0.5)
Transit mode share in plan/community	1.4%	percent	optional (default value = 0.0137-0.1138)
Vehicle mode share in plan/community	96.9%	percent	optional (default value = 0.8696-0.9688)
Statewide mode shift factor	57.8%	percent	constant (default value = 0.578)
Change in VMT	**-0.25%**	**percent reduction**	

Formula: % Change in VMT = -Level of implementation * ((Percent increase in transit frequency * Transit mode share in plan/community * Elasticity of transit ridership with respect to frequency of service * Statewide mode shift factor) / Vehicle mode share in plan/community)

Sources:

(1) Federal Highway Administration (FHWA). 2017a. National Household Travel Survey–2017 Table Designer. Travel Day PMT by TRPTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(2) Federal Highway Administration (FHWA). 2017b. National Household Travel Survey–2017 Table Designer. Average Vehicle Occupancy by HHSTFIPS. Available: https://nhts.ornl.gov/. Accessed: January 2021. T-25. Increase Transit Service Frequency TRANSPORTATION | 178

(3) Handy, S., K. Lovejoy, M. Boarnet, S. Spears. 2013. Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions. October. Available: https://ww2.arb.ca.gov/sites/default/files/2020- 06/Impacts_of_Transit_Service_Strategies_on_Passenger_Vehicle_Use_and_Greenhouse_Gas_Emissions_Poli cy_Brief.pdf. Accessed: January 2021.

(4) San Diego Association of Governments (SANDAG). 2019. Mobility Management VMT Reduction Calculator Tool– Design Document. June. Available: https://www.icommutesd.com/docs/default-source/planning/tool-designdocument_final_7-17-19.pdf?sfvrsn=ec39eb3b_2. Accessed: January 2021.

FEHR PEERS

Transit - T-28. Provide Bus Rapid Transit

Locational Context	**Urban, Suburban**
Scale of Application	**Plan/Community**
Type of VMT affected:	**All neighborhood/city trips**
Max VMT reduction:	**13.80%**

This measure will convert an existing bus route to a bus rapid transit (BRT) system. BRT includes the following additional components, compared to traditional bus service: exclusive right-of-way (e.g., busways, queue jumping lanes) at congested intersections, increased limited-stop service (e.g., express service), intelligent transportation technology (e.g., transit signal priority, automatic vehicle location systems), advanced technology vehicles (e.g., articulated buses, low-floor buses), enhanced station design, efficient fare-payment smart cards or smartphone apps, branding of the system, and use of vehicle guidance systems. BRT can increase the transit mode share in a community due to improved travel times, service frequencies, and the unique components of the BRT system. This mode shift reduces VMT and the associated GHG emissions.

Select the Core-Based Statistical Area for the project.	Riverside-San Bernardino-Ontario		Appendix C. T-3.1
Percent increase in transit frequency due to BRT	**100.0%**	percent	user input (default value = 0-3)
Level of implementation	**25.0%**	percent	user input (default value = 0-1)
Transit mode share in plan/community	**1.37%**	percent	optional (default value = 0.0137-0.1138)
Vehicle mode share in plan/community	**96.88%**	percent	optional (default value = 0.8696-0.9688)
Statewide mode shift factor	**57.8%**	percent	constant (default value = 0.578)
Percent change in transit ridership due to BRT	**25.0%**	percent	constant (default value = 0.25)
Percent change in transit travel time due to BRT	**-10.0%**	percent	optional (default value = -0.1)
Elasticity of transit ridership with respect to frequency of service	**0.500**	unitless	constant (default value = 0.5)
Elasticity of transit ridership with respect to transit travel time	**-0.400**	unitless	constant (default value = -0.4)
Change in VMT	**-0.16%**	percent reduction	

Formula: % Change in VMT = -Level of implementation * ((Transit mode share in plan/community * Statewide mode shift factor * ((Percent increase in transit frequency due to BRT * Elasticity of transit ridership with respect to frequency of service) + (Percent change in transit travel time due to BRT * J) + Percent change in transit ridership due to BRT)) / Vehicle mode share in plan/community)

Sources:

(1) Federal Highway Administration (FHWA). 2017a. National Household Travel Survey–2017 Table Designer. Travel Day PMT by TRPTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(2) Federal Highway Administration (FHWA). 2017b. National Household Travel Survey–2017 Table Designer. Average Vehicle Occupancy by HHSTFIPS. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(3) Handy, S., K. Lovejoy, M. Boarnet, and S. Spears. 2013. Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions. October. Available: https://ww2.arb.ca.gov/sites/default/files/2020-06/Impacts_of_Transit_Service_Strategies_on_Passenger_Vehicle_Use_and_Greenhouse_Gas_Emissions_Policy_Brief.pdf. Accessed: January 2021.

(4) San Diego Association of Governments (SANDAG). 2019. Mobility Management VMT Reduction Calculator Tool–Design Document. June. Available: https://www.icommutesd.com/docs/default-source/planning/tool-design-document_final_7-17-19.pdf?sfvrsn=ec39eb3b_2. Accessed: January 2021.

(5) Transportation Research Board (TRB). 2007. Transit Cooperative Research Program Report 118: Bus Rapid Transit Practitioner's Guide. Available: https://nacto.org/docs/usdg/tcrp118brt_practitioners_kittleson.pdf. Accessed: January 2021.

Attachment C:
MXD+ Employee Trip Estimates

Select Trip Generation Units

Vehicle Trips | Person Trips

Vehicle Trip Generation by Purpose

Daily (Total)	HBW	HBO	NHB	Total
Productions	19,089	51,131	2,729	72,949
Attractions	2,671	21,513	7,865	32,049
Total	21,760	72,644	10,594	104,998

AM (Total)	HBW	HBO	NHB	Total
Productions	2,651	2,580	601	5,832
Attractions	479	3,380	679	4,538
Total	3,130	5,960	1,280	10,370

PM (Total)	HBW	HBO	NHB	Total
Productions	2,100	3,554	207	5,861
Attractions	245	1,544	660	2,449
Total	2,345	5,098	867	8,310

Walking External	2.09%	1.61%	1.21%	2.51%	1.93%	1.21%	2.09%	1.61%	1.21%
Transit External	0.51%	1.73%	3.90%	0.71%	2.42%	5.47%	0.71%	1.73%	3.90%

Number of Trips		Daily			AM			PM	
Productions	HBW	HBO	NHB	HBW	HBO	NHB	HBW	HBO	NHB
Internal Capture	362	4319	1124	74	819	174	44	338	103
Walking External	380	730	19	63	36	5	42	50	1
Transit External	89	796	60	17	33	16	14	55	4
Attractions	HBW	HBO	NHB	HBW	HBO	NHB	HBW	HBO	NHB
Internal Capture	362	4319	1124	74	819	174	44	338	103
Walking External	48	277	82	10	49	6	4	19	7
Transit External	11	292	254	3	48	19	1	21	22

ITE Vehicle Trip Generation by Trip Purpose

Daily (Total)	HBW	HBO	NHB	Total
Productions	19,089	51,131	2,729	72,949
Attractions	2,671	21,513	7,865	32,049
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Productions	2,100	3,554	207	5,861
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Appendix K2

Transportation Impact Assessment (VMT Memo)

FEHR & PEERS

Memorandum

Date: December 13, 2023

To: Wei Sun, T.E., PTOE, City of Moreno Valley

From: Paul Herrmann, P.E.
Jason D. Pack, P.E.

Subject: Aquabella Specific Plan Amendment Transportation Impact Assessment

OC22-0948

Fehr & Peers completed a Transportation Impact Assessment (TIA), including a Vehicle Miles Traveled (VMT) analysis, for the Aquabella Specific Plan development (Project) located in Moreno Valley, California. This VMT analysis is consistent with requirements of Senate Bill 743 (SB 743), the Office of Planning and Research's *Technical Advisory on Evaluating Transportation Impacts in CEQA* (December 2018), and City of Moreno Valley's *Transportation Impact Analysis Preparation Guide for Vehicle Miles Traveled and Level of Service Assessment* (June 2020) (City's TIA Guidelines).

The remainder of this memorandum is divided into six sections: Executive Summary, Project Description, Transportation Impact Analysis Approach, VMT Screening, VMT Analysis, and Active Transportation and Public Transit Review.

Executive Summary

As recommended in the City's Guidelines, VMT screening criteria was applied to applicable components of the Project (local serving retail, schools, parks and hotel). VMT forecasts for the residential component of the Project were prepared using Riverside County's travel demand forecasting model (RIVCOM). The results of the analysis concluded that the Project's Existing (2023) and Future Year (2045) Home-Based (HB) VMT per resident were both less than the Citywide average and therefore would result in a **less-than-significant impact**. An active transportation and transit review also concluded that the Project would result in a **less-than-significant impact** for those topics.

Project Description

The Project site is located on 673 acres of vacant land in the southeast area of Moreno Valley. The Project is intended to primarily serve as workforce housing to support the proposed 40.5 million square foot logistics warehouse project, the World Logistics Center (WLC) approximately five miles east of the site, and the existing and proposed medical centers adjacent to the Project. Build-out of the Project would consist of the following land uses:

- 7,500 multifamily low-rise residential dwelling units (DUs)
- 7,500 multifamily mid-rise residential DUs
- Four acres of commercial (49,900 sq. ft.)
- 300-room hotel
- Three elementary schools (3,995 students)
- One middle school/junior high school (2,049 students)
- 40 acres of open space:
    - 25 acres of active sports park
    - 15 acres of park and lake promenade

Fehr & Peers estimated the commercial square footage using an approximate 0.25 floor-area-ratio. Student counts were estimated based on the Moreno Valley Unified School District student generation factors.

The Project's design aspects are assumed in the plan and will be included in the project description:

- The internal street network will follow a grid pattern with approximately 600-foot block lengths to provide a street network similar to a downtown, urban area. Intersection density is a proxy for street connectivity, which helps to facilitate a greater number of shorter trips including those made by walking, biking, scooter, etc.
- The internal street network will contain an extensive bike network with Class II, buffered Class II and off-street paths, and will connect to the broader Moreno Valley bike network and support proposed micromobility modes (bikeshare, electric scooter)
- The internal street network will include a comprehensive sidewalk network to facilitate walking

The Project proposes twelve design features that will help reduce the vehicle trips generated by the Project. These Project Design Features (PDFs) are known as Transportation Demand Management (TDM) measures and promote non-automotive modes of transportation such as walking, biking, scooter, public transit, and ridesharing. The following TDM measures are documented by the California Air Pollution Control Officers Association (CAPCOA) in the *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity* (December 2021) (GHG Handbook), which quantifies trip and VMT reductions associated with the measures, and are proposed by the Project:

- Residential Trip Reduction Measures:
  - PDF 1: Community-Based Travel Planning
  - PDF 2: Unbundle Residential Parking Costs from Property Costs
- Employee Commute Trip Reduction Measures:
  - PDF 3: Commute Trip Reduction (CTR) Program Marketing
  - PDF 4: Rideshare Program
  - PDF 5: End-of-Trip Bicycle Facilities
  - PDF 6: Discounted Transit Program for Work Trips
- Project-Generated Trip Reduction Measures:
  - Micromobility on-site and connecting to adjacent uses, such as schools and medical centers:
    - PDF 7: Non-Electric Bikeshare Program
    - PDF 8: Electric Scootershare Program
  - Transit Network Improvements:
    - Work with the Riverside Transit Agency (RTA) to:
      - PDF-9: Extend Transit Network Coverage to existing and future employment centers, such as World Logistics Center
      - Extend Transit Hours for All Shift Times, such as the midnight shift change at World Logistics Center
      - PDF-10 Increase Transit Service Frequency
      - PDF-11: Implement Bus Rapid Transit (BRT) along Alessandro Boulevard
      - PDF-12: Develop an on-site state-of-the-art mobility hub to bolster the effectiveness active transportation options (mobility hubs are places of connectivity that bring together multiple modes of travel and strengthen first-mile/last-mile connections to transit)

Transportation Impact Analysis Approach

Per the City's TIA Guidelines, "for purposes of SB 743 compliance, a VMT analysis should be conducted for land use projects as deemed necessary by the Traffic Engineering Department and would apply to projects that have the potential to increase the average VMT per capita/employee compared to the City's threshold. Normalizing VMT per capita/employee provides a transportation efficiency metric that allows the City to compare the project to the remainder of the incorporated area for purposes of identifying transportation impacts."

The Project has the potential to increase VMT and is subject to VMT analysis to compare the Project's VMT per capita/employee to the City's threshold to determine if it would result in a significant transportation impact. The City's TIA Guidelines provide criteria to screen projects from VMT modeling assessment under the presumption that they would result in a less-than-significant transportation impact. Projects or parts of a project that do not screen out using the City's VMT screening criteria require a VMT analysis using the RIVCOM model.

The City's TIA Guidelines also require a review of active transportation and transit facilities to determine if the Project would conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decreases the performance or safety of such facilities.

VMT Screening

The City's TIA Guidelines state the following criteria can be applied to effectively screen projects from project-level VMT assessment under the presumption that they would result in a less-than-significant transportation impact:

- Transit Prioirty Area (TPA) Screening
- Low VMT Area Screening
- Project Type Screening

These screening criteria are discussed in more detail below.

Transit Priority Area (TPA) Screening

Projects that are within a half mile of an existing major transit stop[1] or an existing stop along a high-quality transit corridor[2] are considered in a TPA. Though, the Project proposes to significantly increase the quantity of transit service lines and improve headways in the area, since those lines are not currently in operation and are run by a third party not in control by the Project, TPA screening was not applied for this effort. However, it is anticipated that, at complete buildout of the Project, with the implementation of the proposed BRT along Alessandro Boulevard and development of the proposed mobility hub within the Project boundary, that the Project could qualify as a TPA.

Low VMT Area Screening

Projects located in Transportation Analysis Zones (TAZs) that generate VMT per capita below the City's threshold of significance are eligible for Low VMT Area Screening using the Western Riverside Council of Governments (WRCOG) VMT screening tool. Additional criteria need to be met for eligibility, such as developing similar land uses that already exist in the low VMT zone. Since the Project is proposed on vacant land, it is not eligible for Low VMT Area Screening, as the TAZ for the Project does not contain any existing land use for determining consistency.

Project Type Screening

Consistent with the project types identified in the City's TIA Guidelines, the following components of the Project were screened out using Project Type Screening:

- Local-serving retail less than 50,000 SF
- Local-serving K-12 schools
- Local parks
- Local-serving hotels (e.g., non-destination hotels)

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[1] Pub. Resources Code, § 21064.3 - 'Major transit stop' means a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.

[2] Pub. Resources Code, § 21155 - For purposes of this section, a 'high-quality transit corridor' means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.

Screening Determination

The proposed retail, schools, parks and hotel were screened from the VMT analysis because they are all local serving uses, consistent with the City's TIA Guidelines. These needs would exist with or without the Project, such that they don't represent an increase in VMT. As noted above, buildout of the Project may also qualify the Project site as a TPA due to increased transit service and connectivity to/from the site; however, this will require cooperation from Riverside Transit Agency (RTA), which the Project applicant cannot guarantee at this time. For this reason, TPA screening was not assumed. Low VMT screening was also not met.

Given the above referenced results of the VMT screening effort, a full VMT modeling and forecasting effort was prepared for the residential component of the project per the City's TIA guidelines, as described below.

VMT Analysis

As required in the City's TIA guidelines, this transportation impact analysis presents 'project-generated VMT' and evaluates the 'project effect on VMT.' Project-generated VMT in this assessment presents trips and trip distances of specific trip purposes (in this case residential home-based trips). The effect on VMT is an estimate of how VMT within the region will change once a project is built and new and existing traffic redistributes.

Project-generated VMT was estimated for non-screened land uses using the Production/Attraction (PA) method (described in more detail below). Project-generated VMT is presented for the residential uses, normalized by the resident population, and compared to the City's adopted threshold of significance to determine potential transportation impacts.

Project effect on VMT was estimated with and without the Project within multiple regional areas to compare the traffic redistribution with the Project. Boundary VMT estimates were normalized by the Service Population (the summation of the residents and employees within a boundary) for comparative purposes and to determine potential transportation impacts.

City of Moreno Valley Thresholds of Significance

The City's TIA Guidelines list the following thresholds of significance to apply to VMT analysis:

1. *A project would have a significant VMT impact if, in the Existing Plus Project scenario, its net VMT per capita (for residential projects) or per employee (for office and industrial*

projects) exceeds the per capita VMT for Moreno Valley. For all other uses, a net increase in VMT would be considered a significant impact.

2. *If a project is consistent with the regional RTP/SCS, then the cumulative impacts shall be considered less than significant subject to consideration of other substantial evidence. If it is not consistent with the RTP/SCS, then it would have a significant VMT impact if:*
    a. *For residential projects its net VMT per capita exceeds the average VMT per capita for Moreno Valley in the RTP/SCS horizon-year.*
    b. *For office and industrial projects its net VMT per employee exceeds the average VMT per employee for Moreno Valley in the RTP/SCS horizon year*
    c. *For all other land development project types, a net increase in VMT in the RTP/SCS horizon year would be considered a significant impact.*

Note that the Cumulative No Project scenario shall reflect the adopted RTP/SCS; as such, if a project is consistent with the regional RTP/SCS, then the cumulative impacts shall be considered less than significant subject to consideration of other substantial evidence.

The project-generated VMT analysis for the Project was performed for the residential use and therefore the following was applied to determine potential transportation impacts:

1. *A project would have a significant VMT impact if, in the Existing Plus Project scenario, its net VMT per capita exceeds the per capita VMT for Moreno Valley.*
2. *As the project is not consistent with the RTP/SCS, it would have a significant VMT impact if its net VMT per capita exceeds the average VMT per capita for Moreno Valley in the RTP/SCS horizon-year.*

The City's thresholds of significance are specific to project-generated VMT and are not defined for project effect on VMT analysis. For this effort, the following was applied to determine potential transportation impacts:

1. *A project would have a significant VMT impact if the Existing Plus Project scenario VMT per capita within the Citywide or ten-mile radius exceeds the per capita VMT in the Existing No Project within the same boundary.*
2. *A project would have a significant VMT impact if the RTP/SCS Horizon Year Plus Project scenario VMT per capita within the Citywide or ten-mile radius exceeds the per capita VMT in the Horizon Year No Project within the same boundary.*

VMT Modeling Methodology

The RIVCOM model was utilized to prepare VMT forecasts for the analysis scenarios. RIVCOM is a trip-based (4-step) travel demand forecasting model. Trip-based models use origin-destination pairing between geographical locations (TAZs) according to the following sequence:

1. Trip Generation,
2. Trip Distribution,
3. Mode Choice
4. Network Assignment

RIVCOM is the Western Riverside County Council of Government's (WRCOG) latest update to the Riverside County Transportation Analysis Model (RIVTAM) and consistent with *Connect SoCal 2020*, Southern California Association of Government's (SCAG's) 2020 Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS). RIVCOM uses a model base year of 2018 and model future year of 2045 and is considered the most appropriate model for use in this Project due to the more recent land use and roadway information.

Cumulative Project Considerations

The future year model land use dataset was reviewed against the City of Moreno Valley's pending and approved development project list to ensure all projects were reflected in future assumptions. One major discrepancy between RIVCOM future land use assumptions, which are consistent with SCAG's 2020 RTP/SCS growth projections in 2045, and *The World Logistics Center EIR (LSA, 2015)*, is the assumption of the buildout of the World Logistics Center (WLC). The 2020 RTP/SCS forecasts approximately 50% buildout of WLC by 2045, equating to approximately 11,503 employees within the WLC TAZs. This differs from the WLC EIR projection that WLC will be completely constructed (with 22,653 employees) by 2045. In addition, one of the primary impetuses of the Project is to provide housing for the WLC project, such that the expectation is that the Project will be phased in coordination concurrent with the completion of WLC. Because of these differences in Citywide land use assumptions, this analysis presents VMT estimates for both future condition scenarios, with "Partial Buildout" and "Full Buildout" of WLC.

Project Socio-Economic Assumptions

The project was coded into TAZ 1242, as shown in **Attachment A**. **Table 1** below summarizes the RIVCOM Socio-Economic Data (SED) inputs that represent the Project:

Table 1: Project SED Input Assumptions

Input	Value
Multi-Family Residential DUs	15,000
Total Residents (2.87 persons per household)	*43,050*
Retail Employment	125
Hotel Employment	100
School Employment	504
Park Employment	75
Total Employment	*804*
Total K-12 Students	*6,044*

RIVCOM Post-Processing Considerations

While the City has identified RIVCOM as the most appropriate tool to prepare VMT estimates, it is a macroscopic model that lacks sensitivity to the project design features and TDM measures proposed. For example, RIVCOM does not take into account bike lanes or bike share, does not account for intersection density, or unbundle residential parking costs from property costs. Fehr & Peers post processed the model assignment outputs to more accurately reflect the Project trip making behavior from these design features.

The RIVCOM Project TAZ traffic assignment does not account for the internalization or mode shift estimated in the Project's trip generation estimates that consider its mixed-use nature, site design, and the effect of proposed TDM measures. As shown in *Aquabella Master Plan Development Project Trip Generation Assessment (Fehr & Peers, May 2023),* provided as **Attachment B**, reductions were taken to the trip generation estimates to account for on-site internalization, shifts to active modes and transit, and the relationship between the adjacent medical centers and the existing high school. The Project TAZ trip tables were adjusted to reflect the same intrazonal relationship as was estimated in the Project trip generation estimates.

Following review of preliminary model runs, Fehr & Peers found that RIVCOM did not account for the anticipated relationship between the World Logistics Center (WLC) and the Project, given that the intent of the Project is to serve as workforce housing for WLC and both are being developed by the same landowner. Following discussions with the Project team related to economic forecasts, it is anticipated that the following relationships would exist at completion of the project:

- Partial WLC Buildout:
    - Approximately 33 percent (one third) of the 11,503 forecast (year 2045) employees at WLC would live at the Project.
    - This would equate to 3,834 Project residents (nine percent of Project residents or 25 percent of Project households).
    - Given the active transportation options and TDM measures proposed by the Project, Fehr & Peers estimated that 4,554 daily vehicle trips (or 2,277 round trips) would occur between the Project and WLC assuming a 1.5 vehicle occupancy and a ten percent shift to active modes (consistent with the reductions assumed in the trip generation assessment).
- Full WLC Buildout:
    - approximately 25 percent (one quarter) of the 22,653 forecast (year 2045) employees at WLC would live at the Project.
    - This would equate to 5,663 Project residents (13 percent of Project residents or 37 percent of Project households).
    - This results in 6,726 daily vehicle trips (or 3,363 round trips) that would occur between the Project and WLC.

This relationship was used to adjust the RIVCOM trip tables to more accurately reflect the Project's synergy with WLC for each scenario. Since the WLC does not exist in existing conditions, this relationship was only adjusted in the future (2045) conditions modeling.

VMT Scenarios

VMT estimates were prepared under the following scenarios, consistent with the City's Guidelines and direction related to cumulative project assumptions:

- Existing (2023) No Project Conditions
- Existing (2023) Plus Project Conditions
- Future Year (2045) Partial WLC Buildout (RTP/SCS Horizon Year Consistent) No Project Conditions
- Future Year (2045) Partial WLC Buildout (RTP/SCS Horizon Year Consistent) Plus Project Conditions
- Future Year (2045) Full WLC Buildout (WLC EIR Consistent) No Project Conditions
- Future Year (2045) Full WLC Buildout (WLC EIR Consistent) No Project Conditions

The No Project Conditions model runs were used to estimate Citywide averages (thresholds of significance) and the Plus Project Conditions model runs were used to estimate Project VMT. To estimate year 2023 conditions, data was interpolated between Base Year (2018) and Future Year (2045) Partial WLC Buildout (RTP/SCS Horizon Year Consistent) model runs.

Production/Attraction (PA) VMT

The PA methodology is utilized to estimate project-generated VMT. The PA method for calculating VMT sums all weekday VMT generated by trips with at least one trip end in the study area by trip purpose. The PA method tracks these trips to/from their ultimate destination unless that destination is outside of the model boundary area. Productions are land use types that generate trips (residences) and attractions are land use types that attract trips (employment). Productions and attractions are converted from person trips to vehicle trips for the purposes of calculating VMT.

The PA method allows project VMT to be evaluated based on trip purpose which is consistent with OPR recommendations in the Technical Advisory and consistent with the City's VMT methodology requirements. For example, a single-use project, such as an office building, could be analyzed based only on the commute VMT, or home-based-work (HBW) attraction VMT per employee; and a residential project could be analyzed based on the home-based (HB) production VMT per resident. Because the residential use did not screen out, the metrics of HB production VMT and HB VMT per resident have been quantified in project's VMT analysis, under both Existing and Cumulative conditions.

Due to the structure of the RIVCOM model, PA VMT can only be isolated by trip purpose before final traffic assignment in which all trip types are aggregated together. PA trip matrices include internal (I) trips that have both trip ends (i.e., origin and destination) inside the model boundary[3] and do not include external (X) trips that have one trip end outside of the model boundary (IX-XI trips) or truck trips, and therefore do not include those trips in the VMT estimates. As the PA methodology does not result in full accounting of all VMT, PA VMT estimates are not consistent with total Origin-Destination (OD) VMT utilized in Greenhouse Gas (GHG) impact analysis.

Boundary VMT

The boundary method is utilized to measure the project's effect on VMT. The boundary method is

[3] The RIVCOM model boundary contains all of Riverside County, Orange County, and San Diego County, and contains abbreviated portions of LA County and San Bernardino County.

the sum of all weekday VMT on a roadway network within a designated boundary. Boundary method VMT estimates VMT by multiplying the number of trips on each roadway segment by the length of that segment. This approach includes all trips, including those trips that do not begin or end in the designated boundary. This is the only VMT method that captures the effect of cut-through and/or displaced traffic.

Since the Project is located at the south edge of the City boundary, a ten-mile radius (the approximate average project trip length) geography surrounding the Project was selected as the analysis boundary to better cover the trip length coming from and to the Project site. Boundary VMT for impact determination should be normalized by the service population (summation of residents and employees within a designated boundary) within the boundary to make an apples-to-apples comparison between with and without project conditions.

VMT Estimates

This section summarizes the results of the project-generated (PA method) VMT and effect on VMT (boundary method) modeling. As noted in the thresholds of significance, RTP/SCS Horizon Year (2045) analysis is required for projects that cannot show consistency with the RTP/SCS. While the Project land use total is within the Nason Street Corridor Plan buildout envelope and within the City's General Plan buildout projections, because the Project is approximately 12,000 units more than what is currently programmed in the RTP/SCS within the Project site boundary and TAZ, the Project cannot guarantee consistency with the RTP/SCS and an RTP/SCS Horizon Year (2045) analysis was prepared.

Existing (2023) project-generated HB VMT estimates are presented in **Table 2** and RTP/SCS Horizon Year (2045) project-generated HB VMT estimates are presented in **Table 3**. As shown in **Table 2,** the Existing (2023) Project HB VMT per resident (i.e. 13.0) is estimated to be approximately 17 percent lower than the Citywide average HB VMT per resident (i.e. 15.8). As shown in **Table 3**, the RTP/SCS Horizon Year (2045) Project HB VMT per resident (i.e. 12.4 with Partial WLC Buildout and 12.2 with Full WLC Buildout) is estimated to be approximately 20 percent lower than the Citywide average HB VMT per resident (i.e. 15.4 with Partial WLC Buildout and 15.2 with Full WLC Buildout).

Table 2: Existing (2023) Project-Generated VMT Estimates

VMT Metric	Citywide Average	Project
Home-Based VMT	3,435,654	561,566
Residents	217,095	43,050
HB VMT/Resident	15.8	13.0

Source:
1. *RIVCOM, 2023.*

Table 3: RTP/SCS Horizon Year (2045) Project- Generated VMT Estimates

VMT Metric	Partial WLC Buildout		Full WLC Buildout	
	Citywide Average	Project	Citywide Average	Project
Home-Based VMT	4,161,213	533,653	4,145,715	523,425
Residents	269,507	43,050	269,507	43,050
HB VMT/Resident	15.4	12.4	15.4	12.2

Source:
1. *RIVCOM, 2023.*

Existing (2023) boundary method VMT estimates are presented in **Table 4** and RTP/SCS Horizon Year (2045) boundary method VMT estimates are presented in **Table 5**. As shown in **Table 4,** the Existing (2023) City Boundary VMT per service population with project (i.e., 8.3) is estimated to be approximately seven percent lower than without the project (i.e., 9.0), and the Existing (2023) 10-Mile Boundary VMT per service population with project (i.e., 17.0) is estimated to be approximately five percent lower than without the project (i.e., 17.9). As shown in **Table 5,** the RTP/SCS Horizon Year (2045) City Boundary VMT per service population with project (i.e., 8.8 with Partial WLC Buildout and 8.6 with Full WLC Buildout) is estimated to be approximately seven percent lower than without the project (i.e., 9.5 with Partial WLC Buildout and 9.2 with Full WLC Buildout), and the RTP/SCS Horizon Year (2045) 10-Mile Boundary VMT per service population with project (i.e., 18.1 with Partial WLC Buildout and 17.9 with Full WLC Buildout) is estimated to be approximately four percent lower than without the project (i.e., 19.0 with Partial WLC Buildout and 18.6 with Full WLC Buildout).

Table 4: Existing (2023) Boundary VMT Estimates

VMT Metric	Without Project	With Project
City Boundary VMT	2,366,765	2,559,970
City Service Population	264,202	307,401
City Boundary VMT/Service Population	9.0	8.3
10-Mile Boundary VMT	10,195,386	10,456,417
10-Mile Service Population	571,024	614,223
10-Mile Boundary VMT/Service Population	17.9	17.0

Source:
1. *RIVCOM, 2023.*

Table 5: RTP/SCS Horizon Year (2045) Boundary VMT Estimates

VMT Metric	Partial WLC Buildout		Full WLC Buildout	
	Without Project	With Project	Without Project	With Project
City Boundary VMT	3,168,284	3,336,295	3,174,259	3,352,226
City Service Population	334,071	377,925	345,221	389,075
City Boundary VMT/Service Population	9.5	8.8	9.2	8.6
10-Mile Boundary VMT	15,068,796	15,201,457	14,963,480	15,189,945
10-Mile Service Population	793,703	837,557	804,853	848,707
10-Mile Boundary VMT/Service Population	19.0	18.1	18.6	17.9

Source:
1. *RIVCOM, 2023.*

VMT Impact Determination

The Existing (2023) Project HB VMT per resident and the RTP/SCS Horizon Year (2045) Project HB VMT per resident are estimated to be lower than the Citywide average. The Existing (2023) and RTP/SCS Horizon Year (2045) City Boundary and 10-Mile VMT per service population with project is estimated to be lower than without the Project for both horizon year scenarios (with the partial and full buildout of WLC). Therefore, **the Project is anticipated to result in a less-than-significant transportation impact** related to VMT.

Active Transportation and Public Transit Analysis

Per the City's TIA Guidelines, potential impacts to public transit, pedestrian facilities and travel, and bicycle facilities and travel can be evaluated using the following criterion:

> *A significant impact occurs if the project conflicts with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decreases the performance or safety of such facilities.*

The following sections review existing and proposed active transportation and public transit facilities to examine if the Project is inconsistent with adopted policies, plans, or programs regarding active transportation or public transit facilities, or otherwise decreases the performance or safety of such facilities, and make a determination as to whether it has the potential to conflict with existing or proposed facilities supporting these travel modes.

Proposed Project Features

The Project proposes extensive on-site active transportation facilities and expansions to on- and off-site transit facilities as described in the Project Description and summarized below:

- Urban, downtown grid pattern internal street network
- Internal street network will contain Class II bike lanes, buffered Class II bike lanes and off-street paths, and will connect to Moreno Valley bike network and support proposed micromobility modes (bikeshare, electric scooter)
- End-of-trip bicycle facilities
- Discounted transit program for work trips
- Bikeshare program and electric scootershare program
- Extend transit network coverage, service times and frequency to existing and future employment centers, such as WLC
- BRT along Alessandro Boulevard
- Mobility hub

General Plan Policies Related to Active Transportation and Public Transit

The following Moreno General Plan Circulation Element Policies are relevant to evaluate consistency with adopted plans and policies.

- **C.2-1**: Design, plan, maintain, and operate streets using complete streets principles for all types of transportation projects including design, planning, construction, maintenance, and operations of new and existing streets and facilities. Encourage street connectivity that aims to create a comprehensive, integrated, connected network for all modes.

- **C.2-2**: Implement a layered network approach by prioritizing conflicting modes, such as trucks and bicyclists, on alternative parallel routes to provide safe facilities for each mode.
- **C.2-3**: Work to eliminate traffic-related fatalities and severe injury collisions by developing a transportation system that prioritizes human life on the roadway network.
- **C.2-7**: Plan access and circulation of each development project to accommodate vehicles (including emergency vehicles and trash trucks), pedestrians, and bicycles.
- **C.2-9**: Require connectivity and accessibility to a mix of land uses that meets residents' daily needs within walking distance. Typically, this means creating walkable neighborhoods with block lengths between 330 feet and 660 feet in length, based on divisions of the square mile grid on which the city is laid out.
- **C.2-10**: Ensure that complete streets applications integrate the neighborhood and community identity into the street design and retrofits. This can include special provisions for pedestrians and bicycles that complement the context of each community.
- **C.4-1**: Support the development of highspeed transit linkages or express routes connecting major destinations within the city and beyond, including the Metrolink Station, that would benefit the residents and employers in Moreno Valley.
- **C.4-2**: Collaborate with major employers and other stakeholders to improve access and connectivity to key destination such as the Downtown Center, the Moreno Valley Mall, the hospital complexes, Moreno Valley College, and the Lake Perris State Recreation Area.
- **C.4-3**: Support the establishment of a Transit Center/Mobility Hub in the Downtown Center.
- **C.4-4**: All new developments shall provide sidewalks in conformance with the City's streets cross-section standards, and applicable policies for designated urban and rural areas.
- **C.4-5**: Recognize that high-speed streets, high-volume streets and truck routes can increase pedestrian and bicycle stress levels and decrease comfortability. Provide increased buffers and protected bicycle lanes in high-stress areas, where feasible. Provide landscaped buffers where feasible to separate pedestrian environments from the travel way adjacent to motor vehicles. Provide convenient and high-visibility crossings for pedestrians.
- **C.5-1**: Work to reduce VMT through land use planning, enhanced transit access, localized attractions, and access to nonautomotive modes.
- **C.5-2**: Encourage public transportation that addresses the particular needs of transit dependent individuals, including senior citizens, the disabled, and low -income residents.
- **C.5-3**: Encourage bicycling as an alternative to single occupant vehicle travel for the

purpose of reducing fuel consumption, traffic congestion, and air pollution.

- **C.5-4**: Particularly in corridors and centers, work with transit service providers to provide first-rate amenities to support pedestrian, bicycle and transit usage, such as bus shelters and benches, bike racks on buses, high-visibility crossings, and modern bike storage.
- **C.5-5**: Encourage local employers to implement TDM strategies, including shared ride programs, parking cash out, transit benefits, allowing telecommuting and alternative work schedules.

The Project would not interfere with existing plans or policies and is anticipated to implement certain policies that may not occur without the Project, such as C.4-3: Support the establishment of a Transit Center/Mobility Hub in the Downtown Center.

Bicycle Facilities Review

There are five bicycle facility classifications recognized by the City of Moreno Valley and are classified as follows:

Class I Bikeways (Multi-use Paths)

Class I bikeways are facilities that are physically separated from vehicles, designated for the exclusive use of bicyclists and pedestrians with minimal vehicle crossings. The minimum width for a Class 1 path is 10 feet, with at least two feet of clearance from obstructions on each side.

Class II Bikeways (Bicycle Lanes)

Class II bikeways are striped lanes designated for the use of bicycles on a street or highway. Vehicle parking and vehicle/pedestrian cross flow are permitted at designated locations. Class II bicycle facilities are striped lanes that provide bike travel and can be either located next to a curb or parking lane, a minimum width of five feet is recommended.

Class III Bikeways (Bike Routes)

Class III bikeways, also referred to as bike routes, are only identified by signs or pavement markings. A bicycle route is meant for use by bicyclists and for motor vehicle travel (i.e., shared use). Bicycle routes were typically selected where connectivity could be improved by filling gaps in the system, but there was not sufficient space to install bicycle lanes.

Class IV Bikeways (Cycle Tracks)

Class IV bikeways, also referred to as cycle tracks, are protected bike lanes, which provide a right-of-way designated exclusively for bicycle travel within a roadway that is protected from vehicular traffic with devices such as curbs, flexible posts, inflexible physical barriers, or on-street parking.

Bicycle Boulevards

Bicycle Boulevards are convenient, low-stress cycling environments on low traffic volume streets, typically parallel to higher traffic volume streets as an alternative to them. These roads prioritize bicyclists and typically include speed and traffic volume management measures, such as intersection ROW control, to discourage motor vehicle traffic.

Adjacent to the Project site, In the area around the Project site, existing Class II bikeways can be found on the following roadway segments:

- Both sides on Cactus Avenue
- Both sides on Nason Street
- Both sides on Iris Avenue
- Both Sides on Lasselle Street between Cactus Avenue and La Barca Road

The Project would not interfere with existing or proposed facilities and is anticipated to improve the performance of existing and proposed facilities by expanding the bicycle network**.**

Pedestrian Facilities Review

The existing sidewalk network is mostly undeveloped adjacent to the Project site, while opposite sides of the adjacent streets tend to have continuous five-foot sidewalks that connect to the surrounding area. The **Project would improve the adjacent streets** with continuous sidewalk along with an extensive walkable internal Project site.

Public Transit Review

There are existing bus and regional transit service options available to the City of Moreno Valley.

Riverside Transit Agency (RTA)

RTA provides local and express services to Riverside County, which includes the City of Moreno Valley. The RTA routes that provide service near the Project site are Route 20 south of the project site, Route 31 north of the project site and Route 41 west of the project site and. There are bus stops along Lasselle Street west of the Project site, along Iris Avenue south of the Project site, at the Riverside University Medical Center north of the project site and along Alessandro Blvd a half mile north of the Project site.

Route 20 operates Monday to Friday between 4 AM and 11 PM & Saturday to Sunday between 7 AM and 9 PM with one-hour headways. **Route 20** provides service to Moreno Valley/March Field Metrolink Station and Moreno Valley College.

Route 31 operates Monday to Friday between 5:30 AM and 9 PM & Saturday to Sunday between 7 AM and 8:30 PM with one-hour headways. **Route 31** provides service to Moreno Valley Mall and Mt. San Jacinto College.

Route 41 operates Monday to Friday between 6 AM and 7 PM & Saturday to Sunday between 7 AM and 7 PM with one-hour headways. **Route 41** provides service to Mead Valley Community Center.

Metrolink

Commuter train service in the City of Moreno Valley is provided by Metrolink, which provides service throughout the Southern California region. The Moreno Valley/March Field Metrolink Station is located near the corner of Cactus Avenue and Meridian Parkway, approximately five miles west of the Project site. The Metrolink railroad runs north-south on the west side of the city, along the I-215 freeway.

The Project proposes to work with RTA to improve existing routes frequency, service hours and routes that would expand the transit system throughout the Project Site, surrounding school, medical uses, nearby industrial employment centers, and the broader Moreno Valley.

Active Transportation and Transit Impact Determination

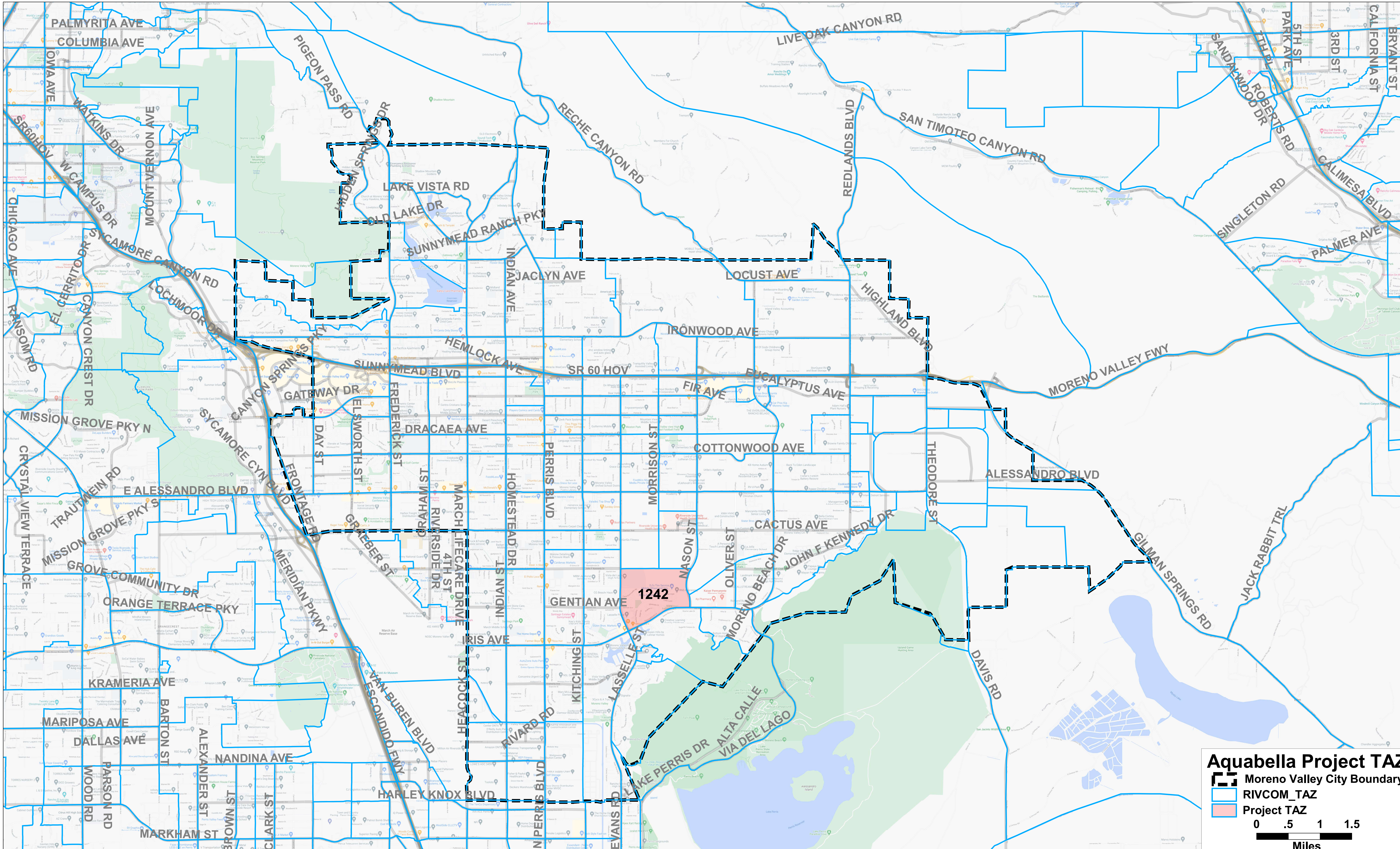
The Project is anticipated to significantly improve and enhance active transportation and transit access and facilities in the study area, consistent with General Plan Circulation Element policies. The review of existing and proposed active transportation and public transit facilities concludes that the Project is consistent with adopted policies, plans, or programs regarding active transportation or public transit facilities, and is anticipated to improve the performance and safety of such facilities. Therefore, **the Project would result in a less-than-significant transportation impact related to active transportation and transit.**

Attachments:

Attachment A – RIVCOM TAZ Map

Attachment B – Aquabella Master Plan Development Project Trip Generation Assessment (Fehr & Peers, May 2023)

Aquabella Project TAZ



FEHR & PEERS

DRAFT Memorandum

Date: May 16, 2023

To: Andrew Daymude, Highland Fairview

From: Paul Herrmann, P.E.
Logan Aspeitia

Subject: Aquabella Master Plan Development Project Trip Generation Assessment

OC22-0948

This memorandum documents a trip generation assessment conducted by Fehr & Peers in support of the Aquabella Specific Plan Amendment (Project) located in Moreno Valley, California. The purpose of this memorandum is to document the methodology used to estimate the number Project trips and is inclusive of the trip reductions associated with internalization and proposed project features that will further reduce the number of trips generated by the Project.

Executive Summary

Fehr & Peers applied a combination of the following to develop trip generation estimates for the project:

- Institute of Transportation Engineers (ITE) Trip Generation 11th edition rates to estimate total vehicle trips
- The Environmental Protection Agency's (EPA's) MXD (mixed-used development) methodology to determine the projected trip internalization for the Project
- California Air Pollution Control Officers Association (CAPCOA) methodology to quantify vehicle trip reductions associated with Project Transportation Demand Management (TDM) strategies

Table ES-1 summarizes the Project trip generation estimates, internalization reductions, and reductions applied for proposed TDM measures.

Table ES-1: Final Project Trip Generation Estimate

TDM Measure	Daily	AM In	AM Out	AM Total	PM In	PM Out	PM Total
Total Project Trips	105,000	3,844	6,522	10,366	4,941	3,369	8,310
Total Internalization Trips	(22,575)	(1,778)	(1,778)	(3,556)	(856)	(856)	(1,712)
Residential Trip TDM Reductions	(4,853)	(62)	(203)	(265)	(242)	(148)	(390)
Employee Commute Trip TDM Reductions	(43)	(7)	(4)	(11)	(1)	(3)	(4)
Project-Generated Trip TDM Reductions	(1,116)	(29)	(66)	(95)	(55)	(34)	(89)
Final Net External Trip Generation	**76,413**	**1,968**	**4,471**	**6,439**	**3,787**	**2,328**	**6,115**

Source(s):

1. *Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition, 2021.*
2. *MXD+, Fehr & Peers, 2023.*
3. *California Air Pollution Control Officers Association (CAPCOA), 2021.*
4. *TDM+, Fehr & Peers, 2023.*

Project Description

The Project site is located on 637 acres of vacant land in the southeast area of Moreno Valley. Under maximum build-out of the Project, it would consist of the following land uses:

- 7,500 multifamily low-rise residential dwelling units (DUs)
- 7,500 multifamily mid-rise residential DUs
- Four acres of commercial (49,900 sq. ft.)
- 300-room hotel
- Three elementary schools (3,995 students)
- One middle school/junior high school (2,049 students)
- 25 acres of Active Sports Park
- 15 acres of Park and Lake Promenade

The commercial square footage was estimated at an approximate 0.25 floor-area-ratio. Student counts were estimated based on the Moreno Valley Unified School District student generation factors.

The Project is programmatic in nature and does not contain specifics regarding internal street design, site access, or building site plans. However, the following design aspects are assumed in the plan and will be included in the project description:

- The internal street network will follow a grid pattern with approximately 600-foot block lengths to provide a street network similar to a downtown, urban area. Increased intersection density is a proxy for street connectivity improvements, which help to facilitate a greater number of shorter trips including those made by walking, biking, scooter, etc
- The internal street network will contain an extensive bike network with Class II, buffered Class II and off-street paths, and will connect to the broader Moreno Valley bike network and support proposed micromobility modes (bikeshare, electric scooter)
- The internal street network will provide a comprehensive sidewalk network to facilitate walking

The Project proposes eleven design features that will help reduce the vehicle trips generated by the Project. These design features are known as Transportation Demand Management (TDM) measures and promote non-automotive modes of transportation such as walking, biking, scooter, public transit, and ridesharing. The following TDM measures are documented in the California Air Pollution Control Officers Association (CAPCOA) and are proposed by the Project:

- Residential Trip Reduction Measures:
    - Community-Based Travel Planning
    - Unbundle Residential Parking Costs from Property Costs
- Employee Commute Trip Reduction Measures:
    - Commute Trip Reduction (CTR) Program Marketing
    - Rideshare Program
    - End-of-Trip Bicycle Facilities
    - Discounted Transit Program for Work Trips
- Project-Generated Trip Reduction Measures:
    - Micromobility on-site and connecting to adjacent uses, such as schools and medical centers:
        - Non-Electric Bikeshare Program
        - Electric Scootershare Program

- Transit Network Improvements:
  - Extend Transit Network Coverage to existing and future employment centers, such as World Logistics Center
  - Extend Transit Hours for All Shift Times, such as the midnight shift change at World Logistics Center
  - Increase Transit Service Frequency
  - Bus Rapid Transit (BRT) along Alessandro Boulevard
  - A state-of-the-art mobility hub is proposed on-site to bolster the effectiveness active transportation options (mobility hubs are places of connectivity that bring together multiple modes of travel and strengthen first-mile/last-mile connections to transit)

The Project TDM measures are described in more detail in the Trip Generation TDM Reductions section of the memorandum.

Trip Generation

Trip generation refers to the process of estimating the amount of vehicular traffic a project would add to the surrounding roadway system. Estimates for the Project were created for the daily condition and for the peak one-hour period during the morning and evening commutes when traffic volumes on the adjacent streets are typically the highest.

Weekday morning and evening peak hour trips were estimated for most Project land uses using methods published in *Trip Generation, 11th Edition (Institute of Transportation Engineers [ITE], 2021)*. The following ITE trip generation rates were used to estimate Project trips:

- ITE Code 220 – Multifamily Housing (Low Rise)
- ITE Code 221 – Multifamily Housing (Mid-Rise)
- ITE Code 821 – Shopping Plaza (40 - 150 KSF)
- ITE Code 310 – Hotel
- ITE Code 520 – Elementary School
- ITE Code 522 – Middle School/Junior High School
- ITE Code 411 – Public Park

For the Active Sports Park, the ITE trip generation rates for park (ITE Code 411) were not applicable. The Active Sports Park will have facilities such as ball or soccer fields and is anticipated to generate more trips than a typical park. Fehr & Peers referenced the daily trip generation rate for a park in *Brief Guide of Vehicular Traffic Generation Rates for San Diego Region (San Diego Association of Governments ([SANDAG], 2002)*. The SANDAG daily trip generation rate was combined with ITE Code 411's relationship between peak hour and daily trips to develop trip generation rates for the Active Sports Park.

Table 1 summarizes the trip generation rates used to develop the total trip generation estimates for Project, which are shown in **Table 2**.

Table 1: ITE Trip Generation Rates

Land Use	ITE Code	Quantity	Units	Daily Rate	AM In	AM Out	AM Rate	PM In	PM Out	PM Rate
Multifamily Housing (Low Rise)	220	7,500	DUs	6.74	24%	76%	0.40	63%	37%	0.51
Multifamily Housing (Mid-Rise)	221	7,500	DUs	4.54	23%	77%	0.37	61%	39%	0.39
Shopping Center (40 - 150 KSF)[1]	821	49.9	KSF	67.52	62%	38%	1.73	49%	51%	5.19
Hotel	310	300	Rooms	7.99	56%	44%	0.46	51%	49%	0.59
Elementary School	520	3,995	Students	2.27	54%	46%	0.74	46%	54%	0.16
Middle School/Junior High School	522	2,049	Students	2.10	54%	46%	0.67	48%	52%	0.15
Park and Lake Promenade	411	15	AC	0.78	59%	41%	0.02	55%	45%	0.11
Active Sports Park	-[2]	25	AC	50.00	50%	50%	1.50	50%	50%	7.00

Note:

1. ITE Code 821 rates do not include a supermarket.

Source:

1. *Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition, 2021.*
2. *San Diego Association of Governments (SANDAG)'s Brief Guide of Vehicular Traffic Generation Rates for San Diego Region, 2002.*

Table 2: Total Trip Generation

Land Use	ITE Code	Quantity	Units	Daily Trips	AM In	AM Out	AM Total	PM In	PM Out	PM Total
Multifamily Housing (Low Rise)	220	7,500	DUs	50,550	720	2,280	3,000	2,410	1,415	3,825
Multifamily Housing (Mid-Rise)	221	7,500	DUs	34,050	638	2,137	2,775	1,784	1,141	2,925
Residential Trips Subtotal				*84,600*	*1,358*	*4,417*	*5,775*	*4,194*	*2,556*	*6,750*
Shopping Center (40 - 150 KSF)[1]	821	49.9	KSF	3,369	53	33	86	127	132	259
Hotel	310	300	Rooms	2,397	77	61	138	90	87	177
Elementary School	520	3,995	Students	9,069	1,596	1,360	2,956	294	345	639
Middle School/Junior High School	522	2,049	Students	4,303	741	632	1,373	147	160	307
Park and Lake Promenade	411	15	AC	12	0	0	0	1	1	2
Active Sports Park	-[2]	25	AC	1,250	19	19	38	88	88	175
Non-Residential Trips Subtotal				*20,400*	*2,486*	*2,105*	*4,591*	*747*	*813*	*1,560*
Total Trip Generation				**105,000**	**3,844**	**6,522**	**10,366**	**4,941**	**3,369**	**8,310**

Note:
1. ITE Code 821 rates do not include a supermarket.

Source:
1. *Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition, 2021.*
2. *San Diego Association of Governments (SANDAG)'s Brief Guide of Vehicular Traffic Generation Rates for San Diego Region, 2002.*

Trip Generation Reductions

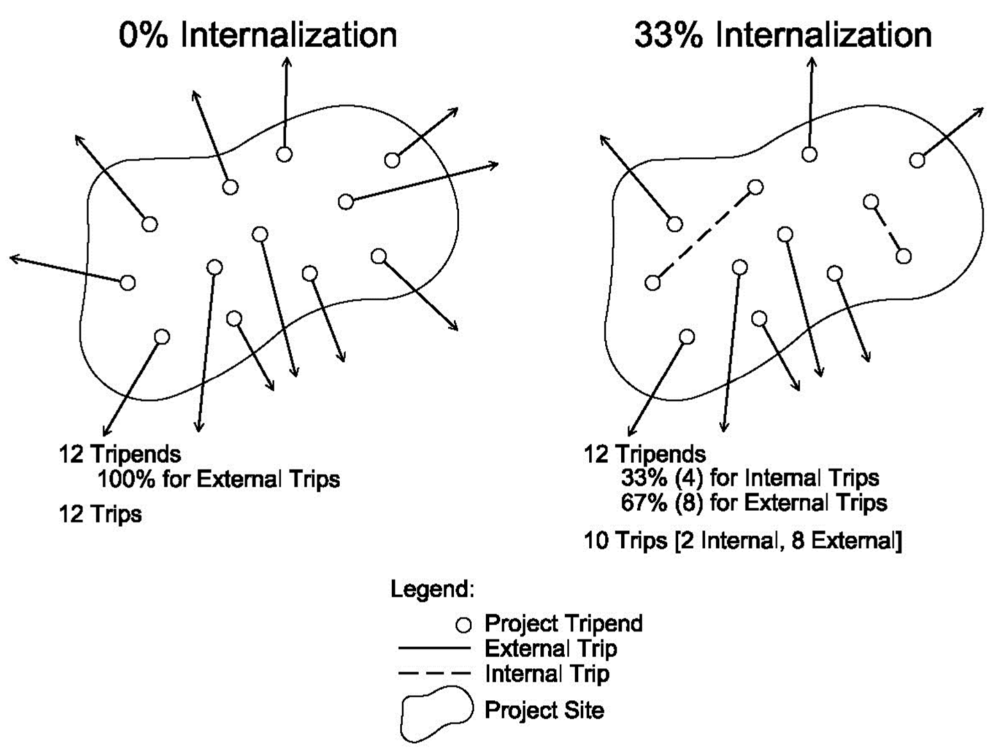
Below are summaries of the trip generation reductions that were applied to the Project.

Internal Capture Reductions

Given the mixed-use nature of the Project, it will not generate traffic in a similar manner to what is typically evaluated for most transportation studies. As such, the analysis evaluates the combined effects of the Project's mix of uses, regional location, demographics, and development scale that contribute to a reduction in off-site average weekday vehicle "trips" known as internalization, which accounts for trips beginning and ending on the project site.

The Environmental Protection Agency's (EPA's) MXD (mixed-used development) methodology was used to determine the projected trip internalization for the Project. This method more accurately estimates internalization of project trips compared to the traditional Institute of Transportation Engineers' (ITE) internalization methodology. The MXD model is more refined for the study area because it accounts for various attributes, such as density of the site, distance to transit, density of intersections, employment, household size, and variables that reduce vehicle trip-making behavior. Given the statistical robustness of the MXD method, it is more appropriate for estimating internalization of Project trips. Fehr & Peers' MXD+ tool (which incorporates the MXD methodology) was used to develop trip internalization for the Project.

Internal capture represents the percentage of Project tripends for trips that would remain internal to the Project site, which differs from the overall percentage of the net number of Project trips that remain internal to the Project site. In layman's terms, since each trip has two tripends (i.e., the beginning of the trip and the end of the trip), if a project generates 100 internalized trip ends, this represents 50 trips that are internal to the Project site (i.e., 100 tripends/2 tripends per trip = 50 trips). As such, when the number of trips is applied to the tripends component of the project, the total internal capture is roughly twice that which would otherwise be accounted for in the trips component. An example of the relationship between tripends and trips is provided in the following illustration:



In addition to within the Aquabella site, it is anticipated that a significant number of trips will be captured between the Project and neighboring complimentary uses at the high school and medical centers such that these should be taken into account when applying net external trip reductions. To estimate the full effect of potential internal capture for the Project, these uses were included in the MXD model to estimate internalization percentage to be applied to the total net external Project trip generation estimate.

Table 3 shows the Fehr & Peers MXD+ tool inputs used to generate the internalization estimates. **Table 4** shows the Project trip generation estimates with internalization reductions. MXD+ worksheets are provided in **Attachment A**.

Table 3: MXD Model Inputs

Input Variable	Input Value	Source
Developed Area (acres)	870	Includes the Project site area and adjacent Vista del Lago High School (3,500 students), Riverside University Health System Medical Center, and Kaiser Permanente Medical Center (1.5 MSF of total buildout of the two medical centers)
Transit Available	Yes	Existing RTA stops at Nason Street and Alessandro Blvd
Intersections per Square Mile	80	The Project proposes a grid network with approximately 600' block lengths
Employment within 1 mile of Project Site (employees)	2,890	Riverside County Model (RIVCOM) Future Year (2045)
Site Average Household Size (residents)	2.87	Riverside County Model (RIVCOM) Future Year (2045)

Source:

1. *Fehr & Peers, 2023.*

Table 4: Trip Generation with Internalization Reduction

Trips	Daily	AM In	AM Out	AM Total	PM In	PM Out	PM Total
Total Project Trips	105,000	3,844	6,522	10,366	4,941	3,369	8,310
Internalization Reduction (%)	21.5%		34.3%			20.6%	
Total Internalization Trips	(22,575)	(1,778)	(1,778)	(3,556)	(856)	(856)	(1,712)
Net External Trip Generation	**82,425**	**2,066**	**4,744**	**6,810**	**4,085**	**2,513**	**6,598**

Source(s):

1. *Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition, 2021.*
2. *MXD+, Fehr & Peers, 2023.*

Travel Demand Management Reductions

The Project proposes to implement TDM measures that will reduce the number of vehicle trips generated by the Project. CAPCOA provides methodologies to quantify the effect implementing TDM measures will have on Vehicle Miles Traveled (VMT) reductions. The CAPCOA guidelines include a variety of strategies including some strategies (such as destination accessibility, density, diversity of land uses, etc.) that are already included in the MXD+ assessment above. As such, those strategies are not included in this TDM assessment to ensure those reductions are not double counted.

The CAPCOA guidelines specify reductions associated with VMT reduction for purposes of quantifying GHG reduction potential. The adjustment factor from VMT reduction to vehicle trip reduction is 1.0 for all non-active transportation measures. This assumes that all vehicle trips will average out to typical trip length. Thus, it can be assumed that a percentage reduction in vehicle trips will equal the same percentage reduction in VMT. For bicycle and pedestrian measure reductions in this study, the VMT percent reductions from CAPCOA were conservatively applied as trip reductions (1.0 factor) as this would be an underestimate of trip reductions associated with the short bicycle and pedestrian trips used to calculate VMT.

Trip generation reductions were applied to Project trip generation estimates using the percent VMT reductions associated with each measure. VMT reductions were calculated using Fehr & Peers' TDM+ tool, which applies CAPCOA methodology, for all proposed TDM measures. It should be noted that a Mobility Hub concept is not specifically documented in CAPCOA. Although, the proposed Mobility Hub is expected to enhance and support the effectiveness of the other measures, as a conservative approach, additional reductions were not applied for this measure. TDM+ worksheets are provided in **Attachment B**.

The proposed TDM measures and associated VMT reductions are described below. They are grouped into the following three categories, which indicate the vehicle trip type the measure will reduce:

- Residential trip reductions – TDM measures that reduce trips generated by Project residential land uses
- Employee commute trip reductions – TDM measures that reduce Project employee trips generated by non-residential land uses
- Project-generated trip reductions – TDM measures that are available to the Project as well as adjacent communities

Duplicative dampening, which occurs when multiple TDM measures are applied that target the same users, reduces the effectiveness of some measures when they are implemented together. Therefore, the percent reductions are not additive. To ensure reductions are not over-estimated, Fehr & Peers applied the CAPCOA methodology to conservatively decrease the total percent VMT reduction associated with each group, thus analyzing the groups as a "package" of Project features and not individually consistent with the CAPCOA methodology to account for duplicative dampening.

Lastly, CAPCOA provides a range of reduction potential for each measure based on trends and data observed in research and case studies. Environmental factors, such as place type and the intensity of application of the measure, determine how effective each measure will be for a project. **Table 5** summarizes each of the proposed TDM measures and the maximum reduction potential, which would typically be in an urban area or urban core. While the Project is being designed with densities and block lengths similar to an urban area, this assessment recognizes that the Project is in a suburban setting and applies a conservatively low range of reductions appropriate for the Project place type.

Table 5: Project TDM Measures

TDM Measure	Max Reduction Potential	Project Reduction
Residential Trip Reductions		
Community-Based Travel Planning	2.30%	1.50%
Unbundle Residential Parking Costs from Property Costs	15.70%	5.20%
Employee Commute Trip Reductions		
Commute Trip Reduction (CTR) Program Marketing	4.00%	2.00%
Rideshare Program	8.00%	1.30%
End-of-Trip Bicycle Facilities	4.40%	0.30%
Discounted Transit Program for Work Trips Only	5.50%	0.04%
Project-Generated Trip Reductions		
Non-Electric Bikeshare Program	0.02%	0.01%
Scootershare Program	0.07%	0.01%
Extend Transit Network - Coverage and/or Hours for All Shift Times	4.60%	1.01%
Increase Transit Service Frequency	11.30%	0.25%
Bus Rapid Transit (BRT)	13.80%	0.16%

Source:
1. *California Air Pollution Control Officers Association (CAPCOA), 2021.*
2. *TDM+, Fehr & Peers, 2023.*

Residential Trip Reduction TDM Measures

Residential trip reductions are applied to trips generated by residents on the Aquabella site.

Community-Based Travel Planning (CAPCOA ID: T-23)

CAPCOA states, "This measure will target residences in the plan/community with community-based travel planning (CBTP). CBTP is a residential-based approach to outreach that provides households with customized information, incentives, and support to encourage the use of transportation alternatives in place of single occupancy vehicles, thereby reducing household VMT and associated GHG emissions."

Implementation of this measure in the Project will consist teams of trained travel advisors visiting all households within the Project upon move-in and having tailored conversations about residents' travel needs, and educating residents about the various transportation options available to them.

Unbundle Residential Parking Costs from Property Costs (CAPCOA ID: T-16)

CAPCOA states, "This measure will unbundle, or separate, a residential project's parking costs from property costs, requiring those who wish to purchase parking spaces to do so at an additional cost. On the assumption that parking costs are passed through to the vehicle owners/drivers utilizing the parking spaces, this measure results in decreased vehicle ownership and, therefore, a reduction in VMT and GHG emissions. Unbundling may not be available to all residential developments, depending on funding sources. Parking costs must be passed through to the vehicle owners/drivers utilizing the parking spaces for this measure to result in decreased vehicle ownership."

Implementation of this measure in the Project will consist of parking spaces costing approximately $100-$150 as a separate monthly cost from the unit.

Reductions

The percent VMT reductions for this group of measures are summarized in **Table 6**, and household trip reductions are shown in **Table 7**.

Table 6: Residential Reduction Percentages

TDM Measure	Daily	AM In	AM Out	AM Total	PM In	PM Out	PM Total
Community-Based Travel Planning	1.50%	1.50%			1.50%		
Unbundle Residential Parking Costs from Property Costs	5.20%	5.20%			5.20%		
Residential Reduction[1]	**6.62%**	**6.62%**			**6.62%**		

Note(s):

1. Duplicative dampening applied for package of measures.

Source(s):

1. *California Air Pollution Control Officers Association (CAPCOA), 2021.*
2. *TDM+, Fehr & Peers, 2023.*

Table 7: Residential Trip Reductions

TDM Measure	Daily	AM In	AM Out	AM Total	PM In	PM Out	PM Total
Residential Trips with Internalization	73,312	940	3,057	3,997	3,662	2,232	5,894
Residential VMT Reduction	6.62%		6.62%			6.62%	
Residential Trip TDM Reductions	**(4,853)**	**(62)**	**(203)**	**(265)**	**(242)**	**(148)**	**(390)**

Source:

1. *Fehr & Peers, 2023.*

Employee Commute Trip Reduction TDM Measures

Employee commute trip reductions are applied to trips of people employed on the Aquabella project site and are typically implemented by employers on site. Employee commute trips were estimated using Fehr & Peers' MXD+ tool, which incorporates the MXD methodology and provides an estimate of home-based-work trips and VMT. **Table 3** shows the Fehr & Peers MXD+ tool information used to generate the employee commute trip estimates. **Table 8** summarizes the employee commute trip types and associated internalization to estimate net external employee commute trips.

Table 8: Employee Commute Trip Estimates

TDM Measure	Daily	AM In	AM Out	AM Total	PM In	PM Out	PM Total
Employee Commute Trips	2,671	383	96	479	98	147	245
Internalization Reductions	(1,478)	(149)	(37)	(186)	(54)	(80)	(134)
Net External Employee Commute Trips	**1,193**	**234**	**59**	**293**	**44**	**67**	**111**

Source:

1. *MXD+, Fehr & Peers, 2023.*

Commute Trip Reduction (CTR) Program Marketing (CAPCOA ID: T-7)

CAPCOA states, "This measure will implement a marketing strategy to promote the project site employer's CTR program. Information sharing and marketing promote and educate employees about their travel choices to the employment location beyond driving such as carpooling, taking transit, walking, and biking, thereby reducing VMT and GHG emissions."

Implementation of this measure in the Project will consist of:

- Onsite or online commuter information services
- Employee transportation coordinators
- Onsite or online transit pass sales
- Guaranteed ride home service

Rideshare Program (CAPCOA ID: T-8)

CAPCOA states, "This measure will implement a ridesharing program and establish a permanent transportation management association with funding requirements for employers. Ridesharing encourages carpooled vehicle trips in place of single-occupied vehicle trips, thereby reducing the number of trips, VMT, and GHG emissions."

Implementation of this measure in the Project will consist of employers promoting the following:

- Designating a certain percentage of desirable parking spaces for ridesharing vehicles
- Designating adequate passenger loading and unloading and waiting areas for ridesharing vehicles
- Providing an app or website for coordinating rides

End-of-Trip Bicycle Facilities (CAPCOA ID: T-10)

CAPCOA states, "This measure will install and maintain end-of-trip facilities for employee use. End-of-trip facilities include bike parking, bike lockers, showers, and personal lockers. The provision and maintenance of secure bike parking and related facilities encourages commuting by bicycle, thereby reducing VMT and GHG emissions."

Implementation of this measure in the Project will be proportionally sized to the number of commuting bicyclists and regularly maintained by employers.

Discounted Transit Program for Work Trips Only (CAPCOA ID: T-9-B)

CAPCOA states, "This measure will provide subsidized or discounted, or free transit passes for employees. Reducing the out-of-pocket cost for choosing transit improves the competitiveness of transit against driving, increasing the total number of transit trips and decreasing vehicle trips. This decrease in vehicle trips results in reduced VMT and thus a reduction in GHG emissions. The project should be accessible either within 1 mile of high-quality transit service (rail or bus with headways of less than 15 minutes), 0.5 mile of local or less frequent transit service, or along a designated shuttle route providing last-mile connections to rail service. If a well-established bikeshare service (Measure T-22-A) is available, the site may be located up to 2 miles from a high-quality transit service."

Implementation of this measure in the Project will be provided by on-site employers. As detailed in other parts of this memorandum, transit service will be expanded with implementation of the Project:

- Bus Rapid Transit (BRT) is proposed on Alessandro Boulevard that would provide high-quality transit service
- Bus service will provide direct connections to the Moreno Valley / March Field Metrolink Train Station
- Bikeshare will be available to support this program

Reductions

The percent VMT reductions for this group of measures are summarized in **Table 9**, and employee commute trip reductions are shown in **Table 10**.

Table 9: Employee Commute Reduction Percentages

TDM Measure	Daily	AM In	AM Out	AM Total	PM In	PM Out	PM Total
CTR Program Marketing	2.00%		2.00%			2.00%	
Rideshare Program	1.30%		1.30%			1.30%	
End-of-Trip Bicycle Facilities	0.30%		0.30%			0.30%	
Discounted Transit Program for Work Trips	0.30%		0.04%			0.04%	
Employee Commute Reduction[1]	**3.60%**		**3.60%**			**3.60%**	

Note(s):

1. Duplicative dampening applied for package of measures.

Source(s):

1. *California Air Pollution Control Officers Association (CAPCOA), 2021.*
2. *TDM+, Fehr & Peers, 2023.*

Table 10: Employee Commute Trip Reductions

TDM Measure	Daily	AM In	AM Out	AM Total	PM In	PM Out	PM Total
Net External Employee Commute Trips	1,193	234	59	293	44	67	111
Employee Commute VMT Reduction	3.60%		3.60%			3.60%	
Employee Commute Trip TDM Reductions	**(43)**	**(7)**	**(4)**	**(11)**	**(1)**	**(3)**	**(4)**

Source:
1. *Fehr & Peers, 2023.*

Project-Generated Trip Reduction TDM Measures

Non-Electric Bikeshare Program (CAPCOA ID: T-22-A)

CAPCOA states, "This measure will establish a bikeshare program. Bikeshare programs provide users with on-demand access to bikes for short-term rentals. This encourages a mode shift from vehicles to bicycles, displacing VMT and thus reducing GHG emissions."

Implementation of this measure in the Project will require the Project applicant to establish the bikeshare program within the Project area.

Scootershare Program (CAPCOA ID: T-22-C)

CAPCOA states, "This measure will establish a scootershare program. Scootershare programs provide users with on-demand access to electric scooters for short-term rentals. This encourages a mode shift from vehicles to scooters, displacing VMT and thus reducing GHG emissions."

Implementation of this measure in the Project will require the Project applicant to establish the scootershare program within the Project area.

Extend Transit Network – Coverage and/or Hours for All Shift Times (CAPCOA ID: T-25)

CAPCOA states, "This measure will expand the local transit network by either adding or modifying existing transit service or extending the operation hours to enhance the service near the project site. Starting services earlier in the morning and/or extending services to late-night hours can accommodate the commuting times of alternative-shift workers. This will encourage the use of transit and therefore reduce VMT and associated GHG emissions."

Implementation of this measure in the Project will require the Project applicant to coordinate with the Riverside Transit Agency (RTA) to update bus service routes and service times to serve the new community.

Assumes a 100% increase (doubling the network coverage and expanding times) in network coverage by covering the east side of the City in addition to new routes to the west.

Increase Transit Service Frequency (CAPCOA ID: T-26)

CAPCOA states, "This measure will increase transit frequency on one or more transit lines serving the plan/community. Increased transit frequency reduces waiting and overall travel times, which improves the user experience and increases the attractiveness of transit service. This results in a mode shift from single occupancy vehicles to transit, which reduces VMT and associated GHG emissions."

Implementation of this measure in the Project will require the Project applicant to coordinate with the Riverside Transit Agency (RTA) to update bus service routes and service times to serve the new community. This would also include working with RTA to establish BRT on Alessandro Boulevard and providing direct bus connections to the Moreno Valley / March Field Metrolink Train Station. The Aquabella and World Logistics Project teams are committed to expanding transit service between these uses to account for all shift times.

Assumes 200% increase in frequency in the area (currently served at 1 hour frequencies, will provide 15-min headways during peak hours to provide high-quality transit.

Bus Rapid Transit (BRT)

CAPCOA states, "This measure will convert an existing bus route to a Bus Rapid Transit (BRT) system. BRT includes the following additional components, compared to traditional bus service: exclusive right-of-way (e.g., busways, queue jumping lanes) at congested intersections, increased limited-stop service (e.g., express service), intelligent transportation technology (e.g., transit signal priority, automatic vehicle location systems), advanced technology vehicles (e.g., articulated buses, low-floor buses), enhanced station design, efficient fare-payment smart cards or smartphone apps, branding of the system, and use of vehicle guidance systems. BRT can increase the transit mode share in a community due to improved travel times, service frequencies, and the unique components of the BRT system. This mode shift reduces VMT and the associated GHG emissions."

Consistent with the City of Moreno Valley and RTA plans, BRT is proposed along Alessandro Boulevard which will significantly increase transit frequency and service in the area.

Implementation of this measure should include improved travel times from transit signal prioritization, increased service frequency, and a full-featured BRT service operating on a fully segregated running way with a specialized vehicles, attractive stations, and efficient fare collection practices.

Assumes 50% increase in frequency to provide 15-minute headways. Assumes level of implementation is 25% (represents number of lines this influences).

Mobility Hub

Mobility Hubs provide a centralized location for non-automotive transportation modes to connect users to their destinations. There are limited benefits to implementing a stand-alone Mobility Hub, as the facility is meant to promote and support alternative transportation modes. Mobility Hubs should be supplemented with additional strategies or programs that provide increased public transit, bicycle, and pedestrian access and improvements.

Implementation of this project would require coordination with RTA, Metrolink and the City of Moreno Valley. The Project would construct the mobility hub at or near the Project.

Though, the proposed Mobility Hub is not included in CAPCOA, many of the characteristics of the Mobility Hub (increased transit accessibility, increased bicycling accessibility, etc) are part of other TDM strategies outlined in CAPCOA. The mobility hub is anticipated to strengthen the effectiveness of other proposed TDM strategies. However, to provide a conservative approach to trip generation, additional reductions were not applied for the mobility hub in this assessment.

Reductions

The percent VMT reductions for this group of measures are summarized in **Table 11**, and project-generated trip reductions are shown in **Table 12**. Since these TDM measures reduce overall Project trips, this group's total percent VMT reduction was applied after taking the reductions associated with the other measures, ensuring this group's effect on the Project are not overestimated.

Table 11: Project-Generated Reduction Percentages

TDM Measure	Daily	AM In	AM Out	AM Total	PM In	PM Out	PM Total
Non-Electric Bikeshare Program	0.01%		0.01%			0.01%	
Scootershare Program	0.01%		0.01%			0.01%	
Extend Transit Network	1.01%		1.01%			1.01%	
Increase Transit Services	0.25%		0.25%			0.25%	
Bus Rapid Transit (BRT)	0.16%		0.16%			0.16%	
Project-Generated Reduction[1]	**1.44%**		**1.44%**			**1.44%**	

Note(s):
1. Duplicative dampening applied for package of measures.

Source(s):
1. *California Air Pollution Control Officers Association (CAPCOA), 2021.*
2. *TDM+, Fehr & Peers, 2023.*

Table 12: Project-Generated Trip Reductions

TDM Measure	Daily	AM In	AM Out	AM Total	PM In	PM Out	PM Total
Net External Trip Generation	82,425	2,066	4,744	6,810	4,085	2,513	6,598
Residential Trip TDM Reductions	(4,853)	(62)	(203)	(265)	(242)	(148)	(390)
Employee Commute Trip TDM Reductions	(43)	(7)	(4)	(11)	(1)	(3)	(4)
Trip Generation with Internalization, Residential and Employee Commute TDM Reductions Subtotal	*77,529*	*1,997*	*4,537*	*6,534*	*3,842*	*2,362*	*6,204*
Project-Generated VMT Reduction	1.44%		1.44%			1.44%	
Project-Generated Trip TDM Reductions	**(1,116)**	**(29)**	**(66)**	**(95)**	**(55)**	**(34)**	**(89)**

Source:
1. *Fehr & Peers, 2023.*

Pass-By Reductions Considerations

The MXD+ model considers the relationship of internal capture between complimentary uses on site. To avoid double counting of reductions, no pass-by reductions were applied in addition to internal capture and TDM.

Conclusion

ITE Trip Generation 11th edition rates were used to estimate the Project trip generation. Due to the mixed-use characteristics of the site, Fehr & Peers used MXD methodology to estimate internalization reductions. Furthermore, the Project proposes to implement TDM measures to reduce vehicle trips generated by the site. CAPCOA methodology, which quantifies the effect TDM strategies have on VMT reduction, were used to estimate the reduction in vehicle trips associated with the proposed measures. The final tip generation estimates are shown in **Table 13**.

Table 13: Final Project Trip Generation Estimate

TDM Measure	Daily	AM In	AM Out	AM Total	PM In	PM Out	PM Total
Total Project Trips	105,000	3,844	6,522	10,366	4,941	3,369	8,310
Total Internalization Trips	(22,575)	(1,778)	(1,778)	(3,556)	(856)	(856)	(1,712)
Residential Trip TDM Reductions	(4,853)	(62)	(203)	(265)	(242)	(148)	(390)
Employee Commute Trip TDM Reductions	(43)	(7)	(4)	(11)	(1)	(3)	(4)
Project-Generated Trip TDM Reductions	(1,116)	(29)	(66)	(95)	(55)	(34)	(89)
Final Net External Trip Generation	**76,413**	**1,968**	**4,471**	**6,439**	**3,787**	**2,328**	**6,115**

Source(s):

1. *Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition, 2021.*
2. *MXD+, Fehr & Peers, 2023.*
3. *California Air Pollution Control Officers Association (CAPCOA), 2021.*
4. *TDM+, Fehr & Peers, 2023.*

Attachments

Attachment A – MXD+ Internalization Estimation Worksheets

Attachment B – TDM+ Trip Reduction Estimation Worksheets

Model Inputs

Input Variable	Input Value	Source
MXD specific inputs		
Project Area (Acres)	870	GIS
Intersections per Square Mile	80	custom
Employment within 1 mile of Project Site	2890	custom
Share of regional employment within a 30 minute trip by transit	0.000001	City Model 2035
Surrounding Household Size	3.14	ACS 2012 (5-year) - All Housing Types
Surrounding Vehicle Ownership	2.10	ACS 2012 (5-year) - All Housing Types
Site Household Size	2.87	custom
Site Vehicle Ownership	2.10	ACS 2012 (5-year) - All Housing Types
Average Vehicle Occupancy (HBW Trips)	1.1	NCHRP 758
Average Vehicle Occupancy (HBO Trips)	1.1	NCHRP 758
Average Vehicle Occupancy (NHB Trips)	1.1	NCHRP 758

Model Outputs (Vehicle Trips)

Land Use	Units[1]	ITE Code	Quantity	Daily	AM Peak Hour			PM Peak Ho	
					In	Out	Total	In	Out
Net New Uses									
(411) - Public Park (Adj Streets, 7-9A, 4-6P)	Acres	411[2]	15	12	0	0	0	1	1
(821) ShoppingPlaza (40-150k)-Supermarket -No (Adj Streets, 7-9A, 4-6P)	1000 Sq. Ft. GLA	821[3]	49.9	3369	53	33	86	127	132
(610) Hospital (Adj Streets, 7-9A, 4-6P)	1000 Sq. Ft. GFA	610[4]	1500	16155	824	406	1230	451	839
(525) - High School (Adj Streets, 7-9A, 4-6P)	Students	525[5]	3158	6127	1117	525	1642	212	230
(220) Multifamily Housing (Low- Rise) Not Close toRail Transit (Adj Streets, 7-9A, 4-6P)	Dwelling Units	220[6]	7500	50550	720	2280	3000	2410	1415
Custom	Custom	000[7]	25	1250	19	19	38	88	88
(520) - Elementary School (Adj Streets, 7-9A, 4-6P)	Students	520[8]	3995	9069	1596	1360	2956	294	345
(522) - Middle School/Junior High School (Adj Streets, 7-9A, 4-6P)	Students	522[9]	2049	4303	741	632	1373	147	160
(221) Multifamily Housing (Mid- Rise) Not Close toRail Transit (Adj Streets, 7-9A, 4-6P)	Dwelling Units	221[10]	7500	34050	638	2137	2775	1784	1141
(310) Hotel (Adj Streets, 7-9A, 4-6P)	Rooms	310[11]	300	2397	77	61	138	90	87
Reductions									
Internal Capture				-24,030	-1,846	-2,378	-4,224	-1,010	-800
External Walk, Bike, and Transit				-3,253	-138	-179	-317	-144	-114
Total Reductions				-27,283	-1,984	-2,557	-4,541	-1,154	-914
Net New Project Trips				99,999	3,801	4,896	8,697	4,450	3,524

1. **DU = dweling units. KSF = 1000 square feet**
2. **ITE Trip Generation land use category (411) - Public Park (Adj Streets, 7-9A, 4-6P)**
   - **Daily: T = 0.78(X)**
   - **AM Peak Hour: T = 0.02(X) (56.00000000000001% in, 44% out)**
   - **PM Peak Hour: T = 0.11(X) (56.99999999999999% in, 43% out)**
3. **ITE Trip Generation land use category (821) ShoppingPlaza (40-150k)-Supermarket -No (Adj Streets, 7-9A, 4-6P)**
   - **Daily: T = 67.52(X)**
   - **AM Peak Hour: T = 1.73(X)**
   - **PM Peak Hour: T = 5.19(X)**
4. **ITE Trip Generation land use category (610) Hospital (Adj Streets, 7-9A, 4-6P)**
   - **Daily: T = 10.77(X)**
   - **AM Peak Hour: T = 0.82(X) (72% in, 28.000000000000004% out)**
   - **PM Peak Hour: T = 0.86(X) (33% in, 67% out)**
5. **ITE Trip Generation land use category (525) - High School (Adj Streets, 7-9A, 4-6P)**
   - **Daily: T = 1.94(X)**
   - **AM Peak Hour: T = 0.52(X)**
   - **PM Peak Hour: T = 0.14(X)**
6. **ITE Trip Generation land use category (220) Multifamily Housing (Low- Rise) Not Close toRail Transit (Adj Streets, 7-9A, 4-6P)**
   - **Daily: T = 6.74(X)**
   - **AM Peak Hour: T = 0.40(X) (20% in, 80% out)**
   - **PM Peak Hour: T = 0.51(X) (65% in, 35% out)**
7. **ITE Trip Generation land use category Custom**
   - **Daily: T = 0.00(X)**
   - **AM Peak Hour: T = 0.00(X)**
   - **PM Peak Hour: T = 0.00(X)**
8. **ITE Trip Generation land use category (520) - Elementary School (Adj Streets, 7-9A, 4-6P)**
   - **Daily: T = 2.27(X)**
   - **AM Peak Hour: T = 0.74(X) (0% in, 0% out)**
   - **PM Peak Hour: T = 0.16(X) (49% in, 51% out)**
9. **ITE Trip Generation land use category (522) - Middle School/Junior High School (Adj Streets, 7-9A, 4-6P)**
   - **Daily: T = 2.10(X)**
   - **AM Peak Hour: T = 0.67(X) (0% in, 0% out)**
   - **PM Peak Hour: T = 0.15(X) (45% in, 55.00000000000001% out)**
10. **ITE Trip Generation land use category (221) Multifamily Housing (Mid- Rise) Not Close toRail Transit (Adj Streets, 7-9A, 4-6P)**
    - **Daily: T = 4.54(X)**
    - **AM Peak Hour: T = 0.37(X) (21% in, 79% out)**
    - **PM Peak Hour: T = 0.39(X) (65% in, 35% out)**
11. **ITE Trip Generation land use category (310) Hotel (Adj Streets, 7-9A, 4-6P)**
    - **Daily: T = 7.99(X)**
    - **AM Peak Hour: T = 0.46(X) (57.99999999999999% in, 42% out)**
    - **PM Peak Hour: T = 0.59(X) (49% in, 51% out)**
12. **Reductions based on application of MXD+ model:**
    - **Total Reductions: Daily = 21.5%, AM Peak Hour = 34.3%, PM Peak Hour = 20.6%**
    - **Internal Capture: Daily = 18.9%, AM Peak Hour = 31.9%, PM Peak Hour = 18%**
    - **External Walk, Bike, and Transit: Daily = 2.6%, AM Peak Hour = 2.4%, PM Peak Hour = 2.6%**
13. **Sources:**
    - ***ITE Trip Generation Manual*, 9th and 10th Edition**
    - **Fehr and Peers**
14. **Person Trips:**
    - **Person Trips derived using the following average vehicle occupancy rates, applied to ITE Vehicle Trip Generation:**
    - **HBW AVO:1.05**
    - **HBO AVO:1.05**
    - **NHW AVO:1.05**

Model Outputs (Person Trips)

Land Use	Units[1]	ITE Code	Quantity	Daily	AM Peak Hour			PM Peak Ho	
					In	Out	Total	In	Out
Net New Uses									
(411) - Public Park (Adj Streets, 7-9A, 4-6P)	Acres	411[2]	15	13	0	0	0	1	1
(821) ShoppingPlaza (40-150k)-Supermarket -No (Adj Streets, 7-9A, 4-6P)	1000 Sq. Ft. GLA	821[3]	49.9	3,537	56	35	90	133	139
(610) Hospital (Adj Streets, 7-9A, 4-6P)	1000 Sq. Ft. GFA	610[4]	1,500	16,963	865	426	1,292	474	881
(525) - High School (Adj Streets, 7-9A, 4-6P)	Students	525[5]	3,158	6,433	1,173	551	1,724	223	241
(220) Multifamily Housing (Low- Rise) Not Close toRail Transit (Adj Streets, 7-9A, 4-6P)	Dwelling Units	220[6]	7,500	53,078	756	2,394	3,150	2,531	1,486
Custom	Custom	000[7]	25	1,313	20	20	40	92	92
(520) - Elementary School (Adj Streets, 7-9A, 4-6P)	Students	520[8]	3,995	9,522	1,676	1,428	3,104	309	362
(522) - Middle School/Junior High School (Adj Streets, 7-9A, 4-6P)	Students	522[9]	2,049	4,518	778	664	1,442	154	168
(221) Multifamily Housing (Mid- Rise) Not Close toRail Transit (Adj Streets, 7-9A, 4-6P)	Dwelling Units	221[10]	7,500	35,753	670	2,244	2,914	1,873	1,198
(310) Hotel (Adj Streets, 7-9A, 4-6P)	Rooms	310[11]	300	2,517	81	64	145	95	91
Net Raw Project Trips				133,647	6,075	7,826	13,901	5,885	4,659
Reductions									
Internal Capture				-25,230	-1,938	-2,496	-4,434	-1,062	-841
External Walk, Bike, and Transit				-3,417	-145	-187	-332	-151	-119
Total Reductions				-28,647	-2,083	-2,683	-4,766	-1,212	-960
Net New Project Trips				105,000	3,992	5,143	9,135	4,673	3,699

1. **DU = dweling units. KSF = 1000 square feet**
2. **ITE Trip Generation land use category (411) - Public Park (Adj Streets, 7-9A, 4-6P)**
   - **Daily: T = 0.78(X)**
   - **AM Peak Hour: T = 0.02(X) (56.00000000000001% in, 44% out)**
   - **PM Peak Hour: T = 0.11(X) (56.99999999999999% in, 43% out)**
3. **ITE Trip Generation land use category (821) ShoppingPlaza (40-150k)-Supermarket -No (Adj Streets, 7-9A, 4-6P)**
   - **Daily: T = 67.52(X)**
   - **AM Peak Hour: T = 1.73(X)**
   - **PM Peak Hour: T = 5.19(X)**
4. **ITE Trip Generation land use category (610) Hospital (Adj Streets, 7-9A, 4-6P)**
   - **Daily: T = 10.77(X)**
   - **AM Peak Hour: T = 0.82(X) (72% in, 28.000000000000004% out)**
   - **PM Peak Hour: T = 0.86(X) (33% in, 67% out)**
5. **ITE Trip Generation land use category (525) - High School (Adj Streets, 7-9A, 4-6P)**
   - **Daily: T = 1.94(X)**
   - **AM Peak Hour: T = 0.52(X)**
   - **PM Peak Hour: T = 0.14(X)**
6. **ITE Trip Generation land use category (220) Multifamily Housing (Low- Rise) Not Close toRail Transit (Adj Streets, 7-9A, 4-6P)**
   - **Daily: T = 6.74(X)**
   - **AM Peak Hour: T = 0.40(X) (20% in, 80% out)**
   - **PM Peak Hour: T = 0.51(X) (65% in, 35% out)**
7. **ITE Trip Generation land use category Custom**
   - **Daily: T = 0.00(X)**
   - **AM Peak Hour: T = 0.00(X)**
   - **PM Peak Hour: T = 0.00(X)**
8. **ITE Trip Generation land use category (520) - Elementary School (Adj Streets, 7-9A, 4-6P)**
   - **Daily: T = 2.27(X)**
   - **AM Peak Hour: T = 0.74(X) (0% in, 0% out)**
   - **PM Peak Hour: T = 0.16(X) (49% in, 51% out)**
9. **ITE Trip Generation land use category (522) - Middle School/Junior High School (Adj Streets, 7-9A, 4-6P)**
   - **Daily: T = 2.10(X)**
   - **AM Peak Hour: T = 0.67(X) (0% in, 0% out)**
   - **PM Peak Hour: T = 0.15(X) (45% in, 55.00000000000001% out)**
10. **ITE Trip Generation land use category (221) Multifamily Housing (Mid- Rise) Not Close toRail Transit (Adj Streets, 7-9A, 4-6P)**
    - **Daily: T = 4.54(X)**
    - **AM Peak Hour: T = 0.37(X) (21% in, 79% out)**
    - **PM Peak Hour: T = 0.39(X) (65% in, 35% out)**
11. **ITE Trip Generation land use category (310) Hotel (Adj Streets, 7-9A, 4-6P)**
    - **Daily: T = 7.99(X)**
    - **AM Peak Hour: T = 0.46(X) (57.99999999999999% in, 42% out)**
    - **PM Peak Hour: T = 0.59(X) (49% in, 51% out)**
12. **Reductions based on application of MXD+ model:**
    - **Total Reductions: Daily = 21.5%, AM Peak Hour = 34.3%, PM Peak Hour = 20.6%**
    - **Internal Capture: Daily = 18.9%, AM Peak Hour = 31.9%, PM Peak Hour = 18%**
    - **External Walk, Bike, and Transit: Daily = 2.6%, AM Peak Hour = 2.4%, PM Peak Hour = 2.6%**
13. **Sources:**
    - ***ITE Trip Generation Manual*, 9th and 10th Edition**
    - **Fehr and Peers**
14. **Person Trips:**
    - **Person Trips derived using the following average vehicle occupancy rates, applied to ITE Vehicle Trip Generation:**
    - **HBW AVO:1.05**
    - **HBO AVO:1.05**
    - **NHW AVO:1.05**

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TDM+

Project Information

General Project Info		Common Variables (selecting this will set all measures with this variable to the same value)	
Project Name:	OC22-0947 Aquabella Planning	Select the Core-Based Statistical Area for the project.	Riverside-San Bernardino-Ontario
Project Address:			
Project Type:	Mixed-Use		
Locational Context:	Suburban		

TDM Strategy Available (strategies that can combine their reductions are the same color)

TDM ID	Strategy Name	Strategy Type	VMT Type
T-1	Increase Residential Density	Land Use	Project-generated trips
T-2	Increase Job Density	Land Use	Project-generated trips
T-3	Provide Transit-Oriented Development	Land Use	Project-generated trips
T-4	Integrate Affordable and Below Market Rate Housing	Land Use	Project-generated trips
T-5	Implement Commute Trip Reduction Program (Voluntary)	Trip Reduction Programs	Employee commute trips
T-6	Implement Commute Trip Reduction Program (Mandatory Implementation and Monitoring)	Trip Reduction Programs	Employee commute trips
T-7	Implement Commute Trip Reduction Marketing	Trip Reduction Programs	Employee commute trips
T-8	Provide Ridesharing Program	Trip Reduction Programs	Employee commute trips
T-9-A	Implement Subsidized or Discounted Transit Program - All Trips	Trip Reduction Programs	Project-generated trips
T-9-B	Implement Subsidized or Discounted Transit Program - Work Trips Only	Trip Reduction Programs	Employee commute trips
T-10	Provide End-of-Trip Bicycle Facilities	Trip Reduction Programs	Employee commute trips
T-11	Provide Employer-Sponsored Vanpool	Trip Reduction Programs	Employee commute trips
T-12	Price Workplace Parking	Trip Reduction Programs	Employee commute trips
T-13	Implement Employee Parking Cash-Out	Trip Reduction Programs	Employee commute trips
T-15	Limit Residential Parking Supply	Parking or Road Pricing/Management	Project-generated trips
T-16	Unbundle Residential Parking Costs from Property Cost	Parking or Road Pricing/Management	Project-generated trips
T-17	Improve Street Connectivity	Land Use	All neighborhood/city trips
T-18	Provide Pedestrian Network Improvement	Neighborhood Design	Household trips
T-19-A	Construct or Improve Bike Facility	Neighborhood Design	All neighborhood/city trips
T-19-B	Construct or Improve Bike Boulevard	Neighborhood Design	All neighborhood/city trips
T-20	Expand Bikeway Network	Neighborhood Design	Employee commute trips
T-21-A	Implement Conventional Carshare Program	Neighborhood Design	All neighborhood/city trips
T-22-A	Implement Pedal (Non-Electric) Bikeshare Program	Neighborhood Design	All neighborhood/city trips
T-22-B	Implement Electric Bikeshare Programs	Neighborhood Design	All neighborhood/city trips
T-22-C	Implement Scootershare Program	Neighborhood Design	All neighborhood/city trips
T-23	Provide Community-Based Travel Planning	Trip Reduction Programs	Household trips
T-24	Implement Market Price Public Parking (On-Street)	Parking or Road Pricing/Management	All neighborhood/city trips
T-25	Extend Transit Network Coverage or Hours	Transit	All neighborhood/city trips
T-26	Increase Transit Service Frequency	Transit	All neighborhood/city trips
T-27	Implement Transit-Supportive Roadway Treatments	Transit	All neighborhood/city trips
T-28	Provide Bus Rapid Transit	Transit	All neighborhood/city trips
T-29	Reduce Transit Fares	Transit	All neighborhood/city trips

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Source: Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity (GHG Handbook), California Air Pollution Control Officers Association (2021).

https://www.caleemod.com/handbook/full_handbook.html

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TDM Strategy Results

TDM ID	Strategy Name	Strategy Type	VMT Type	Change in VMT
T-1	Increase Residential Density	Land Use	Project-generated trips	-
T-2	Increase Job Density	Land Use	Project-generated trips	-
T-3	Provide Transit-Oriented Development	Land Use	Project-generated trips	-
T-4	Integrate Affordable and Below Market Rate Housing	Land Use	Project-generated trips	-
T-5	Implement Commute Trip Reduction Program (Voluntary)	Trip Reduction Programs	Employee commute trips	-
T-6	Implement Commute Trip Reduction Program (Mandatory Implementation and Monitoring)	Trip Reduction Programs	Employee commute trips	-
T-7	Implement Commute Trip Reduction Marketing	Trip Reduction Programs	Employee commute trips	-2.0%
T-8	Provide Ridesharing Program	Trip Reduction Programs	Employee commute trips	-1.3%
T-9-A	Implement Subsidized or Discounted Transit Program - All Trips	Trip Reduction Programs	Project-generated trips	-0.3%
T-9-B	Implement Subsidized or Discounted Transit Program - Work Trips Only	Trip Reduction Programs	Employee commute trips	0.0%
T-10	Provide End-of-Trip Bicycle Facilities	Trip Reduction Programs	Employee commute trips	-0.3%
T-11	Provide Employer-Sponsored Vanpool	Trip Reduction Programs	Employee commute trips	-
T-11-FP	Provide Employer-Sponsored Van pool (FP version)	Trip Reduction Programs	Employee commute trips	-
T-12	Price Workplace Parking	Trip Reduction Programs	Employee commute trips	-
T-13	Implement Employee Parking Cash-Out	Trip Reduction Programs	Employee commute trips	-
T-15	Limit Residential Parking Supply	Parking or Road Pricing/Management	Project-generated trips	-
T-16	Unbundle Residential Parking Costs from Property Cost	Parking or Road Pricing/Management	Project-generated trips	-5.2%
T-17	Improve Street Connectivity	Land Use	All neighborhood/city trips	-
T-18	Provide Pedestrian Network Improvement	Neighborhood Design	Household trips	-
T-19-A	Construct or Improve Bike Facility	Neighborhood Design	All neighborhood/city trips	0.0%
T-19-B	Construct or Improve Bike Boulevard	Neighborhood Design	All neighborhood/city trips	0.0%
T-20	Expand Bikeway Network	Neighborhood Design	Employee commute trips	-
T-21-A	Implement Conventional Carshare Program	Neighborhood Design	All neighborhood/city trips	-
T-22-A	Implement Pedal (Non-Electric) Bikeshare Program	Neighborhood Design	All neighborhood/city trips	-0.01%
T-22-B	Implement Electric Bikeshare Programs	Neighborhood Design	All neighborhood/city trips	-
T-22-C	Implement Scootershare Program	Neighborhood Design	All neighborhood/city trips	-0.01%
T-23	Provide Community-Based Travel Planning	Trip Reduction Programs	Household trips	-1.5%
T-24	Implement Market Price Public Parking (On-Street)	Parking or Road Pricing/Management	All neighborhood/city trips	-
T-25	Extend Transit Network Coverage or Hours	Transit	All neighborhood/city trips	-1.0%
T-26	Increase Transit Service Frequency	Transit	All neighborhood/city trips	-0.3%
T-27	Implement Transit-Supportive Roadway Treatments	Transit	All neighborhood/city trips	-
T-28	Provide Bus Rapid Transit	Transit	All neighborhood/city trips	-0.2%
T-29	Reduce Transit Fares	Transit	All neighborhood/city trips	-

TDM Reduction Summary

Land Use	**Project Site**	**Project-generated trips**		**0.0%**
Land Use	**Plan/Community**	**All neighborhood/city trips**		**0.0%**
Trip Reduction Programs	**Project Site**	**Employee commute trips**	**(multiplicative dampening applied)**	**-3.6%**
Trip Reduction Programs	**Project Site**	**Project-generated trips**		**-0.3%**
Trip Reduction Programs	**Plan/Community**	**Household trips**		**-1.5%**
Parking or Road Pricing/Management	**Project Site**	**Project-generated trips**		**-5.2%**
Parking or Road Pricing/Management	**Plan/Community**	**All neighborhood/city trips**		**0.0%**
Neighborhood Design	**Plan/Community**	**All neighborhood/city trips**	**(multiplicative dampening applied)**	**0.0%**
Neighborhood Design	**Plan/Community**	**Employee commute trips**		**0.0%**
Neighborhood Design	**Plan/Community**	**Household Trips**		**0.0%**
Transit	**Plan/Community**	**All neighborhood/city trips**	**(multiplicative dampening applied)**	**-1.4%**

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Trip Reduction Programs - T-7. Implement Commute Trip Reduction Marketing

Locational Context	**Urban, Suburban**
Scale of Application	**Project/Site**
Type of VMT affected:	**Employee commute trips**
Max VMT reduction:	**4.00%**

This measure will implement a marketing strategy to promote the project site employer's CTR program. Information sharing and marketing promote and educate employees about their travel choices to the employment location beyond driving such as carpooling, taking transit, walking, and biking, thereby reducing VMT and GHG emissions.

The following features (or similar alternatives) of the marketing strategy are essential for effectiveness.

- Onsite or online commuter information services.
- Employee transportation coordinators.
- Onsite or online transit pass sales.
- Guaranteed ride home service.

Percent of employees eligible for program	40.0%	**percent**	user input (default value = 0-1)
Percent reduction in employee commute vehicle trips	-5.0%	**percent**	constant (default value = -0.04)
Adjustment from vehicle trips to VMT	1.000	**unitless**	constant (default value = 1)
Change in VMT	**-2.00%**	**percent reduction**	

Formula: % Change in VMT = Percent of employees eligible for program * Percent reduction in employee commute vehicle trips

Sources:

(1) Transportation Research Board (TRB). 2010. Traveler Response to Transportation System Changes Handbook, Third Edition: Chapter 19, Employer and Institutional TDM Strategies. June. Available: http://www.trb.org/Publications/Blurbs/163781.aspx. Accessed: January 2021.

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Trip Reduction Programs - T-8. Provide Ridesharing Program

Locational Context	**Urban, Suburban**
Scale of Application	**Project/Site**
Type of VMT affected:	**Employee commute trips**
Max VMT reduction:	**8.00%**

This measure will implement a ridesharing program and establish a permanent transportation management association with funding requirements for employers. Ridesharing encourages carpooled vehicle trips in place of single-occupied vehicle trips, thereby reducing the number of trips, VMT, and GHG emissions.

Ridesharing must be promoted through a multi-faceted approach.
Examples include the following.

- Designating a certain percentage of desirable parking spaces for ridesharing vehicles.
- Designating adequate passenger loading and unloading and waiting areas for ridesharing vehicles.
- Providing an app or website for coordinating rides.

Select the Place Type for the project.	Suburban		Appendix C. T-8.1
Percent of employees eligible for program	25.0%	**percent**	user input (default value = 0-1)
Percent reduction in employee commute VMT	-5.0%	**percent**	constant (default value = -0.04--0.08)
Change in VMT	**-1.25%**	**percent reduction**	

Formula: % Change in VMT = Percent of employees eligible for program * Percent reduction in employee commute VMT

Sources:

(1) San Diego Association of Governments (SANDAG). 2019. Mobility Management VMT Reduction Calculator Tool–Design Document. June. Available: https://www.icommutesd.com/docs/defaultsource/planning/tool-design-document_final_7-17-19.pdf?sfvrsn=ec39eb3b_2. Accessed: January 2021.

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Trip Reduction Programs - T-9-A. Implement Subsidized or Discounted Transit Program - All Trips

Locational Context	**Urban, Suburban**
Scale of Application	**Project/Site**
Type of VMT affected:	**Project-generated trips**
Max VMT reduction:	**5.50%**

This measure will provide subsidized or discounted, or free transit passes for employees and/or residents. Reducing the out-of-pocket cost for choosing transit improves the competitiveness of transit against driving, increasing the total number of transit trips and decreasing vehicle trips. This decrease in vehicle trips results in reduced VMT and thus a reduction in GHG emissions. The project should be accessible either within 1 mile of high-quality transit service (rail or bus with headways of less than 15 minutes), 0.5 mile of local or less frequent transit service, or along a designated shuttle route providing last-mile connections to rail service. If a well-established bikeshare service (Measure T-22-A) is available, the site may be located up to 2 miles from a high-quality transit service.

Select the Core-Based Statistical Area for the project.	Riverside-San Bernardino-Ontario		Appendix C. T-3.1
Average transit fare without subsidy	$5.00	dollar	user input (default value = 0-1000)
Subsidy amount	$2.00	dollar	user input (default value = 0-1000)
Percent of employees/residents eligible for subsidy	50.0%	percent	user input (default value = 0-1)
Percent of project-generated VMT from employees/residents	70.0%	percent	user input (default value = 0-1)
Transit mode share of all trips	10.0%	percent	optional (default value = 0.0137-0.1138)
Elasticity of transit boardings with respect to transit fare price	-0.430	unitless	constant (default value = -0.43)
Percent of transit trips that would otherwise be made in a vehicle	50.0%	percent	constant (default value = 0.5)
Conversion factor of vehicle trips to VMT	1.000	unitless	constant (default value = 1)
Change in VMT	**-0.30%**	percent reduction	

Formula: % Change in VMT = (Subsidy amount / Average transit fare without subsidy * Elasticity of transit boardings with respect to transit fare price) * Percent of employees/residents eligible for subsidy * Percent of project-generated VMT from employees/residents * Transit mode share of all trips * Percent of transit trips that would otherwise be made in a vehicle * Conversion factor of vehicle trips to VMT

Sources:

(1) Federal Highway Administration (FHWA). 2017. National Household Travel Survey – 2017 Table Designer. Travel Day PMT by TRPTRANS by HH_CBSA, Workers by WRKTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(2) Handy, L., Boarnet, S. 2013. Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions. Available: http://www.arb.ca.gov/cc/sb375/policies/transitservice/transit_brief.pdf. Accessed: January 2021.

(3) Litman, T. 2020a. Transit Price Elasticities and Cross-elasticities. Victoria Transport Policy Institute. April. Available: https://www.vtpi.org/tranelas.pdf. Accessed: January 2021.

(4) Taylor, B., Miller, D., Iseki, H., & Fink, C. 2008. Nature and/or Nurture? Analyzing the Determinants of Transit Ridership Across US Urbanized Areas. Transportation Research Part A: Policy and Practice, 43(1), 60-77. Available: https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.367.5311&rep=rep1&type=pdf. Accessed: January 2021.

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Trip Reduction Programs - T-9-B. Implement Subsidized or Discounted Transit Program - Work Trips Only

Locational Context	**Urban, Suburban**
Scale of Application	**Project/Site**
Type of VMT affected:	**Employee commute trips**
Max VMT reduction:	**5.50%**

This measure will provide subsidized or discounted, or free transit passes for employees. Reducing the out-of-pocket cost for choosing transit improves the competitiveness of transit against driving, increasing the total number of transit trips and decreasing vehicle trips. This decrease in vehicle trips results in reduced VMT and thus a reduction in GHG emissions. The project should be accessible either within 1 mile of high-quality transit service (rail or bus with headways of less than 15 minutes), 0.5 mile of local or less frequent transit service, or along a designated shuttle route providing last-mile connections to rail service. If a well-established bikeshare service (Measure T-22-A) is available, the site may be located up to 2 miles from a high-quality transit service.

Select the Core-Based Statistical Area for the project.	Riverside-San Bernardino-Ontario		Appendix C. T-9.1
Average transit fare without subsidy	$5.00	dollar	user input (default value = 0-1000)
Subsidy amount	$2.00	dollar	user input (default value = 0-1000)
Percent of employees/residents eligible for subsidy	50.0%	percent	user input (default value = 0-1)
Percent of project-generated VMT from employees/residents	75.0%	percent	user input (default value = 0-1)
Transit mode share of all work trips	1.1%	percent	optional (default value = 0.0112-0.256)
Elasticity of transit boardings with respect to transit fare price	-0.430	unitless	constant (default value = -0.43)
Percent of transit trips that would otherwise be made in a vehicle	50.0%	percent	constant (default value = 0.5)
Conversion factor of vehicle trips to VMT	1.000	unitless	constant (default value = 1)
Change in VMT	**-0.04%**	**percent reduction**	

Formula: % Change in VMT = (Subsidy amount / Average transit fare without subsidy * Elasticity of transit boardings with respect to transit fare price) * Percent of employees/residents eligible for subsidy * Percent of project-generated VMT from employees/residents * Transit mode share of all work trips * Percent of transit trips that would otherwise be made in a vehicle * Conversion factor of vehicle trips to VMT

Sources:

(1) Federal Highway Administration (FHWA). 2017. National Household Travel Survey – 2017 Table Designer. Travel Day PMT by TRPTRANS by HH_CBSA, Workers by WRKTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(2) Handy, L., Boarnet, S. 2013. Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions. Available: http://www.arb.ca.gov/cc/sb375/policies/transitservice/transit_brief.pdf. Accessed: January 2021.

(3) Litman, T. 2020a. Transit Price Elasticities and Cross-elasticities. Victoria Transport Policy Institute. April. Available: https://www.vtpi.org/tranelas.pdf. Accessed: January 2021.

(4) Taylor, B., Miller, D., Iseki, H., & Fink, C. 2008. Nature and/or Nurture? Analyzing the Determinants of Transit Ridership Across US Urbanized Areas. Transportation Research Part A: Policy and Practice, 43(1), 60-77. Available: https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.367.5311&rep=rep1&type=pdf. Accessed: January 2021.

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Trip Reduction Programs - T-10. Provide End-of-Trip Bicycle Facilities

Locational Context	**Urban, Suburban**
Scale of Application	**Project/Site**
Type of VMT affected:	**Employee commute trips**
Max VMT reduction:	**4.40%**

This measure will install and maintain end-of-trip facilities for employee use. End-of-trip facilities include bike parking, bike lockers, showers, and personal lockers. The provision and maintenance of secure bike parking and related facilities encourages commuting by bicycle, thereby reducing VMT and GHG emissions.

Select the Core-Based Statistical Area for the project.	Riverside-San Bernardino-Ontario		Appendix C. T-10.1
Bike mode adjustment factor	4.860	**unitless**	constant (default value = 1.78-4.86)
Existing bicycle trip length for all trips in region	2.2	**mile**	optional (default value = 1.7-2.9)
Existing vehicle trip length for all trips in region	11.7	**mile**	optional (default value = 9.7-19.1)
Existing bicycle mode share for work trips in region	0.4%	**percent**	optional (default value = 0.004-0.041)
Existing vehicle mode share for work trips in region	95.3%	**percent**	optional (default value = 0.671-0.953)
Change in VMT	**-0.30%**	**percent reduction**	

Formula: % Change in VMT = (Existing bicycle trip length for all trips in region * (Existing bicycle mode share for work trips in region - (Bike mode adjustment factor * Existing bicycle mode share for work trips in region))) / (Existing vehicle trip length for all trips in region * Existing vehicle mode share for work trips in region)

Sources:

(1) Buehler, R. 2012. Determinants of bicycle commuting in the Washington, DC region: The role bicycle parking, cyclist showers, and free car parking at work. Transportation Research Part D, 17, 525– 531. Available: http://www.pedbikeinfo.org/cms/downloads/DeterminantsofBicycleCommuting.pdf. Accessed: January 2021.

(2) Federal Highway Administration (FHWA). 2017a. National Household Travel Survey – 2017 Table Designer. Travel Day PT by TRPTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(3) Federal Highway Administration (FHWA). 2017b. National Household Travel Survey – 2017 Table Designer. Workers by WRKTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

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Parking or Road Pricing/Management - T-16. Unbundle Residential Parking Costs from Property Cost

Locational Context	**Urban, Suburban**
Scale of Application	**Project/Site**
Type of VMT affected:	**Project-generated trips**
Max VMT reduction:	**15.70%**

This measure will unbundle, or separate, a residential project's parking costs from property costs, requiring those who wish to purchase parking spaces to do so at an additional cost. On the assumption that parking costs are passed through to the vehicle owners/drivers utilizing the parking spaces, this measure results in decreased vehicle ownership and, therefore, a reduction in VMT and GHG emissions. Unbundling may not be available to all residential developments, depending on funding sources. Parking costs must be passed through to the vehicle owners/drivers utilizing the parking spaces for this measure to result in decreased vehicle ownership.

Annual parking cost per space	$1,200.00	dollar	user input (default value = 0-3600)
Average annual vehicle cost	$9,282.00	dollar	constant (default value = 9282)
Elasticity of vehicle ownership with respect to total vehicle cost	-0.400	unitless	constant (default value = -0.4)
Adjustment factor from vehicle ownership to VMT	1.010	unitless	constant (default value = 1.01)
Change in VMT	**-5.22%**	**percent reduction**	

Formula: % Change in VMT = (Annual parking cost per space / Average annual vehicle cost) * Elasticity of vehicle ownership with respect to total vehicle cost * Adjustment factor from vehicle ownership to VMT

Sources:

(1) AAA. 2019. Your Driving Costs. September. Available: https://exchange.aaa.com/wpcontent/uploads/2019/09/AAA-Your-Driving-Costs-2019.pdf. Accessed: January 2021.

(2) Federal Highway Administration (FHWA). 2017. National Household Travel Survey – 2017 Table Designer. Annual VMT / Vehicle by Count of Household Vehicles in California. Available: https://nhts.ornl.gov/. Accessed: March 2021.

(3) Litman, T. 2020. Parking Requirement Impacts on Housing Affordability. June. Available: https://www.vtpi.org/park-hou.pdf. Accessed: January 2021.

FEHR PEERS

Neighborhood Design - T-19-A. Construct or Improve Bike Facility

Locational Context	**Urban, Suburban**
Scale of Application	**Plan/Community**
Type of VMT affected:	**All neighborhood/city trips**
Max VMT reduction:	**0.80%**

This measure will construct or improve a single bicycle lane facility (only Class I, II, or IV) that connects to a larger existing bikeway network. Providing bicycle infrastructure helps to improve biking conditions within an area. This encourages a mode shift on the roadway parallel to the bicycle facility from vehicles to bicycles, displacing VMT and thus reducing GHG emissions. When constructing or improving a bicycle facility, a best practice is to consider local or state bike lane width standards. A variation of this measure is provided as T-19-B, Construct or Improve Bike Boulevard.

Select the Core-Based Statistical Area for the project.	Riverside-San Bernardino-Ontario		Appendix C. T-10.1
Select existing annual average daily traffic of the facility	30,001+		Appendix C. T-19.1
Select the length of the proposed bike facility	> 2 miles		Appendix C. T-19.1
What is the city popultion?	211,600		
Is the proposed facility in an university town?	Yes		
Select number of key destinations between 1/4 to 1/2 mile of facility	3		Appendix C. T-19.2
Select number of key destinations within 1/4 mile of facility	4 to 6		Appendix C. T-19.2
Select the proposed facility type	New Class II bike lane		Appendix C. T-19.3
Percent of plan/community VMT on parallel roadway	**50.0%**	**percent**	user input (default value = 0-1)
Active transportation adjustment factor	**0.000**	**unitless**	constant (default value = 0.0052-0.0207)
Credits for key destinations near project	**0.003**	**unitless**	constant (default value = 0-0.0015)
Growth factor adjustment for facility type	**1.000**	**unitless**	constant (default value = 0.54-1.54)
Annual days of use of new facility	**320**	**day**	optional (default value = 252-365)
Existing regional average one-way bicycle trip length	**2.2**	**mile**	optional (default value = 1.7-2.9)
Existing regional average one-way vehicle trip length	**11.7**	**mile**	optional (default value = 9.7-19.1)
Days per year	**365**	**day**	constant (default value = 365)
Change in VMT	**-0.02%**	**percent reduction**	

Formula: % Change in VMT = -Percent of plan/community VMT on parallel roadway * (((Annual days of use of new facility / Days per year) * (Active transportation adjustment factor + Credits for key destinations near project) * Growth factor adjustment for facility type * Existing regional average one-way bicycle trip length) / Existing regional average one-way vehicle trip length)

Sources:

(1) California Air Resources Board (CARB). 2020. Quantification Methodology for the Strategic Growth Council's Affordable Housing and Sustainable Communities Program. September. Available: https://ww2.arb.ca.gov/sites/default/files/classic/cc/capandtrade/auctionproceeds/draft_sgc_ahsc_q m_091620.pdf. Accessed: January 2021.

(2) Federal Highway Administration (FHWA). 2017. National Household Travel Survey–2017 Table Designer. Travel Day PT by TRPTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(3) National Oceanic and Atmospheric Administration (NOAA). 2021. Global Historical Climatology Network–Daily (GHCN-Daily), Version 3. 2015-2019 Average of Days Per Year with Precipitation >0.1 Inches. Available: https://www.ncei.noaa.gov/access/search/data-search/dailysummaries?bbox=38.922,-120.071,38.338,-119.547&place=County:1276&dataTypes=PRCP&startDate=2015-01- 01T00:00:00&endDate=2019-01-01T23:59:59. Accessed: May 2021.

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Neighborhood Design - T-19-B. Construct or Improve Bike Boulevard

Locational Context	**Urban, Suburban**
Scale of Application	**Plan/Community**
Type of VMT affected:	**All neighborhood/city trips**
Max VMT reduction:	**0.20%**

Construct or improve a single bicycle boulevard that connects to a larger existing bikeway network. Bicycle boulevards are a designation within Class III Bikeway that create safe, low-stress connections for people biking and walking on streets. This encourages a mode shift from vehicles to bicycles, displacing VMT and thus reducing GHG emissions. A variation of this measure is provided as T-19-A, Construct or Improve Bike Facility, which is for Class I, II, or IV bicycle infrastructure.

The following roadway conditions must be met.
- Functional classification: local and collector if there is no more than a single general-purpose travel lane in each direction.
- Design speed: <= 25 miles per hour.
- Design volume <= 5,000 average daily traffic.
- Treatments at major intersections: both directions have traffic signals (or an effective control device that prioritizes pedestrian and bicycle access such as rapid flashing beacons, pedestrian hybrid beacons, high-intensity activated crosswalks, TOUCANs), bike route signs, "sharrowed" roadway markings, and pedestrian crosswalks.

Select the Core-Based Statistical Area for the project.	Riverside-San Bernardino-Ontario		Appendix C. T-10.1
Percent of plan/community VMT on roadway to have bicycle boulevard	50.0%	**percent**	user input (default value = 0-1)
Bike mode adjustment factor	1.140	**unitless**	constant (default value = 1.14)
Existing bicycle trip length for all trips in region	2.2	**mile**	optional (default value = 1.7-2.9)
Existing vehicle trip length for all trips in region	11.7	**mile**	optional (default value = 9.7-19.1)
Existing bicycle mode share for work trips in region	0.4%	**percent**	optional (default value = 0.004-0.041)
Existing vehicle mode share for work trips in region	95.3%	**percent**	optional (default value = 0.671-0.953)
Change in VMT	**-0.01%**	**percent reduction**	

Formula: % Change in VMT = Percent of plan/community VMT on roadway to have bicycle boulevard * ((Existing bicycle trip length for all trips in region * (Existing bicycle mode share for work trips in region - (Bike mode adjustment factor * Existing bicycle mode share for work trips in region))) / (Existing vehicle trip length for all trips in region * Existing vehicle mode share for work trips in region))

Sources:

(1) Federal Highway Administration (FHWA). 2017a. National Household Travel Survey–2017 Table Designer. Travel Day PT by TRPTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(2) Federal Highway Administration (FHWA). 2017b. National Household Travel Survey–2017 Table Designer. Workers by WRKTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(3) Schwartz, S. 2021. Planning for Stress Free Connections: Estimating VMT Reductions. February.

FEHR & PEERS

Neighborhood Design - T-22-A. Implement Pedal (Non-Electric) Bikeshare Program

Locational Context	**Urban, Suburban**
Scale of Application	**Plan/Community**
Type of VMT affected:	**All neighborhood/city trips**
Max VMT reduction:	**0.02%**

This measure will establish a bikeshare program. Bikeshare programs provide users with on-demand access to bikes for short-term rentals. This encourages a mode shift from vehicles to bicycles, displacing VMT and thus reducing GHG emissions. Variations of this measure are described in Measure T-22-B, Implement Electric Bikeshare Program, and Measure T-22-C, Implement Scootershare Program. Access to bikesharing is measured as the percent of residences in the plan/community within 0.25 mile of a bikeshare station. For dockless bikes, assume that all residences within 0.25 mile of the designated dockless service area would have access.

Select the Core-Based Statistical Area for the project.	Riverside-San Bernardino-Ontario		Appendix C. T-10.1
Percent of residences in plan/community with access to bikeshare system without measure	40.0%	**percent**	user input (default value = 0-1)
Percent of residences in plan/community with access to bikeshare system with measure	75.0%	**percent**	user input (default value = 0-1)
Daily bikeshare trips per person	0.021	**trip**	constant (default value = 0.021)
Vehicle to bikeshare substitution rate	19.6%	**percent**	constant (default value = 0.196)
Bikeshare average one-way trip length	1.4	**mile**	optional (default value = 1.4)
Daily vehicle trips per person	2.700	**trip**	constant (default value = 2.7)
Regional average one-way vehicle trip length	11.7	**mile**	optional (default value = 9.7-19.1)
Change in VMT	**-0.01%**	**percent reduction**	

Formula: % Change in VMT = -1 * (((Percent of residences in plan/community with access to bikeshare system with measure - Percent of residences in plan/community with access to bikeshare system without measure) * Daily bikeshare trips per person * Vehicle to bikeshare substitution rate * Bikeshare average one-way trip length) / (Daily vehicle trips per person * Regional average one-way vehicle trip length))

Sources:
(1) Federal Highway Administration (FHWA). 2017. National Household Travel Survey–2017 Table Designer. Travel Day PT by TRPTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(2) Federal Highway Administration (FHWA). 2018. Summary of Travel Trends 2017–National Household Travel Survey. July. Available: https://www.fhwa.dot.gov/policyinformation/documents/2017_nhts_summary_travel_trends.pdf. Accessed: January 2021.

(3) Lazarus, J., J. Pourquier, F. Feng, H. Hammel, and S. Shaheen. 2019. Bikesharing Evolution and Expansion: Understanding How Docked and Dockless Models Complement and Compete – A Case Study of San Francisco. Paper No. 19-02761. Annual Meeting of the Transportation Research Board: Washington, D.C. Available: https://trid.trb.org/view/1572878. Accessed: January 2021.

(4) McQueen, M., G. Abou-Zeid, J. MacArthur, and K. Clifton. 2020. Transportation Transformation: Is Micromobility Making a Macro Impact on Sustainability? Journal of Planning Literature. November. Available: https://doi.org/10.1177/0885412220972696. Accessed: March 2021.

(5) Metropolitan Transportation Commission (MTC). 2017. Plan Bay Area 2040 Final Supplemental Report–Travel Modeling Report. July. Available: http://2040.planbayarea.org/files/2020-02/Travel_Modeling_PBA2040_Supplemental%20Report_7-2017.pdf. Accessed: January 2021.

FEHR & PEERS

Neighborhood Design - T-22-C. Implement Scootershare Program

Locational Context	**Urban, Suburban**
Scale of Application	**Plan/Community**
Type of VMT affected:	**All neighborhood/city trips**
Max VMT reduction:	**0.07%**

This measure will establish a scootershare program. Scootershare programs provide users with on-demand access to electric scooters for short-term rentals. This encourages a mode shift from vehicles to scooters, displacing VMT and thus reducing GHG emissions. Variations of this measure are described in Measure T-22-A, Implement Pedal (Non-Electric) Bikeshare Program, and Measure T-22-B, Implement Electric Bikeshare Program. Access to scootersharing is measured as the percent of residences in the plan/community within 0.25-mile of a scootershare station. For dockless scooters, assume that all residences within 0.25-mile of the designated dockless service area would have access.

Select the Core-Based Statistical Area for the project.	Riverside-San Bernardino-Ontario		Appendix C. T-10.1
Percent of residences in plan/community with access to scootershare system without measure	10.0%	**percent**	user input (default value = 0-1)
Percent of residences in plan/community with access to scootershare system with measure	20.0%	**percent**	user input (default value = 0-1)
Daily scootershare trips per person	0.021	**trip**	constant (default value = 0.021)
Vehicle to scootershare substitution rate	38.5%	**percent**	constant (default value = 0.385)
Scootershare average one-way trip length	2.1	**mile**	optional (default value = 2.14)
Daily vehicle trips per person	2.700	**trip**	constant (default value = 2.7)
Regional average one-way vehicle trip length	11.7	**mile**	optional (default value = 9.7-19.1)
Change in VMT	**-0.01%**	**percent reduction**	

Formula: % Change in VMT = -1 * (((Percent of residences in plan/community with access to scootershare system with measure - Percent of residences in plan/community with access to scootershare system without measure) * Daily scootershare trips per person * Vehicle to scootershare substitution rate * Scootershare average one-way trip length) / (Daily vehicle trips per person * Regional average one-way vehicle trip length))

Sources:
(1) Federal Highway Administration (FHWA). 2017. National Household Travel Survey–2017 Table Designer. Travel Day PT by TRPTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(2) Federal Highway Administration (FHWA). 2018. Summary of Travel Trends 2017–National Household Travel Survey. July. Available: https://www.fhwa.dot.gov/policyinformation/documents/2017_nhts_summary_travel_trends.pdf. Accessed: January 2021.

(3) Metropolitan Transportation Commission (MTC). 2017. Plan Bay Area 2040 Final Supplemental Report–Travel Modeling Report. July. Available: http://2040.planbayarea.org/files/2020-02/Travel_Modeling_PBA2040_Supplemental%20Report_7-2017.pdf. Accessed: January 2021.

(4) McQueen, M., G. Abou-Zeid, J. MacArthur, and K. Clifton. 2020. Transportation Transformation: Is Micromobility Making a Macro Impact on Sustainability? Journal of Planning Literature. November. Available: https://doi.org/10.1177/0885412220972696. Accessed: March 2021. (5) Portland Bureau of Transportation (PBOT). 2021. Portland Bureau of Transportation E-Scooter Dashboard. Available: https://public.tableau.com/profile/portland.bureau.of.transportation#!/vizhome/PBOTEScooterTripsDashboard/ScooterDashboard. Accessed: March 2021.

FEHR PEERS

Trip Reduction Programs - T-23. Provide Community-Based Travel Planning

Locational Context	**Urban, Suburban**
Scale of Application	**Plan/Community**
Type of VMT affected:	**Household trips**
Max VMT reduction:	**2.30%**

This measure will target residences in the plan/community with community-based travel planning (CBTP). CBTP is a residential-based approach to outreach that provides households with customized information, incentives, and support to encourage the use of transportation alternatives in place of single occupancy vehicles, thereby reducing household VMT and associated GHG emissions.

Residences in plan/community	15000	**residence**	user input (default value = 0-99999)
Residences in plan/community targeted with CBTP	15000	**residence**	user input (default value = 0-99999)
Percent of targeted residences that participate	15.0%	**percent**	constant (default value = 0.19)
Percent vehicle trip reduction by participating residences	10.0%	**percent**	constant (default value = 0.12)
Adjustment factor from vehicle trips to VMT	1.000	**unitless**	constant (default value = 1)

Change in VMT **-1.50%** **percent reduction**

Formula: % Change in VMT = - (Residences in plan/community targeted with CBTP / Residences in plan/community) * Percent of targeted residences that participate * Percent vehicle trip reduction by participating residences * Adjustment factor from vehicle trips to VMT

Sources:

(1) Metropolitan Transportation Commission (MTC). 2021. Plan Bay Area 2050, Supplemental Report. (forthcoming)

FEHR PEERS

Transit - T-25. Extend Transit Network Coverage or Hours

Locational Context	**Urban, Suburban**
Scale of Application	**Plan/Community**
Type of VMT affected:	**All neighborhood/city trips**
Max VMT reduction:	**4.60%**

This measure will expand the local transit network by either adding or modifying existing transit service or extending the operation hours to enhance the service near the project site. Starting services earlier in the morning and/or extending services to late-night hours can accommodate the commuting times of alternative-shift workers. This will encourage the use of transit and therefore reduce VMT and associated GHG emissions.

Select the Core-Based Statistical Area for the project.	Riverside-San Bernardino-Ontario		Appendix C. T-3.1
Total transit service miles or service hours in plan/community before expansion	15.0	mile	user input (default value = 0-9999)
Total transit service miles or service hours in plan/community after expansion	30.0	mile	user input (default value = 0-9999)
Transit mode share in plan/community	2.5%	percent	optional (default value = 0.0137-0.1138)
Elasticity of transit demand with respect to service miles or service hours	0.700	unitless	constant (default value = 0.7)
Statewide mode shift factor	57.8%	percent	constant (default value = 0.578)
Ratio of vehicle trip reduction to VMT	1.000	unitless	constant (default value = 1)

Change in VMT **-1.01%** **percent reduction**

Formula: % Change in VMT = -1 * ((Total transit service miles or service hours in plan/community after expansion - Total transit service miles or service hours in plan/community before expansion) / Total transit service miles or service hours in plan/community before expansion) * Transit mode share in plan/community * Elasticity of transit demand with respect to service miles or service hours * Statewide mode shift factor * Ratio of vehicle trip reduction to VMT

Sources:
(1) Handy, S., Lovejoy, K., Boarnet, M., Spears, S. 2013. Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions. October. Available: https://ww2.arb.ca.gov/sites/default/files/2020- 06/Impacts_of_Transit_Service_Strategies_on_Passenger_Vehicle_Use_and_Greenhouse_Gas_Emi ssions_Policy_Brief.pdf. Accessed: January 2021.

(2) Federal Highway Administration (FHWA). 2017. National Household Travel Survey – 2017 Table Designer. Average Vehicle Occupancy by HHSTFIPS. Available: https://nhts.ornl.gov/. Accessed: January 2021.

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Transit - T-26. Increase Transit Service Frequency

Locational Context	**Urban, Suburban**
Scale of Application	**Plan/Community**
Type of VMT affected:	**All neighborhood/city trips**
Max VMT reduction:	**11.30%**

This measure will increase transit frequency on one or more transit lines serving the plan/community. Increased transit frequency reduces waiting and overall travel times, which improves the user experience and increases the attractiveness of transit service. This results in a mode shift from single occupancy vehicles to transit, which reduces VMT and associated GHG emissions.

Select the Core-Based Statistical Area for the project.	Riverside-San Bernardino-Ontario		Appendix C. T-3.1
Percent increase in transit frequency	200.0%	**percent**	user input (default value = 0-3)
Level of implementation	30.0%	**percent**	user input (default value = 0-1)
Elasticity of transit ridership with respect to frequency of service	0.500	**unitless**	constant (default value = 0.5)
Transit mode share in plan/community	1.4%	**percent**	optional (default value = 0.0137-0.1138)
Vehicle mode share in plan/community	96.9%	**percent**	optional (default value = 0.8696-0.9688)
Statewide mode shift factor	57.8%	**percent**	constant (default value = 0.578)
Change in VMT	**-0.25%**	**percent reduction**	

Formula: % Change in VMT = -Level of implementation * ((Percent increase in transit frequency * Transit mode share in plan/community * Elasticity of transit ridership with respect to frequency of service * Statewide mode shift factor) / Vehicle mode share in plan/community)

Sources:
(1) Federal Highway Administration (FHWA). 2017a. National Household Travel Survey–2017 Table Designer. Travel Day PMT by TRPTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(2) Federal Highway Administration (FHWA). 2017b. National Household Travel Survey–2017 Table Designer. Average Vehicle Occupancy by HHSTFIPS. Available: https://nhts.ornl.gov/. Accessed: January 2021. T-25. Increase Transit Service Frequency TRANSPORTATION | 178

(3) Handy, S., K. Lovejoy, M. Boarnet, S. Spears. 2013. Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions. October. Available: https://ww2.arb.ca.gov/sites/default/files/2020- 06/Impacts_of_Transit_Service_Strategies_on_Passenger_Vehicle_Use_and_Greenhouse_Gas_Emissions_Poli cy_Brief.pdf. Accessed: January 2021.

(4) San Diego Association of Governments (SANDAG). 2019. Mobility Management VMT Reduction Calculator Tool– Design Document. June. Available: https://www.icommutesd.com/docs/default-source/planning/tool-designdocument_final_7-17-19.pdf?sfvrsn=ec39eb3b_2. Accessed: January 2021.

FEHR PEERS

Transit - T-28. Provide Bus Rapid Transit

Locational Context	**Urban, Suburban**
Scale of Application	**Plan/Community**
Type of VMT affected:	**All neighborhood/city trips**
Max VMT reduction:	**13.80%**

This measure will convert an existing bus route to a bus rapid transit (BRT) system. BRT includes the following additional components, compared to traditional bus service: exclusive right-of-way (e.g., busways, queue jumping lanes) at congested intersections, increased limited-stop service (e.g., express service), intelligent transportation technology (e.g., transit signal priority, automatic vehicle location systems), advanced technology vehicles (e.g., articulated buses, low-floor buses), enhanced station design, efficient fare-payment smart cards or smartphone apps, branding of the system, and use of vehicle guidance systems. BRT can increase the transit mode share in a community due to improved travel times, service frequencies, and the unique components of the BRT system. This mode shift reduces VMT and the associated GHG emissions.

Select the Core-Based Statistical Area for the project.	Riverside-San Bernardino-Ontario		Appendix C. T-3.1
Percent increase in transit frequency due to BRT	**100.0%**	percent	user input (default value = 0-3)
Level of implementation	**25.0%**	percent	user input (default value = 0-1)
Transit mode share in plan/community	**1.37%**	percent	optional (default value = 0.0137-0.1138)
Vehicle mode share in plan/community	**96.88%**	percent	optional (default value = 0.8696-0.9688)
Statewide mode shift factor	**57.8%**	percent	constant (default value = 0.578)
Percent change in transit ridership due to BRT	**25.0%**	percent	constant (default value = 0.25)
Percent change in transit travel time due to BRT	**-10.0%**	percent	optional (default value = -0.1)
Elasticity of transit ridership with respect to frequency of service	**0.500**	unitless	constant (default value = 0.5)
Elasticity of transit ridership with respect to transit travel time	**-0.400**	unitless	constant (default value = -0.4)
Change in VMT	**-0.16%**	percent reduction	

Formula: % Change in VMT = -Level of implementation * ((Transit mode share in plan/community * Statewide mode shift factor * ((Percent increase in transit frequency due to BRT * Elasticity of transit ridership with respect to frequency of service) + (Percent change in transit travel time due to BRT * J) + Percent change in transit ridership due to BRT)) / Vehicle mode share in plan/community)

Sources:

(1) Federal Highway Administration (FHWA). 2017a. National Household Travel Survey–2017 Table Designer. Travel Day PMT by TRPTRANS by HH_CBSA. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(2) Federal Highway Administration (FHWA). 2017b. National Household Travel Survey–2017 Table Designer. Average Vehicle Occupancy by HHSTFIPS. Available: https://nhts.ornl.gov/. Accessed: January 2021.

(3) Handy, S., K. Lovejoy, M. Boarnet, and S. Spears. 2013. Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions. October. Available: https://ww2.arb.ca.gov/sites/default/files/2020-06/Impacts_of_Transit_Service_Strategies_on_Passenger_Vehicle_Use_and_Greenhouse_Gas_Emissions_Policy_Brief.pdf. Accessed: January 2021.

(4) San Diego Association of Governments (SANDAG). 2019. Mobility Management VMT Reduction Calculator Tool–Design Document. June. Available: https://www.icommutesd.com/docs/default-source/planning/tool-design-document_final_7-17-19.pdf?sfvrsn=ec39eb3b_2. Accessed: January 2021.

(5) Transportation Research Board (TRB). 2007. Transit Cooperative Research Program Report 118: Bus Rapid Transit Practitioner's Guide. Available: https://nacto.org/docs/usdg/tcrp118brt_practitioners_kittleson.pdf. Accessed: January 2021.

Appendix K3
Traffic Analysis

URBAN | CROSSROADS

AQUABELLA SPECIFIC PLAN AMENDMENT

TRAFFIC ANALYSIS

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Reference Number	Agency	Date
15197-02 TA Report.docx	City of Moreno Valley	November 10, 2023

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APPENDICES

LIST OF EXHIBITS

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
CA MUTCD	California Manual on Uniform Traffic Control Devices
Caltrans	California Department of Transportation
DIF	Development Impact Fee
EPA	Environmental Protection Agency
HCM	Highway Capacity Manual
ITE	Institute of Transportation Engineers
LOS	Level of Service
MXD	Mixed-Use Development
NCHRP	National Cooperative Highway Research Program
PHF	Peak Hour Factor
Project	Aquabella Specific Plan Amendment
RCTC	Riverside County Transportation Commission
RIVCOM	Riverside County Transportation Analysis Model
RTP	Regional Transportation Plan
SCAG	Southern California Association of Governments
SCS	Sustainable Communities Strategy
SP	Specific Plan
TA	Traffic Analysis
TDM	Transportation Demand Management
TUMF	Transportation Uniform Mitigation Fee
v/c	Volume to Capacity
vphgpl	Vehicles per Hour Green per Lane
WLC	World Logistics Center

1 INTRODUCTION

This report presents the results of the Traffic Analysis (TA) for Aquabella Specific Plan Amendment (Project), which is located on Cactus Avenue and Nason Street, east of Lasselle Street, north of Iris Avenue, west of Oliver Street, and south of Brodiaea Street in the City of Moreno Valley. The purpose of this Level of Service (LOS) TA is to evaluate the potential circulation system deficiencies that may result from the development of the proposed Project, and where necessary, identify improvements to achieve acceptable operations consistent with General Plan level of service goals and policies.

This traffic study has been prepared in accordance with the City of Moreno Valley's Transportation Impact Analysis Preparation Guide Vehicle Miles Traveled and Level of Service Assessment (June 2020) and consultation with City staff during the traffic study scoping process. (1) The August 16, 2023 AQUABELLA SPECIFIC PLAN AMENDMENT LOS ANALYSIS SCOPING AGREEMENT, was approved by the City of Moreno Valley for preparation of the Level of Service (LOS) Analysis for the Project.

1.1 PROJECT OVERVIEW

The existing 2040 Moreno Valley General Plan Update land use designation and zoning for the Project site is Downtown Center (DC). Horizon Year 2045 is evaluated with full buildout of the Project. Aquabella is intended to provide housing for World Logistics Center (WLC) workers. The proposed Project is to consist of 7,500 multifamily low-rise residential units, 7,500 multifamily mid-rise residential units, 4 acres of commercial (49,900 sq. ft.), 300-room hotel, up to three elementary schools (up to 3,995 students), one middle school/junior high school (2,049 students), 15 acres of park and lake promenade, and 25 acres of active sports park.

Aquabella baseline/approved land uses include 2,702 detached senior adult housing units, 220 attached, non-age-restricted residential units, 300 room hotel, and a 100,000 square foot shopping center. The 220 residential units are constructed and occupied.

For the purposes of the TA, the full Project is evaluated, whereas future analyses to be conducted at each project phase will determine the interim improvement needs. Vehicle access to each Planning Area is oriented primarily to adjacent General Plan roadways (Cactus Avenue, Nason Street, Lasselle Street, Iris Avenue, Oliver Street, and Brodiaea Street), as described in Section 6.1.

In comparison to the Aquabella baseline/approved land uses, the Project increases external trip ends in the study area by 57,945 external vehicle trips per day with 5,511 AM peak hour trips and 4,788 PM peak hour trips.

1.2 ANALYSIS SCENARIOS

Riverside County's travel demand forecasting model (RIVCOM) is utilized in preparation of Horizon Year (2045) traffic volume projections. RIVCOM is the Western Riverside County Council of Government's (WRCOG) latest update to the Riverside County Transportation Analysis Model (RIVTAM) and consistent with *Connect SoCal 2020*, Southern California Association of Government's (SCAG's) 2020 Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS) (2). The future year model land use dataset was reviewed against the City of Moreno Valley's pending and approved development project list to ensure all projects were reflected in future assumptions.

During the Project scoping process with City of Moreno Valley technical staff members, it was determined that the RTP/SCS version of RIVCOM does not account for full buildout of the World Logistics Center (WLC). Given that the intent of the Project is to serve as workforce housing for WLC and both are being developed by the same landowner, Fehr & Peers updated RIVCOM to fully represent the Project interaction with the WLC buildout. At completion, there is an anticipated 40.4 million square feet of Logistics Development (LD) industrial warehouse and 200,000 square feet of Light Logistics (LL) for a total of 40.6 million square feet in WLC.

It is anticipated that approximately 25 percent (one quarter) of the 22,653 forecast (year 2045) employees at WLC would live at the Project. This would equate to 5,663 Project residents (13 percent of Project residents). This relationship was used to adjust the RIVCOM trip tables to reflect the Project's synergy with WLC, resulting in about 9% of the Project external traffic interacting with WLC on weekdays.

To evaluate Horizon Year (2045) traffic conditions with the approved SP, long range traffic projections were modified to account for senior residential development within the Project site.

For the purposes of this traffic study, potential deficiencies to traffic and circulation have been assessed for each of the following conditions:

- Existing (2023)
- Horizon Year (2045) Without Project (Approved SP), with WLC Buildout
- Horizon Year (2045) With Project, with WLC Buildout

The Horizon Year (2045) With Project scenario is utilized in this LOS analysis to determine the framework of ultimate improvement needs with completion of the project. Subsequent traffic analyses will be conducted at each project phase to determine the actual phasing of circulation improvements. The 2045 roadway network includes roadway connections consistent with the City of Moreno Valley General Plan.

The 2045 without and with Project scenarios are also utilized to determine if improvements funded through transportation fee programs, such as the City's Development Impact Fee (DIF) and Riverside County's Transportation Uniform Mitigation Fee (TUMF) programs, can accommodate the long-range cumulative traffic at the target Level of Service (LOS) identified in the City of Moreno Valley (lead agency) General Plan. (3) Each of these transportation fee programs are discussed in more detail in Section 8.

1.3 STUDY AREA

To ensure that this TA satisfies the City of Moreno Valley's traffic study requirements, Urban Crossroads, Inc. prepared a Project traffic study scoping package for review by City of Moreno Valley staff prior to the preparation of this report. This agreement provides an outline of the Project study area, trip generation, trip distribution, and analysis methodology.

The traffic study area includes 99 intersection analysis locations as described in Section 2.3 of this report. The Minimum LOS for the City of Moreno Valley is LOS D for intersections and roadway segments that are adjacent to freeway on/off ramps, and/or adjacent to employment generating land uses. LOS C is applicable to other intersections and roadway segments. The minimum LOS for intersections approaching City boundaries is assumed to be LOS D.

1.4 SPECIAL ISSUES

A **queuing evaluation at key intersections** has been conducted for the Horizon Year (2045) With Project traffic conditions to determine the appropriate left turn storage lengths at the Project access points as well as other locations where Project LOS deficiencies are identified.

Traffic signal warrant analyses have been conducted for all study area unsignalized intersections for existing conditions (2023), Horizon Year (2045) Without Project (Approved SP) conditions, and Horizon Year (2045) With Project conditions based upon peak hour volume warrants.

A **queuing evaluation at Caltrans ramps** has also been conducted for the long-range with project traffic conditions within the study area to determine the queues anticipated to occur during peak hours.

When new traffic signals are warranted, **alternate intersection control** measures (to traffic signals) have been considered. Roundabout intersections are identified and evaluated in terms of LOS at locations within the World Logistics Center.

Pedestrian, Bicycle and Transit Access routes to/from the project site have been examined, with the goal of providing convenient and direct access for those users, including accessibility from adjacent transit stops. Existing and planned transit routes, pedestrian facilities, and bikeways are identified for the Project area, and incorporation of the planned facilities into the proposed project are discussed in Section 8.4. The internal street network will include a comprehensive sidewalk network to facilitate walking. The project has begun coordination with RTA to implement transit improvements that are anticipated to improve transit access and connectivity for the project and broadly the rest of the City of Moreno Valley.

For off-site **transportation improvements** needed with or without the Project, traffic fair share contributions have been calculated based upon peak hour traffic flows. Specific improvements are identified in Section 8.3 to address transportation-related deficiencies caused by the Project.

Project **traffic safety considerations** build upon the City's Local Road Safety Plan (LRSP) and are documented in Section 8.5. Collision hot spots and proposed countermeasures are indicated.

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2 METHODOLOGIES

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The methodologies described are consistent with City of Moreno Valley's Traffic Study Guidelines.

2.1 LEVEL OF SERVICE

Traffic operations of roadway facilities are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic flow based on several factors, such as speed, travel time, delay, and freedom to maneuver. Six levels are typically defined ranging from LOS A, representing completely free-flow conditions, to LOS F, representing breakdown in flow resulting in stop-and-go conditions. LOS E represents operations at or near capacity, an unstable level where vehicles are operating with the minimum spacing for maintaining uniform flow.

CITY OF MORENO VALLEY

The definition of an intersection deficiency has been obtained from the City of Moreno Valley General Plan. The City's General Plan policies states that the City will maintain the following City-wide target LOS:

- *Policy C.3-1: Strive to maintain Level of Service (LOS) C on roadway links, wherever possible, and LOS D in the vicinity of SR-60 Freeway and high employment centers. Strive to maintain LOS D at intersection during peak hours.*
- *Policy C.3-2: Allow for a list of locations to be exempt from the LOS policy based on right-of-way constraints and goals and values of the community. The City Engineer shall update the excepted intersections and roadway segments list periodically to be included with the traffic impact study guidelines and adopted by ordinance.*
- *Policy C.3-3: Where new developments would increase traffic flows beyond the LOS C (or LOS D, where applicable), require appropriate and feasible improvement measures as a condition of approval. Such measures may include extra right-of-way and improvements to accommodate additional left-turn and right-turn lanes at intersections, or other improvements.*

CALTRANS

Senate Bill 743 (SB 743), approved in 2013, endeavors to change the way transportation impacts will be determined according to the California Environmental Quality Act (CEQA). The Office of Planning and Research (OPR) has recommended the use of vehicle miles traveled (VMT) as the replacement for automobile delay-based LOS. Caltrans acknowledges automobile delay will no longer be considered a CEQA impact for development projects and will use VMT as the metric for determining impacts on the State Highway System (SHS). However, LOS D has been utilized as the target LOS for Caltrans facilities, consistent with City of Moreno Valley Policy C.3-1.

CITY OF RIVERSIDE

The City of Riverside has established LOS D as the minimum level of service for its intersections. Therefore, any intersection operating at LOS E or F is considered deficient.

CITY OF PERRIS

Per City of Perris' General Plan, LOS D is the acceptable LOS along all City maintained roads (including intersections) and LOS D along I-215 and SR-74 (including intersections with local streets and roads). An exception to the local road standard is LOS E at intersections of any Arterials and Expressways with SR-74, the Ramona-Cajalco Expressway, or at I-215 Freeway ramps.

2.2 INTERSECTION CAPACITY ANALYSIS

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. The 6th Edition Highway Capacity Manual (HCM) methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. (4) The HCM uses different procedures depending on the type of intersection control.

2.2.1 SIGNALIZED INTERSECTIONS

The City of Moreno Valley and California Department of Transportation (Caltrans) require signalized intersection operations analysis based on the methodology described in the HCM. (4) Intersection LOS operations are based on an intersection's average control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections LOS is related to the average control delay per vehicle and is correlated to a LOS designation as described in Table 2-1.

Saturation Flow Rate consistent with field measurements or 1,900 passenger cars/hour/lane has been utilized. Minimum green time is a minimum of 7 seconds per movement in light pedestrian areas or per the HCM guidance in high pedestrian activity areas. Cycle lengths are set to the HCM optimal cycle length once all other parameters have been defined, with an upper limit of 120 seconds unless otherwise approved. Peak hour factors are based on count data for evaluation of existing conditions, whereas the future peak hour factor is 0.95 consistent with City guidelines.

The traffic modeling and signal timing optimization software package Synchro (Version 11) has been utilized to analyze signalized intersections. Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

The peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15-minute volumes. Customary practice for LOS analysis is to use a peak 15-minute rate of flow. However, flow rates are typically expressed in vehicles per hour. The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume (e.g., PHF = [Hourly Volume] / [4 x Peak 15-minute Flow Rate]). The use of a 15-minute PHF produces a more detailed analysis as compared to analyzing vehicles per hour.

TABLE 2-1: SIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service, V/C ≤ 1.0[1]
Operations with very low delay occurring with favorable progression and/or short cycle length.	0 to 10.00	A
Operations with low delay occurring with good progression and/or short cycle lengths.	10.01 to 20.00	B
Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.01 to 35.00	C
Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.01 to 55.00	D
Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.01 to 80.00	E
Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	80.01 and up	F

Source: HCM, 6th Edition

[1] If V/C is greater than 1.0 then LOS is F per HCM.

Existing PHFs have been used with a minimum of 0.92. Per the HCM, PHF values over 0.95 often are indicative of high traffic volumes with capacity constraints on peak hour flows while lower PHF values are indicative of greater variability of flow during the peak hour. (4)

2.2.2 UNSIGNALIZED INTERSECTIONS

The City of Moreno Valley requires the operations of unsignalized intersections be evaluated using the methodology described in the HCM. (4) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-2). At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. Delay for the intersection is reported for the worst individual movement at a two-way stop-controlled intersection. For all-way stop controlled intersections, LOS is computed for the intersection as a whole (average delay).

TABLE 2-2: UNSIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service, V/C ≤ 1.0[1]
Little or no delays.	0 to 10.00	A
Short traffic delays.	10.01 to 15.00	B
Average traffic delays.	15.01 to 25.00	C
Long traffic delays.	25.01 to 35.00	D
Very long traffic delays.	35.01 to 50.00	E
Extreme traffic delays with intersection capacity exceeded.	> 50.00	F

Source: HCM, 6th Edition

[1] If V/C is greater than 1.0 then LOS is F per HCM.

2.3 STUDY AREA

According to City of Moreno Valley traffic study guidelines, intersections of "Collector" or higher classification streets at which the Project will add 50 or more peak hour trips are included in the LOS analysis area, within a 5-mile radius from the Project site. Based on the Project's trip generation increase in comparison to the approved project, an extensive traffic study area has been defined. The study area includes 99 intersection analysis locations which are shown on 3 separate exhibits labeled the focus study area, the west extended area and the east extended area.

Exhibit 2-1 illustrates the intersections analysis locations and access points in the focus study area, with Project access locations utilized in the LOS analysis. Vehicle access to each PA is oriented primarily to adjacent General Plan roadways (Cactus Avenue, Nason Street, Lasselle Street, Iris Avenue, Oliver Street, and Brodiaea Street).

Exhibits 2-2 and 2-3 identify the extensive proposed study area intersections for the LOS analysis beyond the locations shown on Exhibit 2-1. The Project trip distribution patterns were developed from the Riverside County Model (RIVCOM) in a collaborative effort with Fehr & Peers, Inc., as discussed in Section 4.4.

As indicated in the approved scoping agreement, the following intersections are evaluated:

Focus Area (Exhibit 2-1)

#	Intersection	#	Intersection
1	Kitching St. / Alessandro Bl.	22	Oliver St. / Alessandro Bl.
2	Kitching St. / Brodiaea Av.	23	Oliver St. / Brodiaea Av.
3	Kitching St. / Cactus Av.	24	Oliver St. / Cactus Av.
4	Kitching St. / Delphinium Av.	25	Oliver St. / John F. Kennedy Dr. - PA-3 Access 2
5	Kitching St. / John F. Kennedy Dr.	26	Oliver St. / Iris Av. - Moreno Beach Dr.
6	Kitching St. / Gentian Av.	27	Moreno Beach Dr. / Alessandro Bl.
7	Kitching St. / Iris Av.	28	Moreno Beach Dr. / Brodiaea Av.
8	Lasselle St. / Alessandro Bl.	29	Moreno Beach Dr. / Cactus Av.
9	Lasselle St. / Brodiaea Av.	30	Moreno Beach Dr. / John F. Kennedy Dr.
10	Lasselle St. / Cactus Av.	31	Morrison St. / Brodiaea Av.
11	Lasselle St. / Delphinium Av.- PA-2 Access 7	32	Morrison St. / Cactus Av.
12	Lasselle St. / John F. Kennedy Dr.	33	PA-1 Access 2 / Brodiaea Av.
13	Lasselle St. / Gentian Av.	34	PA-1 Access 1 / Cactus Av.
14	Lasselle St. / Iris Av.	35	Nason St. / PA-3 Access 3
15	Morrison St. / Alessandro Bl.	36	Nason St. / PA-2 Access 4 - PA-3 Access 1
16	S. Hospital Access / Cactus Av.	37	Nason St. / PA-2 Access 5
17	Nason St. / Alessandro Bl.	38	Nason St. / PA-4 Access 1
18	Nason St. / E. Hospital Access	39	Nason St. / PA 5 Access 2
19	Nason St. / Cactus Av.	40	PA-5 Access 1 / Iris Av.
20	Nason St. / Delphinium Av.- PA-2 Access 3	41	Oliver St. / PA-4 Access 2
21	Nason St. / Iris Av.	42	Kaiser Hospital / Iris Av.
		99	Darwin St. / Alessandro Bl.

EXHIBIT 2-1: FOCUS STUDY AREA INTERSECTION ANALYSIS LOCATIONS

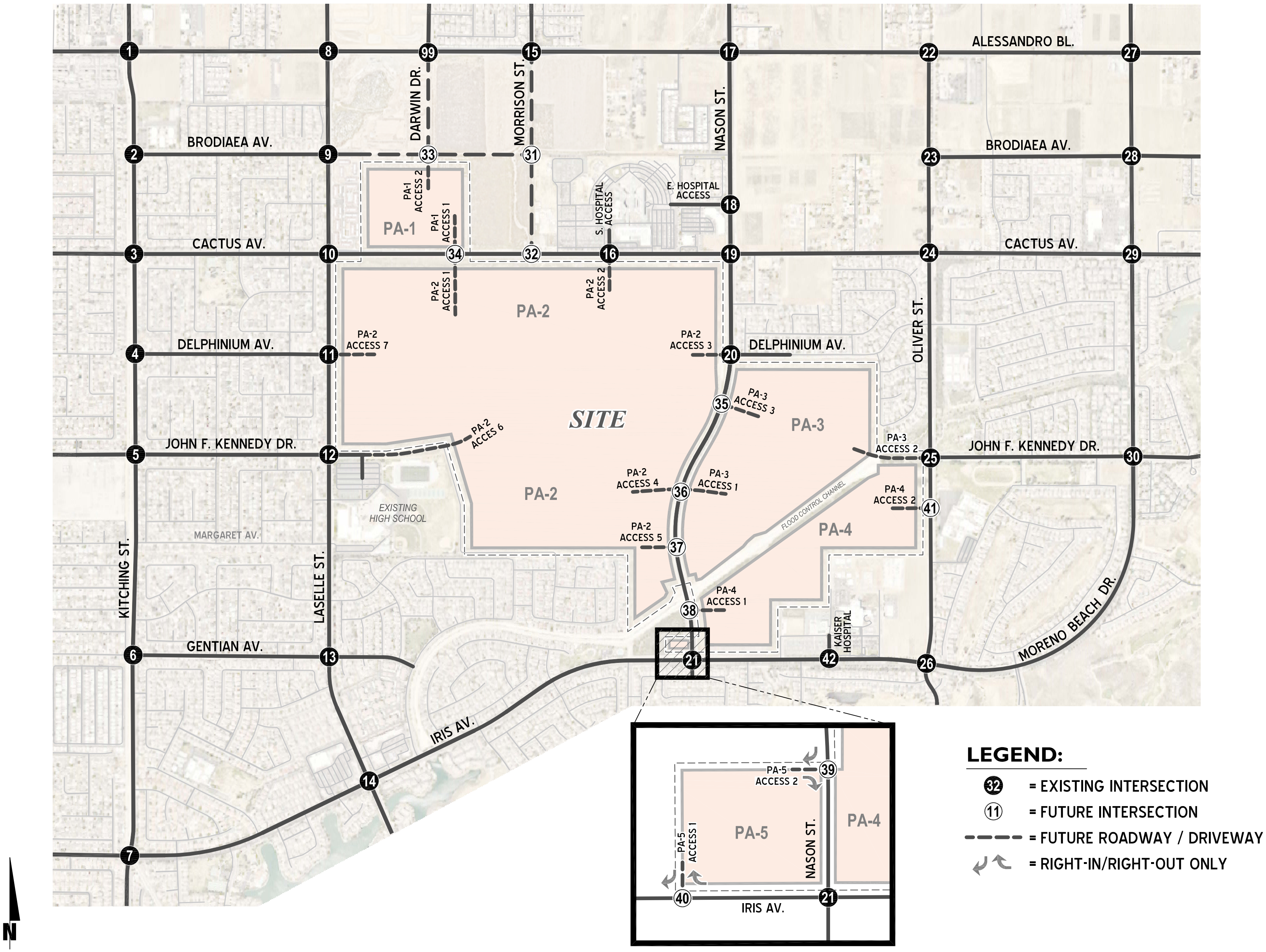


EXHIBIT 2-2: EXTENDED WESTERLY STUDY AREA INTERSECTION ANALYSIS LOCATIONS

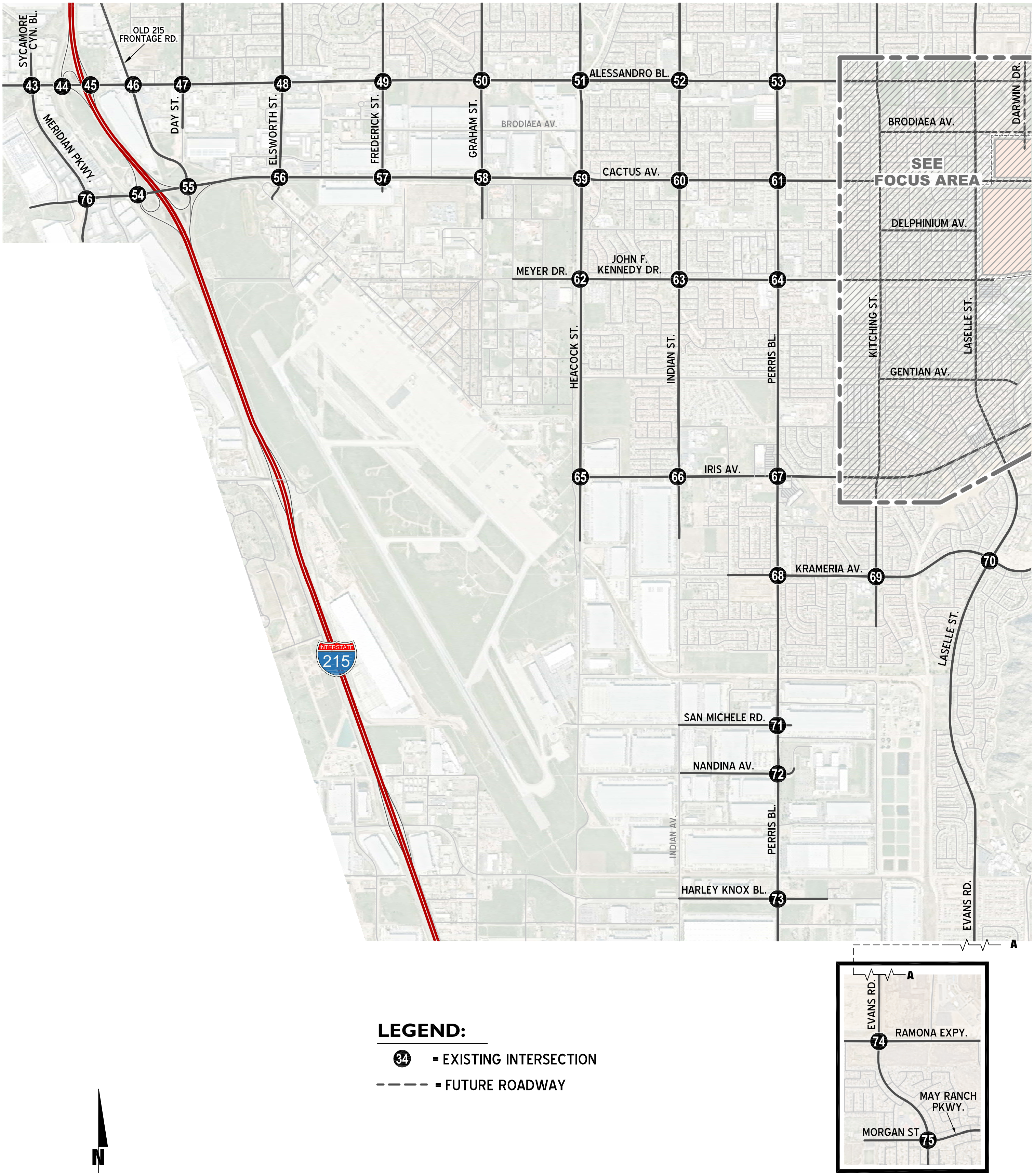
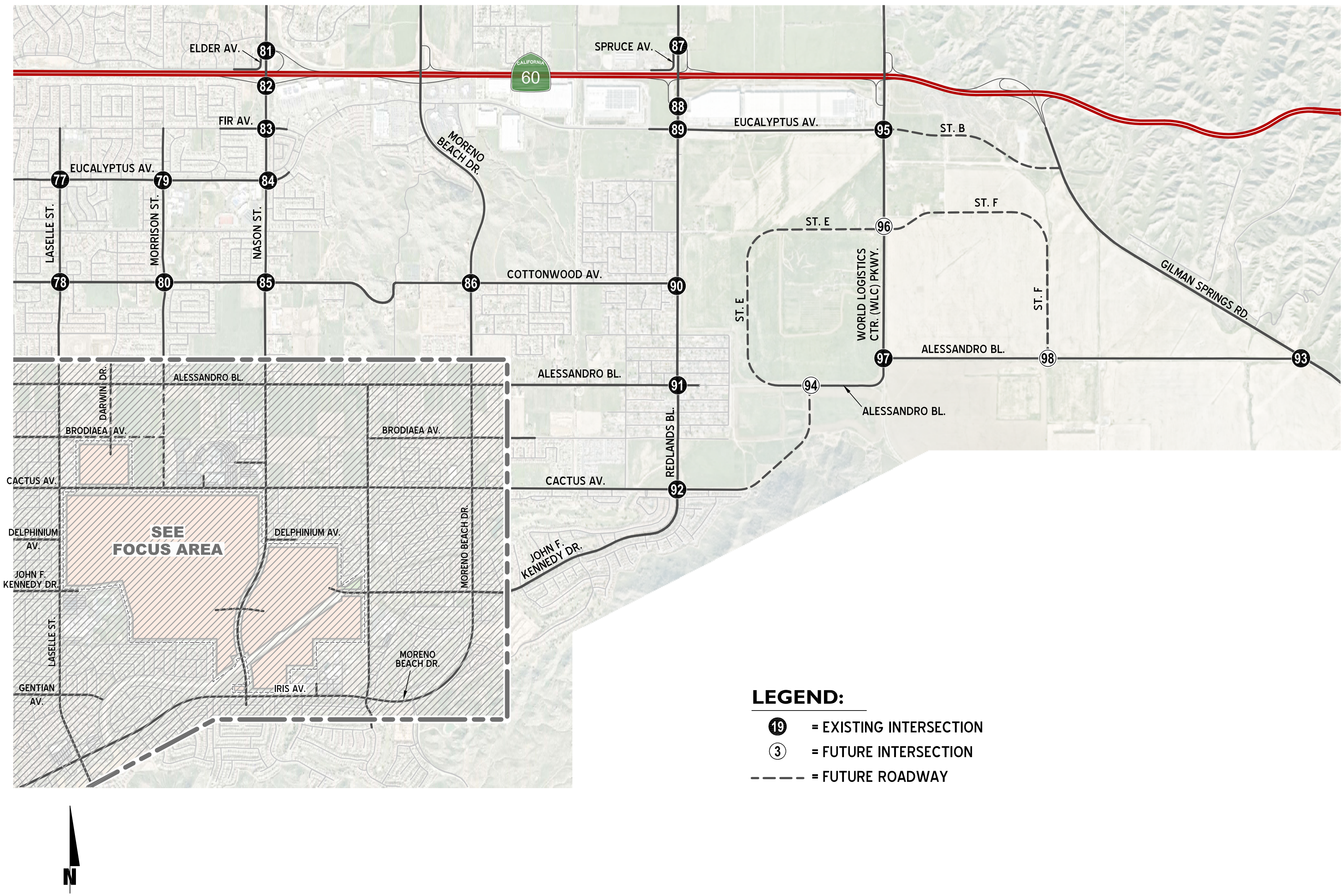


EXHIBIT 2-3: EXTENDED EASTERLY STUDY AREA INTERSECTION ANALYSIS LOCATIONS



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West Extended Area (Exhibit 2-2)

#	Intersection	#	Intersection
43	Sycamore Cyn. Bl. - Meridian Pkwy. / Alessandro Bl.	60	Indian St. / Cactus Av.
44	I-215 SB Ramps / Alessandro Bl.	61	Perris Bl. / Cactus Av.
45	I-215 NB Ramps / Alessandro Bl.	62	Heacock St. / John F. Kennedy Dr.
46	Old 215 Frontage Rd. / Alessandro Bl.	63	Indian St. / John F. Kennedy Dr.
47	Day St. / Alessandro Bl.	64	Perris Bl. / John F. Kennedy Dr.
48	Elsworth St. / Alessandro Bl.	65	Heacock St. / Iris Av.
49	Frederick St. / Alessandro Bl.	66	Indian St. / Iris Av.
50	Graham St. / Alessandro Bl.	67	Perris Bl. / Iris Av.
51	Heacock St. / Alessandro Bl.	68	Perris Bl. / Krameria Av.
52	Indian St. / Alessandro Bl.	69	Kitching St. / Krameria Av.
53	Perris Bl. / Alessandro Bl.	70	Lasselle St. / Krameria Av.
54	I-215 SB Ramps / Cactus Av.	71	Perris Bl. / San Michele Rd.
55	I-215 NB Ramps / Cactus Av.	72	Perris Bl. / Nandina Av.
56	Elsworth St. / Cactus Av.	73	Perris Bl. / Harley Knox Bl.
57	Frederick St. / Cactus Av.	74	Evans Rd. / Ramona Expy.
58	Graham St. / Cactus Av.	75	Evans Rd. / Morgan St. - May Ranch Pkwy.
59	Heacock St. / Cactus Av.	76	Meridian Pkwy. / Cactus Av.

East Extended Area (Exhibit 2-3)

77	Lasselle St. / Eucalyptus Av.	88	Redlands Bl. / SR-60 EB Ramps
78	Lasselle St. / Cottonwood Av.	89	Redlands Bl. / Eucalyptus Av.
79	Morrison St. / Eucalyptus Av.	90	Redlands Bl. / Cottonwood Av.
80	Morrison St. / Cottonwood Av.	91	Redlands Bl. / Alessandro Bl.
81	Nason St. / SR-60 WB Ramps - Elder Av.	92	Redlands Bl. / Cactus Av.
82	Nason St. / SR-60 EB Ramps	93	Gillman Springs Rd. / Alessandro Bl.
83	Nason St. / Fir Av.	94	Cactus Av. / Alessandro Bl.
84	Nason St. / Eucalyptus Av.	95	WLC Pkwy. / Eucalyptus Av.
85	Nason St. / Cottonwood Av.	96	WLC Pkwy. / St. E - St. F
86	Moreno Beach Dr. / Cottonwood Av.	97	WLC Pkwy. / Alessandro Bl.
87	Redlands Bl. / SR-60 WB Ramps - Spruce Av.	98	Street F / Alessandro Bl.

2.4 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

The term "signal warrants" refers to the list of established criteria used by Caltrans and other public agencies to quantitatively justify or determine the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TA uses the signal warrant criteria presented in the latest edition of the Caltrans California Manual on Uniform Traffic Control Devices (CA MUTCD). (5)

The signal warrant criteria for Existing study area intersections are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. The CA MUTCD indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (5)

This TA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing traffic conditions and for all future analysis scenarios for existing unsignalized intersections. Warrant 3 is appropriate to use for this TA because it provides specialized warrant criteria for intersections with rural characteristics. For the purposes of this study, the speed limit was the basis for determining whether Urban or Rural warrants were used for a given intersection. Urban warrants have been used where posted speed limits on the major roadways with unsignalized intersections are 40 miles per hour or below and rural warrants have been used where speeds exceed 40 miles per hour.

Future intersections that do not currently exist have been assessed regarding the potential need for new traffic signals based on future average daily traffic (ADT) volumes, using the Caltrans planning level ADT-based signal warrant analysis worksheets. Similarly, the speed limit has been used as the basis for determining the use of Urban and Rural warrants.

The Existing conditions traffic signal warrant analysis is presented in the subsequent section, Section 3 *Area Conditions* of this report. The traffic signal warrant analyses for future conditions are presented in Section 5 *Horizon Year (2045) Without Project (Approved SP) Traffic Conditions* and Section 6 *Horizon Year (2045) With Project Traffic Conditions* of this report.

It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

2.5 QUEUING ANALYSIS

Consistent with Caltrans requirements, the 95th percentile queuing of vehicles has been assessed at the off-ramps to determine potential queuing deficiencies at the freeway ramp intersections at the following study area interchanges:

- SR-60 Freeway at Nason Street
- SR-60 Freeway at Redlands Boulevard
- I-215 Freeway at Alessandro Boulevard
- I-215 Freeway at Cactus Avenue

Specifically, the off-ramp queuing analysis is utilized to identify any potential queuing and “spill back” onto the freeway mainline from the off-ramps.

2.6 PROJECT FAIR SHARE CALCULATION METHODOLOGY

For improvements that do not appear to be in either the County TUMF and/or City Development Impact Fee (DIF) programs, a fair share contribution based on the Project’s proportional share may be imposed in order to address the Project’s share of deficiencies in lieu of construction. It should be noted that fair share calculations are for informational purposes only and the City’s Traffic Engineer will determine the appropriate improvements to be implemented by a project (to be identified in the conditions of approval). The Project's fair share cost of improvements would be determined based on the following equation, which is the ratio of Project traffic to new traffic, where new traffic is total future traffic less existing baseline traffic:

Project Fair Share % = Project Traffic / (General Plan Buildout (2045) Total Traffic – Existing (2023) Traffic)

3 AREA CONDITIONS

This section provides a summary of the existing circulation network (including automobile lanes, bicycle and pedestrian features, and Riverside Transit Agency (RTA) service), the City of Moreno Valley General Plan Circulation Network, and a review of existing peak hour intersection operations and traffic signal warrant analyses.

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the scoping agreement with City of Moreno Valley staff, the study area includes a total of 99 existing and future intersections as shown previously on Exhibits 2-1 through 2-3. Exhibits 3-1 to 3-3 present the identify the number of through traffic lanes for existing roadways and intersection traffic controls. Focus area travel lanes and intersection controls are shown on Exhibit 3-1. Westerly and easterly study area travel lanes and intersection controls are provided on Exhibits 3-2 and 3-3, respectively.

The RTA routes that provide service near the Project site are Route 20 south of the project site, Route 31 north of the project site and Route 41 west of the project site. There are bus stops along Lasselle Street west of the Project site, along Iris Avenue south of the Project site, at the Riverside University Medical Center north of the project site and along Alessandro Blvd a half mile north of the Project site.

The City's existing and planned bicycle and pedestrian network is shown on Exhibit 3-4. Nason Street, Cactus Avenue, Eucalyptus Avenue, Moreno Beach Drive, Alessandro Boulevard (west of Kitching Street), John F Kennedy Drive, Gentian Avenue, and Lasselle Street (south of Alessandro Boulevard) are currently Class 2 bike routes. Class 2 bike lanes are on-road, striped bike lanes. Class 3 bike route is a signed (but not striped) bike route. Exhibit 3-5 illustrates the existing and proposed parks and recreation facilities.

Within the focus area, existing roadways are described individually below.

Along the Project boundary, **Cactus Avenue** is currently striped with 4 automobile travel lanes and two bike lanes. On the north side of Cactus Avenue, a sidewalk is provided from Lasselle Street to Nason Street. From Lasselle Street to Kitching Street, Cactus Avenue exists with 4 automobile travel lanes and two bike lanes, and sidewalks on both the north and south sides of the street. From Nason Street to Oliver Street, Cactus Avenue is striped with 2 automobile travel lanes but no sidewalks or bike lanes. A sidewalk is provided on the south side of Cactus Avenue from west of Cider Gum Way to Oliver Street. In addition, a 2nd eastbound through lane is included just west of Oliver Street. From Oliver Street to Moreno Beach Drive, Cactus Avenue is currently striped with 4 automobile travel lanes and two bike lanes. Sidewalks are provided on the north and south sides of Cactus Avenue from Oliver Street to Moreno Beach Drive.

EXHIBIT 3-1: FOCUS STUDY AREA EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS

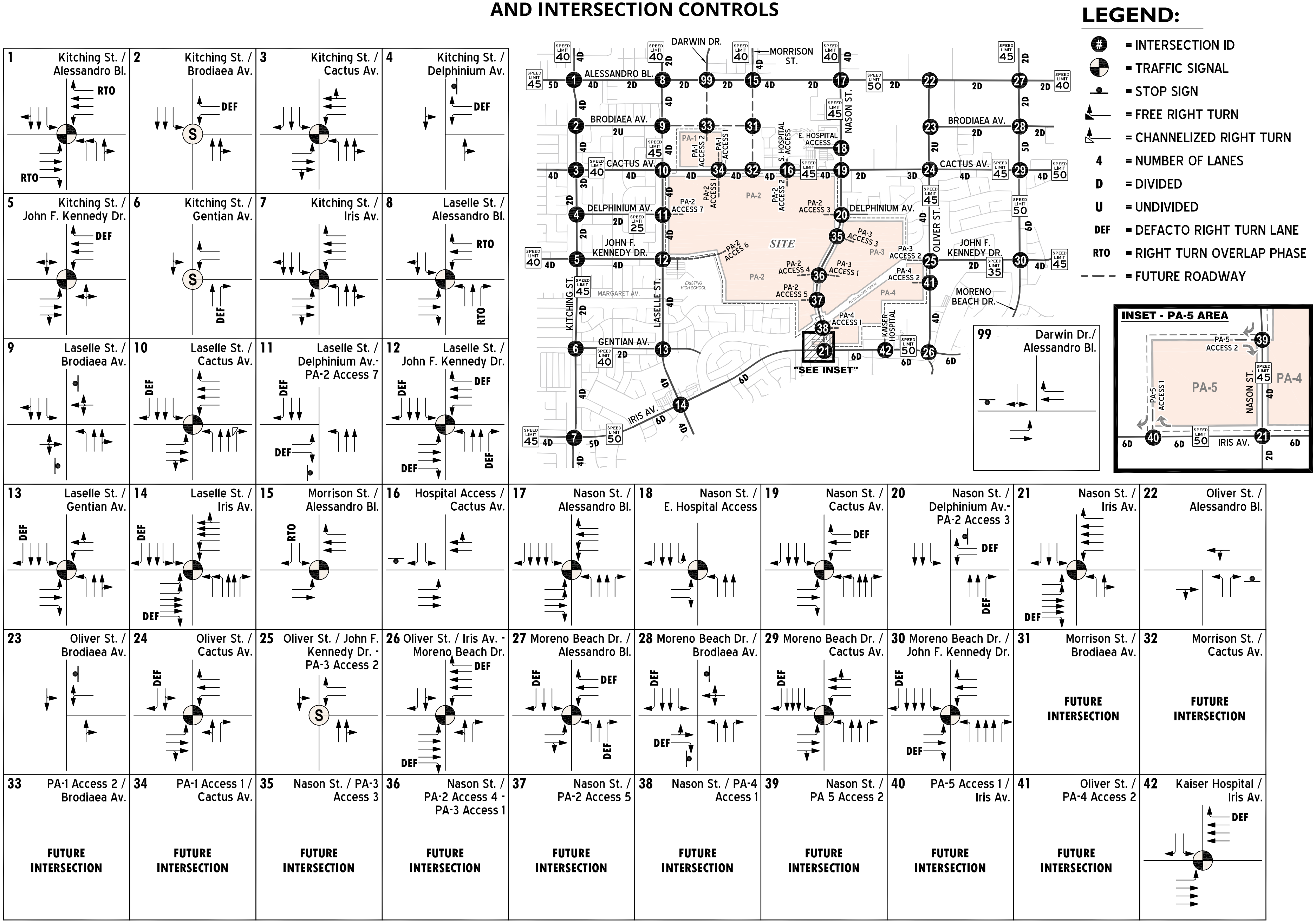


EXHIBIT 3-2: EXTENDED WESTERLY EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS

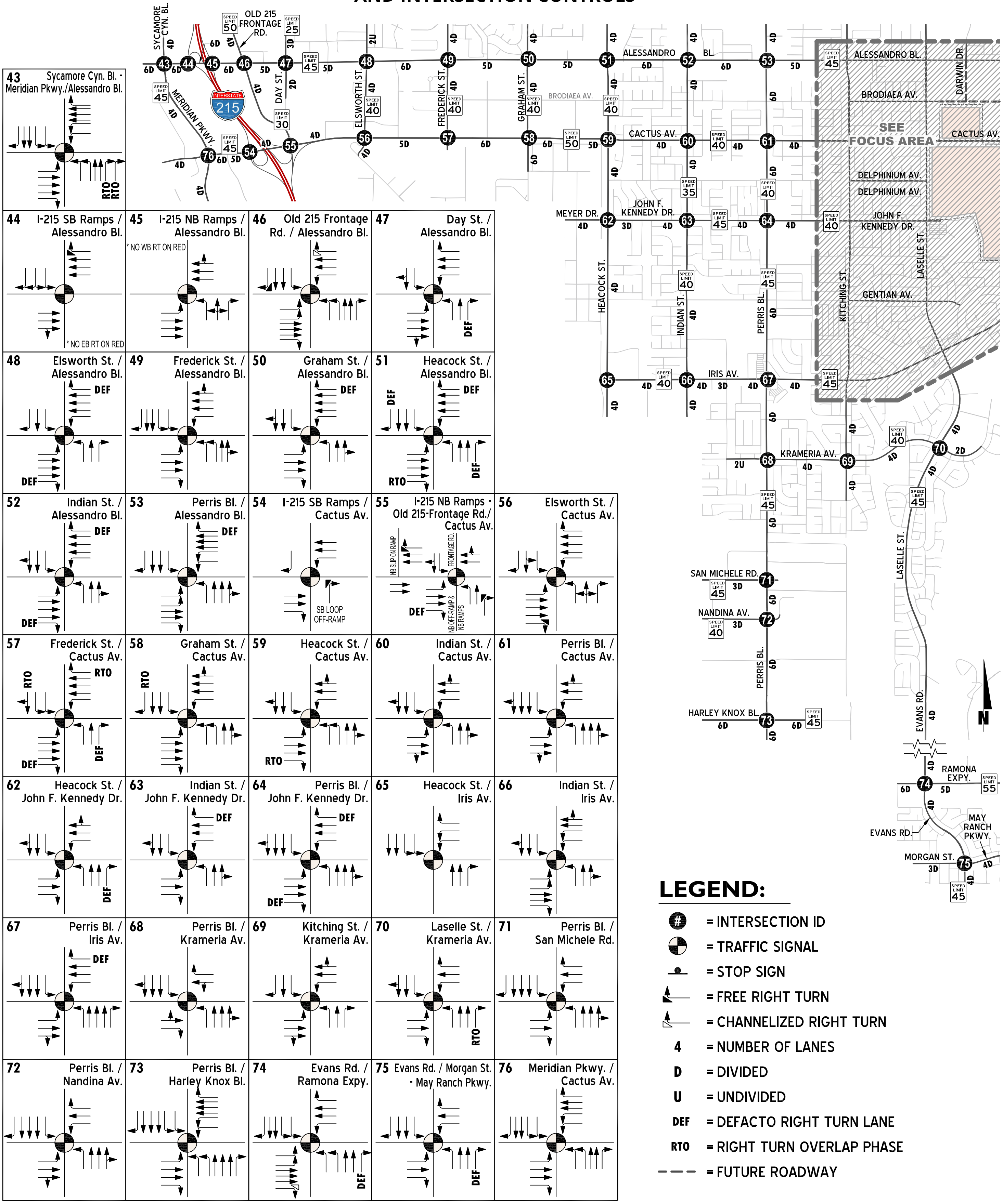


EXHIBIT 3-3: EXTENDED EASTERLY EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS

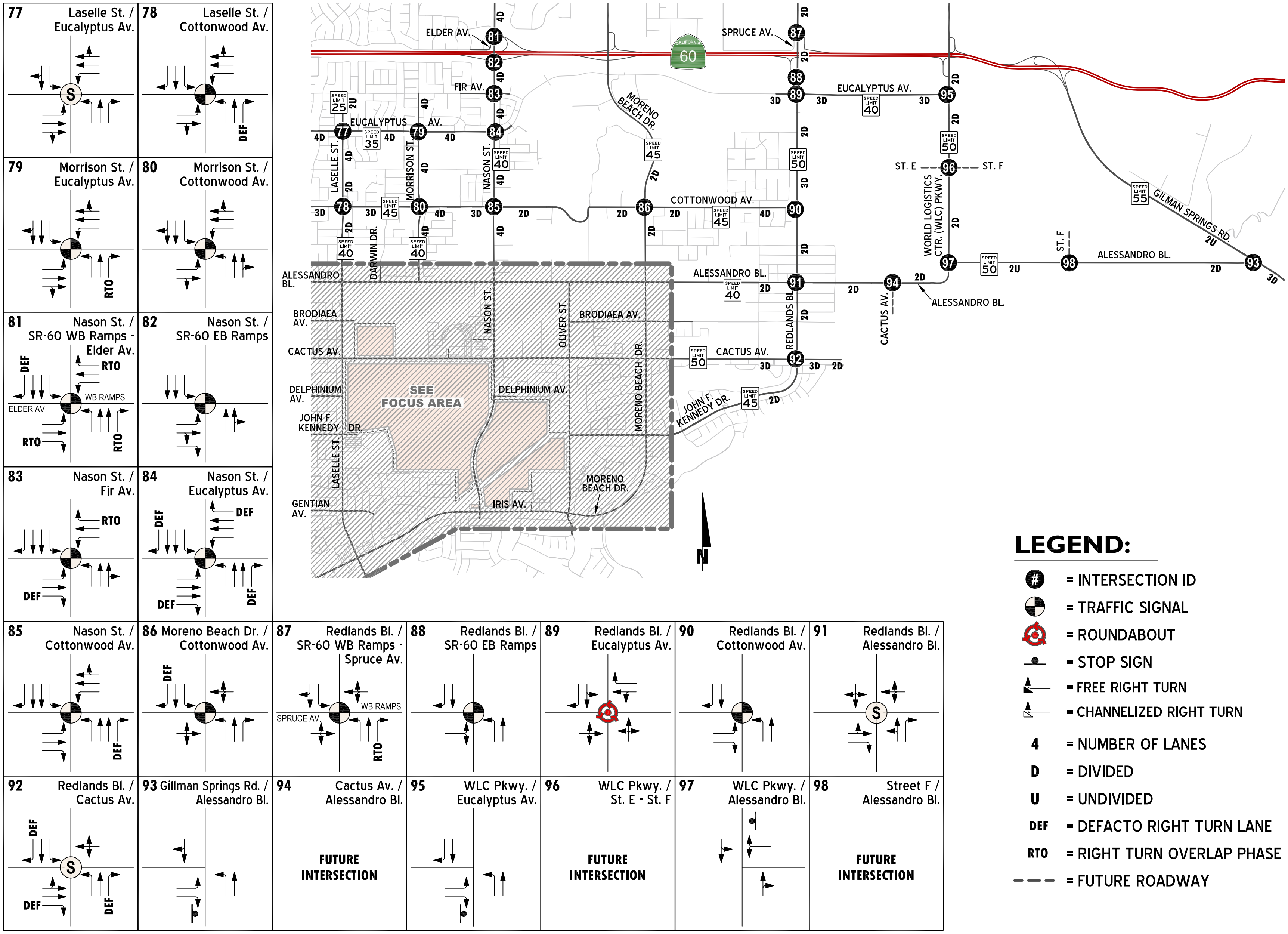


EXHIBIT 3-4: CITY OF MORENO VALLEY EXISTING AND PLANNED BICYCLE AND PEDESTRIAN NETWORK

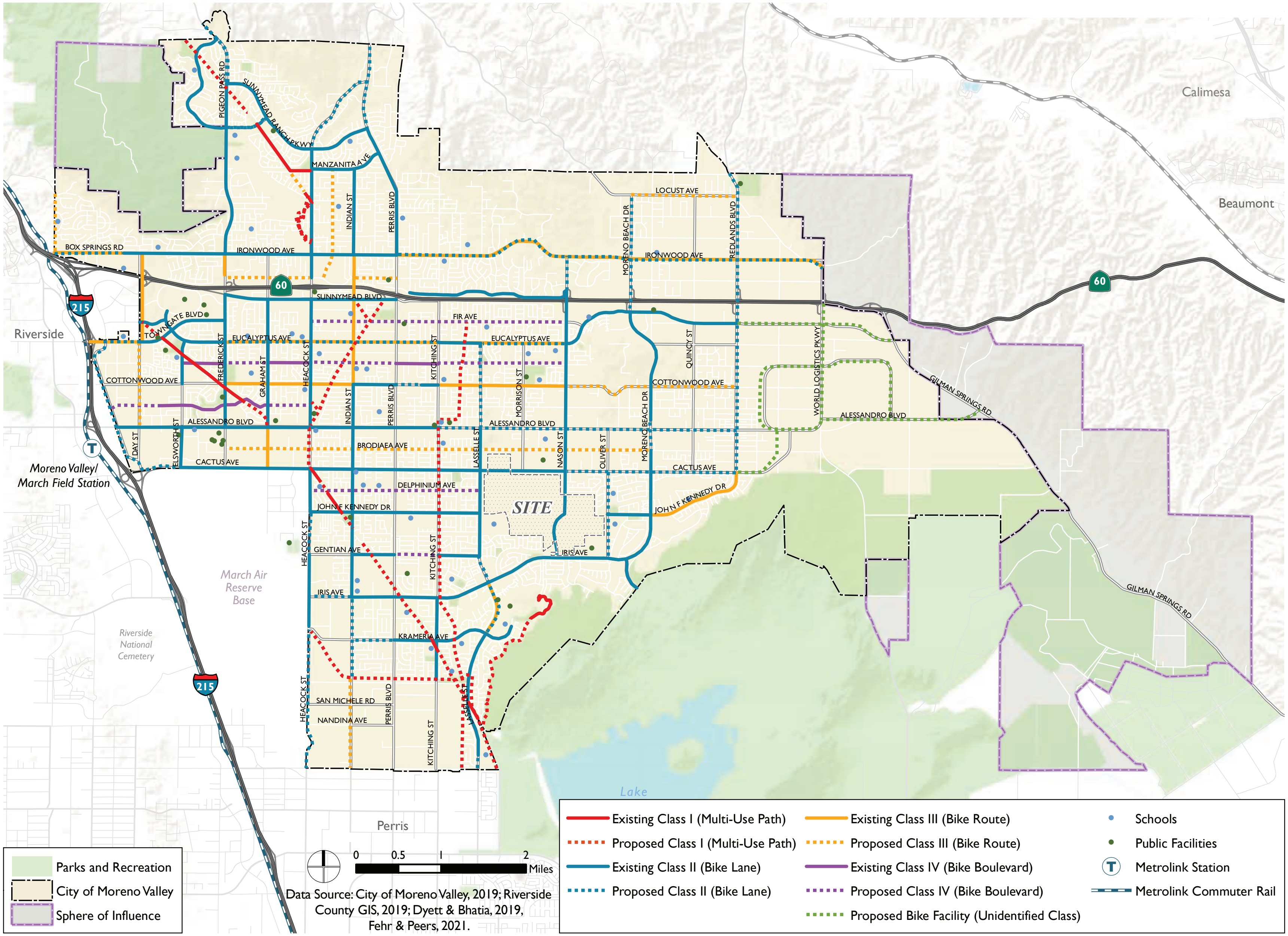
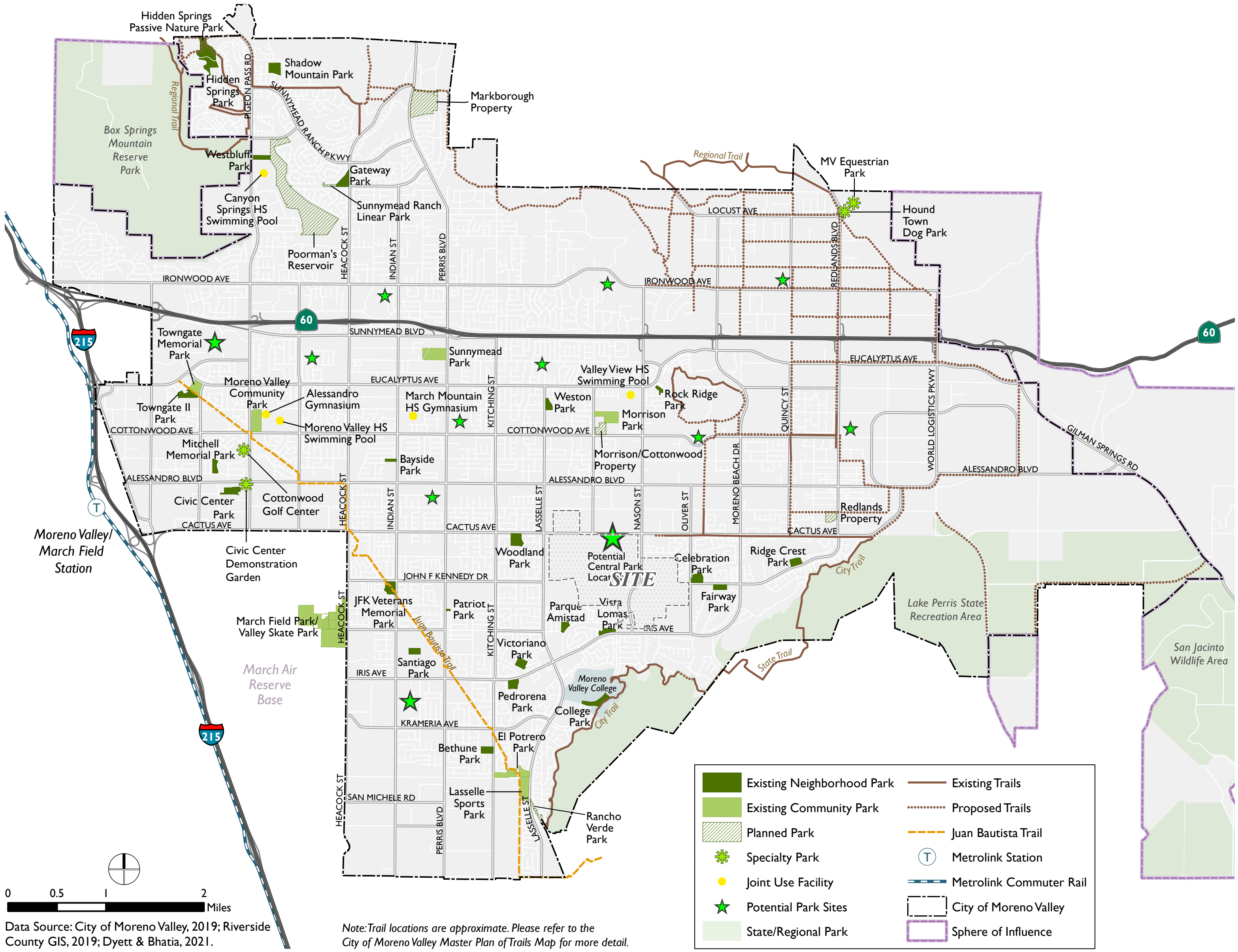


EXHIBIT 3-5: CITY OF MORENO VALLEY EXISTING AND PLANNED PARKS AND RECREATION FACILITIES



For **Brodiaea Avenue** from Kitching Street to Lasselle Street, two lanes are shared between automobile and bicycle traffic (sharrows are painted on the road). Sidewalks and parking are also provided along Brodiaea Avenue from Kitching Street to Lasselle Street. A short section of Brodiaea Avenue exists along the Jan Peterson Child Development Center to Nason Street with 2 travel lanes and a sidewalk on the south side. From Oliver Street to west of Landon Road, Brodiaea Avenue exists as a 2-lane road with a sidewalk on the south side. From west of Landon Road through the existing development, sidewalks are provided on the north and south sides of Brodiaea Avenue. However, east of the existing development on the north side, Brodiaea Avenue is a 2-lane road with a sidewalk on only the south side to Moreno Beach Drive.

Alessandro Boulevard exists as a 3-lane (1 westbound and 2 eastbound) roadway from Kitching Street to Chara Street. From Chara Street to Darwin Drive, Alessandro Boulevard exists as a 2-lane road. Bus stops, served by Route 20 and Route 41 are provided along Alessandro Boulevard. Alessandro Boulevard exists as a 3-lane (2 westbound and 1 eastbound) roadway from Darwin Drive to west of Blue Ribbon Lane. Alessandro Boulevard exists as a 2-lane facility from west of Blue Ribbon Lane to Moreno Beach Drive without consistent bicycle / pedestrian accommodations.

For **Delphinium Avenue** from Kitching Street to Lasselle Street, two lanes are shared between automobile and bicycle traffic (sharrows are painted on the road). Sidewalks and parking are also provided along Delphinium Avenue from Kitching Street to Lasselle Street. Delphinium Avenue also exists from Nason Street to the east as a 2-lane road with a sidewalk on the north side.

John F Kennedy Drive exists as a 4-lane road with bike lanes and sidewalks from Kitching Street to Lasselle Street. East of Lasselle Street, John F Kennedy exists as a 2-lane road with meandering sidewalk to Avenida Anilo. From Oliver Street to Moreno Beach Drive, John F Kennedy exists as a 2-lane road with bicycle lanes and sidewalks on both sides of the street.

Gentian Avenue exists as a 2-lane road with bicycle lanes and sidewalks on both sides of the street from Kitching Street to Lasselle Street.

Iris Avenue from Kitching Street to Oliver Street currently exists as a 6-lane road with bicycle lanes and sidewalks on both sides. Iris Avenue from Oliver Street to Kitching Street is served by RTA Route 20.

Throughout the focus area, **Lasselle Street** is served by RTA Route 41. Lasselle Street from Alessandro Boulevard to Copper Cove Lane exists as a 4-lane road with a southbound separate bicycle lane whereas northbound bicycles are mixed with automobiles via sharrows. There is a sidewalk on the west side of Lasselle Street, but the east side does not currently have a sidewalk. From Copper Cove Lane to Brodiaea Avenue, Lasselle Street continues as a 4-lane road with west side sidewalk and includes separated bicycle lanes on both sides of the street. From Brodiaea Avenue to Cactus Avenue, 4 lanes are provided with separate bicycle lanes and sidewalks on both sides. The segment of Lasselle Street from Cactus Avenue to north of John F Kennedy Drive continues as a 4-lane road with west side sidewalk and includes separated bicycle lanes on both sides of the street. From north of John F Kennedy Drive to Iris Avenue, 4 lanes are provided with separate bicycle lanes and sidewalks on both sides.

Kitching Street from Alessandro Boulevard to Cactus Avenue exists as a 4-lane road with east side sidewalk, but without explicit bicycle accommodations. From Cactus Avenue to John F Kennedy Drive, Kitching Street is a 2-lane road with bicycle lanes on both sides and an east side sidewalk. Kitching Street from Gentian Avenue to Campanilla Way has 2 southbound and 1 northbound automobile lanes with bicycle lanes and an east side sidewalk. From Campanilla Way to Iris Avenue, Kitching Street continues as a 4-lane road with east side sidewalk and includes separated bicycle lanes on both sides of the street.

Nason Street from Alessandro Boulevard to Cactus Avenue currently exists as a 4-lane road with bicycle lanes and sidewalks on both sides. The stretch of Nason Street from Alessandro Boulevard to Cactus Avenue is served by RTA Route 20 and 41 and 31. From Cactus Avenue to Iris Avenue, Nason Street is a 4-lane road with bicycle lanes and an east side sidewalk. Nason Street served by RTA Route 20 and 41 and 31.

Oliver Street from Alessandro Boulevard to Cactus Avenue exists as a 2-lane road without designated bicycle or pedestrian accommodations. From Cactus Avenue to just north of John F Kennedy Drive, 4 lanes are provided with separate bicycle lanes and sidewalks on both sides. From just north of John F Kennedy Drive to Filaree Avenue, the east side of Oliver Street includes 2 automobile lanes with separate bicycle lane and sidewalk, whereas the west side of the street includes 1 automobile lane and a bicycle lane and no sidewalk. From Filaree Avenue to Iris Avenue, Oliver Street exists as a 4-lane road with bicycle lanes and sidewalks on both sides.

From Alessandro Boulevard to Brodiaea Avenue, **Moreno Beach Drive** exists as a 2-lane road with bicycle lanes on both sides but no sidewalks. Moreno Beach Drive from Brodiaea Avenue to south of Cactus Avenue currently exists as a 4-lane road (3 southbound and 1 northbound) with a bicycle lane and a sidewalk on the west side. From south of Cactus Avenue to Oliver Street, Moreno Beach Drive currently exists as a 6-lane road with bicycle lanes and sidewalks on both sides. Moreno Beach Drive from Alessandro Boulevard to Oliver Street is served by RTA Route 20.

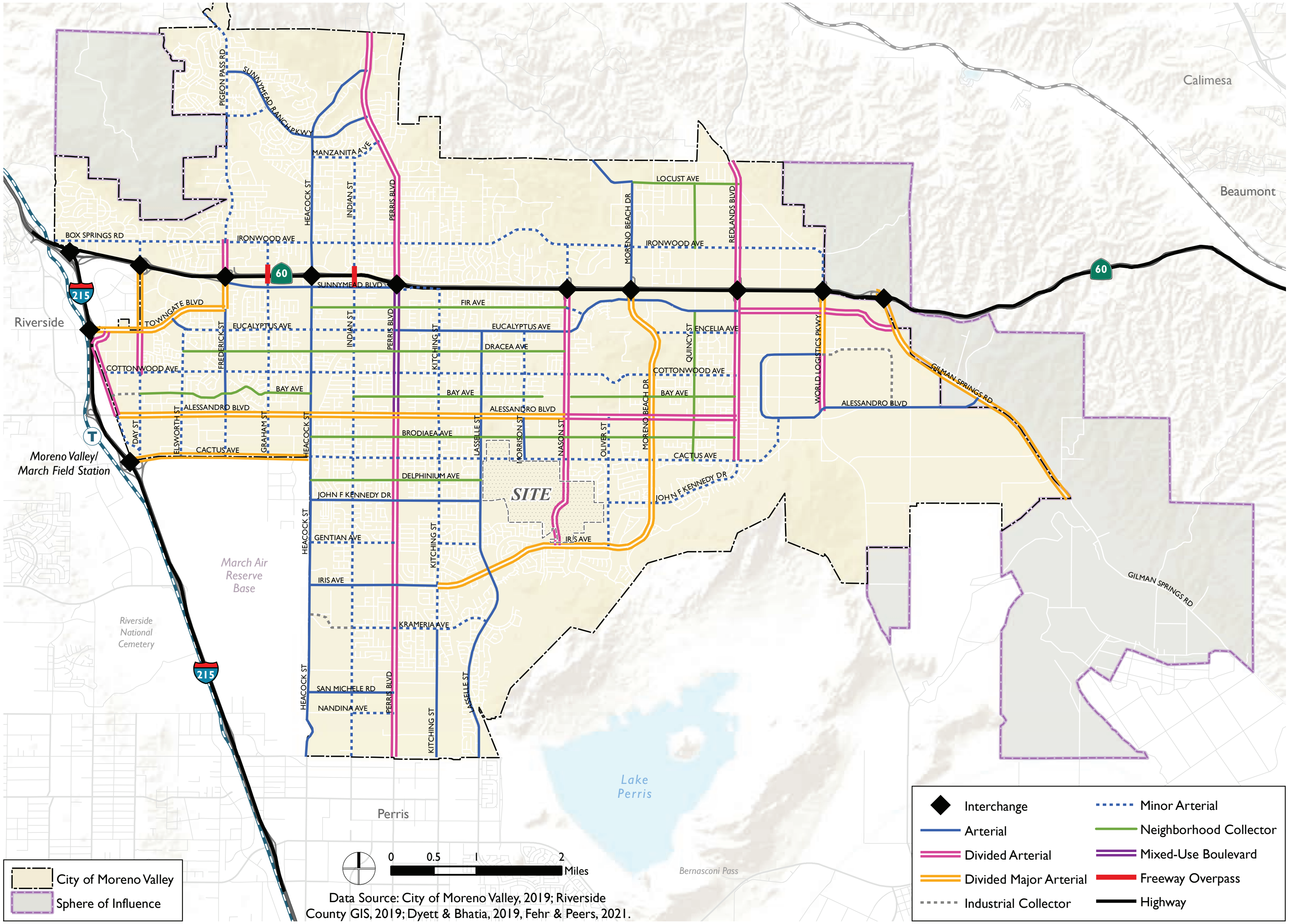
3.2 CITY OF MORENO VALLEY GENERAL PLAN CIRCULATION ELEMENT

The County of Riverside General Plan roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area are described below. Exhibit 3-6 shows the City of Moreno Valley General Plan Circulation Element and Exhibit 3-7 illustrates the City of Moreno Valley General Plan roadway cross-sections. Below is a summary of the major study area roadways and their General Plan classifications:

Divided Major Arterial: Alessandro Boulevard (west of Nason Street), Cactus Avenue (west of Heacock Street), Moreno Beach Drive, Iris Avenue, World Logistics Parkway (north of Street E / Street F), and Gilman Springs Road

Divided Arterial: Alessandro Boulevard (east of Nason Street), Nason Street, Perris Boulevard (south of Alessandro Boulevard), Eucalyptus Avenue (east of Redlands Boulevard), World Logistics Parkway (south of Street E / Street F), and Old 215 Frontage Road

EXHIBIT 3-6: CITY OF MORENO VALLEY GENERAL PLAN CIRCULATION NETWORK



Data Source: City of Moreno Valley, 2019; Riverside County GIS, 2019; Dyett & Bhatia, 2019, Fehr & Peers, 2021.

EXHIBIT 3-7: CITY OF MORENO VALLEY GENERAL PLAN ROADWAY CROSS-SECTIONS

STANDARD CITY PLAN NO.	STREET CLASS	ROW/ CURB TO CURB (FT)	TYPICAL SECTION (PARKING, TRAVEL LANES & MEDIAN) *** (FT)	PARKWAY WIDTH (FT)	THRU LANES	LOS C CAPACITY (ADT)	TRAFFIC INDEX ▲▲	MIN BUS BAY WIDTH (FT)	MIN THICKNESS AC OVER CAB (FT)
MVSI-101A-0, MVSI-101B-0	DIVIDED MAJOR ARTERIAL	134/110 (RAISED MEDIAN)	8 | 12 | 12 | 14 | 18 | 14 | 12 | 12 | 8	12 **	6 ▲	45,000	10	10	.50/1.00
	ALT.	142/110							
MVSI-102A-0, MVSI-102B-0	MODIFIED DIVIDED MAJOR ARTERIAL	120/102 (RAISED MEDIAN)	8 | 12 | 12 | 12 | 14 | 12 | 12 | 12 | 8	9 **	6 ▲	45,000	10	10	.50/1.00
	ALT.	130/102							
MVSI-103A-0, MVSI-103B-0	4-LANE DIVIDED ARTERIAL	110/86 (RAISED MEDIAN)	8 | 12 | 14 | 18 | 14 | 12 | 8	12**	4▲	30,000	10	10	.50/1.00
	ALT.	114/86							
MVSI-103C-0	6-LANE DIVIDED ARTERIAL	110/86 (RAISED MEDIAN)	13 | 11 | 12 | 14 | 12 | 11 | 13	12	6	45,000	10	10	.50/1.00
MVSI-104A-0, MVSI-104B-0	ARTERIAL	100/76	8 | 12 | 12 | 12 | 12 | 12 | 8****	12**	4▲	20,000	10	10	.50/1.00
	ALT.	104/76	6 | 12 | 13 | 14 | 13 | 12 | 6*****			30,000			
MVSI-105A-0, MVSI-105B-0	MINOR ARTERIAL	88/64	8 | 12 | 12 | 12 | 12 | 8 6 | 11 | 10 | 10 | 10 | 11 | 6 7 | 10 | 10 | 10 | 10 | 10 | 7	12**	4	20,000	9	10	.45/.75
MVSI-105C-0	PIGEON PASS RD.	98/74	6 | 13 | 12 | 12 | 12 | 13 | 6	12	4▲	20,000	9	10	.45/.75
MVSI-106A-0	INDUSTRIAL COLLECTOR	78/56	10 | 12 | 12 | 12 | 10	11	2▲	10,000	10	10	.50/1.00
MVSI-106B-0	COLLECTOR	66/44	8 | 14 | 14 | 8	11	2	N/A	7	N/A	.30/.50
MVSI-107A-0	LOCAL STREET	56/36	7 | 11 | 11 | 7	10	2	N/A	6	N/A	.30/.50
MVSI-107B-0	MODIFIED LOCAL STREET	50/36	7 | 11 | 11 | 7	7	2	N/A	6	N/A	.30/.50
MVSI-104C-0, MVSI-104D-0, MVSI-104E-0	SUNNYMEAD BOULEVARD	100/72	20 | 12 | 12 | 12 | 16	12/16	4	30,000	10	10	.50/1.00
		100/68	16 | 12 | 12 | 12 | 16	16	4	30,000	10	10	.50/1.00
		100/68	16 | 12 | 12 | 12 | 16	16	4	30,000	10	10	.50/1.00
			6 | 11 | 11 | 12 | 11 | 11 | 6						

Mixed-Use Boulevard: Perris Boulevard (north of Alessandro Boulevard) provides for high volumes of vehicle flow (40,000-55,000 vehicles per day) including trucks, while providing a wide pedestrian parkway with access to residences along the length of the corridor, and shops and services primarily at intersections.

Arterial: Eucalyptus Avenue (from Perris Boulevard to Redlands Boulevard), Lasselle Street, Morrison Street (south of Alessandro Boulevard), Alessandro Boulevard (east of Street E), Street E, John F Kennedy Drive (west of Lasselle Street), Heacock Street, Kitching Street (south of Krameria Avenue), Iris Avenue (west of Kitching Street)

Minor Arterial: Encelia Avenue, Fir Avenue (east of Nason Street), Cottonwood Avenue, Day Street, Elsworth Street, Frederick Street (south of Alessandro Boulevard), Graham Street, Indian Street, Kitching Street (north of Krameria Avenue), Morrison Street (north of Alessandro Boulevard), Oliver Street, John F Kennedy Drive (east of Oliver Street), Gentian Avenue, Krameria Avenue, Nandina Avenue, and Cactus Avenue (east of Heacock Street)

Neighborhood Collector: Fir Avenue (west of Nason Street), Quincy Street, Brodiaea Avenue, Delphinium Avenue, and Bay Avenue

3.3 EXISTING (2023) TRAFFIC COUNTS

Traffic counts at existing intersection analysis locations were primarily collected for mid-weekdays with schools in session (in person instruction and operating on normal bell schedules) during January, March, and May 2023. Peak hour operations and level of service (LOS) for the 99 study area intersections are evaluated for the weekday AM peak hour (7-9 AM) and PM peak hour (4-6 PM).

Where applicable, traffic volume counts have been adjusted for flow conservation in order to minimize loss of vehicles between intersections. The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1.

Exhibits 3-8 to 3-10 present the existing **AM** peak hour intersection volumes. Focus area intersection volumes are shown on Exhibit 3-8. Westerly and easterly study area volumes are provided on Exhibits 3-9 and 3-10, respectively.

Exhibits 3-11 to 3-13 present the existing **PM** peak hour intersection volumes. Focus area intersection volumes are shown on Exhibit 3-11. Westerly and easterly study area volumes are provided on Exhibits 3-12 and 3-13, respectively.

Exhibits 3-14 to 3-16 present the existing **daily** roadway segment volumes. Focus area daily volumes are shown on Exhibit 3-14. Westerly and easterly study area daily volumes are provided on Exhibits 3-15 and 3-16, respectively.

EXHIBIT 3-8: FOCUS STUDY AREA
EXISTING AM PEAK HOUR INTERSECTION VOLUMES

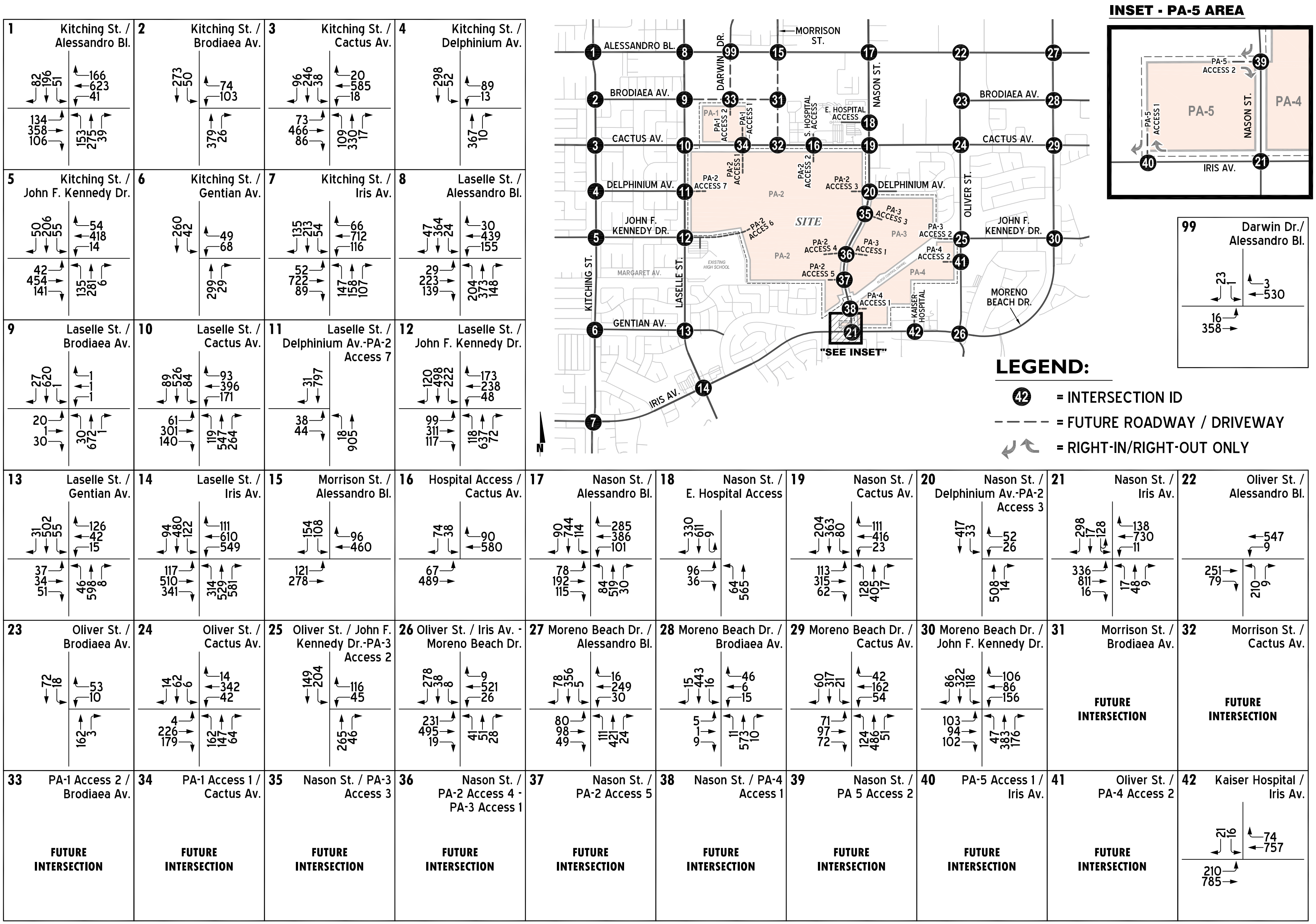


EXHIBIT 3-9: EXTENDED WESTERLY STUDY AREA
EXISTING AM PEAK HOUR INTERSECTION VOLUMES

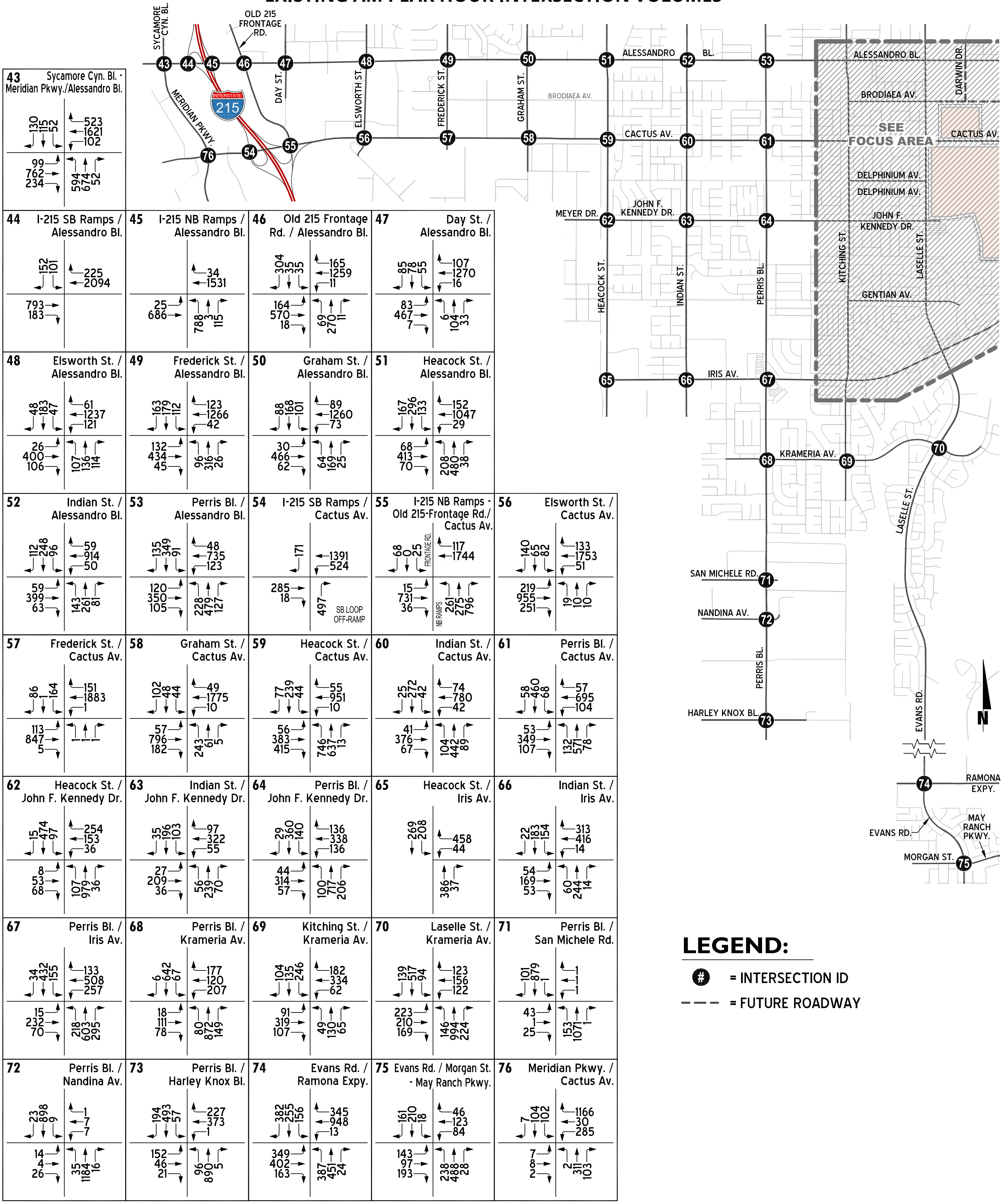


EXHIBIT 3-10: EXTENDED EASTERLY STUDY AREA
EXISTING AM PEAK HOUR INTERSECTION VOLUMES

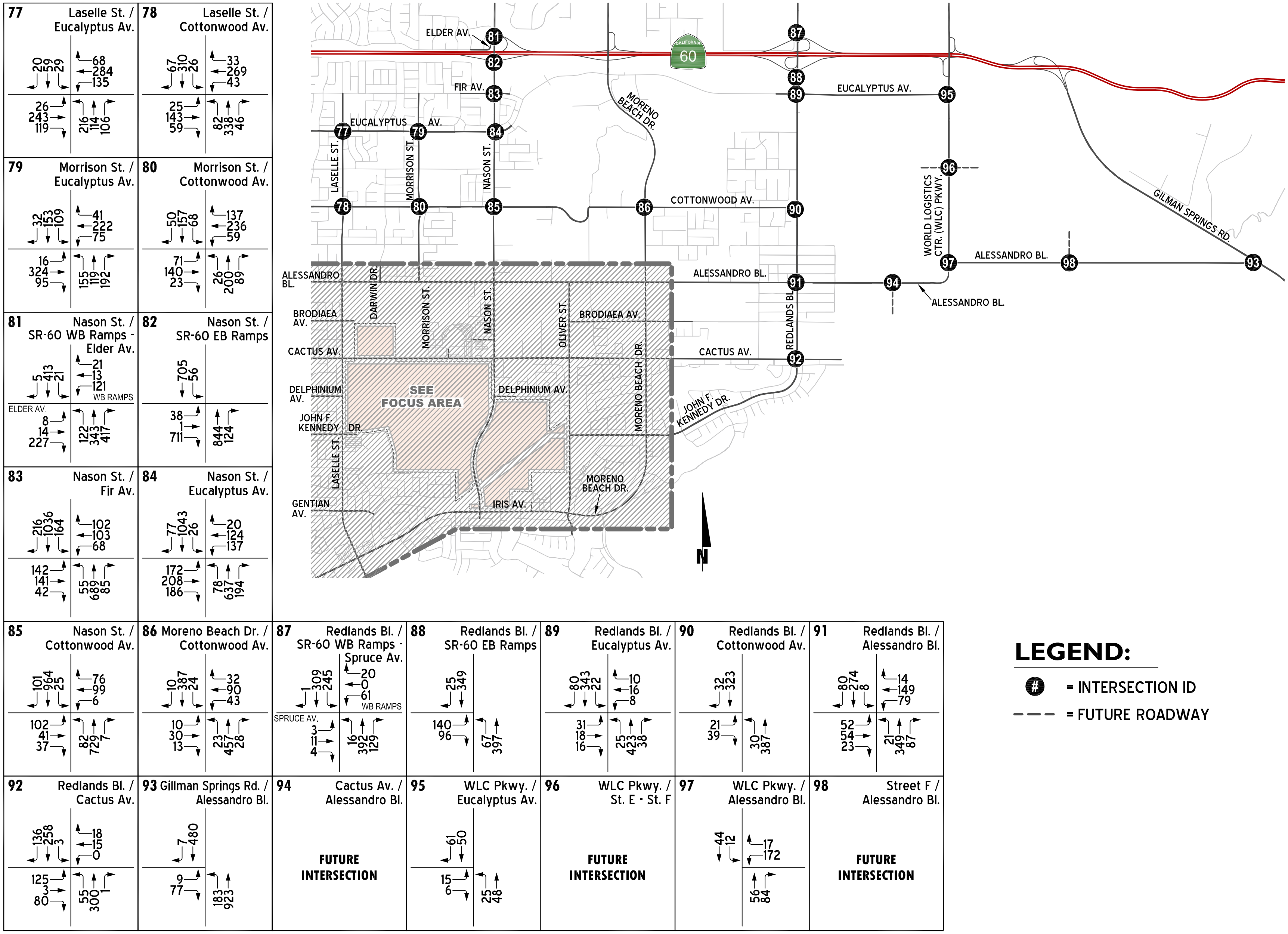


EXHIBIT 3-11: FOCUS STUDY AREA
EXISTING PM PEAK HOUR INTERSECTION VOLUMES

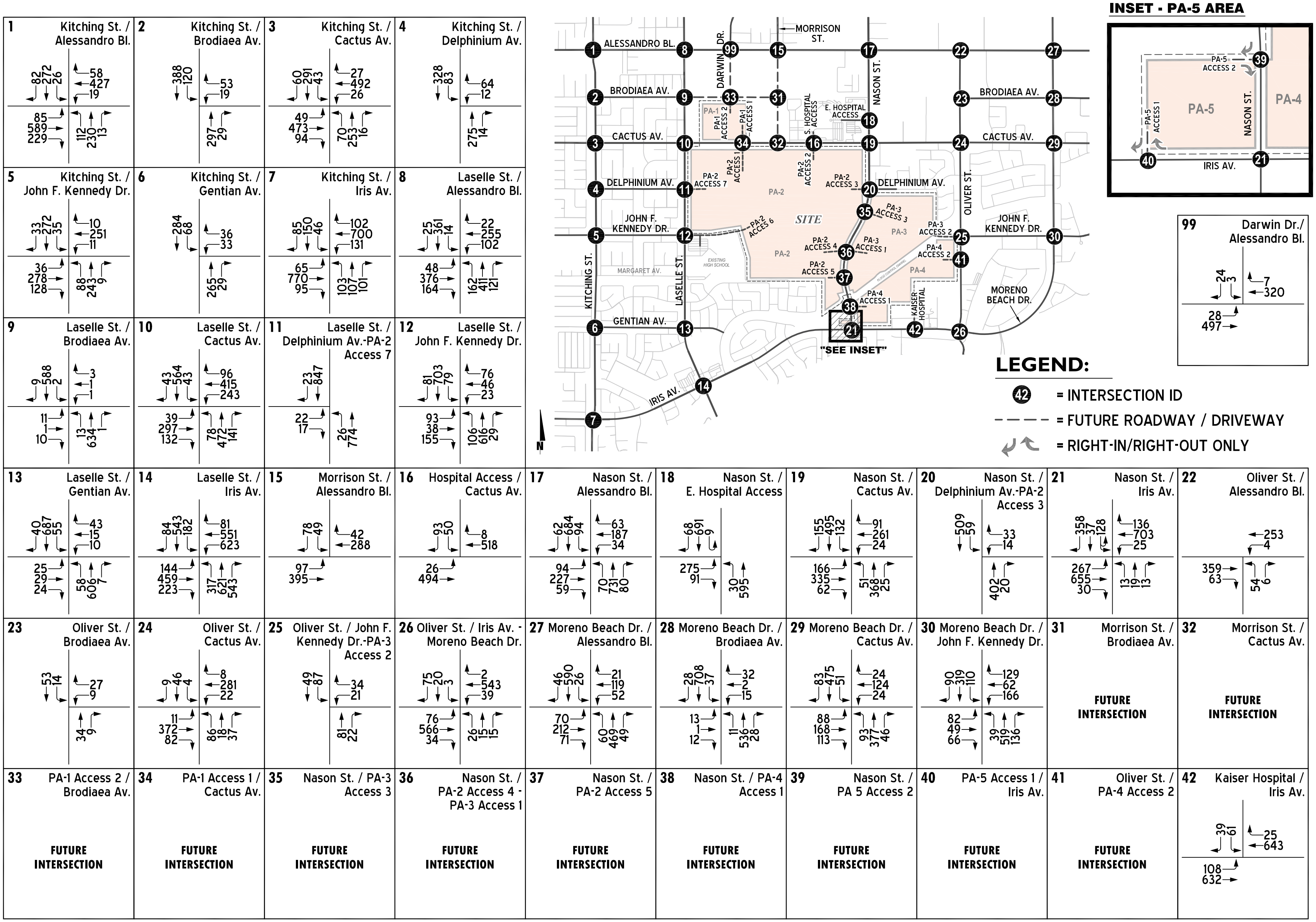


EXHIBIT 3-12: EXTENDED WESTERLY STUDY AREA
EXISTING PM PEAK HOUR INTERSECTION VOLUMES

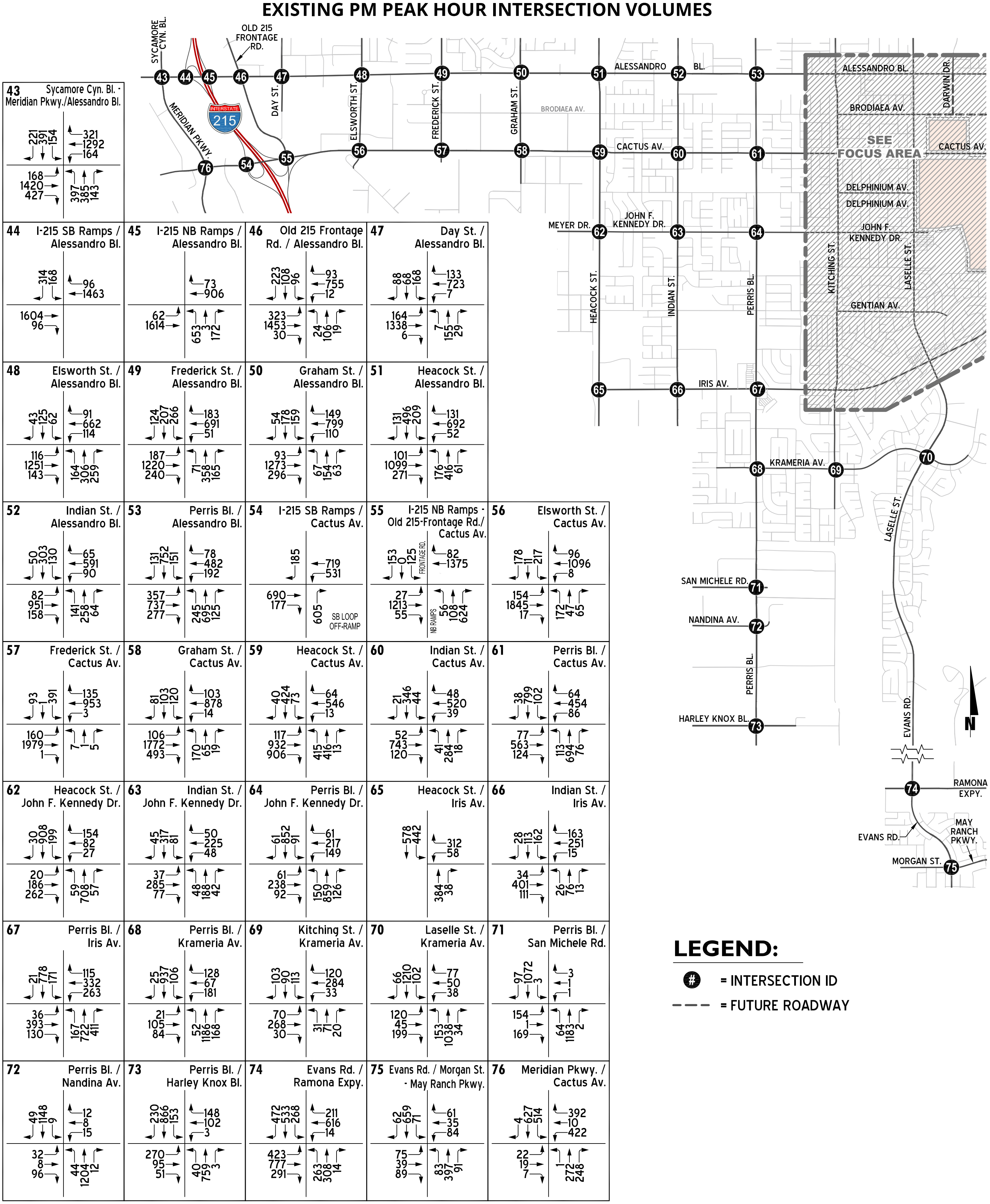


EXHIBIT 3-13: EXTENDED EASTERLY STUDY AREA EXISTING PM PEAK HOUR INTERSECTION VOLUMES

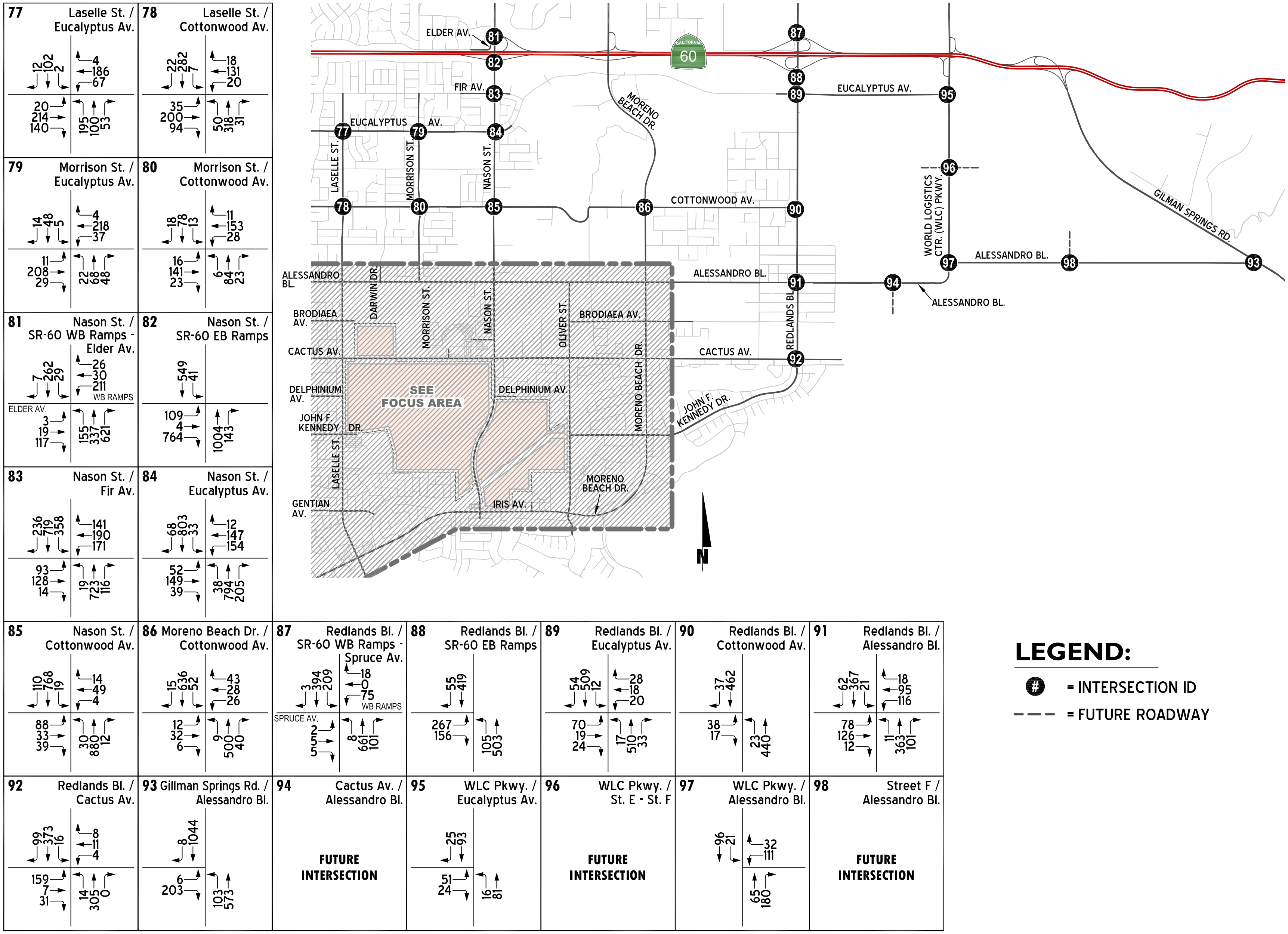


EXHIBIT 3-14: FOCUS STUDY AREA
EXISTING AVERAGE DAILY TRAFFIC (ADT)

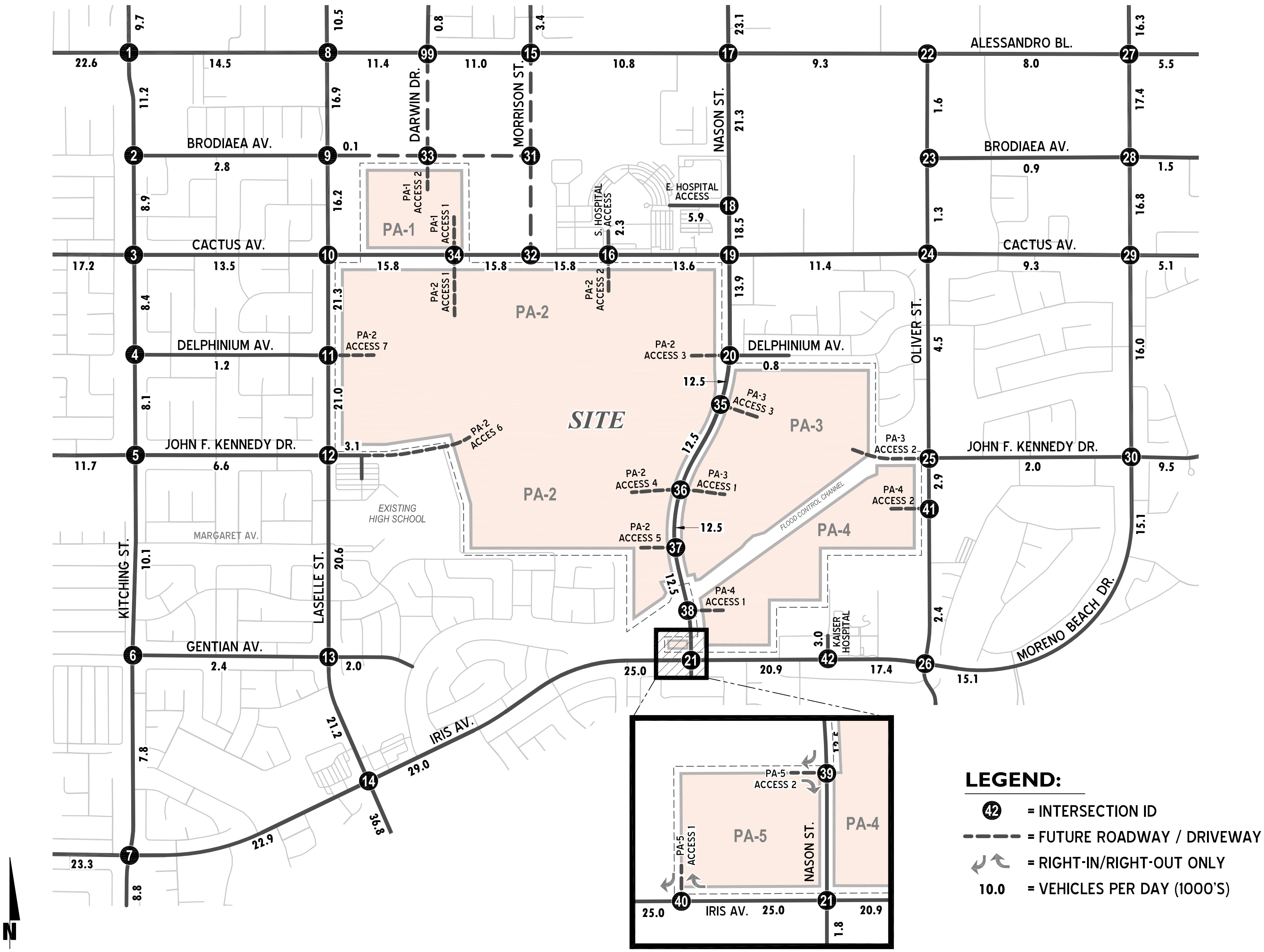
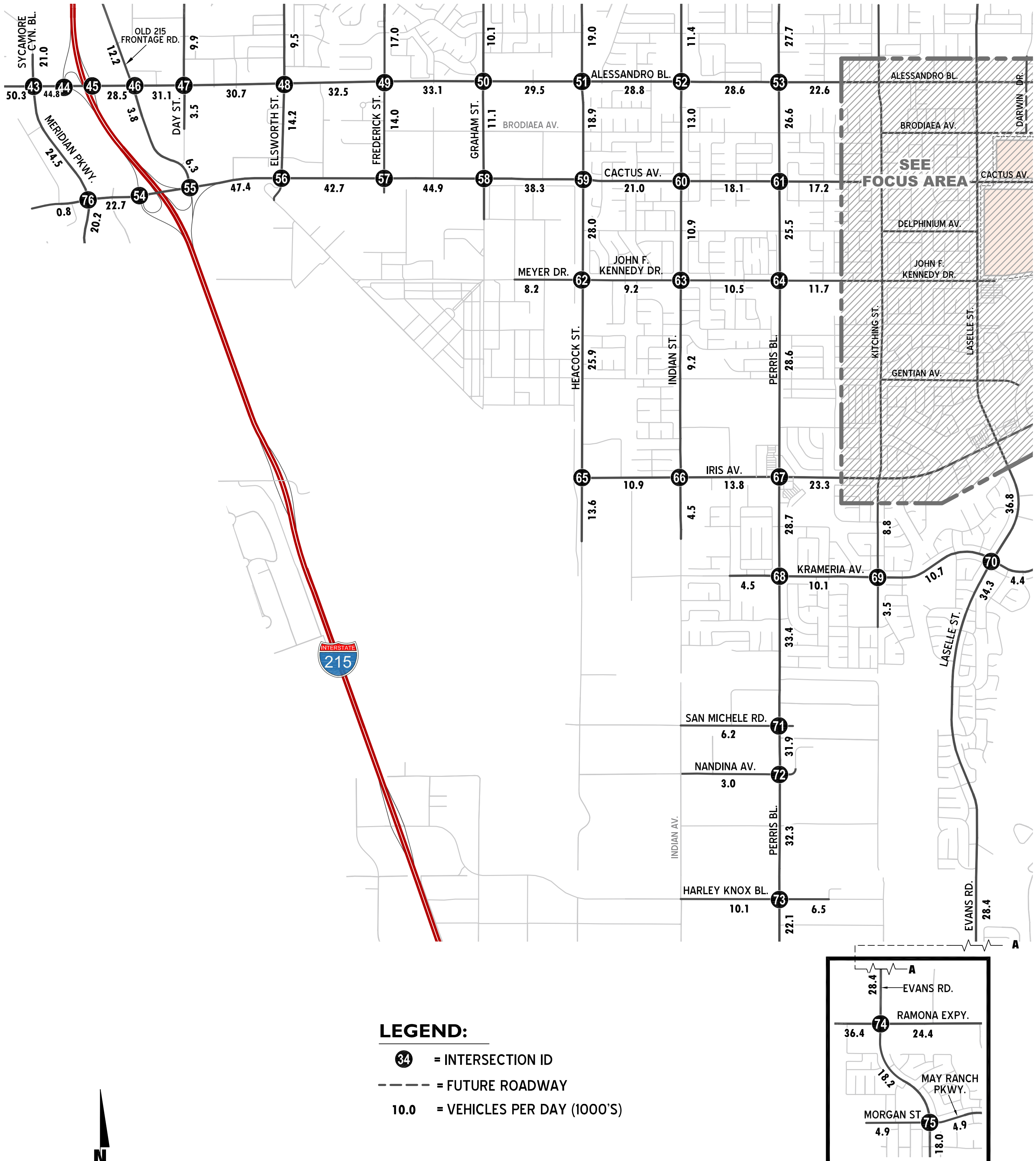


EXHIBIT 3-15: EXTENDED WESTERLY STUDY AREA EXISTING AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

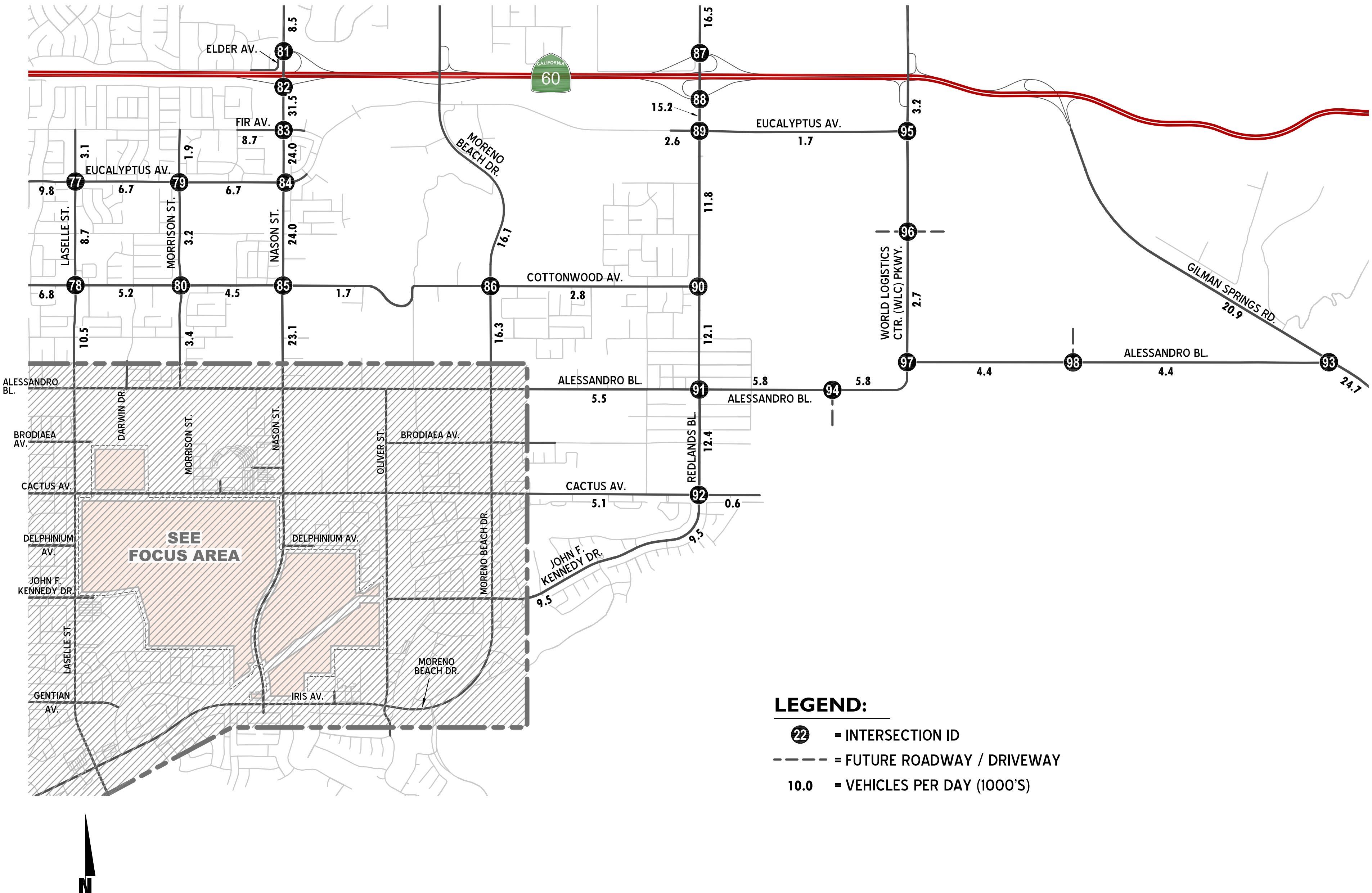
(34) = INTERSECTION ID

– – – – = FUTURE ROADWAY

10.0 = VEHICLES PER DAY (1000'S)

N

EXHIBIT 3-16: EXTENDED EASTERLY STUDY AREA EXISTING AVERAGE DAILY TRAFFIC (ADT)



3.4 EXISTING (2023) INTERSECTION OPERATIONS ANALYSIS

Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis* of this report. As indicated in Table 3-1, the following study area intersections are currently operating at an unacceptable LOS during the peak hours based on 2023 traffic flows.

#	Intersection	LOS AM	LOS PM	LOS Standard
5	Kitching St. / John F. Kennedy Dr.	**D**	**D**	C
10	Laselle St. / Cactus Av.	**D**	**D**	C
11	Laselle St. / Delphinium Av.- PA-2 Access 7	**E**	**E**	C
12	Laselle St. / John F. Kennedy Dr.	**D**	C	C
14	Laselle St. / Iris Av.	**E**	D	D
22	Oliver St. / Alessandro Bl.	**F**	C	C
28	Moreno Beach Dr. / Brodiaea Av.	D	**F**	D
55	I-215 NB Ramps / Cactus Av.	**E**	C	D
61	Perris Bl. / Cactus Av.	C	**D**	C
68	Perris Bl. / Krameria Av.	**F**	**E**	D
69	Kitching St. / Krameria Av.	**D**	C	C
70	Laselle St. / Krameria Av.	**D**	C	C
76	Meridian Pkwy. / Cactus Av.	**F**	D	D
91	Redlands Bl. / Alessandro Bl.	C	**E**	C
93	Gillman Springs Rd. / Alessandro Bl.	**F**	**F**	D

BOLD = Level of Service (LOS) does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

The intersection operations analysis worksheets are included in Appendix 3.2 of this TA.

3.5 TRAFFIC SIGNAL WARRANT ANALYSIS

Table 3-2 contains the traffic signal warrant analysis results for existing conditions. The following existing unsignalized intersections satisfy signal warrants:

- #11 - Lasselle St. / Delphinium Av.- PA-2 Access 7- DIF
- #16 - Hospital Access / Cactus Av.- DIF
- #22 - Oliver St. / Alessandro Bl.- DIF
- #77 - Lasselle St. / Eucalyptus Av.- DIF
- #91 - Redlands Bl. / Alessandro Bl.- DIF
- #92 - Redlands Bl. / Cactus Av.- DIF
- #93 - Gillman Springs Rd. / Alessandro Bl.- DIF
- #95 - WLC Pkwy. / Eucalyptus Av.- DIF

Existing conditions traffic signal warrant analysis worksheets are provided in Appendix 3.3.

TABLE 3-1: INTERSECTION ANALYSIS FOR EXISTING CONDITIONS

			Intersection Approach Lanes[2]												Delay[3]		Level of		
		Traffic	Northbound			Southbound			Eastbound			Westbound			(secs.)		Service[4]		LOS
#	Intersection	Control[1]	L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM	Standard
1	Kitching St. / Alessandro Bl.	TS	2	1	0	1	2	0	1	2	1>	1	2	1>	25.0	20.7	C	C	D
2	Kitching St. / Brodiaea Av.	AWS	0	2	0	1	2	0	0	0	0	0.5	0.5	d	11.9	9.5	B	A	C
3	Kitching St. / Cactus Av.	TS	1	2	0	1	1	1	1	2	0	1	2	0	24.3	23.1	C	C	C
4	Kitching St. / Delphinium Av.	CSS	0	1	0	0.5	0.5	0	0	0	0	0.5	0.5	d	13.0	12.3	B	B	C
5	Kitching St. / John F. Kennedy Dr.	TS	0	1!	0	0	1!	0	1	2	0	1	2	d	50.1	44.1	**D**	**D**	C
6	Kitching St. / Gentian Av.	AWS	0	1	d	0.5	0.5	0	0	0	0	1	0	1	12.4	12.1	B	B	C
7	Kitching St. / Iris Av.	TS	1	2	0	1	2	0	1	2	0	1	2	1	26.9	22.3	C	C	C
8	Laselle St. / Alessandro Bl.	TS	1	1	1>	1	1	0	1	1	1	1	1	1>	41.8	41.3	D	D	D
9	Laselle St. / Brodiaea Av.	CSS	1	2	0	1	2	0	0	1!	0	0	1!	0	28.1	21.0	D	C	D
10	Laselle St. / Cactus Av.	TS	1	2	1	1	2	d	1	2	0	1	2	1	36.8	39.0	**D**	**D**	C
11	Laselle St. / Delphinium Av.- PA-2 Access 7	CSS	1	2	0	0	2	d	0.5	0.5	d	0	0	0	45.8	40.8	**E**	**E**	C
12	Laselle St. / John F. Kennedy Dr.	TS	1	2	d	1	2	d	1	2	d	1	2	d	40.9	33.7	**D**	C	C
13	Laselle St. / Gentian Av.	TS	1	2	0	1	2	d	1	1	1	1	1	0	35.4	21.1	D	C	D
14	Laselle St. / Iris Av.	TS	2	2	1	2	2	d	2	3	d	2	3	0	56.2	50.9	**E**	D	D
15	Morrison St. / Alessandro Bl.	TS	0	0	0	1	0	1>	1	1	0	0	2	1	9.1	8.1	A	A	D
16	Hospital Access - PA2 Access 2 / Cactus Av.	CSS	0	0	0	1	0	1	1	2	0	0	2	0	19.0	15.4	C	C	D
17	Nason St. / Alessandro Bl.	TS	1	2	1	1	3	1	2	1	1	2	1	1	23.9	24.6	C	C	D
18	Nason St. / E. Hospital Access	TS	1	2	0	1	2	1	1	0	1	0	0	0	5.4	14.9	A	B	D
19	Nason St. / Cactus Av.	TS	2	2	1	1	2	1	1	1	1	1	1	0	40.9	32.5	D	C	D
20	Nason St. / Delphinium Av.- PA-2 Access 3	CSS	0	2	d	1	2	0	0	0	0	1	0	d	20.6	17.8	C	C	C
21	Nason St. / Iris Av.	TS	1	1	0	1	1	1	2	3	d	1	3	1	24.7	26.2	C	C	C
22	Oliver St. / Alessandro Bl.	CSS	1	0	1	0	0	0	0	1	0	0.5	0.5	0	50.7	16.8	**F**	C	C
23	Oliver St. / Brodiaea Av.	CSS	0	1	0	0.5	0.5	0	0	0	0	0.5	0	0.5	10.4	9.1	B	A	C
24	Oliver St. / Cactus Av.	TS	0.5	0.5	1	0.5	0.5	d	1	2	0	1	1	1	28.7	21.3	C	C	D
25	Oliver St. / John F. Kennedy Dr. - PA-3 Access 2	AWS	0	2	0	0	1	0	0	0	0	1	0	1	14.9	8.3	B	A	C
26	Oliver St. / Iris Av. - Moreno Beach Dr.	TS	0.5	0.5	1	0.5	0.5	1	1	3	d	1	3	d	22.7	23.5	C	C	D
27	Moreno Beach Dr. / Alessandro Bl.	TS	1	1	d	1	1	d	1	1	0	1	1	d	25.5	35.2	C	D	D
28	Moreno Beach Dr. / Brodiaea Av.	CSS	1	1	1	1	2	d	0.5	0.5	d	0	1!	0	30.9	50.1	D	**F**	D
29	Moreno Beach Dr. / Cactus Av.	TS	1	2	1	1	3	d	1	2	0	1	2	0	18.9	20.1	B	C	C
30	Moreno Beach Dr. / John F. Kennedy Dr.	TS	1	3	1	1	3	d	1	1	d	1	1	1	40.0	39.1	D	D	D
31	Morrison St. / Brodiaea Av.	--	Future Intersection																C
32	Morrison St. / Cactus Av.	--	Future Intersection																C
33	Darwin Dr. - PA-1 Access 2 / Brodiaea Av.	--	Future Intersection																C
34	PA-1 Access 1 / Cactus Av.	--	Future Intersection																C
35	Nason St. / PA-3 Access 3	--	Future Intersection																C
36	Nason St. / PA-2 Access 4 - PA-3 Access 1	--	Future Intersection																C
37	Nason St. / PA-2 Access 5	--	Future Intersection																C
38	Nason St. / PA-4 Access 1	--	Future Intersection																C
39	Nason St. / PA 5 Access 2	--	Future Intersection																C
40	PA-5 Access 1 / Iris Av.	--	Future Intersection																C
41	Oliver St. / PA-4 Access 2	--	Future Intersection																C
42	Kaiser Hospital / Iris Av.	TS	0	0	0	1	0	1	1	3	0	0	3	d	14.5	9.2	B	A	D
43	Sycamore Cyn. Bl. - Meridian Pkwy. / Alessandro	TS	2	2	2>	2	2	1	1	3	1	2	3	1	25.8	30.4	C	C	D
44	I-215 SB Ramps / Alessandro Bl.	TS	0	0	0	1	1!	1	0	3	0	0	3	1>>	2.4	3.7	A	A	D
45	I-215 NB Ramps / Alessandro Bl.	TS	1	1!	1	0	0	0	1	3	0	0	3	0	14.4	11.3	B	B	D
46	Old 215 Frontage Rd. / Alessandro Bl.	TS	2	2	1	1	2	1>>	2	3	1	1	2	1	12.8	12.1	B	B	D
47	Day St. / Alessandro Bl.	TS	1	1	d	1	1	0	1	3	0	1	2	1	18.1	10.8	B	B	D
48	Elsworth St. / Alessandro Bl.	TS	1	1	1	1	1	1	1	3	d	1	3	d	27.8	35.5	C	D	D
49	Frederick St. / Alessandro Bl.	TS	2	2	0	2	2	1	1	2	1	1	3	0	20.2	22.9	C	C	D
50	Graham St. / Alessandro Bl.	TS	1	2	0	1	2	0	1	2	1	1	3	d	17.6	31.2	B	C	D
51	Heacock St. / Alessandro Bl.	TS	1	2	d	1	2	d	1	3	1>	1	3	d	23.8	23.0	C	C	D
52	Indian St. / Alessandro Bl.	TS	1	2	0	1	2	0	1	3	d	1	3	d	23.4	27.4	C	C	D
53	Perris Bl. / Alessandro Bl.	TS	1	3	0	1	2	1	2	2	1	2	3	d	37.8	41.4	D	D	D
54	I-215 SB Ramps / Cactus Av.	TS	0	0	1>>	0	0	1	0	2	1	1	2	0	26.0	26.4	C	C	D
55	I-215 NB Ramps / Cactus Av.	TS	1	1	1>>	1	1	0	1	2	d	0	2	0	58.9	24.8	**E**	C	D

TABLE 3-1: INTERSECTION ANALYSIS FOR EXISTING CONDITIONS

#	Intersection	Traffic Control[1]	Intersection Approach Lanes[2] Northbound L	T	R	Southbound L	T	R	Eastbound L	T	R	Westbound L	T	R	Delay[3] (secs.) AM	PM	Level of Service[4] AM	PM	LOS Standard
56	Elsworth St. / Cactus Av.	TS	1	1!	1	1.5	0.5	1	1	3	1>>	1	3	1	18.3	23.4	B	C	D
57	Frederick St. / Cactus Av.	TS	1	1	d	2	1	0	1	3	d	1	3	1>	7.0	20.9	A	C	D
58	Graham St. / Cactus Av.	TS	2	2	0	1	2	1>	1	3	1	1	3	0	19.1	23.1	B	C	D
59	Heacock St. / Cactus Av.	TS	2	2	0	1	2	0	1	2	1>	1	2	0	38.8	42.5	D	D	D
60	Indian St. / Cactus Av.	TS	1	2	0	1	2	0	1	2	0	1	2	0	28.0	31.1	C	C	C
61	Perris Bl. / Cactus Av.	TS	1	3	0	1	3	0	1	2	0	1	2	0	30.2	35.3	C	**D**	C
62	Heacock St. / John F. Kennedy Dr.	TS	1	2	d	1	2	0	1	1	1	1	2	0	28.2	30.4	C	C	D
63	Indian St. / John F. Kennedy Dr.	TS	1	2	0	1	2	0	1	1	1	1	2	d	18.5	18.6	B	B	C
64	Perris Bl. / John F. Kennedy Dr.	TS	1	3	0	1	3	0	1	2	d	1	2	d	37.8	37.5	D	D	D
65	Heacock St. / Iris Av.	TS	0	2	1	2	2	0	0	0	0	2	0	1	33.3	30.2	C	C	D
66	Indian St. / Iris Av.	TS	1	2	0	1	2	0	2	2	1	2	2	0	39.5	28.3	D	C	D
67	Perris Bl. / Iris Av.	TS	1	3	1	1	3	0	1	2	0	1	2	d	37.3	46.9	D	D	D
68	Perris Bl. / Krameria Av.	TS	1	3	0	1	3	0	0.5	0.5	1	0.5	0.5	1	>80	62.5	**F**	**E**	D
69	Kitching St. / Krameria Av.	TS	1	1	1	1	1	1	1	2	0	1	2	0	39.4	27.8	**D**	C	C
70	Laselle St. / Krameria Av.	TS	1	2	1>	1	2		1	1	1	1	1	1	37.8	32.8	**D**	C	C
71	Perris Bl. / San Michele Rd.	TS	1	3	0	1	3	1	1	1	1	1	1	1	12.2	15.1	B	B	D
72	Perris Bl. / Nandina Av.	TS	1	3	0	1	3	1	1	2	0	1	1	1	5.1	6.7	A	A	D
73	Perris Bl. / Harley Knox Bl.	TS	2	3	1	2	3	1	1	2	1	2	3	1	30.4	30.0	C	C	D
74	Evans Rd. / Ramona Expy.	TS	2	2	d	2	2	1	2	3	1	1	2	1	53.7	45.4	D	D	E
75	Evans Rd. / Morgan St. - May Ranch Pkwy.	TS	1	2	d	1	2	1	1	1	1	1	1	1	36.9	25.6	D	C	D
76	Meridian Pkwy. / Cactus Av.	TS	2	2	1	2	2	1	1	2	1	2	2	1	>80	42.9	**F**	D	D
77	Laselle St. / Eucalyptus Av.	AWS	1	1	1	1	1	0	1	2	0	1	2	0	18.3	13.1	C	B	C
78	Laselle St. / Cottonwood Av.	TS	1	1	0	1	1	1	1	1	0	1	2	0	21.1	18.3	C	B	C
79	Morrison St. / Eucalyptus Av.	TS	1	1	1>	1	2	0	1	2	0	1	2	0	31.5	24.7	C	C	C
80	Morrison St. / Cottonwood Av.	TS	1	2	0	1	2	0	1	1	0	1	2	0	21.4	15.9	C	B	C
81	Nason St. / SR-60 WB Ramps - Elder Av.	TS	1	2	1>	1	2	d	1	1	1>	1	1	1>	19.8	47.5	B	D	D
82	Nason St. / SR-60 EB Ramps	TS	0	2	0	1	2	0	1	0.5	1.5	0	0	0	15.0	16.8	B	B	D
83	Nason St. / Fir Av.	TS	1	2	0	1	2	1	1	1	d	1	1	1>	16.8	23.8	B	C	D
84	Nason St. / Eucalyptus Av.	TS	1	2	d	1	2	d	1	2	d	1	2	d	21.4	15.0	C	B	D
85	Nason St. / Cottonwood Av.	TS	1	2	d	1	2	1	1	1	1	1	2	0	15.1	11.3	B	B	C
86	Moreno Beach Dr. / Cottonwood Av.	TS	1	1	1	1	1	d	0	1!	0	0	1!	0	33.3	28.0	C	C	C
87	Redlands Bl. / SR-60 WB Ramps - Spruce Av.	TS	1	1	1>	1	1	0	0	1!	0	0	1!	0	15.0	17.4	B	B	D
88	Redlands Bl. / SR-60 EB Ramps	TS	1	1	0	0	1	1	0	1!	0	0	0	0	15.6	22.0	B	C	D
89	Redlands Bl. / Eucalyptus Av.	RDB	0	1!	0	0.5	0.5	1	0	1!	0	0.5	0.5	1	5.8	7.8	A	A	D
90	Redlands Bl. / Cottonwood Av.	TS	1	1	0	0	1	1	1	0	1	0	0	0	6.0	5.4	A	A	C
91	Redlands Bl. / Alessandro Bl.	AWS	0.5	0.5	1	0	1!	0	0.5	0.5	1	0	1!	0	22.3	48.2	C	**E**	C
92	Redlands Bl. / Cactus Av.	AWS	1	1	d	1	1	d	0.5	1.5	d	0	1!	0	15.3	17.3	C	C	C
93	Gillman Springs Rd. / Alessandro Bl.	CSS	1	1	0	0	1	0	1	0	1	0	0	0	77.6	64.0	**F**	**F**	D
94	Cactus Av. / Alessandro Bl.	--						Future Intersection											D
95	WLC Pkwy. / Eucalyptus Av.	CSS	1	1	0	0	1	1	1	0	1	0	0	0	9.6	10.3	A	B	D
96	WLC Pkwy. / St. E - St. F	--						Future Intersection											D
97	WLC Pkwy. / Alessandro Bl.	CSS	0	1	0	0.5	0.5	0	0	0	0	0	1!	0	11.0	12.1	B	B	D
98	Street F / Alessandro Bl.	--						Future Intersection											D
99	Darwin Dr. / Alessandro Bl.	CSS	0	0	0	0	1!	0	1	1	0	0	1	1	12.8	11.4	B	B	D

[1] TS = Traffic Signal; CSS = Cross-street Stop; RDB = Roundabout

[2] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.
L = Left; T = Through; R = Right; d = Defacto Right Turn Lane; 0.5 = Shared Lane; 1! = Shared Left/Through/Right lane

[3] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[4] **BOLD** = Level of Service (LOS) does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

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TABLE 3-2: TRAFFIC SIGNAL WARRANT ANALYSIS SUMMARY FOR EXISTING (2023) CONDITIONS

#	Intersection	Existing Peak Hour Warrants
2	Kitching St. / Brodiaea Av.	--
4	Kitching St. / Delphinium Av.	--
6	Kitching St. / Gentian Av.	--
9	Laselle St. / Brodiaea Av.	--
11	Laselle St. / Delphinium Av.- PA-2 Access 7	X
16	Hospital Access - PA2 Access 2 / Cactus Av.	X
20	Nason St. / Delphinium Av.- PA-2 Access 3	--
22	Oliver St. / Alessandro Bl.	X
23	Oliver St. / Brodiaea Av.	--
25	Oliver St. / John F. Kennedy Dr. - PA-3 Access 2	--
28	Moreno Beach Dr. / Brodiaea Av.	--
31	Morrison St. / Brodiaea Av.	n/a
32	Morrison St. / Cactus Av.	n/a
33	Darwin Dr. - PA-1 Access 2 / Brodiaea Av.	n/a
34	PA-1 Access 1 / Cactus Av.	n/a
35	Nason St. / PA-3 Access 3	n/a
36	Nason St. / PA-2 Access 4 - PA-3 Access 1	n/a
37	Nason St. / PA-2 Access 5	n/a
38	Nason St. / PA-4 Access 1	n/a
39	Nason St. / PA 5 Access 2	n/a
40	PA-5 Access 1 / Iris Av.	n/a
41	Oliver St. / PA-4 Access 2	n/a
77	Laselle St. / Eucalyptus Av.	X
89	Redlands Bl. / Eucalyptus Av.	RDB
91	Redlands Bl. / Alessandro Bl.	X
92	Redlands Bl. / Cactus Av.	X
93	Gillman Springs Rd. / Alessandro Bl.	X
94	Cactus Av. / Alessandro Bl.	n/a
95	WLC Pkwy. / Eucalyptus Av.	X
96	WLC Pkwy. / St. E - St. F	n/a
97	WLC Pkwy. / Alessandro Bl.	--
98	Street F / Alessandro Bl.	n/a
99	Darwin Dr. / Alessandro Bl.	--

X = Warranted; RIRO = Right-In/Right-Out Only Access; RDB = Roundabout; n/a = Not Applicable (Future Intersection)

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3.6 OFF-RAMP QUEUING ANALYSIS

Off-ramp queuing analysis findings for Existing (2023) are presented on Table 3-3. As shown on Table 3-3, the following off-ramp movement is estimated to experience queuing issues during the weekday peak 95th percentile traffic flows under 2023 traffic conditions. Worksheets for the 2023 traffic conditions queuing analysis are provided in Appendix 3.4.

- I-215 NB Ramps / Cactus Avenue, northbound left turn lane – AM Peak Hour

Although 95th percentile queue is estimated to exceed the available storage for the northbound left turn lane at the above location, the adjacent northbound off-ramp through lane has sufficient storage to accommodate any spillover without spilling back and affecting the Freeway mainline. The analysis was conducted for the weekday AM and weekday PM peak hours. The traffic modeling and signal timing optimization software package Synchro/SimTraffic (Version 11) has been utilized to assess queues at the ramp intersections. Synchro is a macroscopic traffic software program that is based on the signalized and unsignalized intersection capacity analyses as specified in the HCM

TABLE 3-3: QUEUEING ANALYSIS FOR EXISTING (2023) CONDITIONS

ID	Intersection	Movement	Available Stacking Distance (Feet)	95th Percentile Queue Length (ft.)[1] AM	95th Percentile Queue Length (ft.)[1] PM	Acceptable?[1] AM	Acceptable?[1] PM
44	I-215 SB Ramps / Alessandro Bl.						
		SBL	530	60	90	Yes	Yes
		SBL/R	1,040	53	93	Yes	Yes
		SBR	530	50	86	Yes	Yes
45	I-215 NB Ramps / Alessandro Bl.						
		NBL	380	282 [2]	181	Yes	Yes
		NBL/R	1,300	296 [2]	184	Yes	Yes
		NBR	380	29	49	Yes	Yes
54	I-215 SB Ramps / Cactus Av.						
		NBR	1,900	NOM	95	Yes	Yes
		SBR	1,125	143	18	Yes	Yes
55	I-215 NB Ramps / Cactus Av.						
		NBL	130	424 [3]	91	**No** [3]	Yes
		NBT	1,700	305	141	Yes	Yes
		NBR	2,175	NOM	NOM	Yes	Yes
81	Nason St. / SR-60 WB Ramps						
		WBL	1,350	134	226 [2]	Yes	Yes
		WBT	1,690	15	26	Yes	Yes
		WBR	170	NOM	NOM	Yes	Yes
82	Nason St. / SR-60 EB Ramps						
		EBL	780	31	66	Yes	Yes
		EBT/R	1,260	171 [2]	101	Yes	Yes
		EBR	250	168 [2]	98	Yes	Yes
87	Redlands Bl. / SR-60 WB Ramps						
		WBL/T/R	1,250	NOM	32	Yes	Yes
88	Redlands Bl. / SR-60 EB Ramps						
		EBL/R	1,430	123	250 [2]	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided.
An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.
NOM = Nominal, less than 10 ft.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Although 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent lane has sufficient storage to accommodate any spillover without spilling back and affecting the Freeway mainline.

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4 PROJECTED FUTURE TRAFFIC

Exhibit 4-1 shows the Project land use plan and planning areas (PAs). This LOS analysis assumes the development of the following Project land uses:

- 7,500 multifamily low-rise residential dwelling units (DUs)
- 7,500 multifamily mid-rise residential DUs
- 4 acres of commercial (49,900 sq. ft.)
- 300-room hotel
- Up to three elementary schools (up to 3,995 students)
- One middle school/junior high school (2,049 students)
- 15 acres of Park and Lake Promenade
- 25 acres of Active Sports Park

The existing 2040 Moreno Valley General Plan Update land use designation and zoning for the Project site is Downtown Center (DC).

Horizon Year 2045 is evaluated in the LOS analysis with full buildout of the Project.

4.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic that is attracted and produced by a development based upon the Project land use types and quantities.

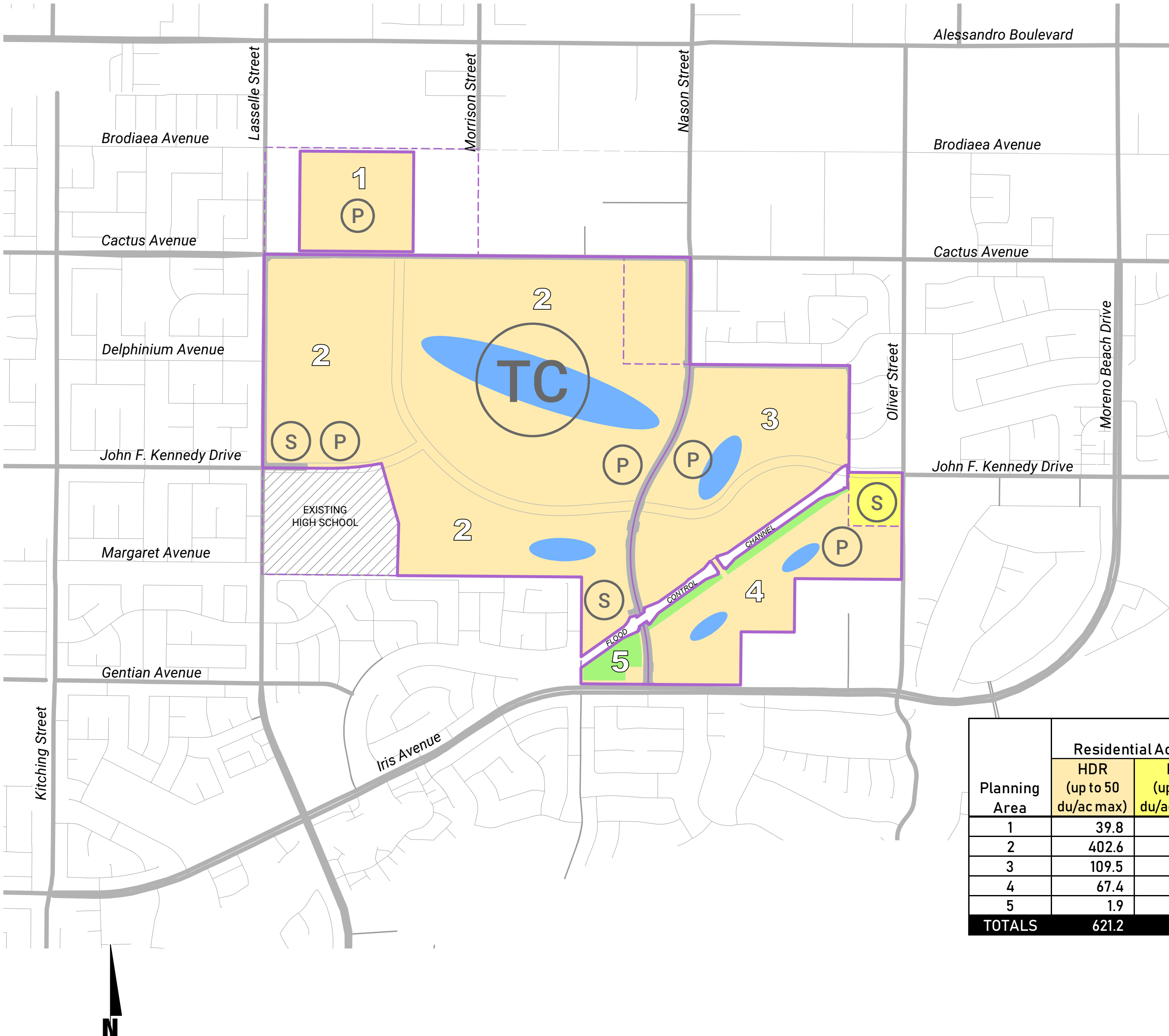
In order to estimate the traffic characteristics of the proposed project, trip-generation statistics published in the Institute of Transportation Engineers (ITE) Trip Generation (11th Edition, 2021) (6) manual are used where available. For active local parks with sports fields, SANDAG trip rates are used because the ITE public park trip rates do not fully represent the potential trips associated with sports activities.

Trip generation represents the amount of traffic that is attracted and produced by a development and is based upon the specific land uses planned for a given project. In order to estimate the traffic characteristics of the proposed project, trip-generation statistics published in the Institute of Transportation Engineers (ITE) Trip Generation (11th Edition, 2021) manual are used where available. For active local parks with sports fields, SANDAG trip rates are used because the ITE public park trip rates do not fully represent the potential trips associated with sports activities.

Residential developments with supporting local retail and park uses do not generate measurable activity involving large trucks on a daily basis, particularly during peak commute periods. Delivery of goods to homes typically involves light- and medium-duty trucks, which maneuver in a similar manner to standard automobiles.

Table 4-1 presents the trip generation rates and the resulting trip generation summary for the proposed Project. As shown in Table 4-1, the Project is anticipated to generate a total of 76,414 external vehicle trips per day with 6,436 AM peak hour trips and 6,115 PM peak hour trips.

EXHIBIT 4-1: LAND USE PLAN



SUMMARY TABLE

Planning Area	Residential Acres: HDR (up to 50 du/ac max)	Residential Acres: R5 (up to 5 du/ac max)	Dwelling Units* (all units 100 % transferable): HDR (up to 50 du/ac max)	Dwelling Units* (all units 100 % transferable): R5 (up to 5 du/ac max)	Existing Open Space	Existing Roads	Total Project Acres
1	39.8		2,000				39.8
2	402.6		12,000			15.5	418.1
3	109.5		5,500			6.8	116.3
4	67.4	10.0	3,750	50	6.9	1.0	85.3
5	1.9		100		6.2	1.0	9.1
TOTALS	621.2	10.0	15,000 max		13.1	24.3	668.6

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TABLE 4-1: PROJECT BUILDOUT TRIP GENERATION SUMMARY

Trip Generation Rates[1]

Land Use	ITE LU Code	Quantity[2]		AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Multifamily Housing (Low-Rise)	220	7,500	DU	0.096	0.304	0.400	0.321	0.189	0.510	6.74
Multifamily Housing (Mid-Rise)	221	7,500	DU	0.085	0.285	0.370	0.238	0.152	0.390	4.54
Shopping Center (40-150k) - Supermarket - No	821	49.9	TSF	1.07	0.66	1.73	2.54	2.65	5.19	67.52
Hotel	310	300	RM	0.26	0.20	0.46	0.30	0.29	0.59	7.99
Elementary School	520	3,995	STU	0.40	0.34	0.74	0.07	0.09	0.16	2.27
Middle School/Junior H.S.	522	2,049	STU	0.36	0.31	0.67	0.07	0.08	0.15	2.10
Park & Lake Promenade	411	15	AC	0.01	0.01	0.02	0.06	0.05	0.11	0.78
Active Park[3]	--	25	AC	0.64	0.64	1.28	3.50	3.50	7.00	50.00

Trip Generation Results

Planning Area (PA)	Land Use	ITE LU Code	Quantity[2]		AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
1	Multifamily Housing (Low-Rise)	220	1,000	DU	96	304	400	321	189	510	6,740
	Multifamily Housing (Mid-Rise)	221	200	DU	17	57	74	48	30	78	908
	Active Park	975	5	AC	3	3	6	18	18	36	250
	Internal PA 1 interaction (Residential with Park)				*(3)*	*(3)*	*(6)*	*(18)*	*(18)*	*(36)*	*(250)*
	Internal PA 1 interaction (Park with Residential)				*(3)*	*(3)*	*(6)*	*(18)*	*(18)*	*(36)*	*(250)*
	PA 1 Interaction with Commercial - PA 2				*(1)*	*(2)*	*(3)*	*(4)*	*(3)*	*(7)*	*(103)*
	PA 1 Interaction with Schools - PA 2				*(52)*	*(61)*	*(113)*	*(11)*	*(10)*	*(21)*	*(311)*
	Interaction within/between Project PAs				*(59)*	*(69)*	*(128)*	*(51)*	*(49)*	*(100)*	*(914)*
	Planning Area 1 Subtotal External Trips Without TDM Reductions				57	295	352	336	188	524	6,984
	PA 3 Residential TDM Reductions[4]				*(5)*	*(16)*	*(21)*	*(19)*	*(12)*	*(31)*	*(388)*
	PA 3 Project Generated TDM Reductions[6]				*(1)*	*(4)*	*(5)*	*(5)*	*(3)*	*(8)*	*(94)*
	Planning Area 1 Subtotal External Trips With TDM Reductions				**51**	**275**	**326**	**312**	**173**	**485**	**6,502**
2	Multifamily Housing (Low-Rise)	220	4,000	DU	384	1,216	1,600	1,286	755	2,041	26,960
	Multifamily Housing (Mid-Rise)	221	6,000	DU	510	1,710	2,220	1,427	913	2,340	27,240
	Shopping Center (40-150k) -	821	49.9	TSF	53	33	86	127	132	259	3,369
	Hotel	310	300	RM	77	61	138	90	87	177	2,397
	Elementary School	520	2,664	STU	1,065	907	1,972	196	230	426	6,048
	Middle School/Junior H.S.	522	2,049	STU	741	632	1,373	147	160	307	4,303
	Park & Lake Promenade	411	13	AC	0	0	0	1	1	2	10
	Active Park	975	10	AC	5	5	10	34	34	68	500
	Internal PA 2 interaction (Residential with Park)				*(5)*	*(5)*	*(10)*	*(35)*	*(35)*	*(70)*	*(510)*
	Internal PA 2 interaction (Residential with School)				*(460)*	*(533)*	*(993)*	*(234)*	*(179)*	*(413)*	*(6,121)*
	Internal PA 2 interaction (Residential with Commercial)				*(10)*	*(16)*	*(26)*	*(47)*	*(45)*	*(92)*	*(1,345)*
	Internal PA 2 interaction (Park with Residential)				*(5)*	*(5)*	*(10)*	*(35)*	*(35)*	*(70)*	*(510)*
	Internal PA 2 interaction (School with Residential)				*(533)*	*(460)*	*(993)*	*(179)*	*(234)*	*(413)*	*(6,121)*
	Internal PA 2 interaction (Commercial with Residential)				*(16)*	*(10)*	*(26)*	*(45)*	*(47)*	*(92)*	*(1,345)*
	Internal PA 2 interaction (Commercial with School)				*(1)*	*(1)*	*(2)*	*(3)*	*(3)*	*(6)*	*(88)*
	Internal PA 2 interaction (School with Commercial)				*(1)*	*(1)*	*(2)*	*(3)*	*(3)*	*(6)*	*(88)*
	PA 2 School / Park Interaction with PA 1, 3, 4, 5 Residential				*(253)*	*(215)*	*(468)*	*(41)*	*(47)*	*(88)*	*(1,304)*
	PA 2 Commercial Interaction with PA 1, 3, 4, 5 Residential				*(7)*	*(4)*	*(11)*	*(14)*	*(15)*	*(29)*	*(423)*
	PA 2 Commercial Interaction with PA 4 School				*(1)*	*(2)*	*(3)*	*(3)*	*(3)*	*(6)*	*(88)*
	Interaction within/between Project PAs				*(1,292)*	*(1,252)*	*(2,544)*	*(639)*	*(646)*	*(1,285)*	*(17,943)*
	Planning Area 2 Subtotal External Trips Without TDM Reductions				1,543	3,312	4,855	2,669	1,666	4,335	52,884
	PA 3 Residential TDM Reductions[4]				*(39)*	*(133)*	*(172)*	*(161)*	*(99)*	*(260)*	*(3,235)*
	PA 3 Project On-Site Employee TDM Reductions[5]				*(7)*	*(4)*	*(11)*	*(1)*	*(3)*	*(4)*	*(43)*
	PA 3 Project Generated TDM Reductions[6]				*(22)*	*(47)*	*(69)*	*(35)*	*(22)*	*(57)*	*(716)*
	Planning Area 2 Subtotal External Trips With TDM Reductions				**1,475**	**3,128**	**4,603**	**2,472**	**1,542**	**4,014**	**48,890**

TABLE 4-1: PROJECT BUILDOUT TRIP GENERATION SUMMARY

Trip Generation Rates[1]

Land Use	ITE LU Code	Quantity[2]		AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Multifamily Housing (Low-Rise)	220	7,500	DU	0.096	0.304	0.400	0.321	0.189	0.510	6.74
Multifamily Housing (Mid-Rise)	221	7,500	DU	0.085	0.285	0.370	0.238	0.152	0.390	4.54
Shopping Center (40-150k) - Supermarket - No	821	49.9	TSF	1.07	0.66	1.73	2.54	2.65	5.19	67.52
Hotel	310	300	RM	0.26	0.20	0.46	0.30	0.29	0.59	7.99
Elementary School	520	3,995	STU	0.40	0.34	0.74	0.07	0.09	0.16	2.27
Middle School/Junior H.S.	522	2,049	STU	0.36	0.31	0.67	0.07	0.08	0.15	2.10
Park & Lake Promenade	411	15	AC	0.01	0.01	0.02	0.06	0.05	0.11	0.78
Active Park[3]	--	25	AC	0.64	0.64	1.28	3.50	3.50	7.00	50.00

Trip Generation Results

Planning Area (PA)	Land Use	ITE LU Code	Quantity[2]		AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
3	Multifamily Housing (Low-Rise)	220	1,500	DU	144	456	600	482	283	765	10,110
	Multifamily Housing (Mid-Rise)	221	900	DU	77	256	333	214	137	351	4,086
	Park & Lake Promenade	411	2	AC	0	0	0	0	0	0	2
	Active Park	975	5	AC	3	3	6	18	18	36	250
	Internal PA 3 interaction (Residential with Park)				*(3)*	*(3)*	*(6)*	*(18)*	*(18)*	*(36)*	*(252)*
	Internal PA 3 interaction (Park with Residential)				*(3)*	*(3)*	*(6)*	*(18)*	*(18)*	*(36)*	*(252)*
	PA 3 Interaction with Commercial - PA 2				*(1)*	*(2)*	*(3)*	*(6)*	*(6)*	*(12)*	*(175)*
	PA 3 Interaction with Schools - PA 2, 4				*(148)*	*(174)*	*(322)*	*(34)*	*(29)*	*(63)*	*(936)*
	Interaction within/between Project PAs				*(155)*	*(182)*	*(337)*	*(76)*	*(71)*	*(147)*	*(1,615)*
	Planning Area 3 Subtotal External Trips Without TDM Reductions				69	533	602	638	367	1,005	12,833
	PA 3 Residential TDM Reductions [4]				*(10)*	*(32)*	*(42)*	*(39)*	*(24)*	*(63)*	*(776)*
	PA 3 Project Generated TDM Reductions [6]				*(1)*	*(7)*	*(8)*	*(9)*	*(5)*	*(14)*	*(174)*
	Planning Area 3 Subtotal External Trips With TDM Reductions				**58**	**494**	**552**	**590**	**338**	**928**	**11,883**
4	Multifamily Housing (Low-Rise)	220	950	DU	91	289	380	305	179	484	6,403
	Multifamily Housing (Mid-Rise)	221	400	DU	34	114	148	95	61	156	1,816
	Elementary School	520	1,331	STU	531	453	984	98	115	213	3,021
	Active Park	975	5	AC	3	3	6	18	18	36	250
	Internal PA 4 interaction (Residential with Park)				*(3)*	*(3)*	*(6)*	*(18)*	*(18)*	*(36)*	*(250)*
	Internal PA 4 interaction (Residential with School)				*(68)*	*(80)*	*(148)*	*(12)*	*(10)*	*(22)*	*(328)*
	Internal PA 4 interaction (Park with Residential)				*(3)*	*(3)*	*(6)*	*(18)*	*(18)*	*(36)*	*(250)*
	Internal PA 4 interaction (School with Residential)				*(80)*	*(68)*	*(148)*	*(10)*	*(12)*	*(22)*	*(328)*
	PA 4 School / Park Interaction with PA 3 & 5 Residential				*(53)*	*(45)*	*(98)*	*(10)*	*(12)*	*(22)*	*(328)*
	PA 4 Residential Interaction with Commercial - PA 2				*(1)*	*(2)*	*(3)*	*(4)*	*(4)*	*(8)*	*(116)*
	PA 4 School Interaction with PA2 Commercial				*(2)*	*(1)*	*(3)*	*(3)*	*(3)*	*(6)*	*(88)*
	PA 4 Residential Interaction with Middle School - PA 2				*(58)*	*(68)*	*(126)*	*(13)*	*(11)*	*(24)*	*(351)*
	Interaction within/between Project PAs				*(268)*	*(270)*	*(538)*	*(88)*	*(88)*	*(176)*	*(2,039)*
	Planning Area 4 Subtotal External Trips Without TDM Reductions				391	589	980	428	285	713	9,451
	PA 4 Residential TDM Reductions [4]				*(6)*	*(18)*	*(24)*	*(22)*	*(13)*	*(35)*	*(437)*
	PA 4 Project Generated TDM Reductions [6]				*(5)*	*(8)*	*(13)*	*(6)*	*(4)*	*(10)*	*(128)*
	Planning Area 4 Subtotal External Trips With TDM Reductions				**380**	**563**	**943**	**400**	**268**	**668**	**8,886**
5	Multifamily Housing (Low-Rise)	220	50	DU	5	15	20	16	9	25	337
	PA 5 Interaction with Commercial - PA 2				*(1)*	*(1)*	*(2)*	*(1)*	*(1)*	*(2)*	*(29)*
	PA 5 Interaction with Schools - PA 2 & 4				*(2)*	*(3)*	*(5)*	*(1)*	*(1)*	*(2)*	*(35)*
	Interaction within/between Project PAs				*(3)*	*(4)*	*(7)*	*(2)*	*(2)*	*(4)*	*(64)*
	Planning Area 5 Subtotal External Trips Without TDM Reductions				2	11	13	14	7	21	273
	PA 5 Residential TDM Reductions [4]				*0*	*(1)*	*(1)*	*(1)*	*0*	*(1)*	*(16)*
	PA 5 Project Generated TDM Reductions [6]				*0*	*0*	*0*	*0*	*0*	*0*	*(4)*
	Planning Area 5 Subtotal External Trips With TDM Reductions				**2**	**10**	**12**	**13**	**7**	**20**	**253**
Total Project Trip Ends					3,839	6,517	10,356	4,941	3,369	8,310	105,000
Total Interaction Within/Between PAs					(1,777)	(1,777)	(3,554)	(856)	(856)	(1,712)	(22,575)
Total TDM Reductions[4,5,6]					(96)	(270)	(366)	(298)	(185)	(483)	(6,011)
TOTAL PROJECT BUILDOUT EXTERNAL TRIPS					**1,966**	**4,470**	**6,436**	**3,787**	**2,328**	**6,115**	**76,414**

1 Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 11th Edition (2021).

2 DU = Dwelling Units; RM = Rooms; TSF = Thousand Square Feet; AC = Acres; STU = Students

3 Since ITE does not have trip rates for the type of active park anticipated in Aquabella, the daily SANDAG park rates are utilized in combination with ITE peak hour relationship between peak hour and daily trips.

4 Community-based travel planning, unbundle residential parking costs, per Fehr & Peers Aquabella Master Plan Development Project Trip Generation Memo 05162023.pdf

5 CTR program marketing, rideshare program, end-of-trip bicycle facilities, discounted transit for work trips, per Fehr & Peers Aquabella Master Plan Development Project Trip Generation Memo 05162023.pdf

6 Non-electric bike share and scootershare programs, transit network improvements, per Fehr & Peers Aquabella Master Plan Development Project Trip Generation Memo 05162023.pdf

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Table 4-1 includes specific Internal interaction patterns that are applied to the trip generation estimates for individual land uses to account for trips within / between Project planning areas. In other words, trips will be made between residential and non-residential uses on-site, and between homes and the town center and park / school uses. These on-site trips can be made either by walking, bicycling, electric scooters, or automobiles using internal roadways without using external streets.

Internal trips between commercial retail, residential, park, school, and hotel land uses are manually added back to the internal routes between planning areas to adequately assess the peak hour operations at key Project intersections.

Trip generation adjustments shown on Table 4-1 are based on the Aquabella Master Plan Development Project Trip Generation Assessment (Fehr & Peers, June 6, 2023) (7). Fehr & Peers used the Environmental Protection Agency's (EPA's) MXD (mixed-used development) methodology to estimate the project's internal capture. The MXD model is more refined than the ITE methodology for the study area because it accounts for various attributes, such as density of the site, distance to transit, density of intersections, employment, household size, and variables that reduce vehicle trip-making behavior. The Aquabella Master Plan Development Project Trip Generation Assessment also presents Travel Demand Management (TDM) reductions, which reduce trips for various components of the Project.

The Horizon Year (2045) Without Project (Approved SP) scenario includes the approval which generated a total of 18,469 external vehicle trips per day with 925 AM peak hour trips and 1,327 PM peak hour trips. A comparison of the Aquabella Project trip generation to the Currently Approved Specific Plan is shown below.

In comparison to the Approved SP, the Project is anticipated to generate a total of 57,945 additional external vehicle trips per day with 5,511 additional AM peak hour trips and 4,788 additional PM peak hour trips.

Comparison of External Trip Generation (Approved vs Proposed)

	AM Peak Hour			PM Peak Hour			
Aquabella Project Land Use	In	Out	Total	In	Out	Total	Daily
Approved SP	377	548	925	744	583	1,327	18,469
Proposed SPA	1,966	4,470	6,439	3,787	2,328	6,115	76,414
Delta	1,589	3,922	5,511	3,043	1,745	4,788	57,945

4.2 PROJECT TRIP DISTRIBUTION

The Project trip distribution and assignment process represents the directional orientation of traffic to and from the Project site. The trip distribution pattern is heavily influenced by the geographical location of the site in the center of Moreno Valley and its proximity to the World Logistics Center (WLC). Aquabella is intended to provide housing for WLC workers.

For the Horizon Year (2045) scenario with employment in the WLC consistent with buildout of the WLC, it is anticipated that approximately 25% of the 22,653 WLC area employees will live at Aquabella.

This correlates to approximately 13% of Aquabella residents working at WLC, resulting in about 9% of the Project external traffic interacting with WLC on weekdays.

The Project trip distribution patterns were developed from the Riverside County Model (RIVCOM) in a collaborative effort with Fehr & Peers, Inc.

For the Horizon Year (2045) With Project, Exhibit 4-2 illustrates the external trip distribution patterns near the Project site, whereas Exhibits 4-3 and 4-4 illustrate the trip distribution patterns for the extended study area.

4.3 MODAL SPLIT

Trip generation adjustments shown on Table 4-1 are based on the Aquabella Master Plan Development Project Trip Generation Assessment (Fehr & Peers, June 6, 2023). Fehr & Peers used the Environmental Protection Agency's (EPA's) MXD (mixed-used development) methodology to estimate the project's internal capture. This methodology is more robust than the ITE methodology as it takes into account the Project's mix of uses, regional location, demographics, and development scale that contribute to a reduction in off-site average weekday vehicle trips.

The MXD model is more refined for the study area because it accounts for various attributes, such as density of the site, distance to transit, density of intersections, employment, household size, and variables that reduce vehicle trip-making behavior.

The Aquabella Master Plan Development Project Trip Generation Assessment also presents Travel Demand Management (TDM) reductions, which reduce trips for various components of the Project as follows:

Residential Trip Reduction Measures:
- Community-Based Travel Planning
- Unbundle Residential Parking Costs from Property Costs

Employee Commute Trip Reduction Measures:
- Commute Trip Reduction (CTR) Program Marketing
- Rideshare Program
- End-of-Trip Bicycle Facilities
- Discounted Transit Program for Work Trips

Project-Generated Trip Reduction Measures:
- Micromobility on-site and connecting to adjacent uses, such as schools and medical centers:
  - Non-Electric Bikeshare Program
  - Electric Scootershare Program

Transit Network Improvements:
- Extend Transit Network Coverage to existing and future employment centers, such as World Logistics Center
  - Extend Transit Hours for All Shift Times, such as the midnight shift change at World Logistics Center
  - Increase Transit Service Frequency
  - Bus Rapid Transit (BRT) along Alessandro Boulevard
  - A state-of-the-art mobility hub is proposed on-site to bolster the effectiveness of active transportation options.

EXHIBIT 4-2: PROJECT EXTERNAL TRIP DISTRIBUTION, FOCUS STUDY AREA

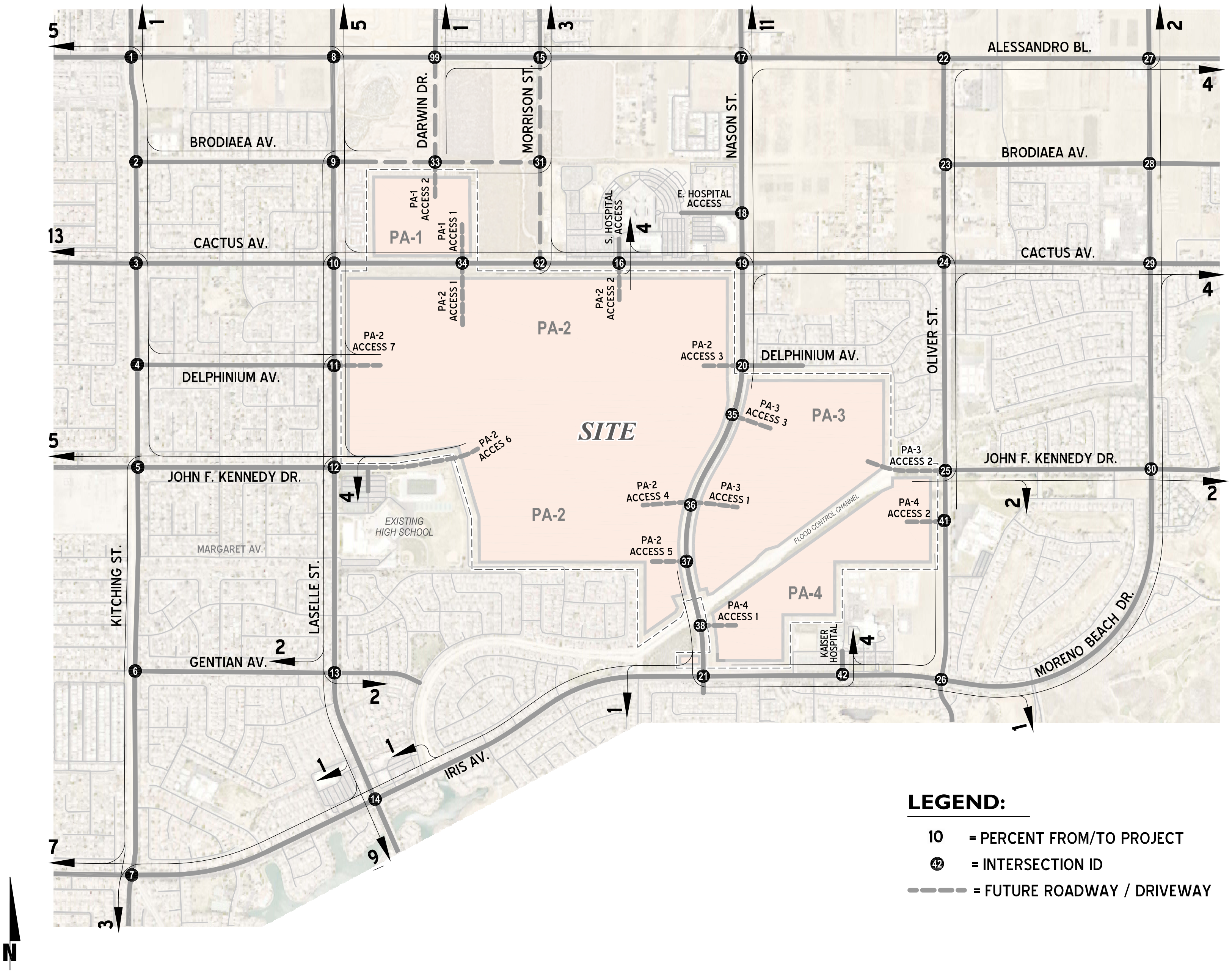


EXHIBIT 4-3: PROJECT EXTERNAL TRIP DISTRIBUTION, EXTENDED WESTERLY STUDY AREA

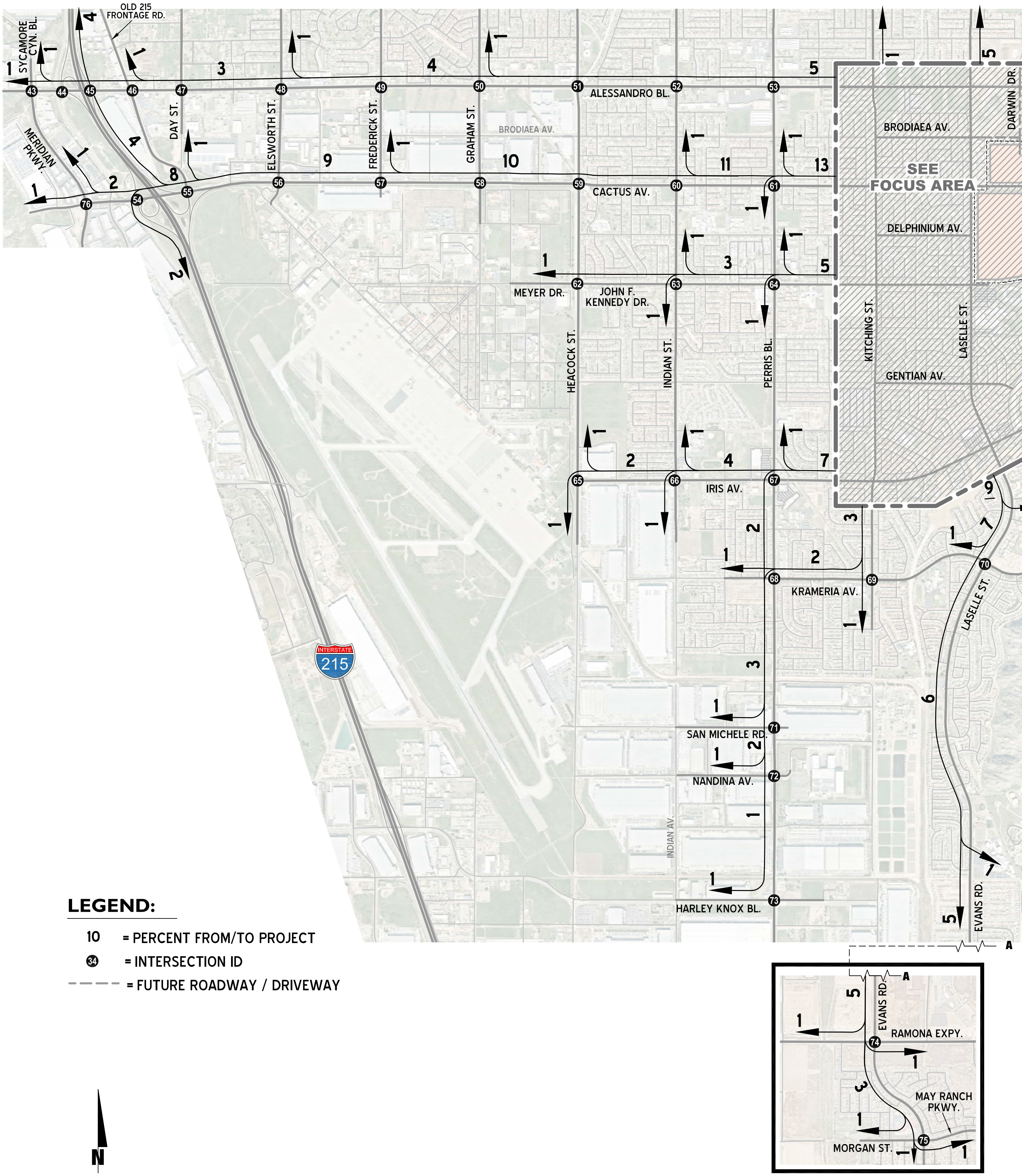
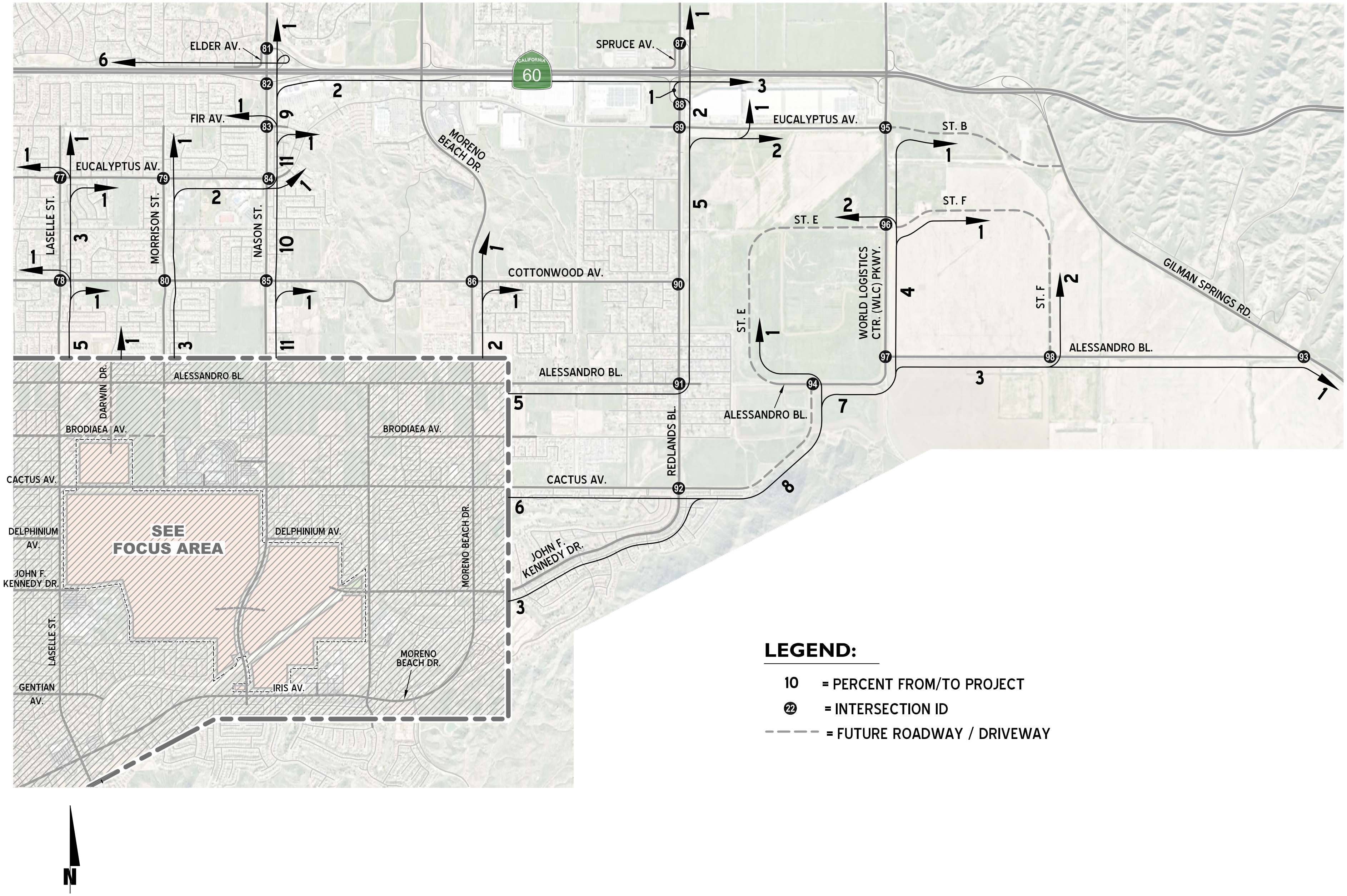


EXHIBIT 4-4: PROJECT EXTERNAL TRIP DISTRIBUTION, EXTENDED EASTERLY STUDY AREA



4.6 PROJECT TRIP ASSIGNMENT

The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project.

Exhibits 4-5 to 4-7 present the Project **AM** peak hour intersection volumes for Horizon Year (2045). Focus area intersection volumes are shown on Exhibit 4-5. Westerly and easterly study area volumes are provided on Exhibits 4-6 and 4-7, respectively.

Exhibits 4-8 to 4-10 present the Project **PM** peak hour intersection volumes for the Horizon Year (2045). Focus area intersection volumes are shown on Exhibit 4-8. Westerly and easterly study area volumes are provided on Exhibits 4-9 and 4-10, respectively.

Exhibits 4-11 to 4-13 present the Project **daily** roadway segment volumes for the Horizon Year (2045). Focus area daily volumes are shown on Exhibit 4-10. Westerly and easterly study area daily volumes are provided on Exhibits 4-12 and 4-13, respectively.

EXHIBIT 4-5: FOCUS STUDY AREA
PROJECT ONLY AM PEAK HOUR INTERSECTION VOLUMES

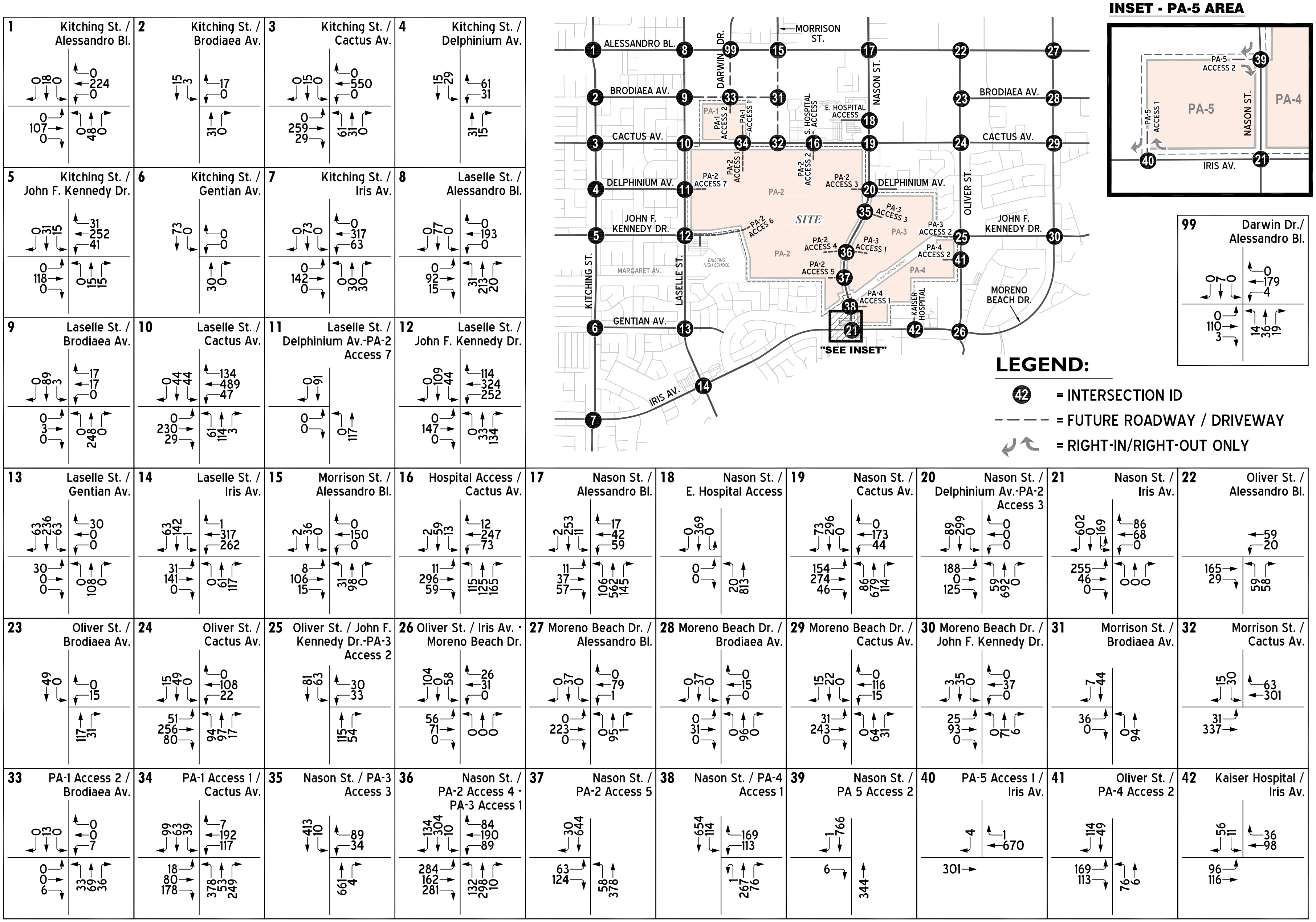


EXHIBIT 4-6: EXTENDED WESTERLY STUDY AREA
PROJECT ONLY AM PEAK HOUR INTERSECTION VOLUMES

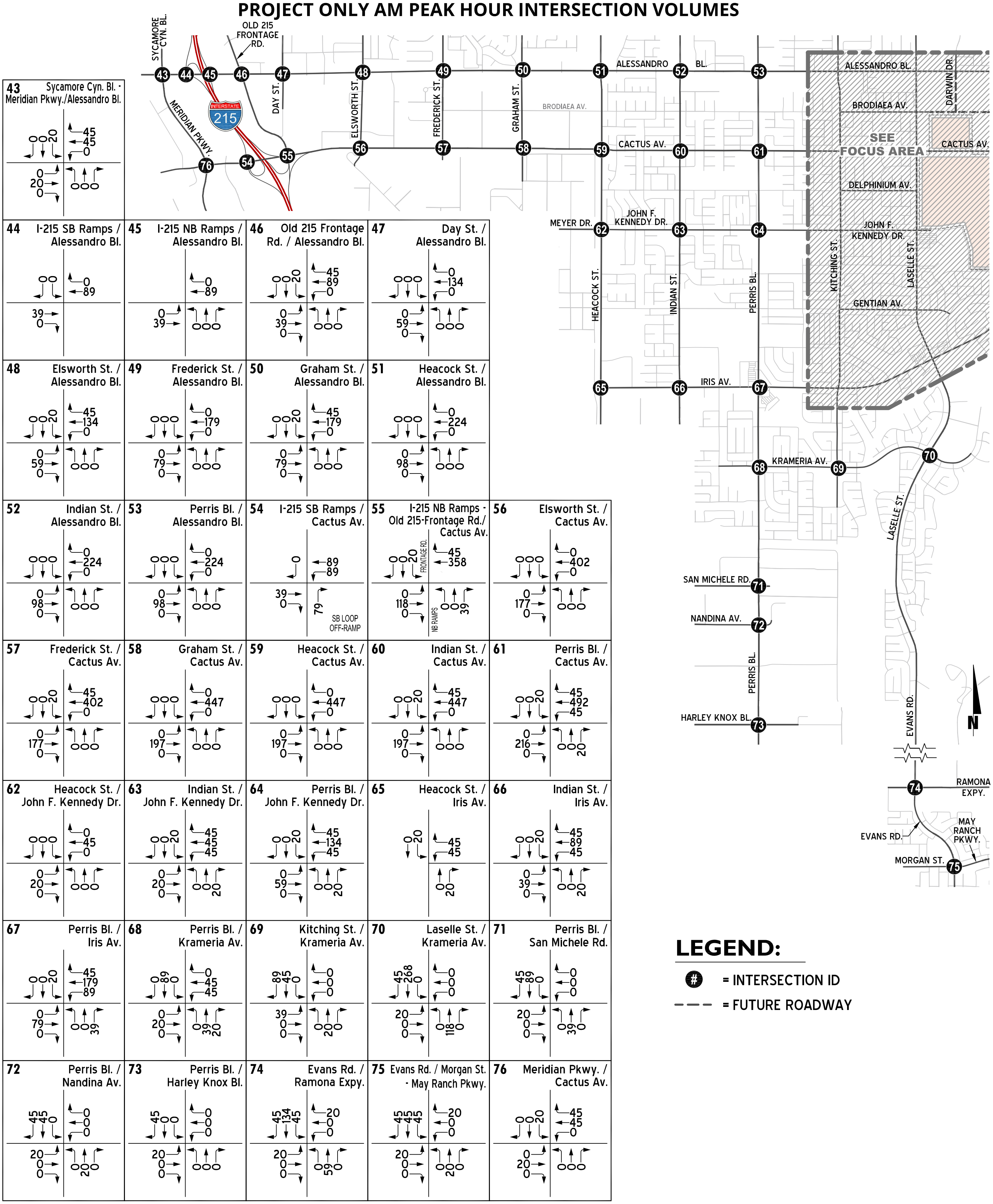


EXHIBIT 4-7: EXTENDED EASTERLY STUDY AREA
PROJECT ONLY AM PEAK HOUR INTERSECTION VOLUMES

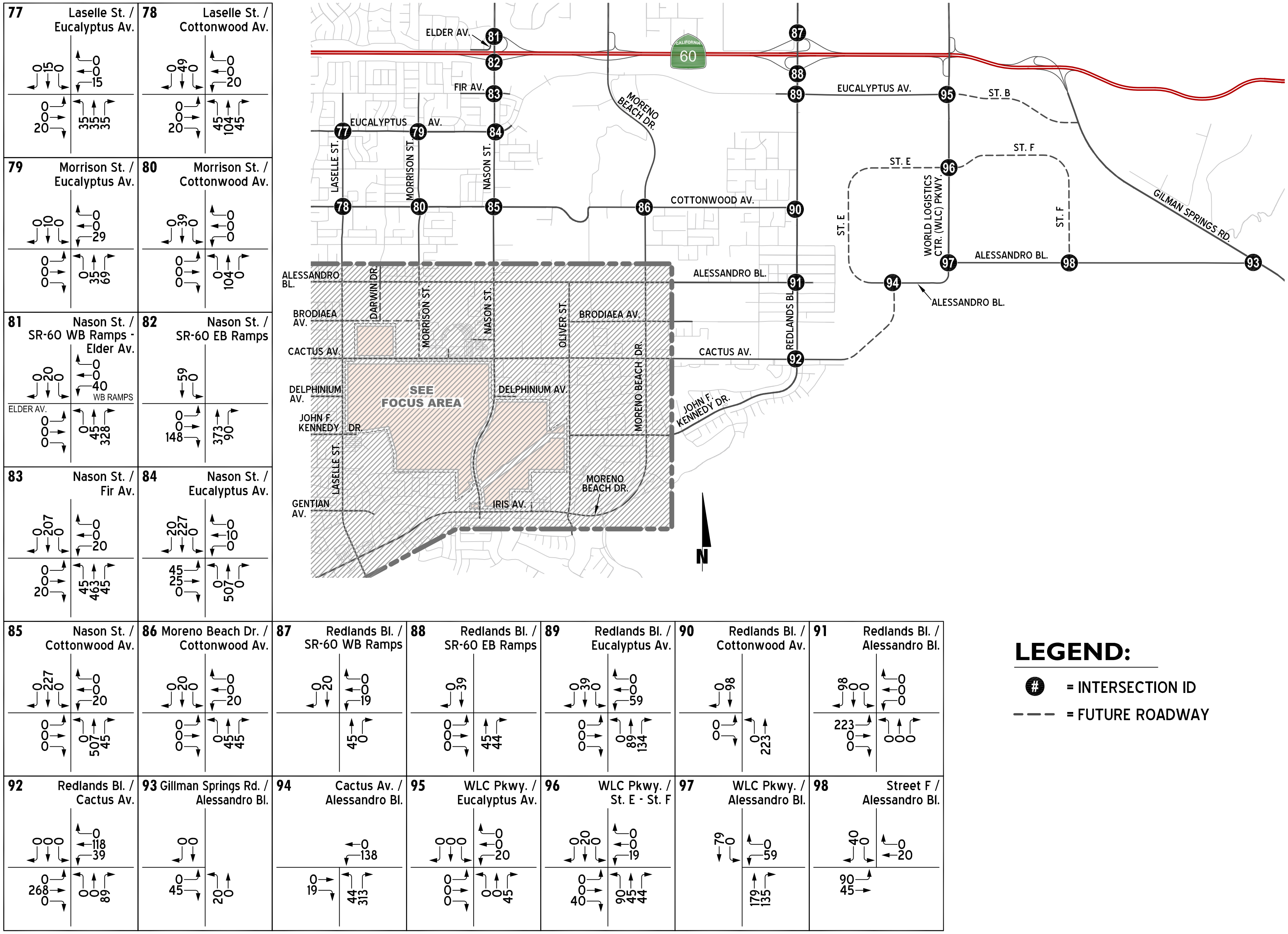


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EXHIBIT 4-8: FOCUS STUDY AREA
PROJECT ONLY PM PEAK HOUR INTERSECTION VOLUMES

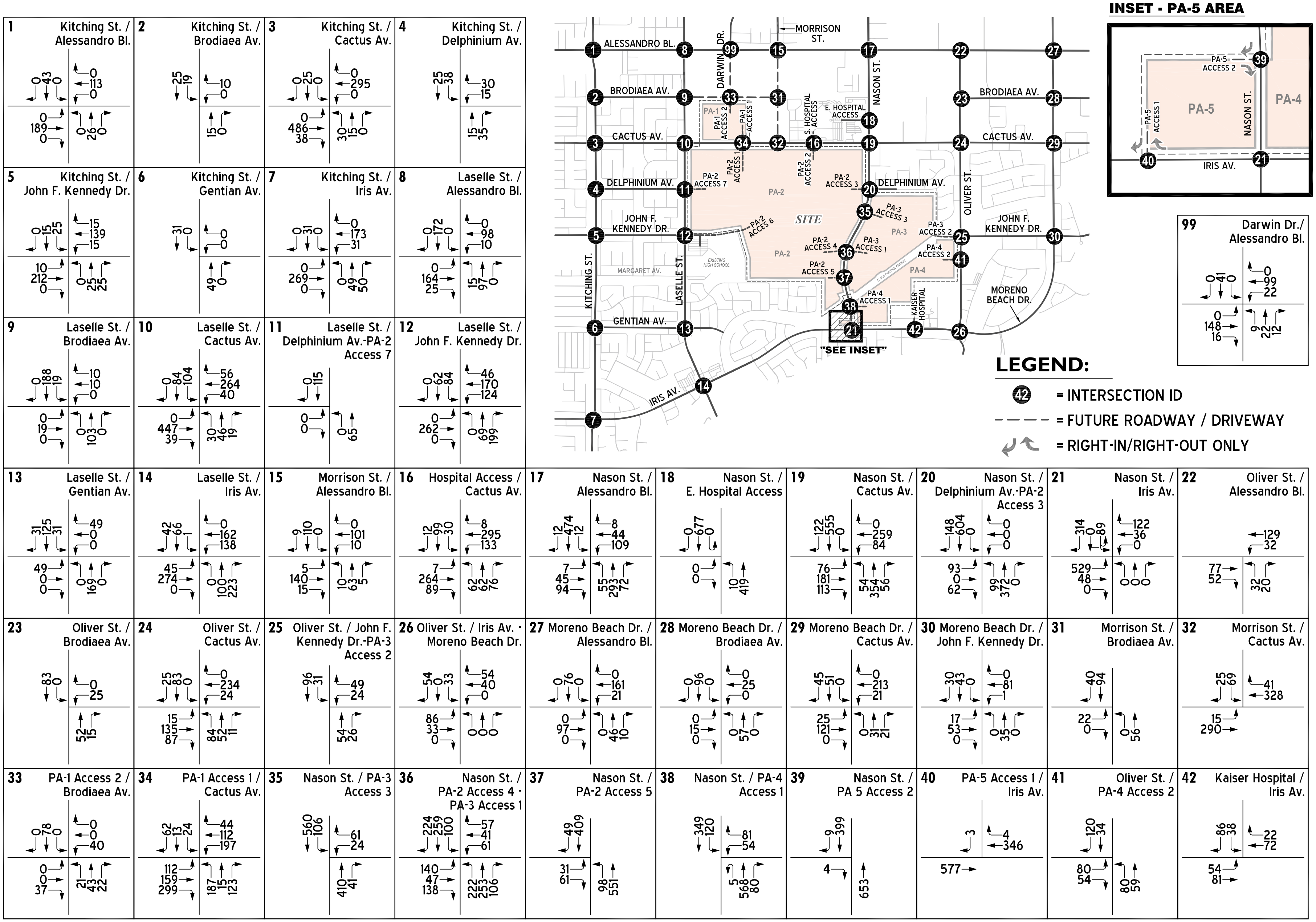


EXHIBIT 4-9: EXTENDED WESTERLY STUDY AREA
PROJECT ONLY PM PEAK HOUR INTERSECTION VOLUMES

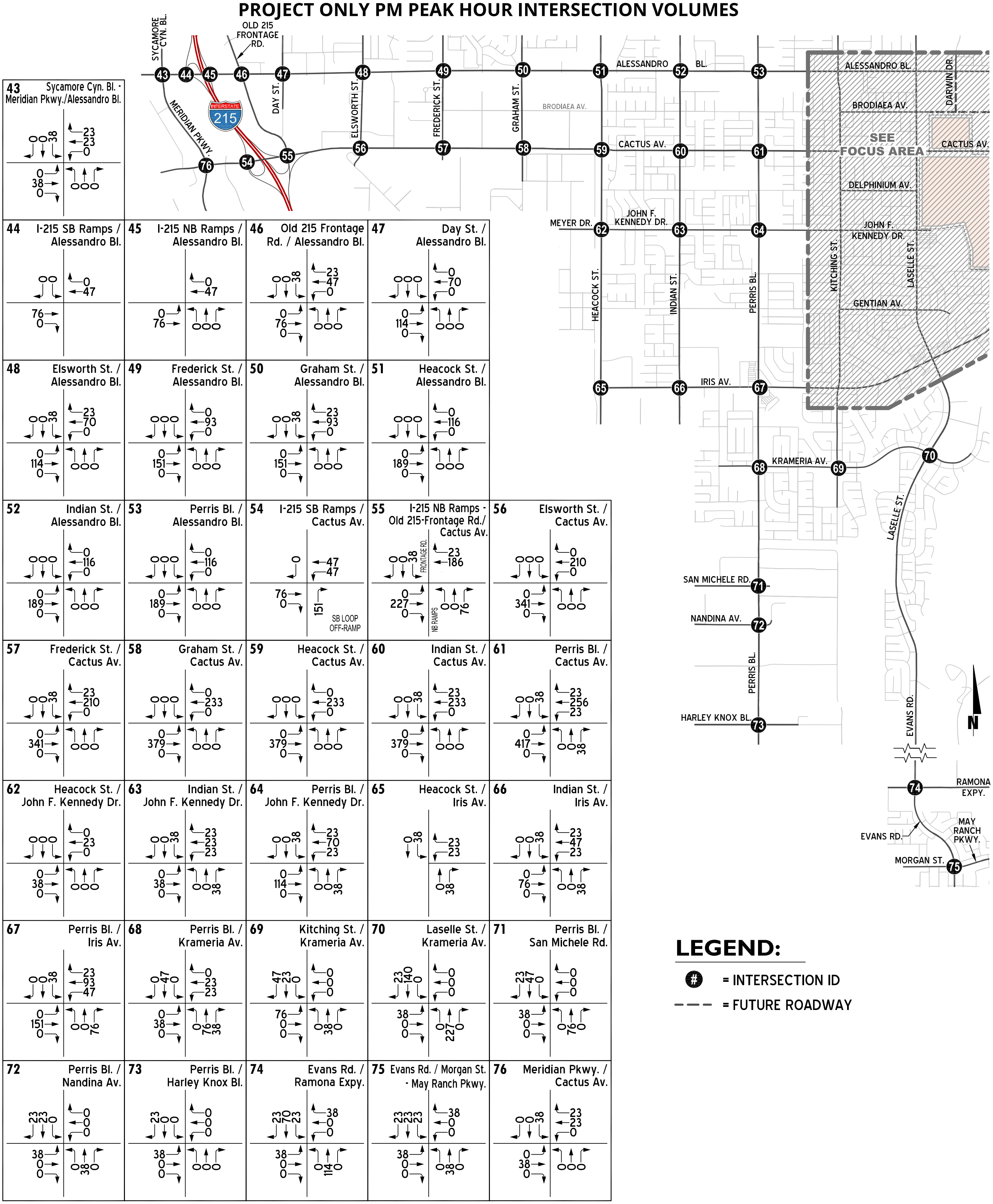
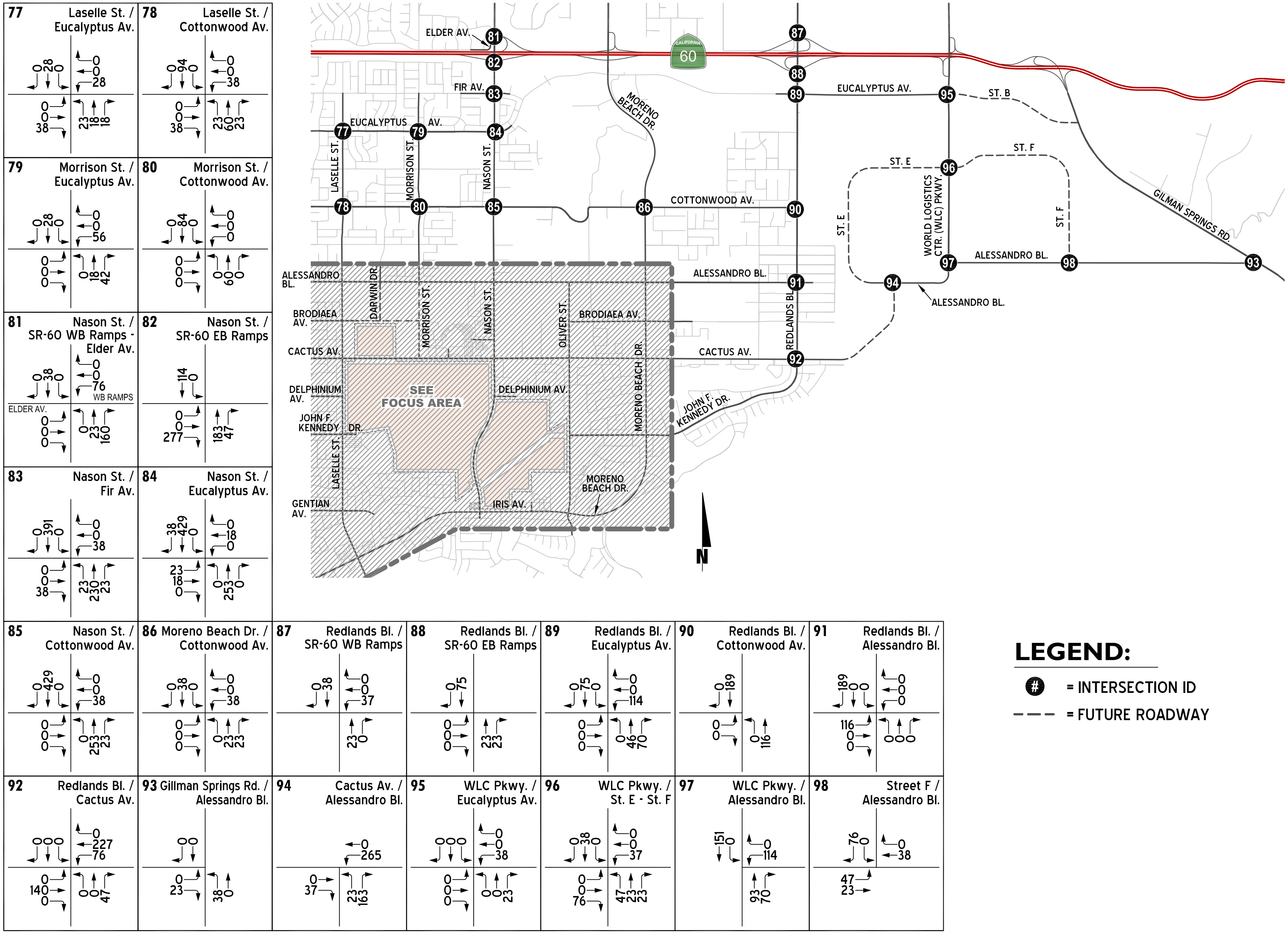


EXHIBIT 4-10: EXTENDED EASTERLY STUDY AREA
PROJECT ONLY PM PEAK HOUR INTERSECTION VOLUMES



LEGEND:

- # = INTERSECTION ID
- - - - = FUTURE ROADWAY

EXHIBIT 4-11: FOCUS STUDY AREA
PROJECT ONLY AVERAGE DAILY TRAFFIC (ADT)

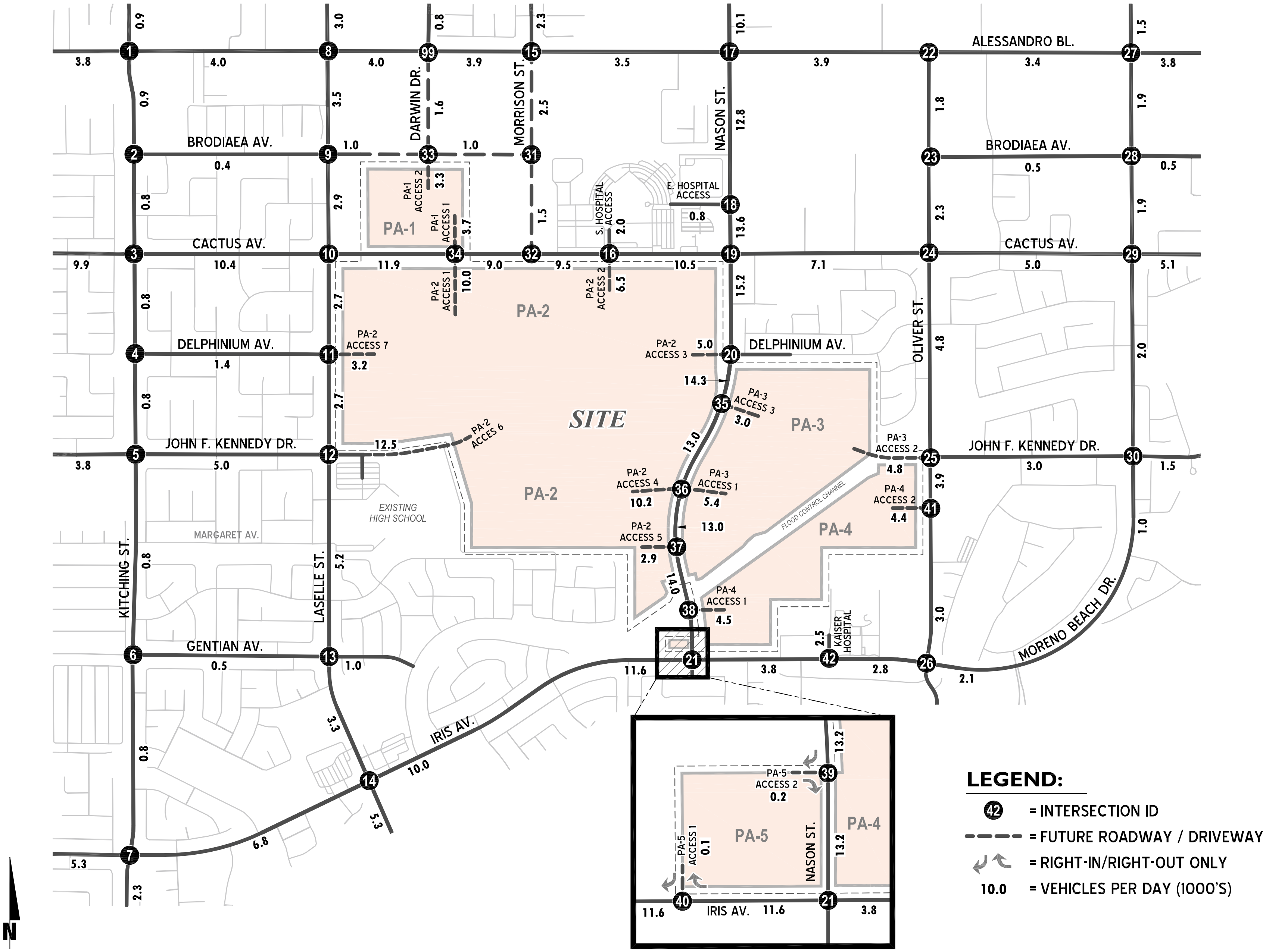


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EXHIBIT 4-12: EXTENDED WESTERLY STUDY AREA PROJECT ONLY AVERAGE DAILY TRAFFIC (ADT)

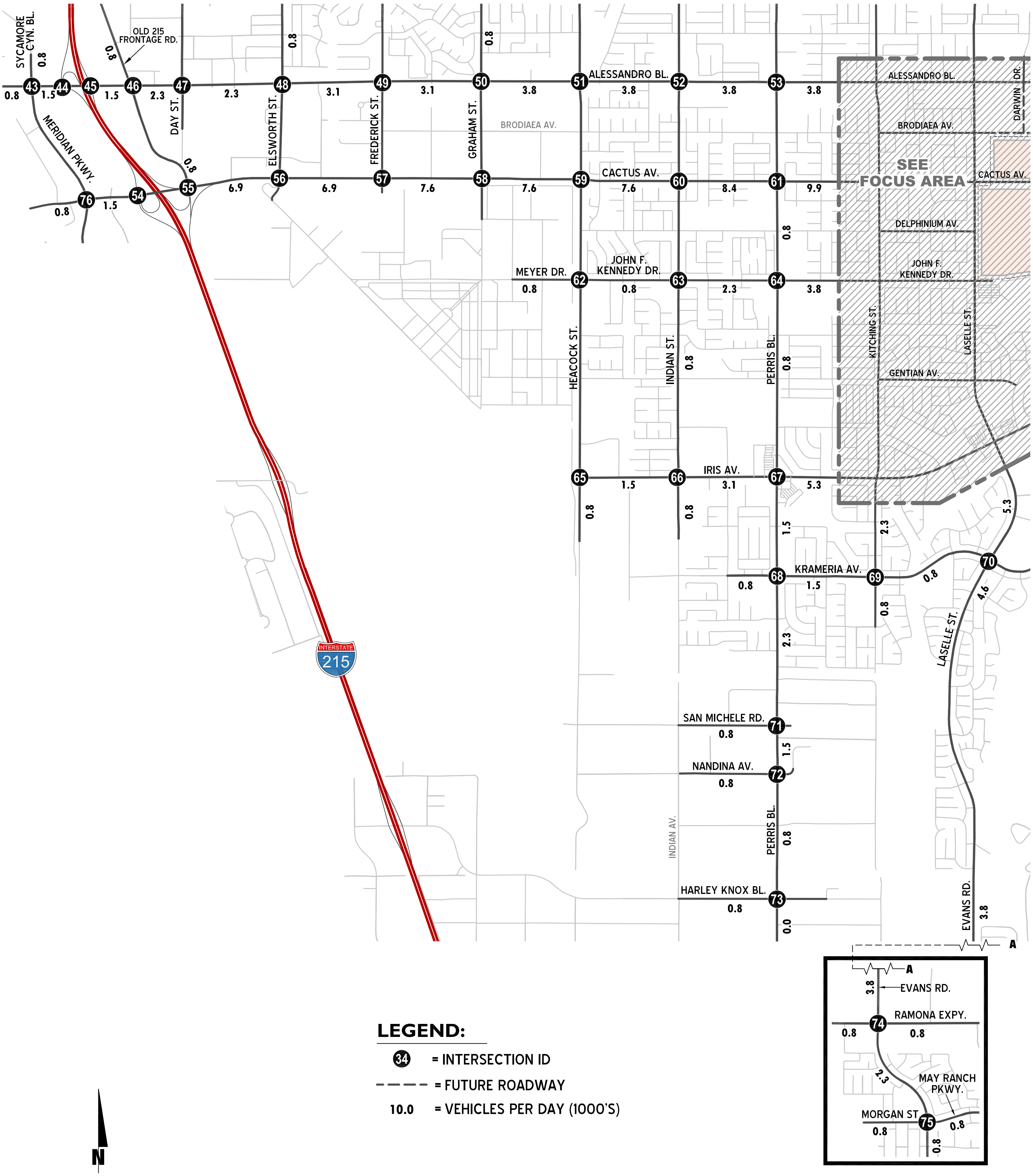
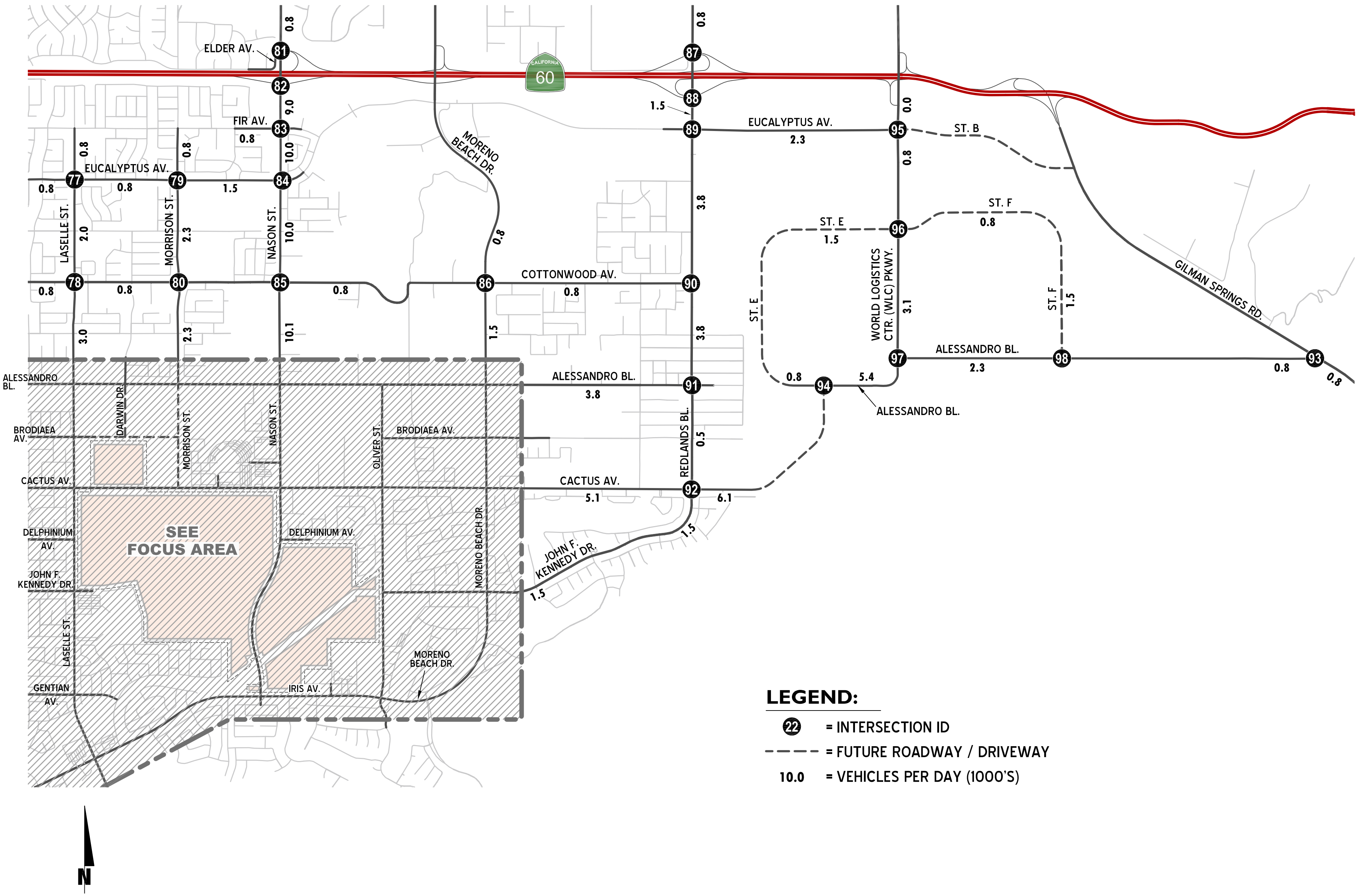


EXHIBIT 4-13: EXTENDED EASTERLY STUDY AREA PROJECT ONLY AVERAGE DAILY TRAFFIC (ADT)



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5 HORIZON YEAR (2045) WITHOUT PROJECT (APPROVED SP)

This section discusses the traffic forecasts for Horizon Year (2045) Without Project (Approved SP) and the resulting intersection operations and traffic signal warrant analyses.

5.1 GENERAL PLAN ROADWAYS

Along the Project boundary, Cactus Avenue is designated a Minor Arterial on the City of Moreno Valley General Plan Circulation Network. For Cactus Avenue from Kitching Street to Nason Street, the City of Moreno Valley General Plan Existing and Planned Bicycle and Pedestrian Network shows existing Class II (Bike Lanes). From Nason Street to Moreno Beach Drive, proposed Class II (Bike Lanes) are shown. RTA transit service is shown on Cactus Avenue from Lasselle Street to Nason Street on the City of Moreno Valley General Plan Transit Lines and Facilities.

Brodiaea Avenue from Kitching Street to Moreno Beach Drive is designated a Neighborhood Collector on the City of Moreno Valley General Plan Circulation Network. The City of Moreno Valley General Plan Existing and Planned Bicycle and Pedestrian Network shows proposed Class III bike routes for Brodiaea Avenue in the study area.

Alessandro Boulevard is designated as a Divided Major Arterial on the City of Moreno Valley General Plan Circulation Network from Kitching Street to Nason Street. From Nason Street to Moreno Beach Drive, Alessandro Boulevard is designated as a Divided Major Arterial. Throughout the focused study area on Alessandro Boulevard, proposed Class II (Bike Lanes) are shown on the City of Moreno Valley General Plan Existing and Planned Bicycle and Pedestrian Network. RTA transit service is shown on Alessandro Boulevard from Kitching Street to Moreno Beach Drive on the City of Moreno Valley General Plan Transit Lines and Facilities.

Delphinium Avenue from Kitching Street to Lasselle Street is designated a Neighborhood Collector on the City of Moreno Valley General Plan Circulation Network. A proposed Class IV (Bike Boulevard) is shown on the City of Moreno Valley General Plan Existing and Planned Bicycle and Pedestrian Network.

From Kitching Street to Lasselle Street, John F Kennedy Drive is shown as an Arterial on the City of Moreno Valley General Plan Circulation Network. From Oliver Street to Moreno Beach Drive, John F Kennedy Drive is designated as a Minor Arterial on the City of Moreno Valley General Plan Circulation Network. Existing Class II (Bike Lanes) are shown on the City of Moreno Valley General Plan Existing and Planned Bicycle and Pedestrian Network. From Kitching Street to Lasselle Street and from Oliver Street to Moreno Beach Drive, Existing Class II (Bike Lanes) are shown on the City of Moreno Valley General Plan Existing and Planned Bicycle and Pedestrian Network. RTA transit service is shown on John F Kennedy Drive from Kitching Street to Lasselle Street on the City of Moreno Valley General Plan Transit Lines and Facilities.

Gentian Avenue is designated as a Minor Arterial from Kitching Street to Lasselle Street on the City of Moreno Valley General Plan Circulation Network. Proposed Class II (Bike Lanes) are shown on Gentian Avenue in the focused study area. RTA transit service is shown on Gentian Avenue from Kitching Street to Lasselle Street on the City of Moreno Valley General Plan Transit Lines and Facilities.

Iris Avenue from Kitching Street to Oliver Street is shown as a Divided Major Arterial on the City of Moreno Valley General Plan Circulation Network. Existing Class II (Bike Lanes) are shown on the City of Moreno Valley General Plan Existing and Planned Bicycle and Pedestrian Network. Iris Avenue from Oliver Street to Kitching Street is shown as served by RTA on the City of Moreno Valley General Plan Transit Lines and Facilities.

Throughout the focus area, Lasselle Street is designated as an Arterial on the City of Moreno Valley General Plan Circulation Network. Existing Class II (Bike Lanes) are shown on the City of Moreno Valley General Plan Existing and Planned Bicycle and Pedestrian Network for Lasselle Street from Alessandro Boulevard to Gentian Avenue. From Gentian Avenue to Iris Avenue, planned Class II (Bike Lanes) are shown. Throughout the focus area, Lasselle Street is shown as served by RTA on the City of Moreno Valley General Plan Transit Lines and Facilities.

Kitching Street from Alessandro Boulevard to Iris Avenue is designated as a Minor Arterial on the City of Moreno Valley General Plan Circulation Network. A Proposed Class I (Multi-Use Path) is shown on the City of Moreno Valley General Plan Existing and Planned Bicycle and Pedestrian Network for Kitching Street from Alessandro Boulevard to Iris Avenue Kitching Street from Gentian Avenue to Iris Avenue is shown as served by RTA on the City of Moreno Valley General Plan Transit Lines and Facilities.

Nason Street throughout the focus area is designated as a Divided Arterial on the City of Moreno Valley General Plan Circulation Network. Existing Class II (Bike Lanes) are shown on the City of Moreno Valley General Plan Existing and Planned Bicycle and Pedestrian Network for Nason Street in the focus area. The section of Nason Street from Alessandro Boulevard to Cactus Avenue is shown as served by RTA on the City of Moreno Valley General Plan Transit Lines and Facilities.

Oliver Street throughout the focus area is designated as a Minor Arterial on the City of Moreno Valley General Plan Circulation Network. From Cactus Avenue to Iris Avenue, planned Class II (Bike Lanes) are shown.

Throughout the focus area, Moreno Beach Drive is designated as a Divided Major Arterial on the City of Moreno Valley General Plan Circulation Network. Existing Class II (Bike Lanes) are shown on the City of Moreno Valley General Plan Existing and Planned Bicycle and Pedestrian Network for Moreno Beach Drive from Brodiaea Avenue to Oliver Street. North of Brodiaea Avenue, proposed Class II (Bike Lanes) are shown. Moreno Beach Drive from Alessandro Boulevard to Oliver Street is shown as served by RTA on the City of Moreno Valley General Plan Transit Lines and Facilities.

5.2 PLANNED INTERCHANGE IMPROVEMENTS

For the I-215 interchange at Cactus Avenue, an interchange redesign with bridge widening to 6 lanes is anticipated in the Traffic Impact Analysis for Kaiser Permanente Moreno Valley Medical Center Master Plan Project (LSA, October, 2019) (8) with fair share or TUMF contribution. The intersection of Cactus Avenue at the I-215 NB Ramps could include an eastbound right turn lane, a westbound right turn lane, a 2nd northbound left turn lane, and a 2nd southbound left turn lane.

Improvements to the Redlands interchange with the SR-60 freeway are anticipated and planned in the Traffic Impact Analysis Report for The World Logistics Center (WSP USA Inc, July, 2018) (9).

For the SR-60 westbound ramps at Redlands Boulevard, the WLC project is anticipated to reconstruct the interchange as a partial cloverleaf design, which includes a second through lane northbound and southbound on Redlands Boulevard in the interchange area, along with a direct (slip) on-ramp from Redlands Boulevard to the eastbound ramp and a direct (slip) on-ramp from Redlands Boulevard to the westbound ramp.

5.3 HORIZON YEAR (2045) WITHOUT PROJECT TRAFFIC VOLUMES

The Aquabella baseline/approved land uses include the following:

- 2,702 detached dwelling units of senior adult housing
- 220 attached dwelling units
- 300 room hotel
- 100,000 square feet shopping center

The Horizon Year (2045) Without Project (Approved SP) scenario includes the approval which generated a total of 18,469 external vehicle trips per day with 925 AM peak hour trips and 1,327 PM peak hour trips. A comparison of the Aquabella Project trip generation to the Currently Approved Specific Plan is shown below.

Comparison of External Trip Generation (Approved vs Proposed)

	AM Peak Hour			PM Peak Hour			
Aquabella Project Land Use	In	Out	Total	In	Out	Total	Daily
Approved SP	377	548	925	744	583	1,327	18,469
Proposed SPA	1,966	4,470	6,439	3,787	2,328	6,115	76,414
Delta	1,589	3,922	5,511	3,043	1,745	4,788	57,945

Cumulative traffic projections for the Horizon Year (2045) Without Project (Approved SP) scenario take into consideration 2045 traffic volumes derived from RIVCOM, existing counts and background growth, and cumulative developments as listed in Table 4-2.

Exhibits 5-1 to 5-3 present the Cumulative **AM** peak hour intersection volumes for the Horizon Year (2045) with Approved Project. Focus area intersection volumes are shown on Exhibit 5-1. Westerly and easterly study area volumes are provided on Exhibits 5-2 and 5-3, respectively.

Exhibits 5-4 to 5-6 present the Cumulative **PM** peak hour intersection volumes for the Horizon Year (2045) with Approved Project. Focus area intersection volumes are shown on Exhibit 5-4. Westerly and easterly study area volumes are provided on Exhibits 5-5 and 5-6, respectively.

Exhibits 5-7 to 5-9 present the Cumulative **daily** roadway segment volumes for the Horizon Year (2045) with Approved Project. Focus area daily volumes are shown on Exhibit 5-7. Westerly and easterly study area daily volumes are provided on Exhibits 5-8 and 5-9, respectively.

EXHIBIT 5-1: FOCUS STUDY AREA
HORIZON YEAR (2045) WITHOUT PROJECT (APPROVED SP) AM PEAK HOUR INTERSECTION VOLUMES

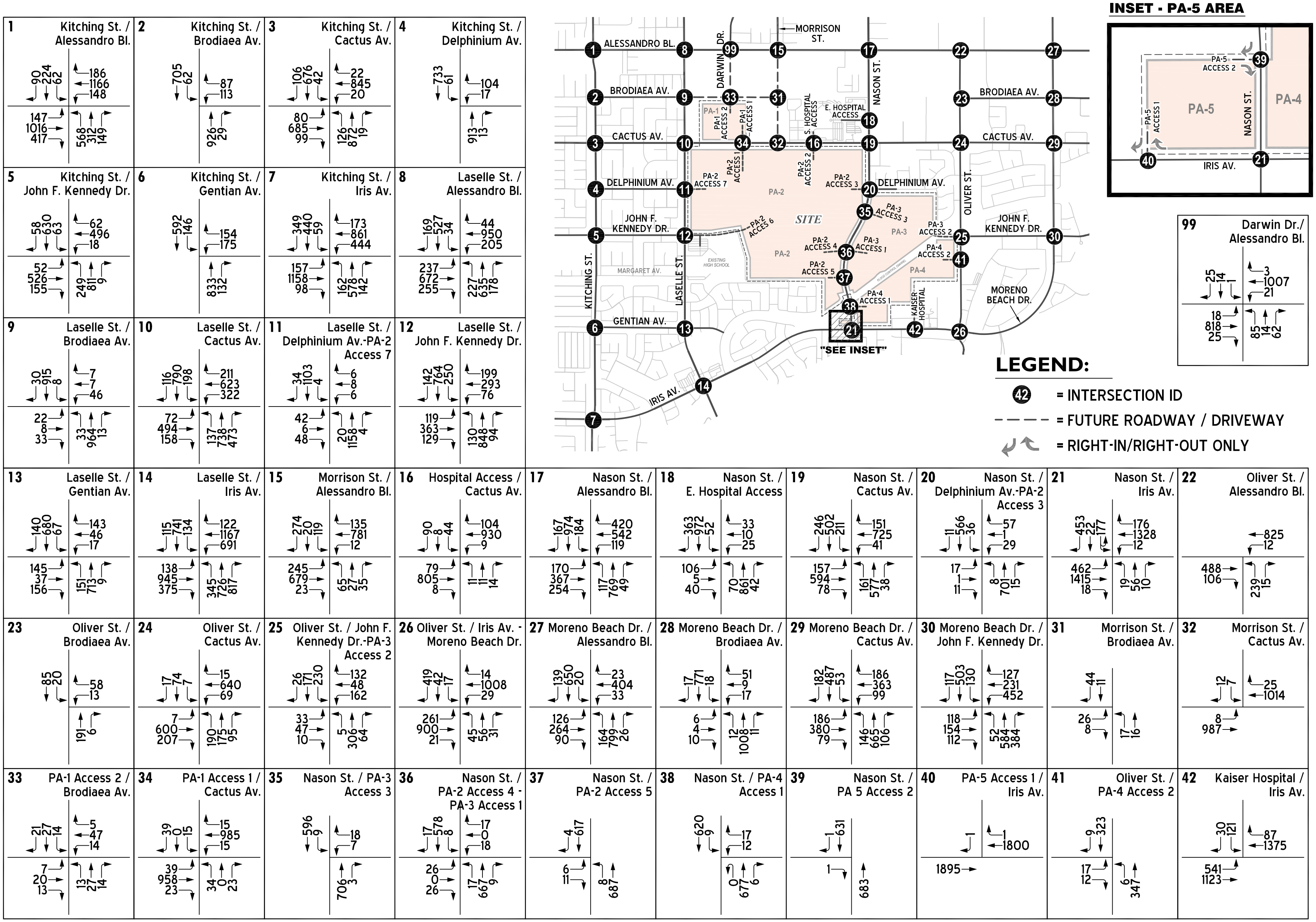
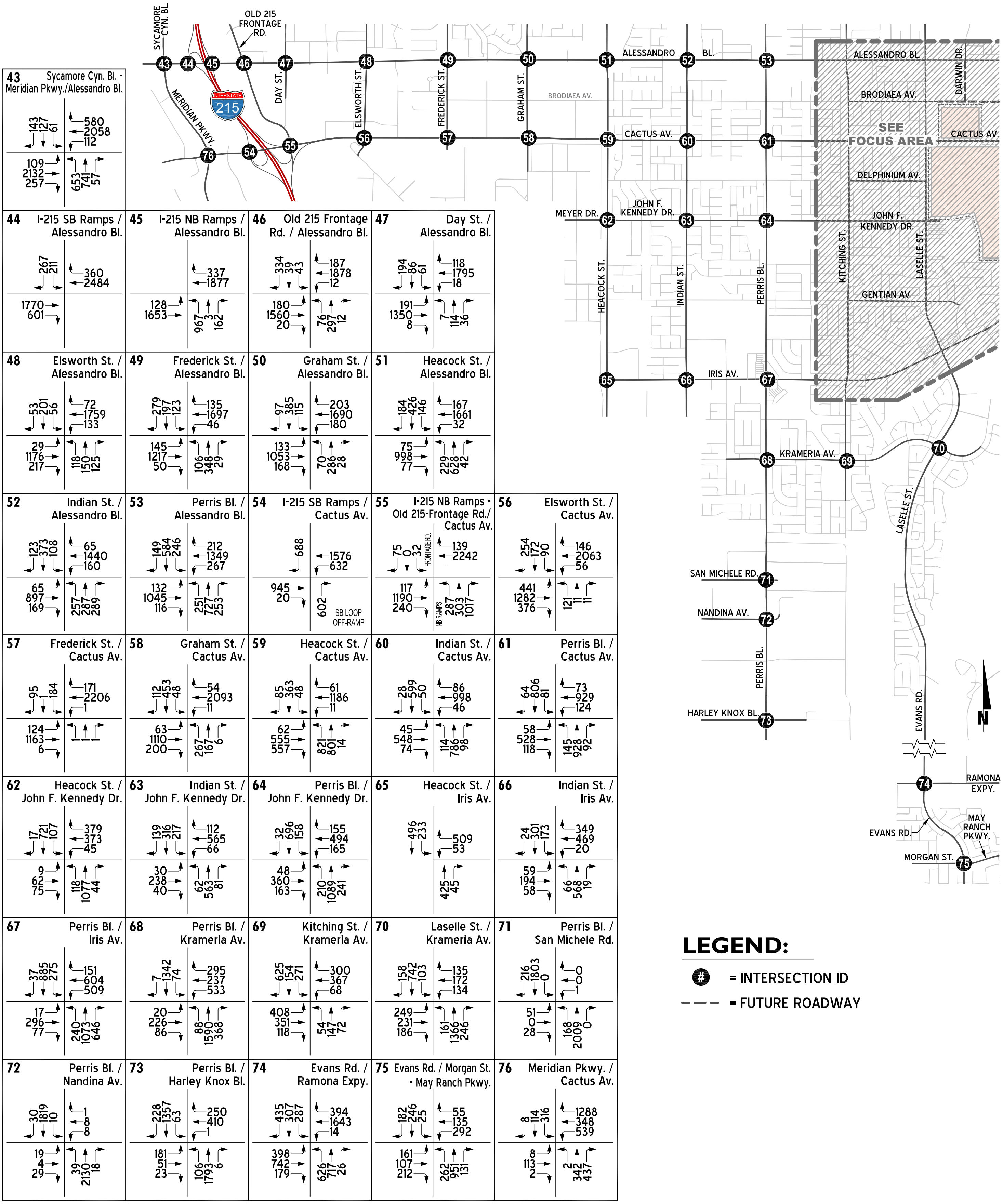


EXHIBIT 5-2: EXTENDED WESTERLY STUDY AREA
HORIZON YEAR (2045) WITHOUT PROJECT (APPROVED SP) AM PEAK HOUR INTERSECTION VOLUMES



LEGEND:

- (#) = INTERSECTION ID
- – – – = FUTURE ROADWAY

EXHIBIT 5-3: EXTENDED EASTERLY STUDY AREA
HORIZON YEAR (2045) WITHOUT PROJECT (APPROVED SP) AM PEAK HOUR INTERSECTION VOLUMES

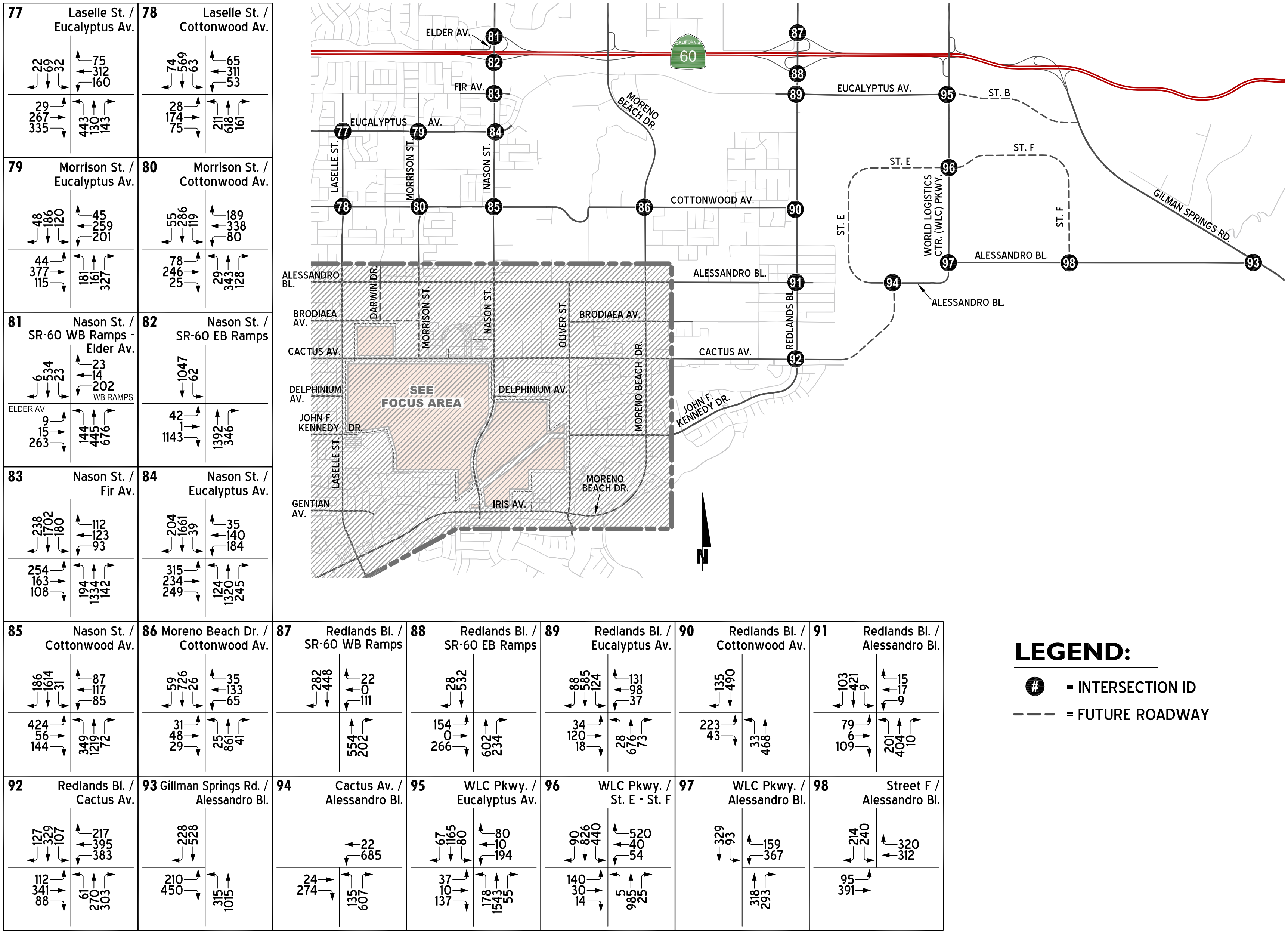


EXHIBIT 5-4: FOCUS STUDY AREA
HORIZON YEAR (2045) WITHOUT PROJECT (APPROVED SP) PM PEAK HOUR INTERSECTION VOLUMES

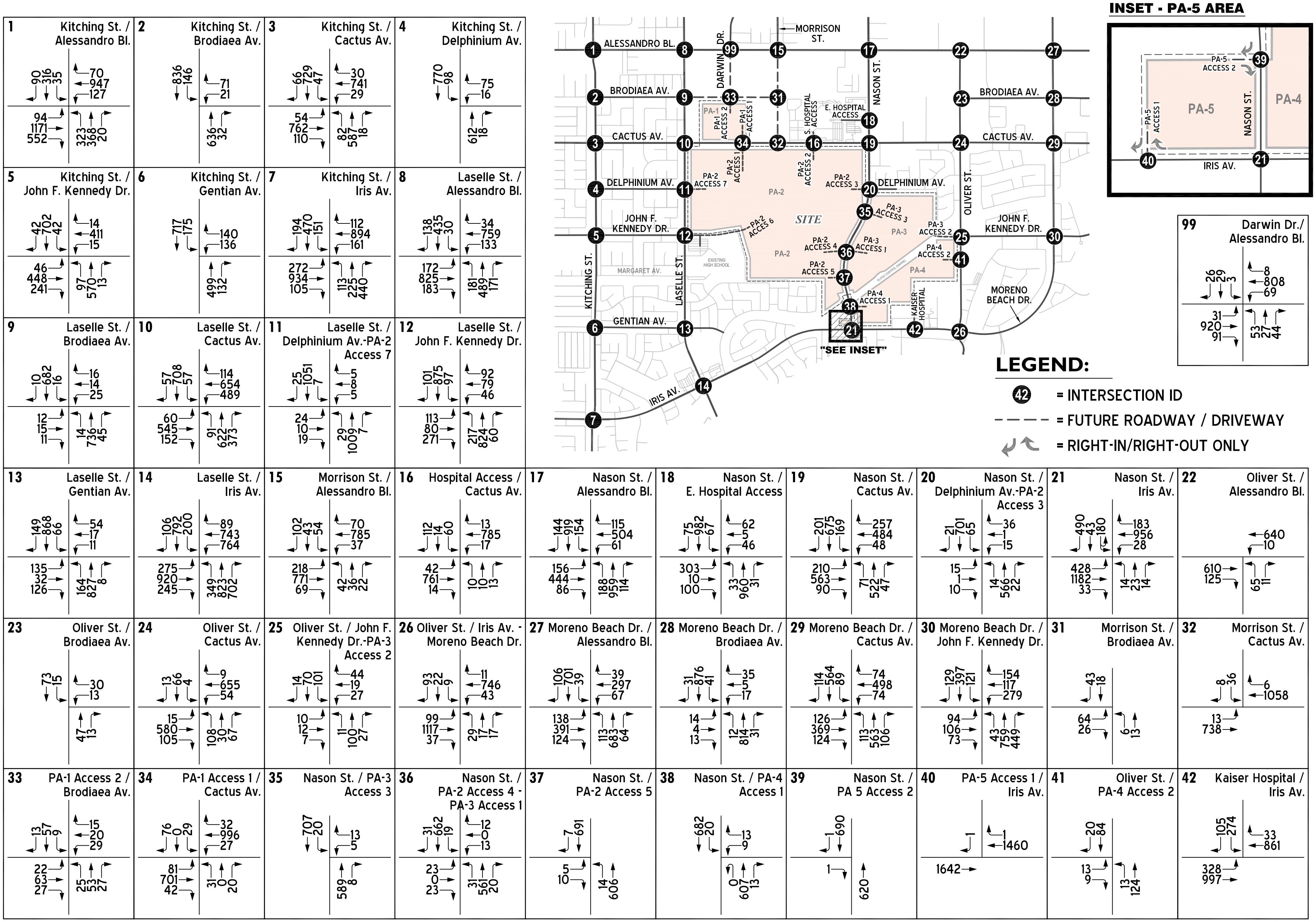


EXHIBIT 5-5: EXTENDED WESTERLY STUDY AREA
HORIZON YEAR (2045) WITHOUT PROJECT (APPROVED SP) PM PEAK HOUR INTERSECTION VOLUMES

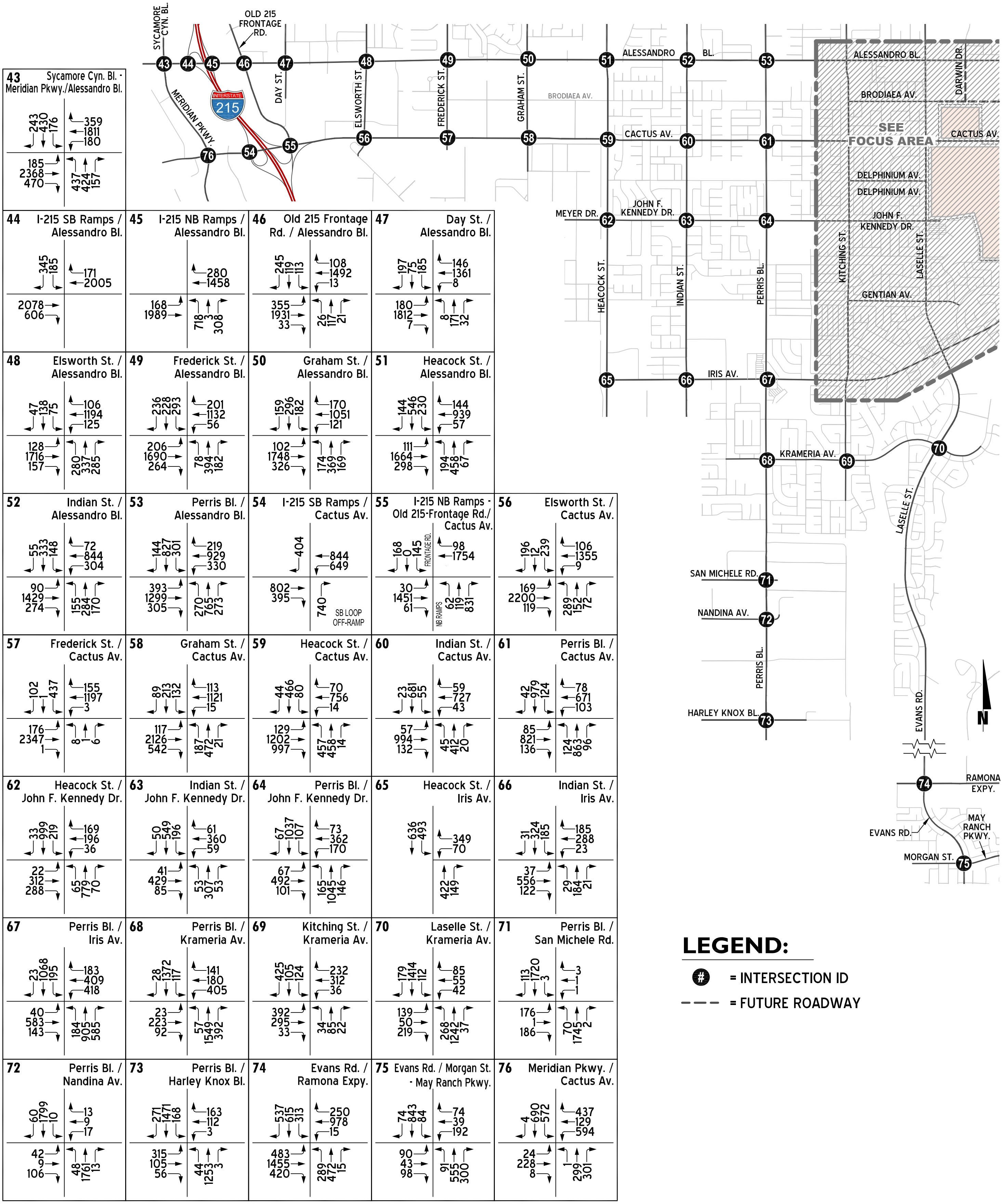


EXHIBIT 5-6: EXTENDED WESTERLY STUDY AREA
HORIZON YEAR (2045) WITHOUT PROJECT (APPROVED SP) PM PEAK HOUR INTERSECTION VOLUMES

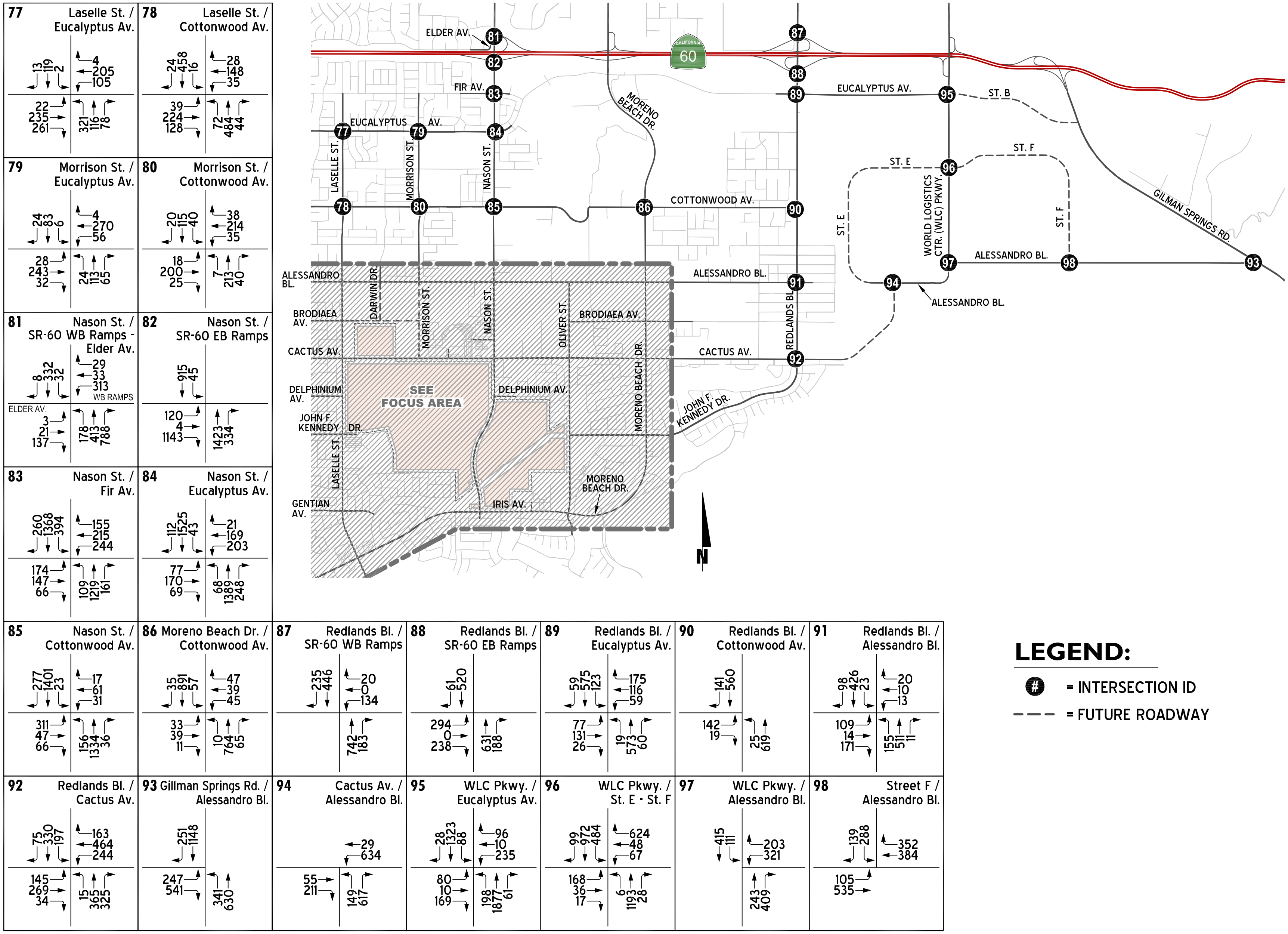


EXHIBIT 5-7: FOCUS STUDY AREA
HORIZON YEAR (2045) WITHOUT PROJECT (APPROVED SP) AVERAGE DAILY TRAFFIC (ADT)

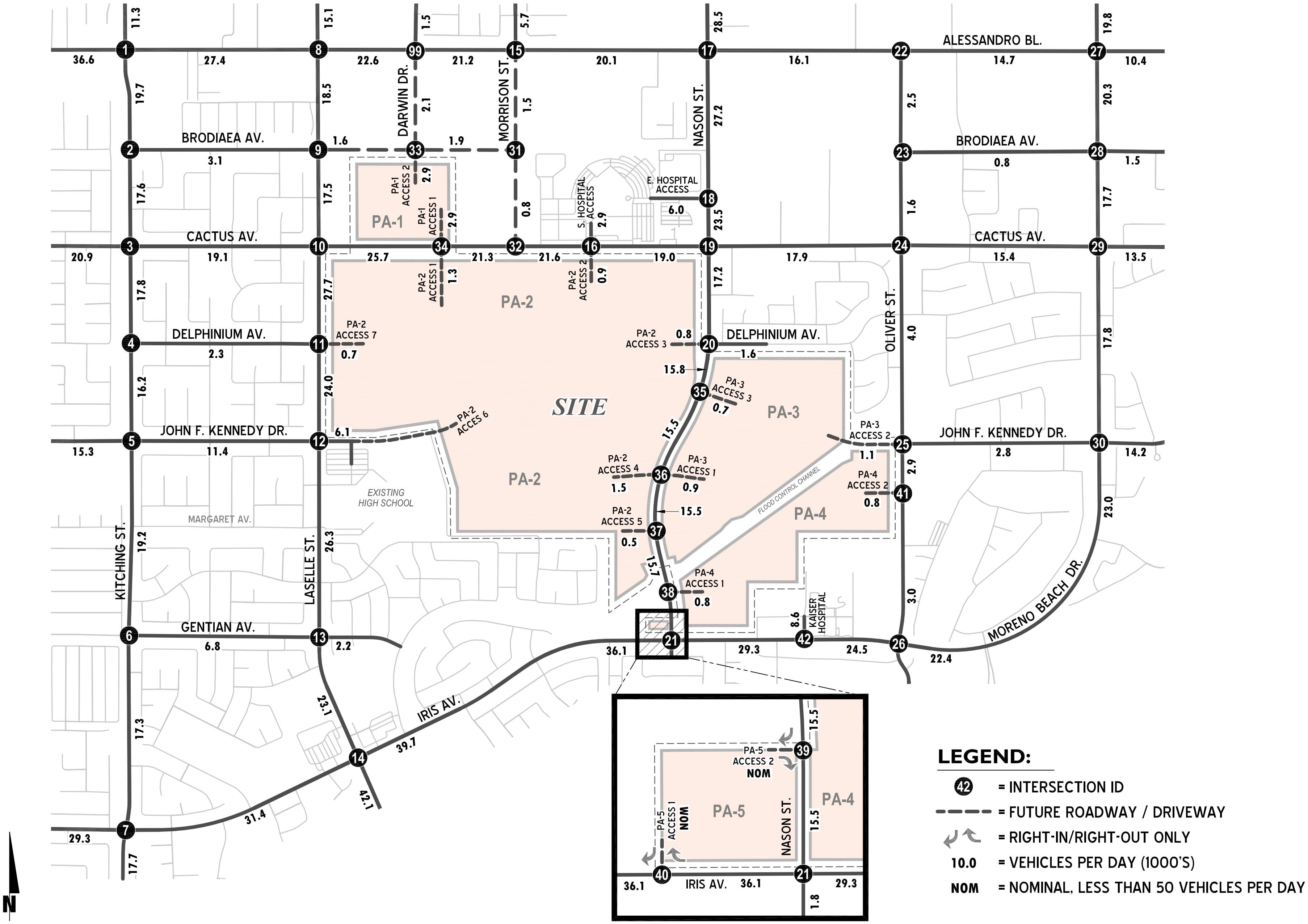


EXHIBIT 5-8: EXTENDED WESTERLY STUDY AREA
HORIZON YEAR (2045) WITHOUT PROJECT (APPROVED SP) AVERAGE DAILY TRAFFIC (ADT)

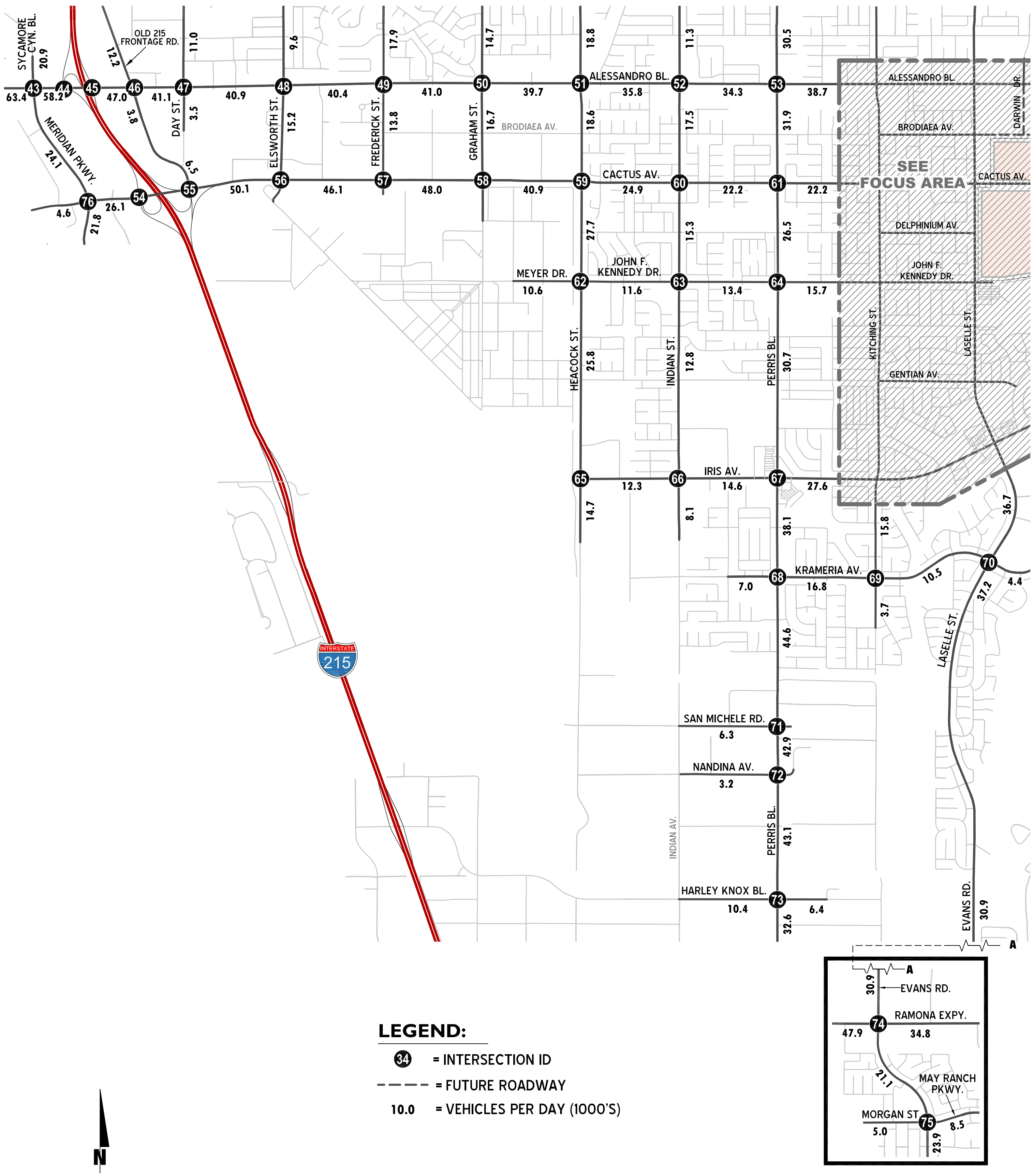
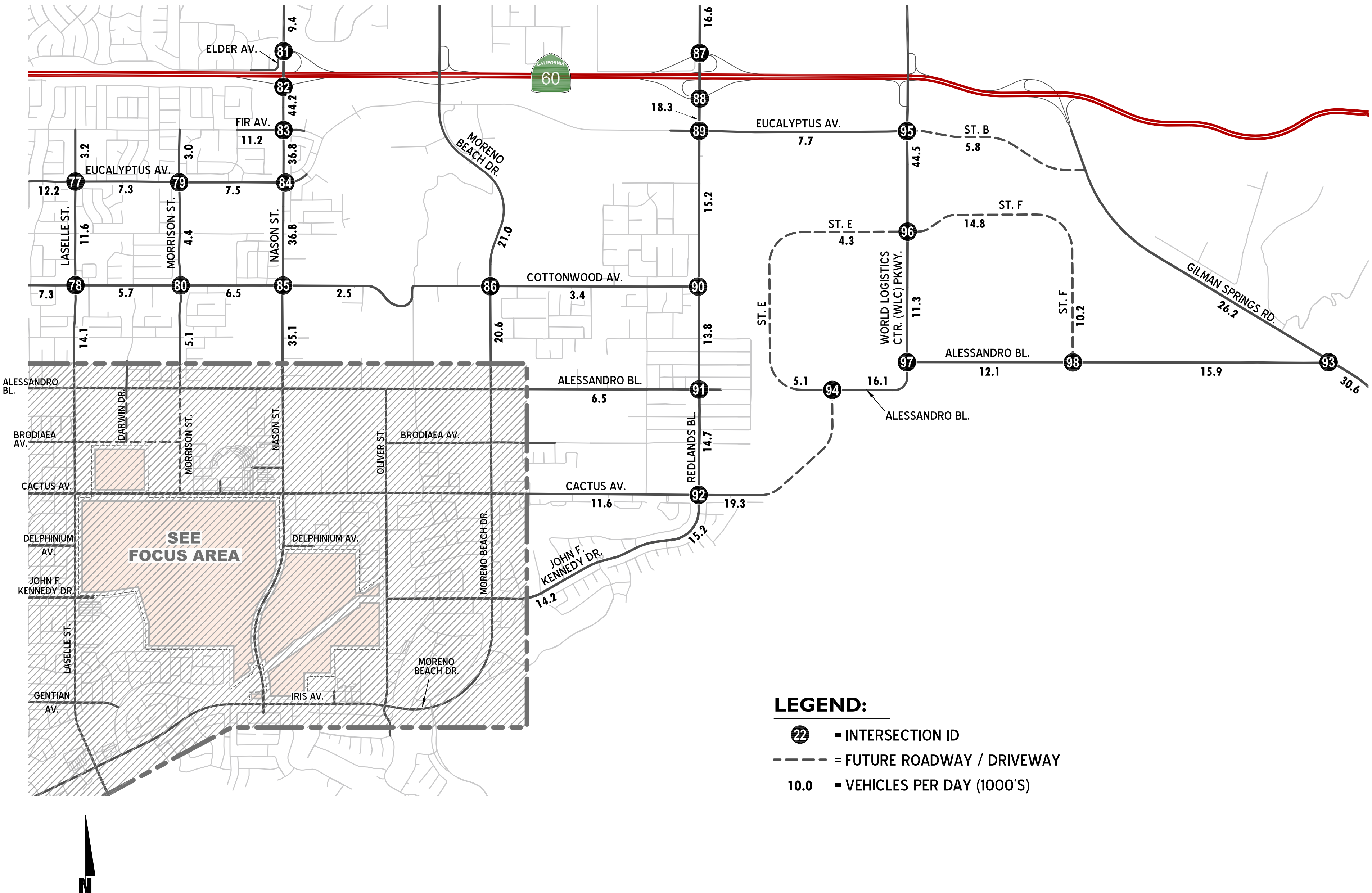


EXHIBIT 5-9: EXTENDED EASTERLY STUDY AREA
HORIZON YEAR (2045) WITHOUT PROJECT (APPROVED SP) AVERAGE DAILY TRAFFIC (ADT)



5.4 HORIZON YEAR (2045) WITHOUT PROJECT INTERSECTION OPERATIONS

Horizon Year (2045) Without Project (Approved SP) traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TA. The Horizon Year (2045) intersection analysis results for Without Project (Approved SP) conditions are summarized in Table 5-1, which indicates that a wide range of cumulative improvements are needed throughout the study area. The traffic control changes and/or lane improvements needed at each intersection to achieve an acceptable LOS are indicated on Table 5-1.

A comprehensive list of off-site intersection improvements needed to serve Horizon Year (2045) Without Project (Approved SP) traffic conditions is provided in Table 8-1 (Section 8 of this report).

The intersection operations analysis worksheets for Horizon Year (2045) Without Project (Approved SP) traffic conditions are included in this Appendix 5.1.

5.5 HORIZON YEAR (2045) WITHOUT PROJECT TRAFFIC SIGNAL WARRANTS

The traffic signal warrant analysis for Horizon Year (2045) Without Project (Approved SP) traffic conditions are based on the peak hour volumes or planning level ADT volume-based traffic signal warrants. Table 5-2 shows the Horizon Year (2045) traffic signal warrant analysis summary for Without Project (Approved SP) traffic conditions.

Intersections satisfying signal warrants for Existing (2023) conditions were previously listed in Section 3-5.

The following additional intersections (in comparison to Existing) are anticipated to meet traffic signal warrants under Horizon Year (2045) Without Project (Approved SP) traffic conditions (see Appendix 3.3):

- #2 - Kitching St. / Brodiaea Av.- DIF
- #4 - Kitching St. / Delphinium Av.- DIF
- #6 - Kitching St. / Gentian Av.- DIF
- #20 - Nason St. / Delphinium Av.- PA-2 Access 3
- #25 - Oliver St. / John F. Kennedy Dr. - PA-3 Access 2
- #28 - Moreno Beach Dr. / Brodiaea Av.- DIF
- #94 - Cactus Av. / Alessandro Bl.- DIF
- #99 - Darwin Dr. / Alessandro Bl.

As noted previously, a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified.

TABLE 5-1: INTERSECTION ANALYSIS FOR HORIZON YEAR (2045) WITHOUT PROJECT (APPROVED SP)

#	Intersection	Traffic Control[1]	Intersection Approach Lanes[2] Northbound L	T	R	Southbound L	T	R	Eastbound L	T	R	Westbound L	T	R	Delay[3] (secs.) AM	PM	Level of Service AM	PM	LOS Standard
1	Kitching St. / Alessandro Bl.	TS	2	1	0	1	2	0	1	2	1>	1	2	1>	48.1	38.2	D	D	D
2	Kitching St. / Brodiaea Av.																		
	Without Improvements:	AWS	0	2	0	1	2	0	0	0	0	0.5	0.5	d	67.9	20.3	**F**	C	C
	With Improvements:	**TS**	0	2	0	1	2	0	0	0	0	0.5	0.5	d	4.7	2.7	A	A	C
3	Kitching St. / Cactus Av.																		
	Without Improvements:	TS	1	2	0	1	1	1	1	2	0	1	2	0	43.0	42.9	**D**	**D**	C
	With Improvements:	TS	1	2	0	1	**2**	0	1	2	0	1	2	0	27.5	28.6	C	C	C
4	Kitching St. / Delphinium Av.																		
	Without Improvements:	CSS	0	1	0	0.5	0.5	0	0	0	0	0.5	0.5	d	50.6	27.6	**F**	**D**	C
	With Improvements:	**TS**	0	1	0	0.5	0.5	0	0	0	0	0.5	0.5	d	5.5	5.5	A	A	C
5	Kitching St. / John F. Kennedy Dr.																		
	Without Improvements:	TS	0	1!	0	0	1!	0	1	2	0	1	2	d	>80	>80	**F**	**F**	C
	With Improvements:	TS	**1**	**2**	0	**1**	**2**	0	1	2	0	1	2	d	30.7	28.3	C	C	C
6	Kitching St. / Gentian Av.																		
	Without Improvements:	AWS	0	1	d	0.5	0.5	0	0	0	0	1	0	1	>80	>80	**F**	**F**	C
	With Improvements:	**TS**	0	1	d	0.5	0.5	0	0	0	0	1	0	1	16.6	12.1	B	B	C
7	Kitching St. / Iris Av.																		
	Without Improvements:	TS	1	2	0	1	2	0	1	2	0	1	2	1	>80	72.0	**F**	**E**	C
	With Improvements[4]:	TS	1	2	0	1	2	**1**	1	2	0	**2**	2	1	52.7	54.1	**D**	**D**	C
8	Laselle St. / Alessandro Bl.																		
	Without Improvements:	TS	1	1	1>	1	1	0	1	1	1	1	1	1>	>80	>80	**F**	**F**	D
	With Improvements:	TS	1	1	1>	1	**2**	0	1	**2**	1	1	**2**	1>	49.4	38.3	D	D	D
9	Laselle St. / Brodiaea Av.																		
	Without Improvements:	CSS	1	2	0	1	2	0	0	1!	0	0	1!	0	>80	48.7	**F**	**E**	D
	With Improvements:	**TS**	1	2	0	1	2	0	0	1!	0	0	1!	0	2.7	2.6	A	A	D
10	Laselle St. / Cactus Av.																		
	Without Improvements:	TS	1	2	1	1	2	d	1	2	0	1	2	1	53.0	50.1	**D**	**D**	C
	With Improvements[4]:	TS	1	2	1	1	2	d	1	2	0	1	2	**1>**	36.3	41.2	**D**	**D**	C
11	Laselle St. / Delphinium Av.- PA-2 Access 7	--						N/A											C
12	Laselle St. / John F. Kennedy Dr.	TS	1	2	d	1	2	d	1	2	d	1	2	d	24.1	29.6	C	C	C
13	Laselle St. / Gentian Av.	TS	1	2	0	1	2	d	1	1	1	1	1	0	42.0	34.0	D	C	D
14	Laselle St. / Iris Av.																		
	Without Improvements:	TS	2	2	1	2	2	d	2	3	d	2	3	0	>80	76.2	**F**	**E**	D
	With Improvements[4]:	TS	2	2	**1>**	2	2	d	2	3	d	2	3	0	49.5	49.9	D	D	D
15	Morrison St. / Alessandro Bl.	TS	**1**	**1**	0	1	**1**	1>	1	1	0	**1**	2	1	23.6	19.5	C	B	D
16	Hospital Access - PA2 Access 2 / Cactus Av.	--						N/A											D
17	Nason St. / Alessandro Bl.																		
	Without Improvements:	TS	1	2	1	1	3	1	2	1	1	2	1	1	44.6	62.4	D	**E**	D
	With Improvements:	TS	1	2	1	1	3	1	2	1	1	2	1	**1>**	44.4	46.5	D	D	D
18	Nason St. / E. Hospital Access	TS	1	2	0	1	2	1	0.5	0.5	1	**0.5**	**0.5**	**1**	17.6	32.0	B	C	D
19	Nason St. / Cactus Av.	TS	2	2	1	1	2	1	1	1	1	1	1	d	50.0	41.3	D	D	D
20	Nason St. / Delphinium Av.- PA-2 Access 3	--						N/A											C
21	Nason St. / Iris Av.																		
	Without Improvements:	TS	1	1	0	1	1	1	2	3	d	1	3	1	34.8	38.7	C	**D**	C
	With Improvements:	TS	1	1	0	1	1	**1>**	2	3	d	1	3	1	31.0	24.6	C	C	C
22	Oliver St. / Alessandro Bl.																		
	Without Improvements:	CSS	1	0	1	0	0	0	0	1	0	0.5	0.5	0	>80	49.2	**F**	**E**	C
	With Improvements:	**TS**	1	0	1	0	0	0	0	1	0	0.5	0.5	0	16.4	16.7	B	B	C
23	Oliver St. / Brodiaea Av.	CSS	0	1	0	0.5	0.5	0	0	0	0	0.5	0	0.5	10.1	9.1	B	A	C
24	Oliver St. / Cactus Av.	TS	0.5	0.5	1	0.5	0.5	d	1	2	0	1	1	1	32.9	22.8	C	C	D
25	Oliver St. / John F. Kennedy Dr. - PA-3 Access 2	--						N/A											C
26	Oliver St. / Iris Av. - Moreno Beach Dr.	TS	0.5	0.5	1	0.5	0.5	1	1	3	d	1	3	d	44.5	22.6	D	C	D
27	Moreno Beach Dr. / Alessandro Bl.	TS	1	1	d	1	1	d	1	1	0	1	1	d	29.2	30.5	C	C	D
28	Moreno Beach Dr. / Brodiaea Av.																		
	Without Improvements:	CSS	1	1	1	1	2	d	0.5	0.5	d	0	1!	0	>80	>80	**F**	**F**	D
	With Improvements:	**TS**	1	1	1	1	2	d	0.5	0.5	d	0	1!	0	12.6	9.5	B	A	D

TABLE 5-1: INTERSECTION ANALYSIS FOR HORIZON YEAR (2045) WITHOUT PROJECT (APPROVED SP)

#	Intersection	Traffic Control[1]	Intersection Approach Lanes[2]												Delay[3] (secs.)		Level of Service		LOS Standard
			Northbound			Southbound			Eastbound			Westbound							
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM	
29	Moreno Beach Dr. / Cactus Av.	TS	1	2	1	1	3	d	1	2	0	1	2	0	32.2	31.6	C	C	C
30	Moreno Beach Dr. / John F. Kennedy Dr.																		
	Without Improvements:	TS	1	3	1	1	3	d	1	1	d	1	1	1	76.6	49.6	**E**	D	D
	With Improvements:	TS	1	3	1>	1	3	d	1	1	d	1	1	1	41.7	38.2	D	D	D
31	Morrison St. / Brodiaea Av.	CSS	0.5	0.5	0	0	1	0	0	1!	0	0	0	0	9.0	9.3	A	A	C
32	Morrison St. / Cactus Av.	TS	0	0	0	1	0	1	1	2	0	0	2	0	5.8	7.6	A	A	C
33	Darwin Dr. - PA-1 Access 2 / Brodiaea Av.	--	N/A																C
34	PA-1 Access 1 / Cactus Av.	--	N/A																C
35	Nason St. / PA-3 Access 3	--	N/A																C
36	Nason St. / PA-2 Access 4 - PA-3 Access 1	--	N/A																C
37	Nason St. / PA-2 Access 5	--	N/A																C
38	Nason St. / PA-4 Access 1	--	N/A																C
39	Nason St. / PA 5 Access 2	--	N/A																C
40	PA-5 Access 1 / Iris Av.	--	N/A																C
41	Oliver St. / PA-4 Access 2	--	N/A																C
42	Kaiser Hospital / Iris Av.	TS	0	0	0	1	0	1	2	3	0	0	3	d	25.2	12.9	C	B	D
43	Sycamore Cyn. Bl. - Meridian Pkwy. / Alessandro Bl.	TS	2	2	2>	2	2	1	1	3	1	2	3	1	32.1	38.7	C	D	D
44	I-215 SB Ramps / Alessandro Bl.	TS	0	0	0	1	1!	1	0	3	0	0	3	1>>	2.7	3.5	A	A	D
45	I-215 NB Ramps / Alessandro Bl.	TS	1	1!	1	0	0	0	1	3	0	0	3	0	15.8	16.2	B	B	D
46	Old 215 Frontage Rd. / Alessandro Bl.	TS	2	2	1	1	2	1>>	2	3	1	1	2	1	10.8	10.8	B	B	D
47	Day St. / Alessandro Bl.	TS	1	1	d	1	1	0	1	3	0	1	2	1	31.1	23.9	C	C	D
48	Elsworth St. / Alessandro Bl.	TS	1	1	1	1	1	1	1	3	d	1	3	d	42.1	43.4	D	D	D
49	Frederick St. / Alessandro Bl.	TS	2	2	0	2	2	1	1	2	1	1	3	0	30.9	35.7	C	D	D
50	Graham St. / Alessandro Bl.	TS	1	2	0	1	2	0	1	2	1	1	3	d	29.3	47.9	C	D	D
51	Heacock St. / Alessandro Bl.	TS	1	2	d	1	2	d	1	3	1>	1	3	d	37.9	25.1	D	C	D
52	Indian St. / Alessandro Bl.	TS	1	2	0	1	2	0	1	3	d	1	3	d	39.8	47.6	D	D	D
53	Perris Bl. / Alessandro Bl.																		
	Without Improvements:	TS	1	3	0	1	2	1	2	2	1	2	3	d	49.5	>80	D	**F**	D
	With Improvements:	TS	1	3	0	1	3	0	2	3	1>	2	3	d	45.2	50.8	D	D	D
54	I-215 SB Ramps / Cactus Av.																		
	Without Improvements:	TS	0	0	1>>	0	0	1	0	2	1	1	2	0	>80	52.3	**F**	D	D
	With Improvements:	TS	0	0	1>>	0	0	2	0	2	1	1	2	0	42.3	36.3	D	D	D
55	I-215 NB Ramps / Cactus Av.																		
	Without Improvements:	TS	1	1	1>>	1	1	0	1	2	d	0	2	0	>80	36.0	**F**	D	D
	With Improvements:	TS	1	1	1>>	1	1	0	1	2	d	0	3	1	32.4	24.8	C	C	D
56	Elsworth St. / Cactus Av.																		
	Without Improvements:	TS	1	1!	1	1.5	0.5	1	1	3	1>>	1	3	1	62.7	28.9	**E**	C	D
	With Improvements:	TS	1	1!	1	1	1!	1	2	3	1>>	1	3	1	26.6	26.7	C	C	D
57	Frederick St. / Cactus Av.	TS	1	1	d	2	1	0	1	3	d	1	3	1>	13.2	17.5	B	B	D
58	Graham St. / Cactus Av.	TS	2	2	0	1	2	1>	1	3	1	1	3	0	30.3	28.9	C	C	D
59	Heacock St. / Cactus Av.	TS	2	2	0	1	2	0	1	2	1>	1	2	0	40.3	42.7	D	D	D
60	Indian St. / Cactus Av.	TS	1	2	0	1	2	0	1	2	0	1	2	0	30.4	34.3	C	C	C
61	Perris Bl. / Cactus Av.[4]	TS	1	3	0	1	3	0	1	2	0	1	2	0	37.0	36.2	**D**	**D**	C
62	Heacock St. / John F. Kennedy Dr.	TS	1	2	d	1	2	0	1	1	1	1	2	0	28.7	34.1	C	C	D
63	Indian St. / John F. Kennedy Dr.[4]	TS	1	2	0	1	2	0	1	1	1	1	2	d	36.1	36.6	**D**	**D**	C
64	Perris Bl. / John F. Kennedy Dr.	TS	1	3	0	1	3	0	1	2	d	1	2	d	41.3	38.4	D	D	D
65	Heacock St. / Iris Av.	TS	0	2	1	2	2	0	0	0	0	2	0	1	21.5	19.4	C	B	D
66	Indian St. / Iris Av.	TS	1	2	0	1	2	0	2	2	1	2	2	0	37.5	30.5	D	C	D
67	Perris Bl. / Iris Av.																		
	Without Improvements:	TS	1	3	1	1	3	0	1	2	0	1	2	d	>80	>80	**F**	**F**	D
	With Improvements:	TS	1	3	1>	1	3	0	1	2	0	1	2	d	38.3	43.4	D	D	D
68	Perris Bl. / Krameria Av.																		
	Without Improvements:	TS	1	3	0	1	3	0	0.5	0.5	1	0.5	0.5	1	>80	>80	**F**	**F**	D
	With Improvements:	TS	1	3	0	1	3	0	1	1	1	1.5	0.5	1>	45.2	43.3	D	D	D

TABLE 5-1: INTERSECTION ANALYSIS FOR HORIZON YEAR (2045) WITHOUT PROJECT (APPROVED SP)

#	Intersection	Traffic Control[1]	Intersection Approach Lanes[2] Northbound L	T	R	Southbound L	T	R	Eastbound L	T	R	Westbound L	T	R	Delay[3] (secs.) AM	PM	Level of Service AM	PM	LOS Standard
69	Kitching St. / Krameria Av.																		
	Without Improvements:	TS	1	1	1	1	1	1	1	2	0	1	2	0	>80	62.5	**F**	**E**	C
	With Improvements:	TS	1	1	1	1	1	1>	1	2	0	1	2	0	33.7	34.4	C	C	C
70	Laselle St. / Krameria Av.																		
	Without Improvements:	TS	1	2	1>	1	2	0	1	1	1	1	1	1	48.2	44.7	**D**	**D**	C
	With Improvements[4]:	TS	1	2	1>	1	2	0	1	1	1>	1	1	1	42.6	40.9	**D**	**D**	C
71	Perris Bl. / San Michele Rd.	TS	1	3	0	1	3	1	1	1	1	1	1	1	9.7	13.2	A	B	D
72	Perris Bl. / Nandina Av.	TS	1	3	0	1	3	1	1	2	0	1	1	1	5.7	7.8	A	A	D
73	Perris Bl. / Harley Knox Bl.	TS	2	3	1	2	3	1	1	2	1	2	3	1	32.4	32.3	C	C	D
74	Evans Rd. / Ramona Expy.																		
	Without Improvements:	TS	2	2	d	2	2	1	2	3	1	1	2	1	>80	59.1	**F**	E	E
	With Improvements:	TS	2	2	d	2	2	1>	2	3	1	1	3	1>	46.2	39.4	D	D	E
75	Evans Rd. / Morgan St. - May Ranch Pkwy.	TS	1	2	d	1	2	1	1	1	1	1	1	1	43.6	27.7	D	C	D
76	Meridian Pkwy. / Cactus Av.																		
	Without Improvements:	TS	2	2	1	2	2	1	1	2	1	2	2	1	>80	42.3	**F**	D	D
	With Improvements:	TS	2	2	1>	2	2	1	1	2	1	2	1	2>	29.6	35.7	C	D	D
77	Laselle St. / Eucalyptus Av.																		
	Without Improvements:	AWS	1	1	1	1	1	0	1	2	0	1	2	0	79.1	37.0	**F**	**E**	C
	With Improvements[4]:	TS	1	1	1	1	1	0	1	2	0	1	2	0	47.2	36.0	**D**	**D**	C
78	Laselle St. / Cottonwood Av.																		
	Without Improvements:	TS	1	1	d	1	1	1	1	1	0	1	2	0	76.1	29.0	**E**	C	C
	With Improvements:	TS	1	1	d	1	1	1	1	2	0	1	2	0	32.0	28.6	C	C	C
79	Morrison St. / Eucalyptus Av.	TS	1	1	1>	1	2	0	1	2	0	1	2	0	33.7	32.0	C	C	C
80	Morrison St. / Cottonwood Av.																		
	Without Improvements:	TS	1	2	0	1	2	0	1	1	0	1	2	0	35.3	32.1	**D**	C	C
	With Improvements:	TS	1	2	0	1	2	0	1	2	0	1	2	0	31.3	29.7	C	C	C
81	Nason St. / SR-60 WB Ramps - Elder Av.	TS	1	2	1>	1	2	d	1	1	1>	1	1	1>	21.7	32.2	C	C	D
82	Nason St. / SR-60 EB Ramps																		
	Without Improvements:	TS	0	2	0	1	2	0	1	0.5	1.5	0	0	0	>80	>80	**F**	**F**	D
	With Improvements:	TS	0	2	1	1	2	0	0.5	0.5	2	0	0	0	23.8	18.2	C	B	D
83	Nason St. / Fir Av.																		
	Without Improvements:	TS	1	2	0	1	2	1	1	1	d	1	1	1>	27.6	59.2	C	**E**	D
	With Improvements:	TS	1	2	0	1	2	1>	1	1	d	1	1	1>	27.6	43.5	C	D	D
84	Nason St. / Eucalyptus Av.	TS	1	2	d	1	2	d	1	2	d	1	2	d	32.3	13.9	C	B	D
85	Nason St. / Cottonwood Av.																		
	Without Improvements:	TS	1	2	d	1	2	1	1	1	1	1	2	0	>80	36.8	**F**	**D**	C
	With Improvements[4]:	TS	1	2	d	1	2	1	2	1	0	1	2	0	39.9	18.8	**D**	B	C
86	Moreno Beach Dr. / Cottonwood Av.																		
	Without Improvements:	TS	1	1	1	1	1	d	0	1!	0	0	1!	0	35.4	33.6	**D**	C	C
	With Improvements:	TS	1	1	1	1	1	d	1	1	0	1	1	0	21.0	18.3	C	B	C
87	Redlands Bl. / SR-60 WB Ramps (Reconfigured Interchange)	TS	0	2	1	0	2	1	0	0	0	1	1	1	3.6	3.6	A	A	D
88	Redlands Bl. / SR-60 EB Ramps (Reconfigured Interchange)	TS	0	2	1	0	2	1	1	1	1	0	0	0	8.2	9.2	A	A	D
89	Redlands Bl. / Eucalyptus Av.	RDB	0	1!	0	0.5	0.5	1	0	1!	0	0.5	0.5	1	14.1	13.3	B	B	D
90	Redlands Bl. / Cottonwood Av.	TS	1	1	0	0	1	1	1	0	1	0	0	0	10.2	7.3	B	A	C
91	Redlands Bl. / Alessandro Bl.																		
	Without Improvements:	AWS	0.5	0.5	1	0	1!	0	0.5	0.5	1	0	1!	0	69.6	>80	**F**	**F**	C
	With Improvements:	TS	0.5	0.5	0	0.5	1.5	0	1	1	0	0	1!	0	11.8	9.1	B	A	C
92	Redlands Bl. / Cactus Av.																		
	Without Improvements:	AWS	1	1	d	1	1	d	0.5	1.5	d	0	1!	0	>80	>80	**F**	**F**	C
	With Improvements[4]:	TS	1	1	1>	1	1	d	1	2	0	2	2	1	32.3	32.6	C	C	C
93	Gillman Springs Rd. / Alessandro Bl.																		
	Without Improvements:	CSS	1	1	0	0	1	0	1	0	1	0	0	0	>80	>80	**F**	**F**	D
	With Improvements:	TS	1	3	0	0	3	1	1	0	2	0	0	0	26.0	31.7	C	C	D
94	Cactus Av. / Alessandro Bl.	TS	1	0	2>	0	0	0	0	1	1	2	1	0	35.2	34.4	D	C	D

TABLE 5-1: INTERSECTION ANALYSIS FOR HORIZON YEAR (2045) WITHOUT PROJECT (APPROVED SP)

#	Intersection	Traffic Control[1]	Intersection Approach Lanes[2] Northbound L	T	R	Southbound L	T	R	Eastbound L	T	R	Westbound L	T	R	Delay[3] (secs.) AM	PM	Level of Service AM	PM	LOS Standard
95	WLC Pkwy. / Eucalyptus Av.	**TS**	**2**	**2**	**1**	**1**	**3**	1	1	**1**	**2**	**1**	**1**	0	28.3	41.0	C	D	D
96	WLC Pkwy. / St. E - St. F	**RDB**	**0.5**	**1**	**0.5**	**0.5**	**1.5**	**1>>**	**1**	**1!**	0	0	**1!**	**1**	13.4	27.0	B	D	D
97	WLC Pkwy. / Alessandro Bl.	**RDB**	0	1	**1**	**1**	1	0	0	0	0	1	0	**1**	6.3	6.3	A	A	D
98	Street F / Alessandro Bl.	**RDB**	0	0	0	0	**1!**	0	**0.5**	**1.5**	0	0	**2**	0	6.3	7.0	A	A	D
99	Darwin Dr. / Alessandro Bl.	**TS**	0	**1!**	0	0	1!	0	1	**2**	0	**1**	**2**	0	25.0	36.5	C	D	D

[1] TS = Traffic Signal; CSS = Cross-street Stop; RDB = Roundabout; AWS = All Way Stop

[2] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.
L = Left; T = Through; R = Right; d = Defacto Right Turn Lane; 0.5 = Shared Lane; 1! = Shared Left/Through/Right lane;
> = Right-Turn Overlap Phasing; >> = Free-Right Turn; **1** = Improvement; N/A = Not Applicable (Project Access Intersections)

[3] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[4] No mitigation feasible due to right-of-way constraints. Intersection is anticipated to continue to operate at a deficient LOS

TABLE 5-2: TRAFFIC SIGNAL WARRANT ANALYSIS SUMMARY FOR HORIZON YEAR (2045) WITHOUT PROJECT (APPROVED SP)

		HY (2045) Without Project (Approved SP)	
#	Intersection	ADT Warrants[1]	Peak Hour Warrants
2	Kitching St. / Brodiaea Av.		X
4	Kitching St. / Delphinium Av.		X
6	Kitching St. / Gentian Av.		X
9	Laselle St. / Brodiaea Av.		--
11	Laselle St. / Delphinium Av.- PA-2 Access 7	--	X
16	Hospital Access - PA2 Access 2 / Cactus Av.	X	X
20	Nason St. / Delphinium Av.- PA-2 Access 3	--	X
22	Oliver St. / Alessandro Bl.		X
23	Oliver St. / Brodiaea Av.		--
25	Oliver St. / John F. Kennedy Dr. - PA-3 Access 2	--	X
28	Moreno Beach Dr. / Brodiaea Av.		X
31	Morrison St. / Brodiaea Av.	--	--
32	Morrison St. / Cactus Av.	--	--
33	Darwin Dr. - PA-1 Access 2 / Brodiaea Av.	n/a	n/a
34	PA-1 Access 1 / Cactus Av.	n/a	n/a
35	Nason St. / PA-3 Access 3	n/a	n/a
36	Nason St. / PA-2 Access 4 - PA-3 Access 1	n/a	n/a
37	Nason St. / PA-2 Access 5	n/a	n/a
38	Nason St. / PA-4 Access 1	n/a	n/a
39	Nason St. / PA 5 Access 2	n/a	n/a
40	PA-5 Access 1 / Iris Av.	n/a	n/a
41	Oliver St. / PA-4 Access 2	n/a	n/a
77	Laselle St. / Eucalyptus Av.		X
89	Redlands Bl. / Eucalyptus Av.	RDB	RDB
91	Redlands Bl. / Alessandro Bl.		X
92	Redlands Bl. / Cactus Av.		X
93	Gillman Springs Rd. / Alessandro Bl.		X
94	Cactus Av. / Alessandro Bl.	X	X
95	WLC Pkwy. / Eucalyptus Av.	X	X
96	WLC Pkwy. / St. E - St. F	RDB	RDB
97	WLC Pkwy. / Alessandro Bl.	RDB	RDB
98	Street F / Alessandro Bl.	RDB	RDB
99	Darwin Dr. / Alessandro Bl.	X	X

X = Warranted; RIRO = Right-In/Right-Out Only Access; RDB = Roundabout; n/a = Not Applicable (Project Access Intersections)

[1] ADT warrants are evaluated for future intersections only.

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5.6 OFF-RAMP QUEUING ANALYSIS

Off-ramp queuing analysis findings for Horizon Year (2045) Without Project (Approved SP) are presented on Table 5-3. As shown on Table 5-3, the following off-ramp movements are anticipated to experience queuing issues during the weekday peak 95th percentile traffic flows under Horizon Year (2045) Without Project (Approved SP) traffic conditions. Worksheets for Horizon Year (2045) Without Project (Approved SP) traffic conditions queuing analysis are provided in Appendix 5.2.

- I-215 NB Ramps / Alessandro Boulevard, northbound left turn lane – AM Peak Hour
- I-215 NB Ramps / Cactus Avenue, northbound left turn lane – AM Peak Hour

Although 95th percentile queue is anticipated to exceed the available storage for each of the northbound left turn lanes at the above two locations, in each case the adjacent off-ramp lane has sufficient storage to accommodate any spillover without spilling back and affecting the Freeway mainline.

TABLE 5-3: QUEUEING ANALYSIS FOR HORIZON YEAR (2045) WITHOUT PROJECT (APPROVED SP), WITH IMPROVEMENTS

ID	Intersection	Movement	Available Stacking Distance (Feet)	95th Percentile Queue Length (ft.)[1] AM	95th Percentile Queue Length (ft.)[1] PM	Acceptable?[1] AM	Acceptable?[1] PM
44	I-215 SB Ramps / Alessandro Bl.						
		SBL	530	103	104	Yes	Yes
		SBL/R	1,040	97	115	Yes	Yes
		SBR	530	91	106	Yes	Yes
45	I-215 NB Ramps / Alessandro Bl.						
		NBL	380	648 [2]	293 [2]	**No** [3]	Yes
		NBL/R	1,300	693 [2]	300 [2]	Yes	Yes
		NBR	380	121	131	Yes	Yes
54	I-215 SB Ramps / Cactus Av.						
		NBR	1,900	130	389 [2]	Yes	Yes
		SBR	1,125	466 [2]	70	Yes	Yes
		SBR	500	462 [2]	69	Yes	Yes
55	I-215 NB Ramps / Cactus Av.						
		NBL	130	440 [2]	97	**No** [3]	Yes
		NBT	1,700	333	154	Yes	Yes
		NBR	2,175	NOM	NOM	Yes	Yes
81	Nason St. / SR-60 WB Ramps						
		WBL	1,350	228	304	Yes	Yes
		WBT	1,690	24	37	Yes	Yes
		WBR	170	NOM	NOM	Yes	Yes
82	Nason St. / SR-60 EB Ramps						
		EBL/T	780	49	329 [2]	Yes	Yes
		EBR	1,260	589 [2]	446	Yes	Yes
		EBR	250	NOM	NOM	Yes	Yes
87	Redlands Bl. / SR-60 WB Ramps						
		WBL	1,350	77	83	Yes	Yes
		WBT	1,690	NOM	NOM	Yes	Yes
		WBR	170	NOM	NOM	Yes	Yes
88	Redlands Bl. / SR-60 EB Ramps						
		EBL	1,350	94	146	Yes	Yes
		EBT	1,690	NOM	NOM	Yes	Yes
		EBR	170	84	49	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided.
An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.
NOM = Nominal, less than 10 ft.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Although 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent lane has sufficient storage to accommodate any spillover without spilling back and affecting the Freeway mainline.

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6 HORIZON YEAR (2045) WITH PROJECT TRAFFIC CONDITIONS

This section discusses the traffic forecasts for Horizon Year (2045) With Project and the resulting intersection operations and traffic signal warrant analyses.

6.1 ACCESS TO PROJECT PLANNING AREAS

Exhibit 2-1 (previously presented) illustrates the intersections analysis locations and access points in the focus study area, with Project access locations to be utilized in LOS analysis. Vehicle access to each PA is oriented primarily to adjacent General Plan roadways (Cactus Avenue, Nason Street, Lasselle Street, Iris Avenue, Oliver Street, and Brodiaea Street), as described below.

PA-1 is located between Lasselle Street and Morrison Street from Brodiaea Avenue to Cactus Avenue.

For purposes of this transportation analysis, PA-1 is assumed to be comprised of 1,000 low-rise multi-family dwelling units, and 200 mid-rise multi-family dwelling units, an active park, and is evaluated with two full access locations:

- PA-1 Access 1, the north leg of intersection #34 on Cactus Avenue.
- PA-1 Access 2, the south leg of intersection #33 on Brodiaea Avenue opposite the future extension of Darwin Drive from Alessandro Boulevard to Brodiaea Avenue.

PA-2 encompasses the project area from Lasselle Street to Nason Street south of Cactus Avenue. The southern boundary of PA-2 is John F Kennedy Drive and the existing high school, Casa Encantador Road, and the flood control channel. PA-2 includes the town center (49,900 square foot shopping center and 300-room hotel), elementary and middle schools, active parks, and residential land uses.

For purposes of this LOS analysis, the residential component of PA-2 is assumed to be comprised of 4,000 low-rise multi-family dwelling units and 6,000 mid-rise multi-family dwelling units.

There are 7 proposed full access locations for analysis of PA-2:

- PA-2 Access 1, the south leg of intersection #34 on Cactus Avenue.
- PA-2 Access 2, the south leg of intersection #16 on Cactus Avenue at the S. Hospital Access.
- PA-2 Access 3, the west leg of intersection #20 on Nason Street at Delphinium Avenue.
- PA-2 Access 4, the west leg of intersection #36 on Nason Street.
- PA-2 Access 5, the west leg of intersection #37 on Nason Street.
- PA-2 Access 6, the extension of John F. Kennedy Drive east of Lasselle Street and east of the existing high school entrance.
- PA-2 Access 7, the east leg of intersection #11 on Lasselle Street at Delphinium Avenue.

PA-3 encompasses the area bounded by Nason Street, Delphinium Avenue, Evergreen Street, and the flood control channel. For purposes of this LOS analysis, PA-3 is assumed to be comprised of 1,500 low-rise multi-family dwelling units and 900 mid-rise multi-family dwelling units, along with active park land uses. PA-3 is evaluated with three full access intersections:

- PA-3 Access 1, the east leg of intersection #36 on Nason Street.
- PA-3 Access 2, the west leg of intersection #25 on Oliver Street at John F. Kennedy Drive.
- PA-3 Access 3, the east leg of intersection #35 on Nason Street.

PA-4 encompasses the area bounded by the flood control channel, John F. Kennedy Drive, Oliver Street, Kaiser Permanente Moreno Valley, Iris Avenue, and Nason Street. For purposes of this transportation analysis, PA-4 is assumed to be comprised of 950 low-rise multi-family dwelling units, 400 mid-rise multi-family dwelling units, an elementary school, and active parks. PA-4 is evaluated with two full access intersections:

- PA-4 Access 1, the east leg of intersection #38 on Nason Street.
- PA-4 Access 2, the west leg of intersection #41 on Oliver Street.

For traffic analysis purposes, **PA-5** is comprised of 50 low-rise multi-family dwelling units. PA-5 is located at the northwest corner of Nason Street at Iris Avenue. PA-5 is evaluated with two right turn in/out only access driveways:

- PA-5 Access 1, the north leg of restricted intersection #40 on Iris Avenue.
- PA-5 Access 2, the west leg of restricted intersection #39 on Nason Street.

Regional access to the Project site is available from the SR-60 Freeway via the Nason Street interchange.

6.2 HORIZON YEAR (2045) WITH PROJECT TRAFFIC PROJECTIONS

The RIVCOM model was utilized to prepare LOS volume forecasts for the Horizon Year (2045) analysis scenarios. RIVCOM is a trip-based (4-step) travel demand forecasting model. Trip-based models use origin-destination pairing between geographical locations (TAZs) according to the following sequence:

- Trip Generation,
- Trip Distribution,
- Mode Choice,
- Network Assignment

RIVCOM is the Western Riverside County Council of Government's (WRCOG) latest update to the Riverside County Transportation Analysis Model (RIVTAM) and consistent with *Connect SoCal 2020*, Southern California Association of Government's (SCAG's) 2020 Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS).

RIVCOM uses a model base year of 2018 and model future year of 2045 and is considered the most appropriate model for use in this Project due to the more recent land use and roadway information. The future year model land use dataset was reviewed against the City of Moreno Valley's pending and approved development project list to ensure all projects were reflected in future assumptions. The project is located in TAZ 1242.

The table below summarizes the RIVCOM Socio-Economic Data (SED) inputs that represent the Project:

Input	Value
Multi-Family Residential DUs	15,000
Total Residents (2.87 persons per household)	43,050
Retail Employment	125
Hotel Employment	100
School Employment	504
Park Employment	75
Total Employment	**804**
Total K-12 Students	6,044

While the City has identified RIVCOM as the most appropriate tool to prepare forecasts, it is a macroscopic model that lacks sensitivity to the project design features and TDM measures proposed. For example, RIVCOM does not take into account bike lanes or bike share, does not account for intersection density, or unbundle residential parking costs from property costs. To more accurately reflect the Project trip making behavior from these design features, Urban Crossroads post processed the model assignment outputs.

The RIVCOM Project TAZ traffic assignment does not account for the internalization or mode shift estimated in the Project's trip generation estimates that consider its mixed-use nature, site design, and the effect of proposed TDM measures. As shown in *Aquabella Master Plan Development Project Trip Generation Assessment (Fehr & Peers, June 2023)* (7), reductions were taken to the trip generation estimates to account for on-site internalization, shifts to active modes and transit, and the relationship between the adjacent medical centers and the existing high school.

The Project TAZ trip tables were adjusted to reflect the same intrazonal relationship as was estimated in the Project trip generation estimates.

Following review of preliminary model runs, Fehr & Peers found that RIVCOM did not account for the anticipated relationship between the World Logistics Center (WLC) (9) and the Project, given that the intent of the Project is to serve as workforce housing for WLC and both are being developed by the same landowner. Following discussions with the Project team related to economic forecasts, it is anticipated that approximately 25 percent (one quarter) of the 22,653 forecast (year 2045) employees at WLC would live at the Project. This would equate to 5,663 Project residents (13 percent of Project residents). Given the active transportation options and TDM measures proposed by the Project, Fehr & Peers estimated that 6,726 daily vehicle trips (or 3,363 round trips) would occur between the Project and WLC assuming a 1.5 vehicle occupancy and a ten percent shift to active modes (consistent with the reductions assumed in the trip generation assessment). This relationship was used to adjust the RIVCOM trip tables to reflect the Project's synergy with WLC. Since the WLC does not exist in existing conditions, this relationship was only adjusted in the future (2045) conditions modeling.

The refined future peak hour approach and departure volumes obtained from the model output data are then entered into a spreadsheet program consistent with the National Cooperative Highway Research Program (NCHRP Report 765), along with initial estimates of turning movement proportions.

A linear programming algorithm is used to calculate individual turning movements which match the known directional roadway segment forecast volumes computed in the previous step. This program computes a likely set of intersection turning movements from intersection approach counts and the initial turning proportions from each approach leg.

The future Horizon Year (2045) Without Project peak hour turning movements were then reviewed by Urban Crossroads, Inc. for reasonableness, to ensure incorporation of background ambient growth and known cumulative projects, and in some cases, were adjusted to achieve flow conservation, reasonable growth, and reasonable diversion between parallel routes. Flow conservation checks ensure that traffic flow between two closely spaced intersections, such as two adjacent driveway locations, is verified in order to make certain that vehicles leaving one intersection are entering the adjacent intersection and that there is no unexplained loss of vehicles. The result of this traffic forecasting procedure is a series of traffic volumes which are suitable for traffic operations analysis.

Cumulative development projects included in the analysis are listed in Table 6-1.

Exhibits 6-1 to 6-3 present the Horizon Year (2045) With Project **AM** peak hour intersection volumes. Focus area intersection volumes are shown on Exhibit 6-1. Westerly and easterly study area volumes are provided on Exhibits 6-2 and 6-3, respectively.

Exhibits 6-4 to 6-6 present the Horizon Year (2045) With Project **PM** peak hour intersection volumes. Focus area intersection volumes are shown on Exhibit 6-4. Westerly and easterly study area volumes are provided on Exhibits 6-5 and 6-6, respectively.

Exhibits 6-7 to 6-9 present the Horizon Year (2045) With Project **daily** roadway segment volumes. Focus area daily volumes are shown on Exhibit 6-7. Westerly and easterly study area daily volumes are provided on Exhibits 6-8 and 6-9, respectively.

6.3 HORIZON YEAR (2045) WITH PROJECT INTERSECTION OPERATIONS

Horizon Year (2045) With Project traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 Methodologies of this TA. The Horizon Year (2045) intersection analysis results for With Project conditions are summarized in Table 6-2, which includes Project -related circulation improvements needed for site access as well as maintenance of acceptable LOS conditions.

A comprehensive list of off-site intersection improvements needed to serve Horizon Year (2045) With Project traffic conditions is provided in Table 8-1 (Section 8 of this report).

The intersection operations analysis worksheets for Horizon Year (2045) With Project traffic conditions are included in Appendix 6.1.

Horizon Year (2045) With Project peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TA.

TABLE 6-1: CUMULATIVE DEVELOPMENT LAND USE SUMMARY

#	Project Name	Land Use[1]	Quantity	Units[2]
1	Tract 36933	Single Family Housing (50%)	138	DU
2	Rocas Grandes II	Multifamily Housing (Low-Rise)	460	DU
3	Tract 32408	Single Family Housing	80	DU
4	Alessandro Walk	Single Family Detached Residential	227	DU
		Office	3.150	TSF
5	Tract 31618	Single Family Housing	56	DU
6	Crystal Cove Apartments	Multifamily Housing (Low-Rise)	192	DU
7	World Logistics Center	High-Cube Logistics Center	40,400.000	TSF
		Light Logistics	200.000	TSF
		SCG Valve/Metering Station	0.150	TSF
		SDG&E Gas Compression Station	30.800	TSF
		Fire Station	1	Site
		Gas Station w/ Market	12	VFP
		Convenience Store	3.0	TSF
8	Town Center at Moreno Valley SP	Single Family Housing	800	DU
		Parks	4.8	AC
		Hotel	106	RM
		Office	15.0	TSF
		Public Library	30.0	TSF
		High Turnover Sit-Down Restaurant	16.660	TSF
		Fast-Food Restaurant w/ Drive-Thru	3.5	TSF
		Retail	60.890	TSF
		Supermarket	45.000	TSF
9	Moreno Valley Elementary School	Elementary School	950	STU
10	Tract 38123	Single Family Housing	195	DU
11	Nason Marketplace	Hotel	84	RM
		Gas Station w/ Market	16	VFP
		Retail	24.547	TSF
		Coffee Shop w/ Drive-Thru	3.059	TSF
12	Village at Moreno Valley	Gas Station w/ Market	18	VFP
		Retail	33	TSF
		Fast-Food Restaurant w/ Drive-Thru	9.956	TSF
		Fast-Food Restaurant w/o Drive-Thru	4.5	TSF
		High Turnover Sit-Down Restaurant	4.5	TSF
13	TR31590	Single Family Detached Residential	96	DU
14	Rocas Grandes	Multifamily Housing (Low-Rise)	420	DU
15	TR38236	Single Family Detached Residential	204	DU
16	TR38237	Single Family Detached Residential	67	DU
17	Rancho Bella Vista Specific Plan	Single Family Detached Residential	745	DU
18	Moreno Beach Gas Station	Gas Station w/ Market	16	VFP
19	PM 37942 - 7 Commercial Lots	Medical-Dental Office	32.0	TSF
		General Office	40.0	TSF
		Gas Station w/ Market	12	VFP
		Fast-Food with Drive-Thru	5.600	TSF
		High-Turnover Sit-Down Restaurant	3.500	TSF
		Retail	4.500	TSF
20	Flamingo Apartments	Multifamily Housing (Low-Rise)	88	DU
21	Alessandro/Lasselle Commercial	Convenience market/gas station	16	VFP
		Fast-Food Restaurant w/ Drive-Thru	6.64	TSF
		High-Turnover Sit-Down Restaurant	7.25	TSF
		Shopping Center	3.20	TSF
		General Office Bldg.	9.90	TSF
		Car wash	3.85	TSF
		Bank w/ Drive-Thru	3.775	TSF
22	TTM38443 (APN: 488190028)	Single Family Detached Residential	133	DU
23	TTM38442 (APN: 488210020)	Single Family Detached Residential	108	DU
24	Kaiser	Hospital Expansion[2]		

[1] DU = Dwelling Units; TSF = Thousand Square Feet; VFP = Vehicle Fueling Position; STU = Students; RM= Rooms; AC = Acres

[2] Source: Kaiser Permanente Moreno Valley Medical Center Master Plan Traffic Impact Analysis (October 2019). Prepared by LSA.

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EXHIBIT 6-1: FOCUS STUDY AREA
HORIZON YEAR (2045) WITH PROJECT AM PEAK HOUR INTERSECTION VOLUME

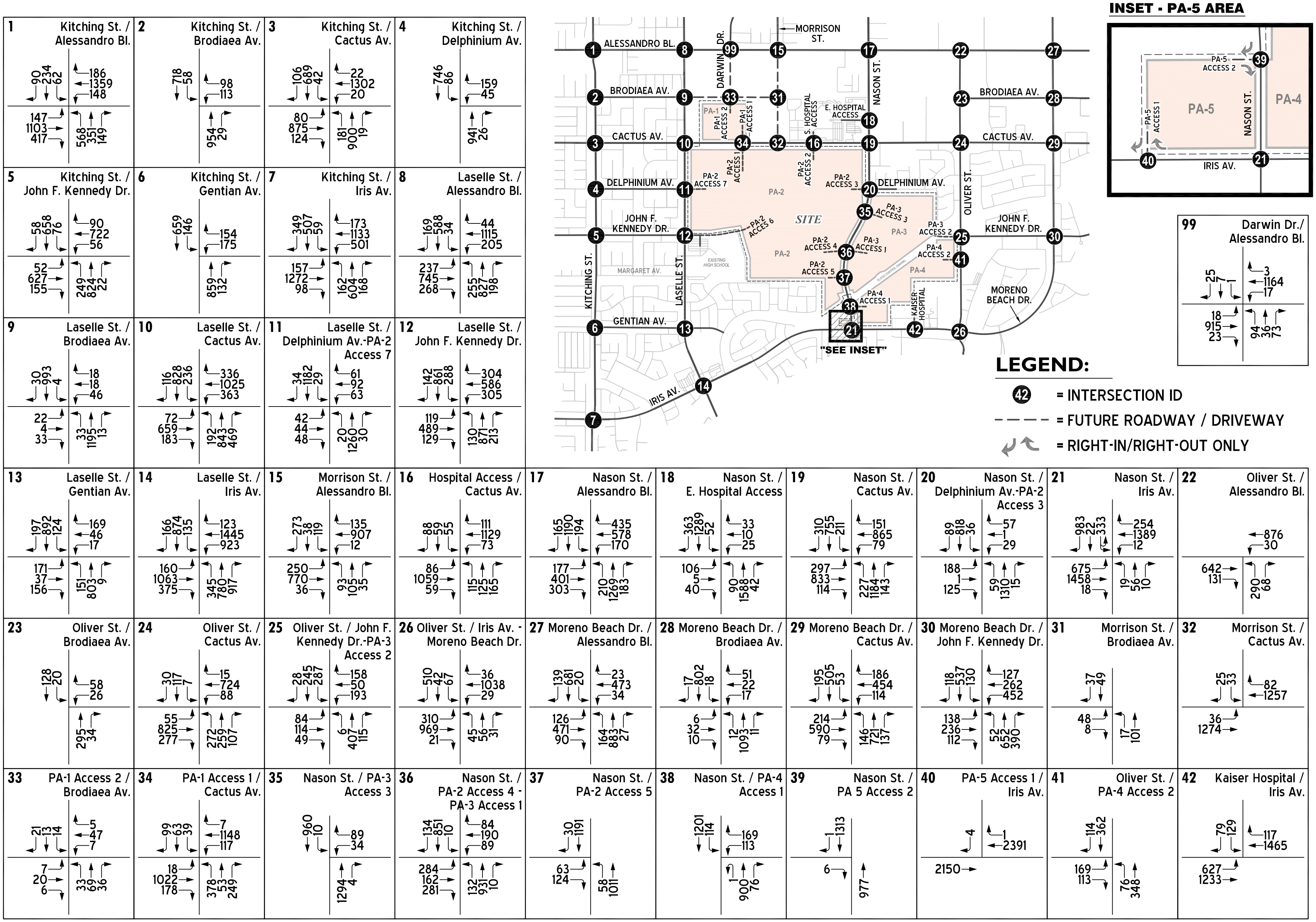


EXHIBIT 6-2: EXTENDED WESTERLY STUDY AREA
HORIZON YEAR (2045) WITH PROJECT AM PEAK HOUR INTERSECTION VOLUMES

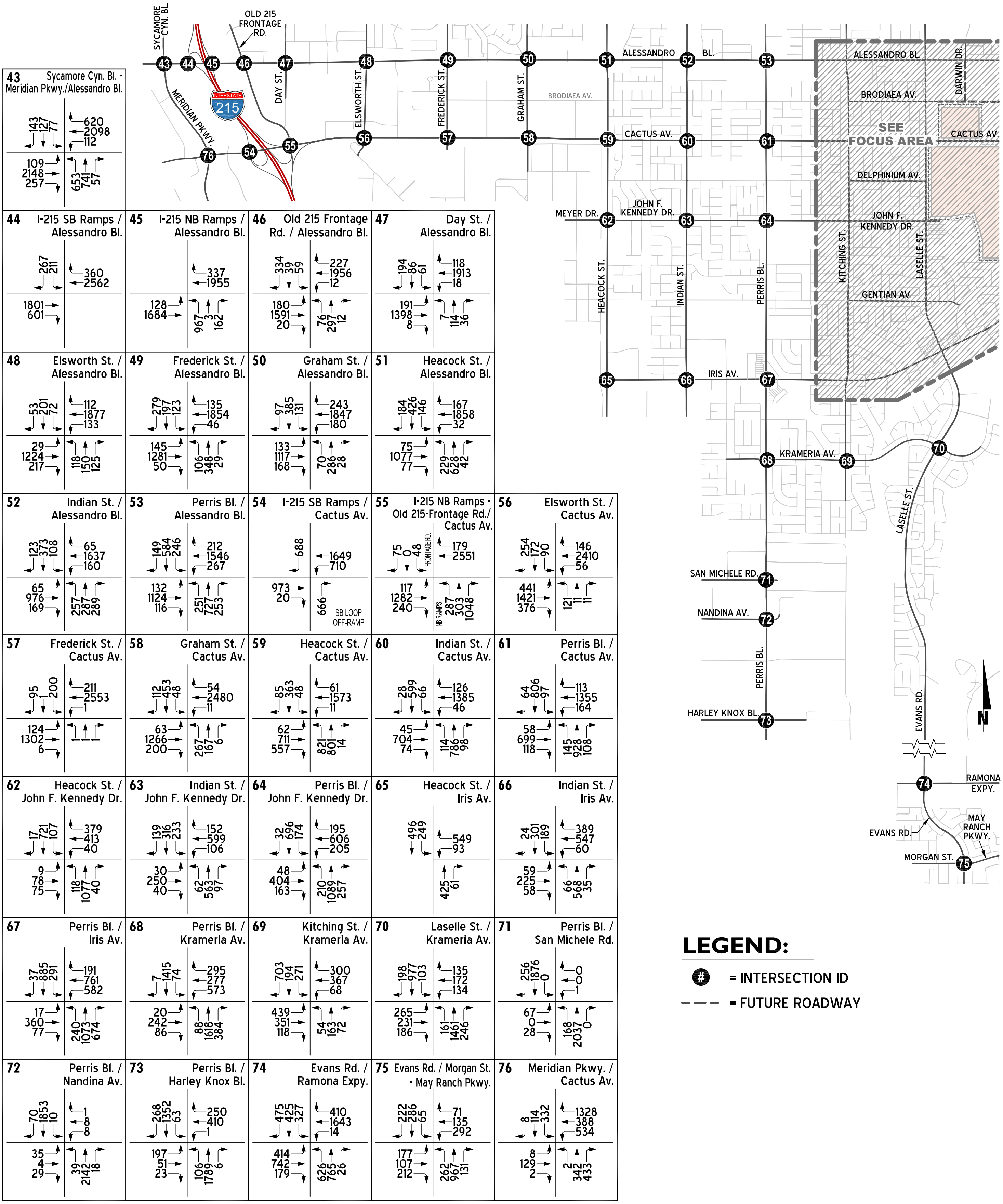


EXHIBIT 6-3: EXTENDED EASTERLY STUDY AREA
HORIZON YEAR (2045) WITH PROJECT AM PEAK HOUR INTERSECTION VOLUMES

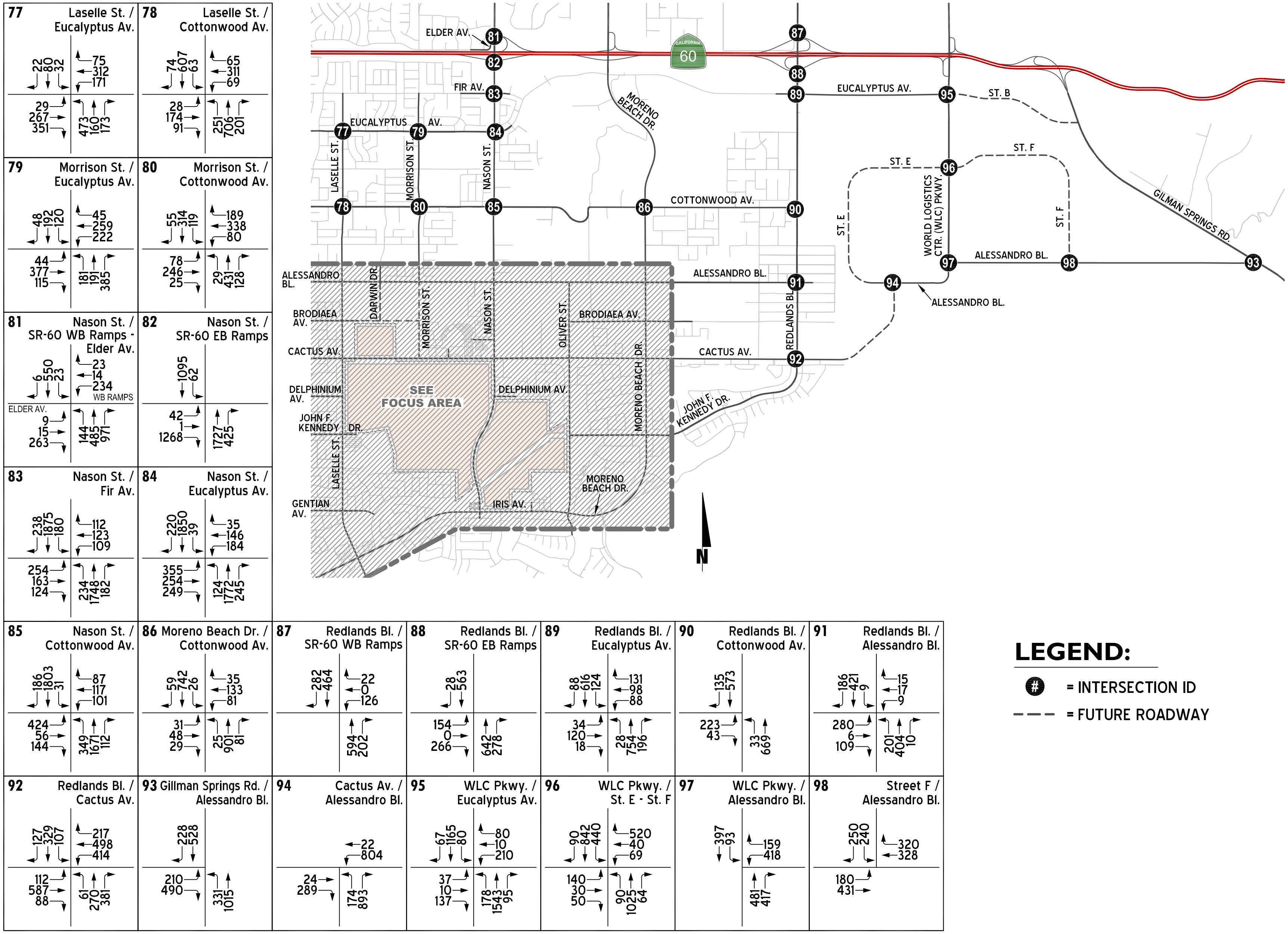


EXHIBIT 6-4: FOCUS STUDY AREA
HORIZON YEAR (2045) WITH PROJECT PM PEAK HOUR INTERSECTION VOLUMES

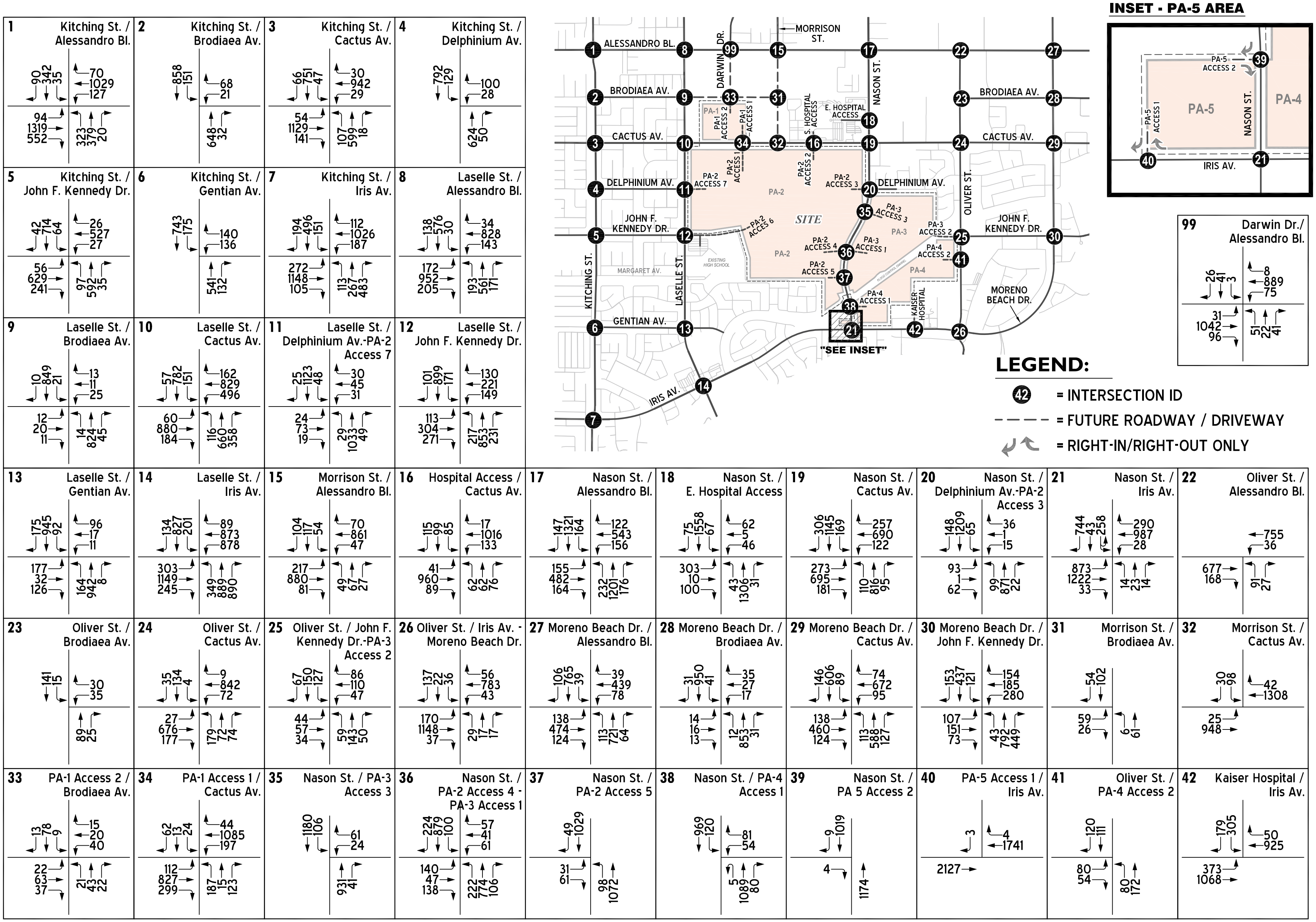
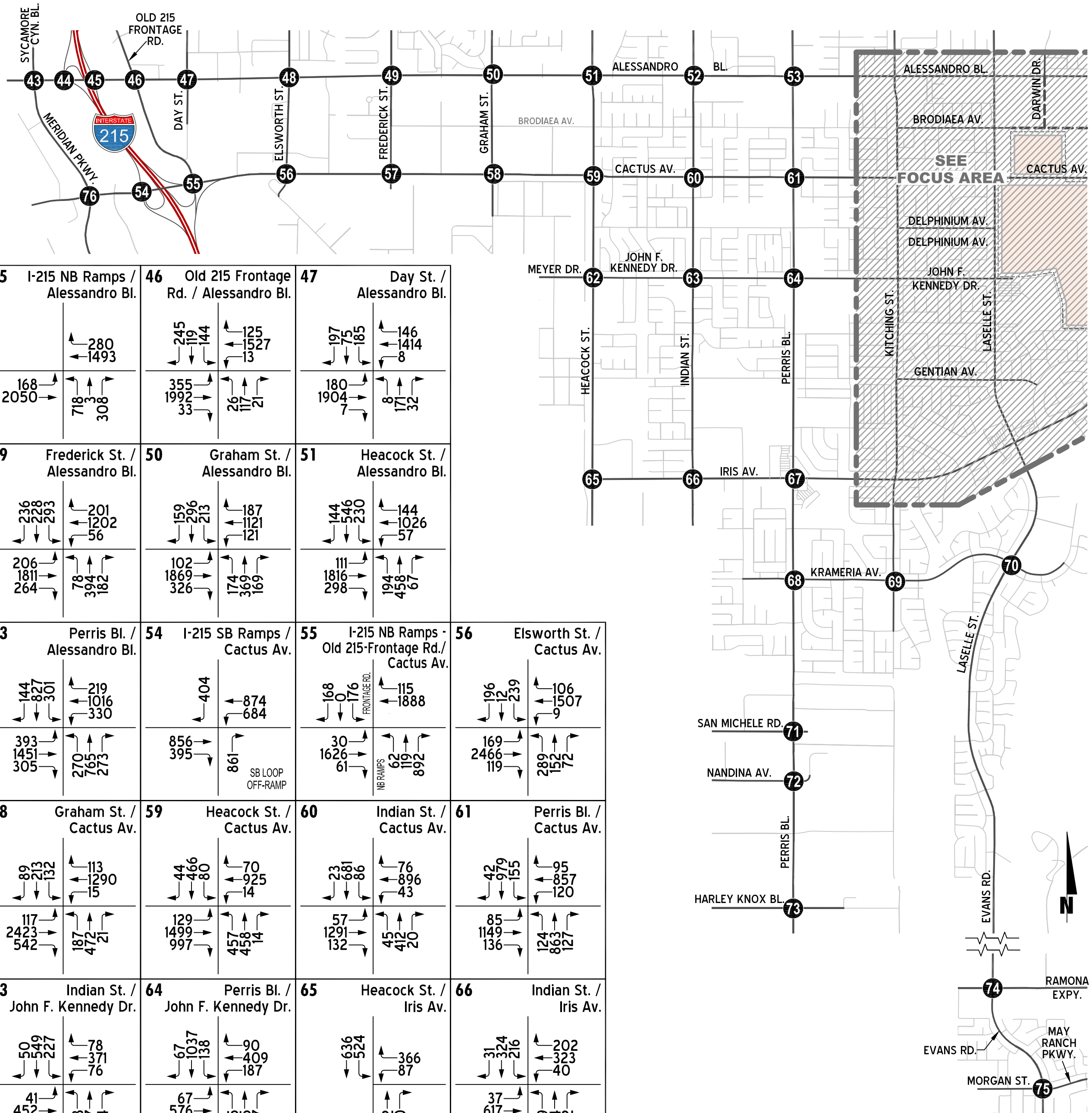


EXHIBIT 6-5: EXTENDED WESTERLY STUDY AREA
HORIZON YEAR (2045) WITH PROJECT PM PEAK HOUR INTERSECTION VOLUMES

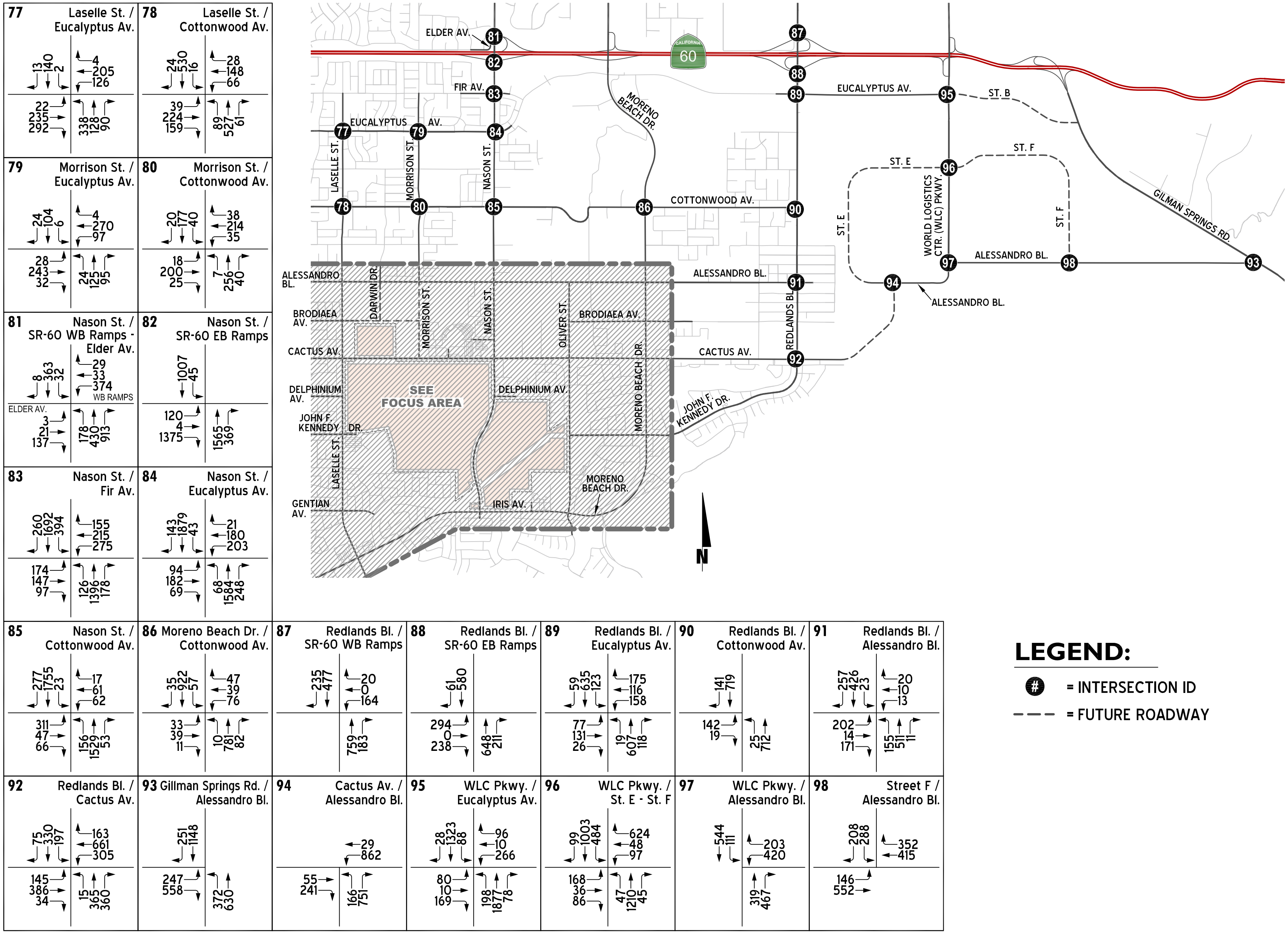


43	Sycamore Cyn. Bl. - Meridian Pkwy./Alessandro Bl.	243, 430, 207	376, 1828, 180	185, 2399, 470	437, 424, 157
44	I-215 SB Ramps / Alessandro Bl.	345, 185	171, 2040	2139, 606	
45	I-215 NB Ramps / Alessandro Bl.		280, 1493	168, 2050	718, 3, 308
46	Old 215 Frontage Rd. / Alessandro Bl.	245, 119, 144	125, 1527, 13	355, 1992, 33	26, 117, 21
47	Day St. / Alessandro Bl.	197, 75, 185	146, 1414, 8	180, 1904, 7	8, 171, 32
48	Elsworth St. / Alessandro Bl.	47, 138, 106	123, 1247, 125	128, 1808, 157	280, 337, 285
49	Frederick St. / Alessandro Bl.	236, 228, 293	201, 1202, 56	206, 1811, 264	78, 394, 182
50	Graham St. / Alessandro Bl.	159, 296, 213	187, 1121, 121	102, 1869, 326	174, 369, 169
51	Heacock St. / Alessandro Bl.	144, 546, 230	144, 1026, 57	111, 1816, 298	194, 458, 67
52	Indian St. / Alessandro Bl.	55, 333, 148	72, 931, 304	90, 1581, 274	155, 284, 170
53	Perris Bl. / Alessandro Bl.	144, 827, 301	219, 1016, 330	393, 1451, 305	270, 765, 273
54	I-215 SB Ramps / Cactus Av.	404	874, 684	856, 395	861 (SB LOOP OFF-RAMP)
55	I-215 NB Ramps - Old 215-Frontage Rd./ Cactus Av.	168, 0, 176 (FRONTAGE RD.)	115, 1888	30, 1626, 61	(NB RAMPS) 62, 119, 892
56	Elsworth St. / Cactus Av.	196, 12, 239	106, 1507, 9	169, 2466, 119	289, 152, 72
57	Frederick St. / Cactus Av.	102, 1, 468	172, 1349, 3	176, 2613, 1	8, 1, 6
58	Graham St. / Cactus Av.	89, 213, 132	113, 1290, 15	117, 2423, 542	187, 472, 21
59	Heacock St. / Cactus Av.	44, 466, 80	70, 925, 14	129, 1499, 997	457, 458, 14
60	Indian St. / Cactus Av.	23, 681, 86	76, 896, 43	57, 1291, 132	45, 412, 20
61	Perris Bl. / Cactus Av.	42, 979, 155	95, 857, 120	85, 1149, 136	124, 863, 127
62	Heacock St. / John F. Kennedy Dr.	33, 999, 219	169, 213, 30	22, 343, 288	65, 779, 63
63	Indian St. / John F. Kennedy Dr.	50, 549, 227	78, 371, 76	41, 452, 85	53, 307, 84
64	Perris Bl. / John F. Kennedy Dr.	67, 1037, 138	90, 409, 187	67, 576, 101	165, 1045, 177
65	Heacock St. / Iris Av.	636, 524	366, 87		422, 180
66	Indian St. / Iris Av.	31, 324, 216	202, 323, 40	37, 617, 122	29, 184, 52
67	Perris Bl. / Iris Av.	23, 1068, 226	200, 479, 448	40, 704, 143	184, 905, 639
68	Perris Bl. / Krameria Av.	28, 1402, 117	141, 197, 422	23, 254, 92	57, 1603, 423
69	Kitching St. / Krameria Av.	460, 122, 124	232, 312, 36	453, 295, 33	34, 116, 22
70	Laselle St. / Krameria Av.	196, 1519, 112	85, 55, 42	170, 50, 219	268, 1424, 37
71	Perris Bl. / San Michele Rd.	130, 1750, 3	3, 1, 1	207, 1, 186	70, 1799, 2
72	Perris Bl. / Nandina Av.	77, 1810, 10	13, 9, 17	73, 9, 106	48, 1784, 13
73	Perris Bl. / Harley Knox Bl.	288, 1465, 168	163, 112, 3	346, 105, 56	44, 1246, 3
74	Evans Rd. / Ramona Expy.	554, 668, 330	281, 978, 15	514, 1455, 420	289, 564, 15
75	Evans Rd. / Morgan St. - May Ranch Pkwy.	91, 860, 101	105, 39, 192	121, 43, 98	91, 586, 300
76	Meridian Pkwy. / Cactus Av.	4, 690, 603	454, 146, 588	24, 259, 8	1, 299, 294

LEGEND:

- # = INTERSECTION ID
- – – – = FUTURE ROADWAY

EXHIBIT 6-6: EXTENDED WESTERLY STUDY AREA
HORIZON YEAR (2045) WITH PROJECT PM PEAK HOUR INTERSECTION VOLUMES



LEGEND:

- # = INTERSECTION ID
- - - - = FUTURE ROADWAY

EXHIBIT 6-7: FOCUS STUDY AREA
HORIZON YEAR (2045) WITH PROJECT AVERAGE DAILY TRAFFIC (ADT)

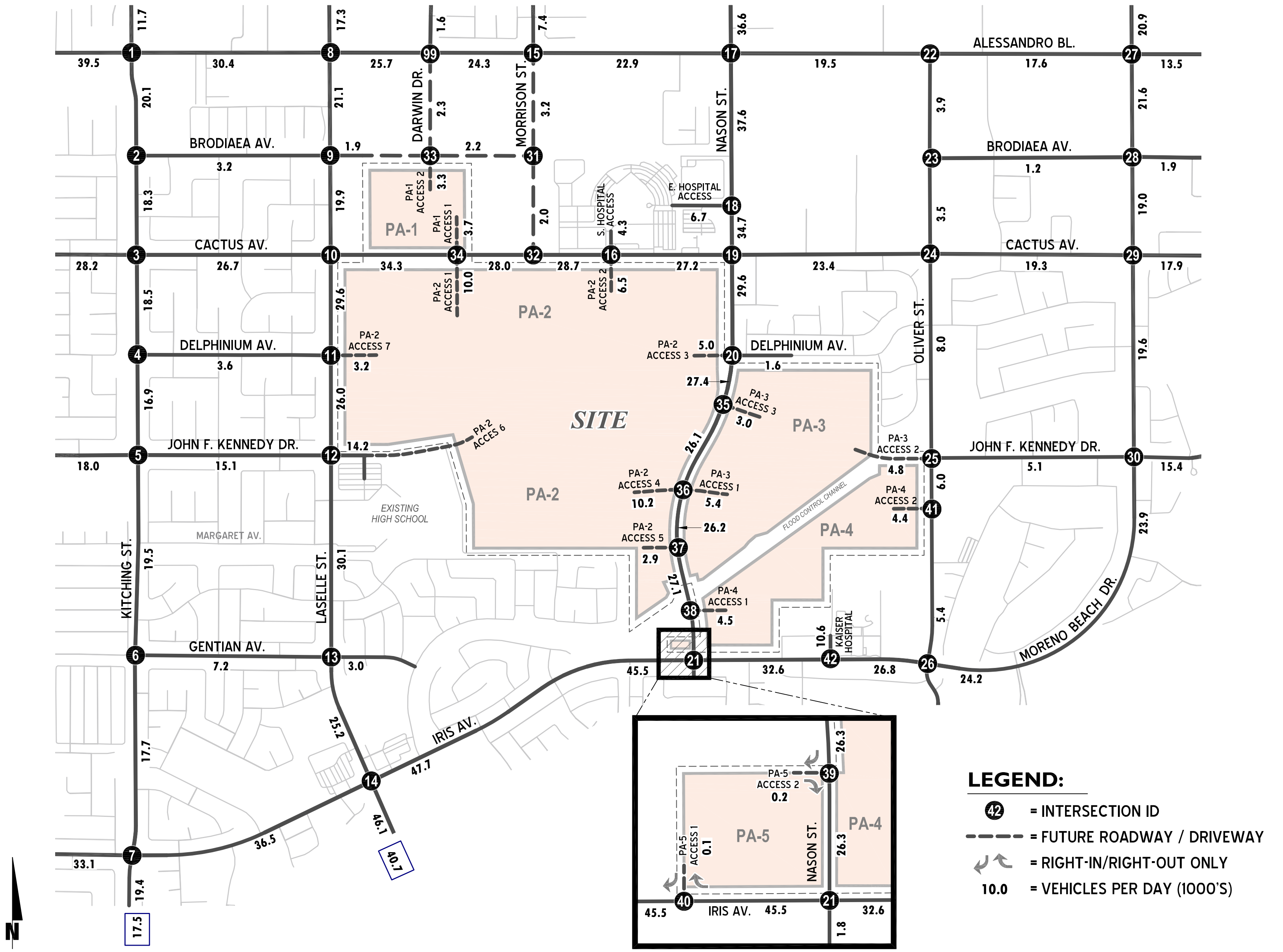


EXHIBIT 6-8: EXTENDED WESTERLY STUDY AREA
HORIZON YEAR (2045) WITH PROJECT AVERAGE DAILY TRAFFIC (ADT)

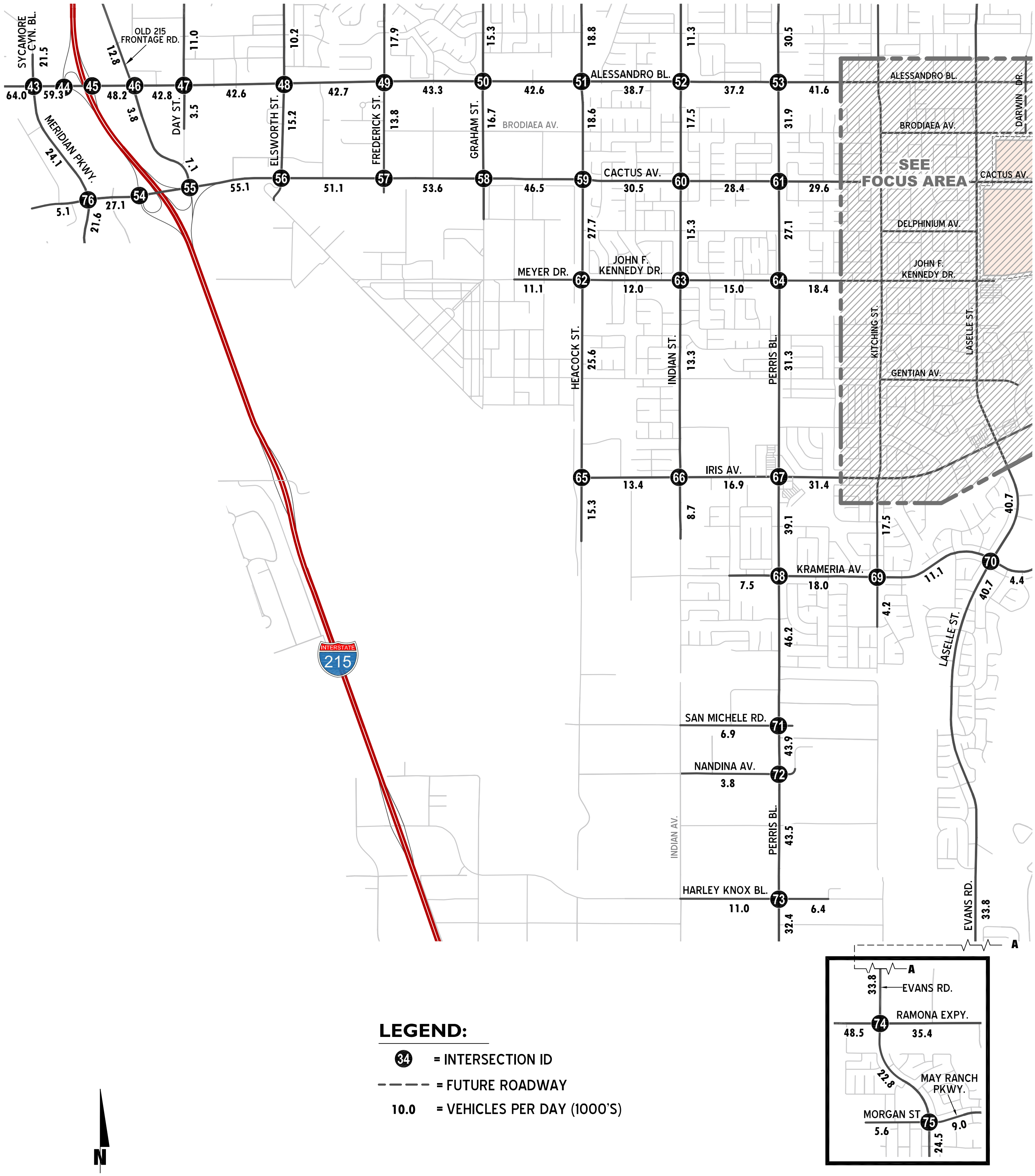


**EXHIBIT 6-9: EXTENDED EASTERLY STUDY AREA
HORIZON YEAR (2045) WITH PROJECT AVERAGE DAILY TRAFFIC (ADT)**

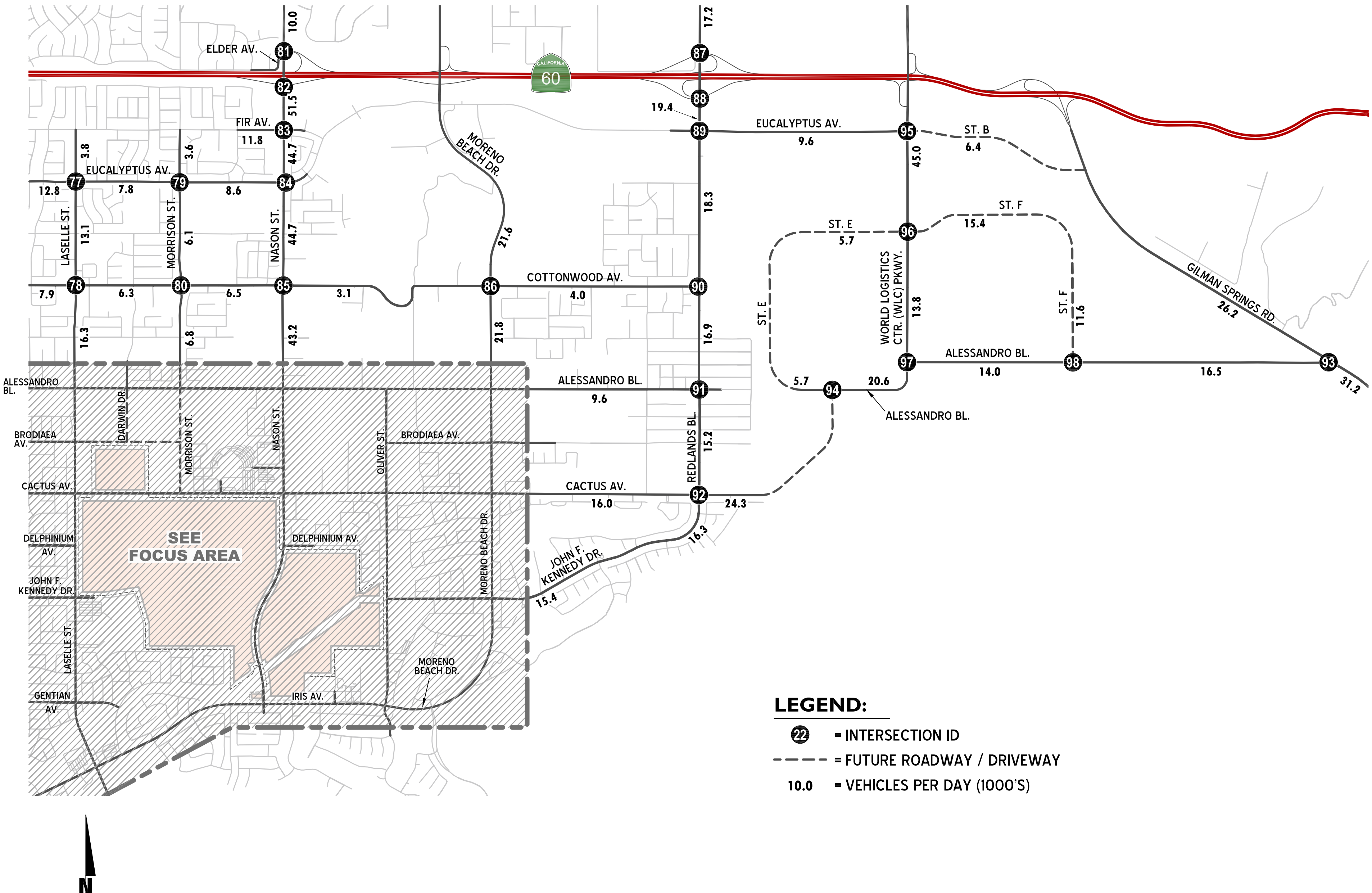


TABLE 6-2: INTERSECTION ANALYSIS FOR HORIZON YEAR (2045) WITH PROJECT

#	Intersection	Traffic Control[1]	Intersection Approach Lanes[2] Northbound L	T	R	Southbound L	T	R	Eastbound L	T	R	Westbound L	T	R	Delay[3] (secs.) AM	PM	Level of Service AM	PM	LOS Standard
1	Kitching St. / Alessandro Bl.	TS	2	1	0	1	2	0	1	2	1>	1	2	1>	53.6	38.5	D	D	D
2	Kitching St. / Brodiaea Av.																		
	Without Improvements:	AWS	0	2	0	1	2	0	0	0	0	0.5	0.5	d	76.4	21.4	**F**	C	C
	With Improvements:	**TS**	0	2	0	1	2	0	0	0	0	0.5	0.5	d	4.7	2.6	A	A	C
3	Kitching St. / Cactus Av.																		
	Without Improvements:	TS	1	2	0	1	1	1	1	2	0	1	2	0	63.2	54.2	**E**	**D**	C
	With Improvements:	TS	1	2	0	1	**2**	0	1	2	0	1	2	0	34.3	33.4	C	C	C
4	Kitching St. / Delphinium Av.																		
	Without Improvements:	CSS	0	1	0	0.5	0.5	0	0	0	0	0.5	0.5	d	>80	61.6	**F**	**F**	C
	With Improvements:	**TS**	0	**2**	0	0.5	**1.5**	0	0	0	0	0.5	0.5	d	4.7	3.9	A	A	C
5	Kitching St. / John F. Kennedy Dr.																		
	Without Improvements:	TS	0	1!	0	0	1!	0	1	2	0	1	2	d	>80	>80	**F**	**F**	C
	With Improvements:	TS	**1**	**2**	0	**1**	**2**	0	1	2	0	1	2	d	33.1	34.0	C	C	C
6	Kitching St. / Gentian Av.																		
	Without Improvements:	AWS	0	1	d	0.5	0.5	0	0	0	0	1	0	1	>80	>80	**F**	**F**	C
	With Improvements:	**TS**	0	**2**	0	0.5	**1.5**	0	0	0	0	1	0	1	8.4	7.6	A	A	C
7	Kitching St. / Iris Av.																		
	Without Improvements:	TS	1	2	0	1	2	0	1	2	0	1	2	1	>80	>80	**F**	**F**	C
	With Improvements[4]:	TS	1	2	0	1	2	**1**	1	2	0	**2**	2	1	54.9	54.4	**D**	**D**	C
8	Laselle St. / Alessandro Bl.																		
	Without Improvements:	TS	1	1	1>	1	1	0	1	1	1	1	1	1>	>80	>80	**F**	**F**	D
	With Improvements:	TS	1	1	1>	1	**2**	0	1	**3**	1	1	**3**	1>	52.8	37.1	D	D	D
9	Laselle St. / Brodiaea Av.																		
	Without Improvements:	CSS	1	2	0	1	2	0	0	1!	0	0	1!	0	>80	>80	**F**	**F**	D
	With Improvements:	**TS**	1	2	0	1	2	0	0	1!	0	0	1!	0	2.7	2.4	A	A	D
10	Laselle St. / Cactus Av.																		
	Without Improvements:	TS	1	2	1	1	2	d	1	2	0	1	2	1	69.0	73.9	**E**	**E**	C
	With Improvements[4]:	TS	1	2	1	1	2	d	1	2	0	1	2	**1>**	50.1	65.7	**D**	**E**	C
11	Laselle St. / Delphinium Av.- PA-2 Access 7	**TS**	1	2	0	**1**	2	d	0.5	0.5	d	**0.5**	**0.5**	**1**	7.6	7.3	A	A	C
12	Laselle St. / John F. Kennedy Dr.																		
	Without Improvements:	TS	1	2	d	1	2	d	1	2	d	1	2	d	47.8	41.8	**D**	**D**	C
	With Improvements:	TS	1	2	d	1	2	d	1	2	d	1	2	**1>**	33.9	34.6	C	C	C
13	Laselle St. / Gentian Av.	TS	1	2	0	1	2	d	1	1	1	1	1	0	45.4	35.4	D	D	D
14	Laselle St. / Iris Av.																		
	Without Improvements:	TS	2	2	1	2	2	d	2	3	d	2	3	0	>80	>80	**F**	**F**	D
	With Improvements[4]:	TS	2	2	**1>**	2	2	d	2	3	d	2	3	0	60.6	59.7	**E**	**E**	D
15	Morrison St. / Alessandro Bl.	TS	**1**	**1**	0	1	**1**	1>	1	**2**	0	**1**	2	1	36.9	24.5	D	C	D
16	Hospital Access - PA2 Access 2 / Cactus Av.	**TS**	**1**	**1**	**1**	1	1	0	1	2	0	**1**	2	0	44.4	31.3	D	C	D
17	Nason St. / Alessandro Bl.																		
	Without Improvements:	TS	1	2	1	1	3	1	2	1	1	2	1	1	>80	>80	**F**	**F**	D
	With Improvements:	TS	1	2	1	1	3	1	2	**2**	**1>**	2	**2**	**1>**	45.3	43.7	D	D	D
18	Nason St. / E. Hospital Access	TS	1	2	0	1	2	1	0.5	0.5	1	**0.5**	**0.5**	**1**	7.9	26.9	A	C	D
19	Nason St. / Cactus Av.																		
	Without Improvements:	TS	2	2	1	1	2	1	1	1	1	1	1	d	>80	>80	**F**	**F**	D
	With Improvements:	TS	2	2	1	1	2	**1>**	1	**2**	0	1	**2**	**1>**	54.1	37.0	D	D	D
20	Nason St. / Delphinium Av.- PA-2 Access 3	**TS**	**1**	2	d	1	2	**1**	**0.5**	**0.5**	**1**	0.5	0.5	d	8.4	18.4	A	B	C
21	Nason St. / Iris Av.																		
	Without Improvements:	TS	1	1	0	1	1	1	2	3	d	1	3	1	>80	>80	**F**	**F**	C
	With Improvements:	TS	1	1	0	**2**	1	**2>**	2	3	d	1	3	1	33.6	27.0	C	C	C
22	Oliver St. / Alessandro Bl.																		
	Without Improvements:	CSS	1	0	1	0	0	0	0	1	0	0.5	0.5	0	>80	>80	**F**	**F**	C
	With Improvements:	**TS**	1	0	1	0	0	0	0	**2**	0	0.5	**1.5**	0	13.9	14.6	B	B	C
23	Oliver St. / Brodiaea Av.	CSS	0	1	0	0.5	0.5	0	0	0	0	0.5	0	0.5	11.7	10.1	B	B	C

TABLE 6-2: INTERSECTION ANALYSIS FOR HORIZON YEAR (2045) WITH PROJECT

# Intersection	Traffic Control[1]	Intersection Approach Lanes[2] Northbound L	T	R	Southbound L	T	R	Eastbound L	T	R	Westbound L	T	R	Delay[3] (secs.) AM	PM	Level of Service AM	PM	LOS Standard
24 Oliver St. / Cactus Av.																		
Without Improvements:	TS	0.5	0.5	1	0.5	0.5	d	1	2	0	1	1	1	60.2	44.4	**E**	D	D
With Improvements:	TS	**1**	1	1	**1**	1	0	1	2	0	1	1	1	43.1	37.2	D	D	D
25 Oliver St. / John F. Kennedy Dr. - PA-3 Access 2	**TS**	**1**	2	0	**1**	**2**	0	**1**	**1**	**1**	1	1	0	33.0	18.0	C	B	C
26 Oliver St. / Iris Av. - Moreno Beach Dr.																		
Without Improvements:	TS	0.5	0.5	1	0.5	0.5	1	1	3	d	1	3	d	58.3	24.5	**E**	C	D
With Improvements:	TS	0.5	0.5	1	0.5	0.5	**1>**	1	3	d	1	3	d	52.8	22.7	D	C	D
27 Moreno Beach Dr. / Alessandro Bl.																		
Without Improvements:	TS	1	1	d	1	1	d	1	1	0	1	1	d	>80	72.1	**F**	**E**	D
With Improvements:	TS	1	**2**	0	1	**2**	0	1	**2**	0	1	**2**	0	32.9	34.6	C	C	D
28 Moreno Beach Dr. / Brodiaea Av.																		
Without Improvements:	CSS	1	1	1	1	2	d	0.5	0.5	d	0	1!	0	>80	>80	**F**	**F**	D
With Improvements:	**TS**	1	**2**	0	1	2	d	0.5	0.5	d	0	1!	0	8.1	8.2	A	A	D
29 Moreno Beach Dr. / Cactus Av.	TS	1	2	1	1	3	d	1	2	0	1	2	0	32.3	30.9	C	C	C
30 Moreno Beach Dr. / John F. Kennedy Dr.																		
Without Improvements:	TS	1	3	1	1	3	d	1	1	d	1	1	1	76.7	48.6	**E**	D	D
With Improvements:	TS	1	3	**1>**	1	3	d	1	1	d	1	1	1	44.0	39.2	D	D	D
31 Morrison St. / Brodiaea Av.	**CSS**	**0.5**	**0.5**	0	0	**1**	0	0	**1!**	0	0	0	0	9.9	10.1	A	B	C
32 Morrison St. / Cactus Av.	**TS**	0	0	0	**1**	0	**1**	**1**	2	0	0	2	0	13.8	9.3	B	A	C
33 Darwin Dr. - PA-1 Access 2 / Brodiaea Av.	**CSS**	**0.5**	**0.5**	**1**	0	**1!**	0	0	**1!**	0	0	**1!**	0	10.3	11.9	B	B	C
34 PA-1 Access 1 / Cactus Av.	**TS**	**1.5**	**0.5**	**1**	**1**	**1**	**1**	**1**	**2**	**1**	**1**	**2**	0	20.4	16.5	C	B	C
35 Nason St. / PA-3 Access 3	**TS**	0	2	0	**1**	2	0	0	0	0	**1**	0	**1**	2.5	2.9	A	A	C
36 Nason St. / PA-2 Access 4 - PA-3 Access 1	**TS**	**1**	2	0	**1**	2	**1**	**1**	**1**	**1**	**1**	**1**	0	18.6	13.9	B	B	C
37 Nason St. / PA-2 Access 5	**TS**	**1**	2	0	0	2	0	**1**	0	**1**	0	0	0	3.9	3.0	A	A	C
38 Nason St. / PA-4 Access 1	**TS**	0	2	0	**1**	2	0	0	0	0	**1**	0	**1**	9.0	4.4	A	A	C
39 Nason St. / PA 5 Access 2	**CSS**	0	2	0	0	2	0	0	0	**1**	0	0	0	14.5	12.7	B	B	C
40 PA-5 Access 1 / Iris Av.	**CSS**	0	0	0	0	0	**1**	0	3	0	0	3	0	23.4	20.9	C	C	C
41 Oliver St. / PA-4 Access 2	**TS**	**1**	2	0	0	**2**	0	**1**	0	**1**	0	0	0	8.9	7.5	A	A	C
42 Kaiser Hospital / Iris Av.	TS	0	0	0	1	0	1	**2**	3	0	0	3	d	22.4	15.4	C	B	D
43 Sycamore Cyn. Bl. - Meridian Pkwy. / Alessandro Bl.	TS	2	2	2>	2	2	1	1	3	1	2	3	1	32.2	39.4	C	D	D
44 I-215 SB Ramps / Alessandro Bl.	TS	0	0	0	1	1!	1	0	3	0	0	3	1>>	2.6	4.2	A	A	D
45 I-215 NB Ramps / Alessandro Bl.	TS	1	1!	1	0	0	0	1	3	0	0	3	0	16.0	16.2	B	B	D
46 Old 215 Frontage Rd. / Alessandro Bl.	TS	2	2	1	1	2	1>>	2	3	1	1	2	1	13.5	12.2	B	B	D
47 Day St. / Alessandro Bl.																		
Without Improvements:	TS	1	1	d	1	1	0	1	3	0	1	2	1	79.3	23.7	**E**	C	D
With Improvements:	TS	1	1	d	1	1	0	1	3	0	1	**3**	0	21.0	19.5	C	B	D
48 Elsworth St. / Alessandro Bl.	TS	1	1	1	1	1	1	1	3	d	1	3	d	41.7	44.0	D	D	D
49 Frederick St. / Alessandro Bl.	TS	2	2	0	2	2	1	1	2	1	1	3	0	31.5	32.6	C	C	D
50 Graham St. / Alessandro Bl.																		
Without Improvements:	TS	1	2	0	1	2	0	1	2	1	1	3	d	>80	61.6	**F**	**E**	D
With Improvements:	TS	1	2	0	1	2	0	1	**3**	1	1	3	d	22.8	32.4	C	C	D
51 Heacock St. / Alessandro Bl.	TS	1	2	d	1	2	d	1	3	1>	1	3	d	35.4	34.4	D	C	D
52 Indian St. / Alessandro Bl.	TS	1	2	0	1	2	0	1	3	d	1	3	d	41.0	45.3	D	D	D
53 Perris Bl. / Alessandro Bl.																		
Without Improvements:	TS	1	3	0	1	2	1	2	2	1	2	3	d	49.6	>80	D	**F**	D
With Improvements:	TS	1	3	0	1	**3**	0	2	**3**	**1>**	2	3	d	43.5	53.4	D	D	D
54 I-215 SB Ramps / Cactus Av.																		
Without Improvements:	TS	0	0	1>>	0	0	1	0	2	1	1	2	0	>80	57.4	**F**	**E**	D
With Improvements:	TS	0	0	1>>	0	0	**2**	0	2	1	1	2	0	51.9	48.0	D	D	D
55 I-215 NB Ramps / Cactus Av.																		
Without Improvements:	TS	1	1	1>>	1	1	0	1	2	d	0	2	0	>80	48.9	**F**	D	D
With Improvements:	TS	1	1	1>>	1	1	0	1	2	d	0	**3**	**1**	52.7	26.7	D	C	D
56 Elsworth St. / Cactus Av.																		
Without Improvements:	TS	1	1!	1	1.5	0.5	1	1	3	1>>	1	3	1	>80	30.1	**F**	C	D
With Improvements:	TS	1	1!	1	1	**1!**	1	**2**	3	1>>	1	3	1	38.1	27.7	D	C	D

TABLE 6-2: INTERSECTION ANALYSIS FOR HORIZON YEAR (2045) WITH PROJECT

#	Intersection	Traffic Control[1]	Northbound L	Northbound T	Northbound R	Southbound L	Southbound T	Southbound R	Eastbound L	Eastbound T	Eastbound R	Westbound L	Westbound T	Westbound R	Delay[3] (secs.) AM	Delay[3] (secs.) PM	Level of Service AM	Level of Service PM	LOS Standard
57	Frederick St. / Cactus Av.	TS	1	1	d	2	1	0	1	3	d	1	3	1>	15.6	20.4	B	C	D
58	Graham St. / Cactus Av.	TS	2	2	0	1	2	1>	1	3	1	1	3	0	26.8	27.2	C	C	D
59	Heacock St. / Cactus Av.	TS	2	2	0	1	2	0	1	2	1>	1	2	0	54.6	34.6	D	C	D
60	Indian St. / Cactus Av.	TS	1	2	0	1	2	0	1	2	0	1	2	0	34.3	30.0	C	C	C
61	Perris Bl. / Cactus Av.[4]	TS	1	3	0	1	3	0	1	2	0	1	2	0	43.3	42.7	**D**	**D**	C
62	Heacock St. / John F. Kennedy Dr.	TS	1	2	d	1	2	0	1	1	1	1	2	0	31.7	34.2	C	C	D
63	Indian St. / John F. Kennedy Dr.[4]	TS	1	2	0	1	2	0	1	1	1	1	2	d	37.5	37.2	**D**	**D**	C
64	Perris Bl. / John F. Kennedy Dr.	TS	1	3	0	1	3	0	1	2	d	1	2	d	42.7	37.7	D	D	D
65	Heacock St. / Iris Av.	TS	0	2	1	2	2	0	0	0	0	2	0	1	25.0	20.3	C	C	D
66	Indian St. / Iris Av.	TS	1	2	0	1	2	0	2	2	1	2	2	0	39.7	32.1	D	C	D
67	Perris Bl. / Iris Av.																		
	Without Improvements:	TS	1	3	1	1	3	0	1	2	0	1	2	d	>80	>80	**F**	**F**	D
	With Improvements:	TS	1	3	1>	1	3	0	1	2	0	1	2	d	48.9	54.8	D	D	D
68	Perris Bl. / Krameria Av.																		
	Without Improvements:	TS	1	3	0	1	3	0	0.5	0.5	1	0.5	0.5	1	>80	>80	**F**	**F**	D
	With Improvements:	TS	1	3	0	1	3	0	1	1	1	1.5	0.5	1>	54.2	47.3	D	D	D
69	Kitching St. / Krameria Av.																		
	Without Improvements:	TS	1	1	1	1	1	1	1	2	0	1	2	0	>80	73.3	**F**	**E**	C
	With Improvements:	TS	1	1	1	1	1	1>	1	2	0	1	2	0	34.6	33.1	C	C	C
70	Laselle St. / Krameria Av.																		
	Without Improvements:	TS	1	2	1>	1	2	0	1	1	1	1	1	1	50.6	51.8	**D**	**D**	C
	With Improvements[4]:	TS	1	2	1>	1	2	0	1	1	1>	1	1	1	47.1	47.4	**D**	**D**	C
71	Perris Bl. / San Michele Rd.	TS	1	3	0	1	3	1	1	1	1	1	1	1	10.2	14.2	B	B	D
72	Perris Bl. / Nandina Av.	TS	1	3	0	1	3	1	1	2	0	1	1	1	6.2	8.4	A	A	D
73	Perris Bl. / Harley Knox Bl.	TS	2	3	1	2	3	1	1	2	1	2	3	1	33.1	33.8	C	C	D
74	Evans Rd. / Ramona Expy.																		
	Without Improvements:	TS	2	2	d	2	2	1	2	3	1	1	2	1	>80	62.0	**F**	E	E
	With Improvements:	TS	2	2	d	2	2	1>	2	3	1	1	3	1>	54.4	40.3	D	D	E
75	Evans Rd. / Morgan St. - May Ranch Pkwy.	TS	1	2	d	1	2	1	1	1	1	1	1	1	45.8	28.6	D	C	D
76	Meridian Pkwy. / Cactus Av.																		
	Without Improvements:	TS	2	2	1	2	2	1	1	2	1	2	2	1	>80	42.8	**F**	D	D
	With Improvements:	TS	2	2	1>	2	2	1	1	2	1	2	1	2>	29.6	35.5	C	D	D
77	Laselle St. / Eucalyptus Av.																		
	Without Improvements:	AWS	1	1	1	1	1	0	1	2	0	1	2	0	>80	37.0	**F**	**E**	C
	With Improvements[4]:	TS	1	1	1	1	1	0	1	2	0	1	2	0	48.8	37.3	**D**	**D**	C
78	Laselle St. / Cottonwood Av.																		
	Without Improvements:	TS	1	1	d	1	1	1	1	1	0	1	2	0	>80	35.8	**F**	**D**	C
	With Improvements:	TS	1	1	d	1	1	1	1	2	0	1	2	0	36.1	30.4	**D**	C	C
79	Morrison St. / Eucalyptus Av.	TS	1	1	1>	1	2	0	1	2	0	1	2	0	33.7	32.0	C	C	C
80	Morrison St. / Cottonwood Av.																		
	Without Improvements:	TS	1	2	0	1	2	0	1	1	0	1	2	0	35.8	32.6	**D**	C	C
	With Improvements:	TS	1	2	0	1	2	0	1	2	0	1	2	0	31.8	30.5	C	C	C
81	Nason St. / SR-60 WB Ramps - Elder Av.	TS	1	2	1>	1	2	d	1	1	1>	1	1	1>	23.9	32.7	C	C	D
82	Nason St. / SR-60 EB Ramps																		
	Without Improvements:	TS	0	2	0	1	2	0	1	0.5	1.5	0	0	0	>80	>80	**F**	**F**	D
	With Improvements:	TS	0	2	1	1	2	0	0.5	0.5	2	0	0	0	48.9	35.8	D	D	D
83	Nason St. / Fir Av.																		
	Without Improvements:	TS	1	2	0	1	2	1	1	1	d	1	1	1>	54.2	66.3	D	**E**	D
	With Improvements:	TS	1	2	0	1	2	1>	1	1	d	1	1	1>	41.5	54.3	D	D	D
84	Nason St. / Eucalyptus Av.	TS	1	2	d	1	2	d	1	2	d	1	2	d	51.5	17.1	D	B	D
85	Nason St. / Cottonwood Av.																		
	Without Improvements:	TS	1	2	d	1	2	1	1	1	1	1	2	0	>80	36.9	**F**	**D**	C
	With Improvements[4]:	TS	1	2	d	1	2	1	2	1	0	1	2	0	54.3	22.7	**D**	C	C
86	Moreno Beach Dr. / Cottonwood Av.																		
	Without Improvements:	TS	1	1	1	1	1	d	0	1!	0	0	1!	0	37.4	36.1	**D**	**D**	C
	With Improvements:	TS	1	1	1	1	1	d	1	1	0	1	1	0	21.4	19.0	C	B	C

TABLE 6-2: INTERSECTION ANALYSIS FOR HORIZON YEAR (2045) WITH PROJECT

#	Intersection	Traffic Control[1]	Intersection Approach Lanes[2] Northbound L	T	R	Southbound L	T	R	Eastbound L	T	R	Westbound L	T	R	Delay[3] (secs.) AM	PM	Level of Service AM	PM	LOS Standard
87	Redlands Bl. / SR-60 WB Ramps (Reconfigured Interchange)	TS	0	2	1	0	2	1	0	0	0	1	1	1	3.8	4.2	A	A	D
88	Redlands Bl. / SR-60 EB Ramps (Reconfigured Interchange)	TS	0	2	1	0	2	1	1	1	1	0	0	0	8.0	8.7	A	A	D
89	Redlands Bl. / Eucalyptus Av.	RDB	0	1!	0	0.5	0.5	1	0	1!	0	0.5	0.5	1	28.6	19.2	D	C	D
90	Redlands Bl. / Cottonwood Av.	TS	1	1	0	0	1	1	1	0	1	0	0	0	9.4	9.1	A	A	C
91	Redlands Bl. / Alessandro Bl.																		
	Without Improvements:	AWS	0.5	0.5	1	0	1!	0	0.5	0.5	1	0	1!	0	>80	>80	**F**	**F**	C
	With Improvements:	TS	0.5	0.5	0	0.5	1.5	0	1	1	0	0	1!	0	18.1	10.0	B	A	C
92	Redlands Bl. / Cactus Av.																		
	Without Improvements:	AWS	1	1	d	1	1	d	0.5	1.5	d	0	1!	0	>80	>80	**F**	**F**	C
	With Improvements[4]:	TS	1	1	1>	1	1	d	1	2	0	2	2	1	34.3	34.8	C	C	C
93	Gillman Springs Rd. / Alessandro Bl.																		
	Without Improvements:	CSS	1	1	0	0	1	0	1	0	1	0	0	0	>80	>80	**F**	**F**	D
	With Improvements:	TS	1	3	0	0	3	1	1	0	2	0	0	0	27.3	33.5	C	C	D
94	Cactus Av. / Alessandro Bl.	TS	1	0	2>	0	0	0	0	1	1	2	1	0	35.2	34.1	D	C	D
95	WLC Pkwy. / Eucalyptus Av.	TS	2	2	1	1	3	1	1	1	2	1	1	0	29.1	45.4	C	D	D
96	WLC Pkwy. / St. E - St. F	RDB	0.5	1	0.5	0.5	1.5	1>>	1	1!	0	0	1!	1	17.5	34.9	C	D	D
97	WLC Pkwy. / Alessandro Bl.	RDB	0	1	1	1	1	0	0	0	0	1	0	1	8.2	8.4	A	A	D
98	Street F / Alessandro Bl.	RDB	0	0	0	0	1!	0	0.5	1.5	0	0	2	0	7.0	7.8	A	A	D
99	Darwin Dr. / Alessandro Bl.	TS	0	1!	0	0	1!	0	1	2	0	1	2	0	30.3	34.9	C	C	D

[1] TS = Traffic Signal; CSS = Cross-street Stop; RDB = Roundabout; AWS = All Way Stop

[2] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.
L = Left; T = Through; R = Right; d = Defacto Right Turn Lane; 0.5 = Shared Lane; 1! = Shared Left/Through/Right lane;
> = Right-Turn Overlap Phasing; >> = Free-Right Turn; 1 = Improvement

[3] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[4] No mitigation feasible due to right-of-way constraints. Intersection is anticipated to continue to operate at a deficient LOS

TABLE 6-3: TRAFFIC SIGNAL WARRANT ANALYSIS SUMMARY FOR HORIZON YEAR (2045) WITH PROJECT

		HY (2045) With Project	
#	Intersection	ADT Warrants[1]	Peak Hour Warrants
2	Kitching St. / Brodiaea Av.		X
4	Kitching St. / Delphinium Av.		X
6	Kitching St. / Gentian Av.		X
9	Laselle St. / Brodiaea Av.		X
11	Laselle St. / Delphinium Av.- PA-2 Access 7	X	X
16	Hospital Access - PA2 Access 2 / Cactus Av.	X	X
20	Nason St. / Delphinium Av.- PA-2 Access 3	X	X
22	Oliver St. / Alessandro Bl.		X
23	Oliver St. / Brodiaea Av.		--
25	Oliver St. / John F. Kennedy Dr. - PA-3 Access 2	X	X
28	Moreno Beach Dr. / Brodiaea Av.		X
31	Morrison St. / Brodiaea Av.	--	--
32	Morrison St. / Cactus Av.	X	X
33	Darwin Dr. - PA-1 Access 2 / Brodiaea Av.	--	--
34	PA-1 Access 1 / Cactus Av.	X	X
35	Nason St. / PA-3 Access 3	X	X
36	Nason St. / PA-2 Access 4 - PA-3 Access 1	X	X
37	Nason St. / PA-2 Access 5	X	X
38	Nason St. / PA-4 Access 1	X	X
39	Nason St. / PA 5 Access 2	RIRO	RIRO
40	PA-5 Access 1 / Iris Av.	RIRO	RIRO
41	Oliver St. / PA-4 Access 2	--	X
77	Laselle St. / Eucalyptus Av.		X
89	Redlands Bl. / Eucalyptus Av.	RDB	RDB
91	Redlands Bl. / Alessandro Bl.		X
92	Redlands Bl. / Cactus Av.		X
93	Gillman Springs Rd. / Alessandro Bl.		X
94	Cactus Av. / Alessandro Bl.	X	X
95	WLC Pkwy. / Eucalyptus Av.	X	X
96	WLC Pkwy. / St. E - St. F	RDB	RDB
97	WLC Pkwy. / Alessandro Bl.	RDB	RDB
98	Street F / Alessandro Bl.	RDB	RDB
99	Darwin Dr. / Alessandro Bl.	X	X

X = Warranted; RIRO = Right-In/Right-Out Only Access; RDB = Roundabout;

[1] ADT warrants are evaluated for future intersections only.

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6.4 HORIZON YEAR (2045) WITH PROJECT TRAFFIC SIGNAL WARRANTS

The traffic signal warrant analysis for Horizon Year (2045) With Project traffic conditions are based on the peak hour volumes or planning level ADT volume-based traffic signal warrants. Table 6-3 summarizes the results of the signal warrant analysis.

Intersections satisfying signal warrants for Existing (2023) conditions were previously listed in Section 3.5. Intersections satisfying signal warrants for Horizon Year (2045) Without Project (Approved SP) conditions were previously listed in Section 5.5.

The following additional study area intersections (in comparison to Existing and Horizon Year Without Project) are anticipated to meet a traffic signal warrant under Horizon Year (2045) With Project conditions (see Appendix 3.3):

- #9 - Lasselle St. / Brodiaea Av.- DIF
- #32 - Morrison St. / Cactus Av.
- #34 - PA-1 Access 1 / Cactus Av.
- #35 - Nason St. / PA-3 Access 3
- #36 - Nason St. / PA-2 Access 4 - PA-3 Access 1
- #37 - Nason St. / PA-2 Access 5
- #38 - Nason St. / PA-4 Access 1
- #41 - Oliver St. / PA-4 Access 2- DIF

It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified.

6.5 OFF-RAMP QUEUING ANALYSIS

Off-ramp queuing analysis findings for Horizon Year (2045) With Project are presented on Table 6-4. As shown on Table 6-4, the following off-ramp movements are anticipated to experience queuing issues during the weekday peak 95th percentile traffic flows under Horizon Year (2045) With Project traffic conditions. Worksheets for Horizon Year (2045) With Project traffic conditions queuing analysis are provided in Appendix 6.2.

- I-215 NB Ramps / Alessandro Boulevard, northbound left turn lane – AM Peak Hour
- I-215 NB Ramps / Cactus Avenue, northbound left turn lane – AM Peak Hour

Although 95th percentile queue is anticipated to exceed the available storage for each of the northbound left turn lanes at the above two locations, in each case the adjacent off-ramp lane has sufficient storage to accommodate any spillover without spilling back and affecting the Freeway mainline. The analysis was conducted for the weekday AM and weekday PM peak hours. The traffic modeling and signal timing optimization software package Synchro/SimTraffic (Version 11) has been utilized to assess queues at the ramp intersections. Synchro is a macroscopic traffic software program that is based on the signalized and unsignalized intersection capacity analyses as specified in the HCM.

TABLE 6-4: QUEUEING ANALYSIS FOR HORIZON YEAR (2045) WITH PROJECT, WITH IMPROVEMENTS

ID	Intersection	Movement	Available Stacking Distance (Feet)	95th Percentile Queue Length (ft.)[1] AM	95th Percentile Queue Length (ft.)[1] PM	Acceptable?[1] AM	Acceptable?[1] PM
44	I-215 SB Ramps / Alessandro Bl.						
		SBL	530	103	104	Yes	Yes
		SBL/R	1,040	97	115	Yes	Yes
		SBR	530	91	106	Yes	Yes
45	I-215 NB Ramps / Alessandro Bl.						
		NBL	380	655 [2]	293 [2]	**No** [3]	Yes
		NBL/R	1,300	702 [2]	300 [2]	Yes	Yes
		NBR	380	122	131	Yes	Yes
54	I-215 SB Ramps / Cactus Av.						
		NBR	1,900	231 [2]	597 [2]	Yes	Yes
		SBR	1,125	482 [2]	90	Yes	Yes
		SBR	500	478 [2]	90	Yes	Yes
55	I-215 NB Ramps / Cactus Av.						
		NBL	130	464 [2]	97	**No** [3]	Yes
		NBT	1,700	341	154	Yes	Yes
		NBR	2,175	NOM	NOM	Yes	Yes
81	Nason St. / SR-60 WB Ramps						
		WBL	1,350	210	349	Yes	Yes
		WBT	1,690	19	34	Yes	Yes
		WBR	170	NOM	NOM	Yes	Yes
82	Nason St. / SR-60 EB Ramps						
		EBL/T	780	51	329 [2]	Yes	Yes
		EBR	1,260	731 [2]	694 [2]	Yes	Yes
		EBR	250	NOM	NOM	Yes	Yes
87	Redlands Bl. / SR-60 WB Ramps						
		WBL	1,350	84	96	Yes	Yes
		WBT	1,690	NOM	NOM	Yes	Yes
		WBR	170	NOM	NOM	Yes	Yes
88	Redlands Bl. / SR-60 EB Ramps						
		EBL	1,350	92	145	Yes	Yes
		EBT	1,690	NOM	NOM	Yes	Yes
		EBR	170	90	64	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided.
An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.
NOM = Nominal, less than 10 ft.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Although 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent lane has sufficient storage to accommodate any spillover without spilling back and affecting the Freeway mainline.

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7 LOCAL AND REGIONAL FUNDING MECHANISMS

Transportation improvements within the City of Moreno Valley are funded through a combination of improvements constructed by the Project, development impact fee programs or fair share contributions. Fee programs applicable to the Project are described below.

7.1 CITY OF MORENO VALLEY DEVELOPMENT IMPACT FEE (DIF) PROGRAM

The Project is located within the City of Moreno Valley's program to impose and collect fees from new residential, commercial, and industrial development for the purpose of funding roadways and intersections necessary to accommodate City growth as identified in the City's General Plan Circulation Element. The City's DIF program includes facilities that are not part of, or which may exceed improvements identified and covered by the TUMF program. As a result, the pairing of the regional and local fee programs provides a more comprehensive funding and implementation plan to ensure an adequate and interconnected transportation system. Under the City's DIF program, the City may grant developers a credit against specific components of fees when those developers construct certain facilities and landscaped medians identified in the list of improvements funded by the DIF program.

The timing to use the DIF fees is established through periodic capital improvement programs which are overseen by the City's Public Works Department. Periodic traffic counts, review of traffic accidents, and a review of traffic trends throughout the City are also periodically performed by City staff and consultants. The City uses this data to determine the timing of implementing the improvements listed in its facilities list. The Project Applicant would pay requisite DIF pursuant to incumbent City ordinance requirements.

The following intersections are included in the City of Moreno Valley Development Impact Fee program for installation of traffic signal improvements:

- #2 - Kitching St. / Brodiaea Av.
- #4 - Kitching St. / Delphinium Av.
- #6 - Kitching St. / Gentian Av.
- #9 - Lasselle St. / Brodiaea Av.
- #11 - Lasselle St. / Delphinium Av.- PA-2 Access 7
- #16 - Hospital Access / Cactus Av.
- #22 - Oliver St. / Alessandro Bl.
- #23 - Oliver St. / Brodiaea Av.
- #28 - Moreno Beach Dr. / Brodiaea Av.
- #40 - PA-5 Access 1 / Iris Av.
- #41 - Oliver St. / PA-4 Access 2
- #77 - Lasselle St. / Eucalyptus Av.
- #89 - Redlands Bl. / Eucalyptus Av.
- #91 - Redlands Bl. / Alessandro Bl.
- #92 - Redlands Bl. / Cactus Av.

- #93 - Gillman Springs Rd. / Alessandro Bl.
- #94 - Cactus Av. / Alessandro Bl.
- #95 - WLC Pkwy. / Eucalyptus Av.
- #96 - WLC Pkwy. / St. E - St. F
- #97 - WLC Pkwy. / Alessandro Bl.

7.2 RIVERSIDE COUNTY TRANSPORTATION UNIFORM MITIGATION FEE (TUMF)

The TUMF program is administered by WRCOG based upon a regional Nexus Study which addresses right of way acquisition and improvement cost factors. This regional program was put into place to ensure that development pays its fair share, and that funding is in place for construction of facilities needed to maintain the requisite level of service and critical to mobility in the region. TUMF is a truly regional mitigation fee program and is imposed and implemented in every jurisdiction in Western Riverside County.

7.3 FAIR SHARE CONTRIBUTION

Project improvements may include a combination of fee payments to established programs, construction of specific improvements, payment of a fair share contribution toward future improvements or a combination of these approaches. Improvements constructed by development may be eligible for a fee credit or reimbursement through the program where appropriate (to be determined at the City's discretion).

When off-site improvements are identified with a minor share of responsibility assigned to proposed development, the approving jurisdiction may elect to collect a fair share contribution or require the development to construct improvements. Detailed fair share calculations, for each peak hour, are provided in Table 7-1 for improvements to study area intersections based upon Horizon Year (2045) Conditions. Fair share contributions are intended to be collected with the proceeds solely used as part of a funding mechanism aimed at ensuring that study area roadways and intersection expansions keep pace with the projected population increases.

TABLE 7-1: FAIR SHARE CALCULATIONS

#	Intersection	Existing (2023) Traffic	HY (2045) Future Traffic	Project Only Traffic	Total New Traffic[1]	Project Fair Share (%)[2]
2	Kitching St. / Brodiaea Av.					
	• AM Peak Hour	905	1,970	66	1,065	6.2%
	• PM Peak Hour	906	1,778	69	872	7.9%
3	Kitching St. / Cactus Av.					
	• AM Peak Hour	2,084	4,360	945	2,276	41.5%
	• PM Peak Hour	1,894	3,913	889	2,019	44.0%
4	Kitching St. / Delphinium Av.					
	• AM Peak Hour	829	2,003	182	1,174	15.5%
	• PM Peak Hour	776	1,723	158	947	16.7%
5	Kitching St. / John F. Kennedy Dr.					
	• AM Peak Hour	1,856	3,589	518	1,733	29.9%
	• PM Peak Hour	1,394	3,050	481	1,656	29.0%
6	Kitching St. / Gentian Av.					
	• AM Peak Hour	747	2,125	103	1,378	7.5%
	• PM Peak Hour	715	1,867	80	1,152	6.9%
7	Kitching St. / Iris Av.					
	• AM Peak Hour	2,571	5,183	655	2,612	25.1%
	• PM Peak Hour	2,455	4,554	603	2,099	28.7%
8	Laselle St. / Alessandro Bl.					
	• AM Peak Hour	2,175	4,685	641	2,510	25.5%
	• PM Peak Hour	2,061	4,003	581	1,942	29.9%
9	Laselle St. / Brodiaea Av.					
	• AM Peak Hour	1,405	2,409	377	1,004	37.5%
	• PM Peak Hour	1,274	1,855	349	581	60.1%
10	Laselle St. / Cactus Av.					
	• AM Peak Hour	2,791	5,322	1,195	2,531	47.2%
	• PM Peak Hour	2,563	4,735	1,129	2,172	52.0%
14	Laselle St. / Iris Av.					
	• AM Peak Hour	4,358	7,306	1,136	2,948	38.5%
	• PM Peak Hour	4,371	6,827	1,051	2,456	42.8%
15	Morrison St. / Alessandro Bl.					
	• AM Peak Hour	1,217	2,773	446	1,556	28.7%
	• PM Peak Hour	949	2,574	468	1,625	28.8%
17	Nason St. / Alessandro Bl.					
	• AM Peak Hour	2,738	5,275	1,302	2,537	51.3%
	• PM Peak Hour	2,385	4,863	1,225	2,478	49.4%
19	Nason St. / Cactus Av.					
	• AM Peak Hour	2,237	5,169	1,939	2,932	66.1%
	• PM Peak Hour	2,165	4,859	1,854	2,694	68.8%
21	Nason St. / Iris Av.					
	• AM Peak Hour	2,559	5,229	1,226	2,670	45.9%
	• PM Peak Hour	2,384	4,529	1,138	2,145	53.1%
22	Oliver St. / Alessandro Bl.					
	• AM Peak Hour	1,105	2,037	390	932	41.8%
	• PM Peak Hour	739	1,754	342	1,015	33.7%
24	Oliver St. / Cactus Av.					
	• AM Peak Hour	1,262	2,776	789	1,514	52.1%
	• PM Peak Hour	976	2,301	750	1,325	56.6%
26	Oliver St. / Iris Av. - Moreno Beach Dr.					
	• AM Peak Hour	1,745	3,154	346	1,409	24.6%
	• PM Peak Hour	1,414	2,495	300	1,081	27.8%
27	Moreno Beach Dr. / Alessandro Bl.					
	• AM Peak Hour	1,517	3,131	436	1,614	27.0%
	• PM Peak Hour	1,785	3,100	411	1,315	31.3%
28	Moreno Beach Dr. / Brodiaea Av.					
	• AM Peak Hour	1,150	2,091	179	941	19.0%
	• PM Peak Hour	1,423	2,040	193	617	31.3%

TABLE 7-1: FAIR SHARE CALCULATIONS

#	Intersection	Existing (2023) Traffic	HY (2045) Future Traffic	Project Only Traffic	Total New Traffic[1]	Project Fair Share (%)[2]
30	Moreno Beach Dr. / John F. Kennedy Dr.					
	• AM Peak Hour	1,779	3,206	270	1,427	18.9%
	• PM Peak Hour	1,767	2,945	260	1,178	22.1%
31	Morrison St. / Brodiaea Av.					
	• AM Peak Hour	0	260	181	260	69.6%
	• PM Peak Hour	0	308	212	308	68.8%
32	Morrison St. / Cactus Av.					
	• AM Peak Hour	1,309	2,707	777	1,398	55.6%
	• PM Peak Hour	1,235	2,451	768	1,216	63.2%
47	Day St. / Alessandro Bl.					
	• AM Peak Hour	2,311	4,144	193	1,833	10.5%
	• PM Peak Hour	2,886	4,327	184	1,441	12.8%
50	Graham St. / Alessandro Bl.					
	• AM Peak Hour	2,595	4,685	323	2,090	15.5%
	• PM Peak Hour	3,395	5,106	305	1,711	17.8%
53	Perris Bl. / Alessandro Bl.					
	• AM Peak Hour	2,890	5,607	322	2,717	11.9%
	• PM Peak Hour	4,222	6,294	305	2,072	14.7%
54	I-215 SB Ramps / Cactus Av.					
	• AM Peak Hour	2,886	4,706	296	1,820	16.3%
	• PM Peak Hour	2,907	4,074	321	1,167	27.5%
55	I-215 NB Ramps / Cactus Av.					
	• AM Peak Hour	4,068	6,130	580	2,062	28.1%
	• PM Peak Hour	3,818	5,137	550	1,319	41.7%
56	Elsworth St. / Cactus Av.					
	• AM Peak Hour	3,688	5,509	579	1,821	31.8%
	• PM Peak Hour	3,906	5,336	551	1,430	38.5%
67	Perris Bl. / Iris Av.					
	• AM Peak Hour	2,952	5,188	451	2,236	20.2%
	• PM Peak Hour	3,539	5,059	428	1,520	28.2%
68	Perris Bl. / Krameria Av.					
	• AM Peak Hour	2,527	5,079	258	2,552	10.1%
	• PM Peak Hour	3,060	4,759	245	1,699	14.4%
69	Kitching St. / Krameria Av.					
	• AM Peak Hour	1,824	3,100	193	1,276	15.1%
	• PM Peak Hour	1,233	2,239	184	1,006	18.3%
74	Evans Rd. / Ramona Expy.					
	• AM Peak Hour	3,875	6,046	323	2,171	14.9%
	• PM Peak Hour	4,190	6,083	306	1,893	16.2%
76	Meridian Pkwy. / Cactus Av.					
	• AM Peak Hour	2,127	3,620	130	1,493	8.7%
	• PM Peak Hour	2,538	3,370	122	832	14.7%
78	Laselle St. / Cottonwood Av.					
	• AM Peak Hour	1,441	2,640	283	1,199	23.6%
	• PM Peak Hour	1,208	1,911	276	703	39.3%
80	Morrison St. / Cottonwood Av.					
	• AM Peak Hour	1,256	2,032	143	776	18.4%
	• PM Peak Hour	594	1,070	144	476	30.3%
82	Nason St. / SR-60 EB Ramps					
	• AM Peak Hour	2,479	4,620	670	2,141	31.3%
	• PM Peak Hour	2,614	4,485	621	1,871	33.2%
83	Nason St. / Fir Av.					
	• AM Peak Hour	2,843	5,342	800	2,499	32.0%
	• PM Peak Hour	2,908	5,109	743	2,201	33.8%

TABLE 7-1: FAIR SHARE CALCULATIONS

#	Intersection	Existing (2023) Traffic	HY (2045) Future Traffic	Project Only Traffic	Total New Traffic[1]	Project Fair Share (%)[2]
86	Moreno Beach Dr. / Cottonwood Av.					
	• AM Peak Hour	1,147	2,191	130	1,044	12.5%
	• PM Peak Hour	1,399	2,132	122	733	16.6%
87	Redlands Bl. / SR-60 WB Ramps - Spruce Av.					
	• AM Peak Hour	1,187	1,690	84	503	16.7%
	• PM Peak Hour	1,476	1,838	98	362	27.1%
88	Redlands Bl. / SR-60 EB Ramps					
	• AM Peak Hour	1,074	1,931	128	857	14.9%
	• PM Peak Hour	1,505	2,032	121	527	23.0%
91	Redlands Bl. / Alessandro Bl.					
	• AM Peak Hour	1,041	1,667	321	626	51.3%
	• PM Peak Hour	1,175	1,813	305	638	47.8%
92	Redlands Bl. / Cactus Av.					
	• AM Peak Hour	1,178	3,192	514	2,014	25.5%
	• PM Peak Hour	1,227	3,038	490	1,811	27.1%
93	Gillman Springs Rd. / Alessandro Bl.					
	• AM Peak Hour	1,679	2,802	65	1,123	5.8%
	• PM Peak Hour	1,937	3,206	61	1,269	4.8%
99	Darwin Dr. / Alessandro Bl.					
	• AM Peak Hour	931	2,376	372	1,445	25.7%
	• PM Peak Hour	879	2,325	369	1,446	25.5%

[1] Total New Traffic = (Horizon Year Future Traffic - Existing Traffic)
[2] Project Fair Share % = (Project Only Traffic / Total New Traffic)

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8 FINDINGS / RECOMMENDATIONS

It is the intent of the Project to improve roadways adjacent to the Project which are not currently constructed to the full roadway and parkway standards anticipated in the City of Moreno Valley General Plan.

8.1 ADJACENT ROADWAY SEGMENT IMPROVEMENTS

The Project is to construct the following ultimate improvements as design features in conjunction with development of each Planning Area, as follows:

Planning Area 1

- Project to improve Brodiaea Avenue between Lasselle Street and Morrison Street to achieve its ultimate full section as a Neighborhood Collector (66-foot right-of-way), including parkway and sidewalk adjacent to the site, in conjunction with access intersection improvements listed below. A Class III bike route should be anticipated along Brodiaea Avenue with appropriate signs and/or pavement markings.
- Project to construct Morrison Street from Brodiaea Avenue to Cactus Avenue at its ultimate half section width (west side) as an Arterial (100-foot right-of-way) with parkway and sidewalk adjacent to the site. The interim cross-section may require east side improvements to accommodate at least one northbound through lane.
- Project to complete the north side parkway of Cactus Avenue along the PA-1 frontage at its ultimate full section-width as a Minor Arterial (88-foot right-of-way) consistent with City standards, in conjunction with access intersection improvements listed below.

Planning Area 2

- Project to improve the south side parkway of Cactus Avenue along the PA-2 frontage, including sidewalk adjacent to the site at its ultimate full section-width as a Minor Arterial (88-foot right-of-way) consistent with City standards, in conjunction with access intersection improvements listed below. Intersection improvements associated with the Lasselle Street / Cactus Avenue intersection and the Nason Street / Cactus Avenue intersection are also described below.
- Project to improve the east side parkway of Lasselle Street along the PA-2 frontage, including sidewalk adjacent to the site at its ultimate full section-width as an Arterial (100-foot right-of-way) consistent with City standards, in conjunction with access intersection improvements listed below.
- Project to improve the west side parkway of Nason Street along the PA-2 frontage, including sidewalk adjacent to the site consistent with City standards for a 4-lane Divided Arterial (110-foot right-of-way) in conjunction with access intersection improvements listed below.

Planning Area 3

- Project to complete the east side parkway of Nason Street along the PA-3 frontage adjacent to the site consistent with City standards for a 4-lane Divided Arterial (110-foot right-of-way) in conjunction with access intersection improvements listed below.

- Project to improve the south side parkway of Delphinium Avenue between Nason Street and Evergreen Street to provide a sidewalk with potential pedestrian connectivity into the site.

Planning Area 4

- Project to improve Oliver Street from north of John F Kennedy Drive to Filaree Avenue at its ultimate half section width (west side) as a Minor Arterial (88-foot right-of-way) with an additional southbound through travel lane as well as parkway and sidewalk adjacent to the site, in conjunction with access intersection improvements listed below.

Planning Area 5

- Project to improve the west side parkway of Nason Street along the PA-5 frontage, including sidewalk adjacent to the site consistent with City standards for a 4-lane Divided Arterial (110-foot right-of-way) in conjunction with access intersection improvements listed below.
- Project to complete the north side parkway of Iris Avenue along the PA-5 frontage, in conjunction with access intersection improvements listed below.

8.2 INTERSECTION ACCESS IMPROVEMENTS

The Project is to construct the following ultimate intersection improvements as design features in conjunction with development of each Planning Area, as follows:

Planning Area 1

PA-1 Access 2 / Brodiaea Av. - (#33):

- Provide two northbound approach lanes (shared left-through lane and separate right turn lane with a minimum of 50-feet of storage) with cross-street stop control
- Accommodate a southbound shared left-through-right lane with cross-street stop control
- Accommodate eastbound and westbound shared left-through-right lanes

PA-1 Access 1 / Cactus Av. - (#34):

- Install a traffic signal in conjunction with PA 2 development
- Provide three southbound approach lanes (left turn lane with a minimum of 100-feet of storage, through lane, and separate right turn lane with a minimum of 100-feet of storage)
- Provide an eastbound left turn lane with a minimum of 200-feet of storage

Planning Area 2

Lasselle St. / Delphinium Av.- PA-2 Access 7 - (#11):

- Traffic signal modification for east leg.
- Provide two westbound approach lanes (shared left-through lane and separate right turn lane with a minimum of 100-feet of storage)
- Accommodate eastbound shared left-through-right lane with traffic signal control
- Provide southbound left turn lane with a minimum of 200-feet of storage

Lasselle St. / John F. Kennedy Dr. - (#12):

- Provide westbound right turn lane with a minimum of 200-feet of storage

- Signal modification to accommodate westbound right turn overlap phase

S. Hospital Access - PA-2 Access / Cactus Avenue. - (#16):

- Traffic signal modification for south leg.
- Provide three northbound approach lanes (left turn lane with a minimum of 200-feet of storage, through lane, and separate right turn lane with a minimum of 200-feet of storage)
- Provide westbound left turn lane with a minimum of 200-feet of storage

Nason St. / Delphinium Av.- PA-2 Access 3 - (#20):

- Install a traffic signal
- Provide northbound left turn lane with a minimum of 200-feet of storage
- Provide southbound right turn lane with a minimum of 150-feet of storage
- Provide two eastbound approach lanes (shared left-through lane and separate right turn lane with a minimum of 100-feet of storage)

PA-1 Access 1 / Cactus Av. - (#34):

- Install a traffic signal in conjunction with PA 1 development
- Provide three northbound approach lanes (left turn lane with a minimum of 300-feet of storage, shared left-through lane, and separate right turn lane with a minimum of 200-feet of storage)
- Provide eastbound right turn lane with a minimum of 300-feet of storage
- Provide westbound left turn lane with a minimum of 200-feet of storage

Nason St. / PA-2 Access 4 - PA-3 Access 1 - (#36):

- Install a traffic signal in conjunction with PA 3 development
- Provide three eastbound approach lanes (left turn lane with a minimum of 250-feet of storage, a through lane, and a right turn lane with a minimum of 250-feet of storage)
- Provide northbound left turn lane with a minimum of 200-feet of storage
- Provide southbound right turn lane with a minimum of 200-feet of storage

Nason St. / PA-2 Access 5 - (#37):

- Install a traffic signal
- Provide two eastbound approach lanes (left turn lane with a minimum of 100-feet of storage and right turn lane with a minimum of 100-feet of storage)
- Provide northbound left turn lane with a minimum of 150-feet of storage

Planning Area 3

Oliver St. / John F. Kennedy Dr. - PA-3 Access 2 - (#25):

- Install a traffic signal
- Provide northbound left turn lane with a minimum of 150-feet of storage
- Provide additional southbound through lane and left turn lane with a minimum of 150-feet of storage
- Provide three eastbound approach lanes (left turn lane with a minimum of 150-feet of storage, through lane, and right turn lane with a minimum of 150-feet of storage)
- Accommodate westbound left turn lane and shared through-right lane with traffic signal control

Nason St. / PA-3 Access 3 - (#35):

- Install a traffic signal

- Provide southbound left turn lane with a minimum of 150-feet of storage
- Provide two westbound approach lanes (left turn lane with a minimum of 100-feet of storage and right turn lane with a minimum of 100-feet of storage)

Nason St. / PA-2 Access 4 - PA-3 Access 1 - (#36):

- Install a traffic signal in conjunction with PA 2 development
- Provide southbound left turn lane with a minimum of 150-feet of storage
- Provide two westbound approach lanes (left turn lane with a minimum of 100-feet of storage and shared through-right lane)

<u>Planning Area 4</u>

Nason St. / PA-4 Access 1 - (#38):

- Install a traffic signal
- Provide southbound left turn lane with a minimum of 150-feet of storage
- Provide two westbound approach lanes (left turn lane with a minimum of 150-feet of storage and right turn lane with a minimum of 150-feet of storage)

Oliver St. / PA-4 Access 2 - (#41):

- Install a traffic signal
- Provide northbound left turn lane with a minimum of 150-feet of storage
- Provide second southbound through lane
- Provide two eastbound approach lanes (left turn lane with a minimum of 150-feet of storage and right turn lane with a minimum of 150-feet of storage)

<u>Planning Area 5</u>

Nason St. / PA 5 Access 2 - (#39):

- Single eastbound (outbound) lane restricted to right turns only

PA-5 Access 1 / Iris Av. - (#40):

- Single southbound (outbound) lane restricted to right turns only

Sight distance at each project access point should be reviewed with respect to standard Caltrans and City of Moreno Valley sight distance standards at the time of preparation of final grading, landscape, and street improvement plans.

8.3 OFF-SITE INTERSECTION IMPROVEMENTS

The recommended improvements needed to address the cumulative deficiencies identified under Horizon Year (2045) Without Project (Approved SP) and Horizon Year (2045) With Project traffic conditions are shown in Table 8-1. Off-site cumulative improvements listed in Table 8-1 for Horizon Year (2045) Without Project (Approved SP) traffic conditions are also needed to serve traffic projections for the Horizon Year (2045) With Project scenario.

For those improvements listed in the Without Project (Approved SP) column and not already included in an adopted fee program (DIF, TUMF, etc.) or not already fully funded by a previously approved project (World Logistics Center, Kaiser Permanente Medical Center, etc.), the Project Applicant's responsibility for the Project's contributions towards cumulatively deficient intersections may be fulfilled through payment of fair share fees that would be assigned to construction of the identified cumulative improvements.

The Horizon Year (2045) With Project scenario is utilized in this LOS analysis to determine the framework of ultimate improvement needs with completion of the project. Subsequent traffic analyses will be conducted at each project phase to determine the actual phasing of circulation improvements. Prior to approval of an entitlement application within the first project phase, the applicant will provide cost estimates for intersection improvements shown in Table 8-1 including updated Project responsibilities tied to a development phasing plan.

In some cases, direct construction of the cumulative improvement by the Project may be eligible for fee credit or reimbursement through an applicable program where appropriate (to be determined at the City' discretion).

For Horizon Year (2045) Without Project (Approved SP) conditions, intersection improvements are depicted on Exhibits 8-1 to 8-3. Focus area intersection improvements are provided on Exhibit 8-1. Westerly and easterly study area intersection improvements are presented on Exhibits 8-2 and 8-3, respectively.

For Horizon Year (2045) With Project conditions, intersection improvements are shown Exhibits 8-4 to 8-6. Focus area intersection improvements are provided on Exhibit 8-4. Westerly and easterly study area intersection improvements are presented on Exhibits 8-5 and 8-6, respectively.

8.4 MULTIMODAL ACCOMMODATIONS

An assessment of multimodal circulation was completed by Fehr & Peers to evaluate project access and connectivity for pedestrians, bicyclists and transit users. Moreno Valley has made a concerted effort to design a system of complete streets, which expand bicycle and pedestrian options for its residents to optimize travel by all modes to achieve health and environmental benefits. Transit service can provide an alternative to automobile travel and is a critical mode of transportation for those who cannot drive (such as the elderly, youth, or disabled) or do not have access to a vehicle. These modes are discussed in greater detail below.

PEDESTRIAN CIRCULATION

The City's pedestrian network surrounding the Aquabella community includes sidewalks along most arterial roadways and crosswalks at intersections, all of which are designed to ensure safe walking opportunities. Sidewalks are currently provided along at least one side of Cactus Avenue, Nason Street, Moreno Beach Drive/Iris Avenue, Lasselle Street, and John F. Kennedy Drive.

The internal street network will follow a grid pattern with approximately 600-foot block lengths to provide a street network similar to a downtown, urban area. Intersection density is a proxy for street connectivity, which helps to facilitate a greater number of shorter trips including those made by walking, biking, scooter, etc. The internal street network will include a comprehensive sidewalk network to facilitate walking.

TABLE 8-1: SUMMARY OF OFF-SITE INTERSECTION IMPROVEMENTS BY ANALYSIS SCENARIO

#	Intersection	Analysis Scenario: Horizon Year (2045) Without Project (Approved SP)	Analysis Scenario: Horizon Year (2045) With Project	Project Fair Share
2	Kitching St. / Brodiaea Av.	Install traffic signal	Same	7.9%
3	Kitching St. / Cactus Av.	Modify SB right turn lane to provide 2nd SB through lane	Same	44.0%
4	Kitching St. / Delphinium Av.	Install traffic signal	Same	16.7%
		--	Provide 2nd NB through lane	
		--	Provide 2nd SB through lane	
5	Kitching St. / John F. Kennedy Dr.	Provide 1 NB left turn lane	Same	29.9%
		Provide 2nd NB through lane	Same	
		Provide 1 SB left turn lane	Same	
		Provide 2nd SB through lane	Same	
6	Kitching St. / Gentian Av.	Install traffic signal	Same	7.5%
		--	Provide 2nd NB through lane	
		--	Provide 2nd SB through lane	
7	Kitching St. / Iris Av.	Provide 1 SB right turn lane	Same	28.7%
		Provide 2nd WB left turn lane	Same	
8	Laselle St. / Alessandro Bl.	Provide 2nd SB through lane	Same	29.9%
		Provide 2nd WB through lane	Same	
		Provide 2nd EB through lane	Same	
		--	Provide 3rd WB through lane	
		--	Provide 3rd EB through lane	
9	Laselle St. / Brodiaea Av.	Install traffic signal	Same	60.1%
10	Laselle St. / Cactus Av.	Provide WB right overlap phase	Same	52.0%
14	Laselle St. / Iris Av.	Provide NB right overlap phase	Same	42.8%
15	Morrison St. / Alessandro Bl.	Provide 1 NB left turn lane	Same	28.8%
		Provide 1 NB shared through/right lane	Same	
		Provide 1 SB through lane	Same	
		Provide 1 WB left turn lane	Same	
		--	Provide 2nd EB through lane	
17	Nason St. / Alessandro Bl.	Provide WB right turn overlap phase	Same	51.3%
		--	Provide EB right turn overlap phase	
		--	Provide 2nd EB through lane	
		--	Provide 2nd WB through lane	
18	Nason St. / E. Hospital Access	Modify EB left turn lane to provide a shared left/through lane	Same	(Access to adjacent commercial lots improvement)
		Provide 1 WB shared left/through lane	Same	
		Provide 1 WB right turn lane	Same	
19	Nason St. / Cactus Av.	--	Provide SB right turn overlap phase	68.8%
		--	Modify EB approach to provide 1 left turn lane & 2 through lanes	
		--	Provide 2nd WB through lane	
		--	Provide WB right turn lane with overlap phase	
21	Nason St. / Iris Av.	Provide SB right turn overlap phase	Same	53.1%
		--	Provide 2nd SB right turn lane	
		--	Provide 2nd SB left turn lane	
22	Oliver St. / Alessandro Bl.	Install traffic signal	Same	41.8%
		--	Provide 2nd EB through lane	
		--	Provide 2nd WB through lane	
24	Oliver St. / Cactus Av.	--	Provide 1 NB left turn lane	56.6%
		--	Provide 1 SB left turn lane	
26	Oliver St. / Iris Av. - Moreno Beach Dr.	--	Provide SB right turn overlap phase	27.8%

TABLE 8-1: SUMMARY OF OFF-SITE INTERSECTION IMPROVEMENTS BY ANALYSIS SCENARIO

(Page 2 of 4)

#	Intersection	Analysis Scenario: Horizon Year (2045) Without Project (Approved SP)	Analysis Scenario: Horizon Year (2045) With Project	Project Fair Share
27	Moreno Beach Dr. / Alessandro Bl.	--	Provide 2nd NB through lane	31.3%
		--	Provide 2nd SB through lane	
		--	Provide 2nd EB through lane	
		--	Provide 2nd WB through lane	
28	Moreno Beach Dr. / Brodiaea Av.	Install traffic signal	Same	31.3%
		--	Modify NB approach to provide 1 left turn lane 2 through lanes	
30	Moreno Beach Dr. / John F. Kennedy Dr.	Provide NB rigth turn overlap phase	Same	22.1%
31	Morrison St. / Brodiaea Av.	Provide a cross-street stop control for the EB approach	Same	69.6%
		Provide 1 NB shared left/through lane	Same	
		Provide 1 SB shared through/right lane	Same	
		Provide 1 EB shared left/right lane	Same	
32	Morrison St. / Cactus Av.	Install traffic signal	Same	63.2%
		Provide 1 SB left turn lane	Same	
		Provide 1 SB right turn lane	Same	
		Provide 1 EB left turn lane	Same	
42	Kaiser Hospital / Iris Av.	Provide 2nd EB left turn lane	Same	(Kaiser related improvement)
47	Day St. / Alessandro Bl.	--	Modify WB approach to provide 1 left turn lane & 3 through lanes	12.8%
50	Graham St. / Alessandro Bl.	--	Provide 3rd EB through lane	17.8%
53	Perris Bl. / Alessandro Bl.	Modify SB approach to provide 1 left turn lane & 3 through lanes	Same	14.7%
		Provide 3rd EB through lane	Same	
		Provide EB right turn overlap phase	Same	
54	I-215 SB Ramps / Cactus Av.	Provide 2nd SB right turn lane	Same	27.5%
55	I-215 NB Ramps / Cactus Av.	Provide 3rd WB through lane	Same	41.7%
		Provide 1 WB right turn lane		
56	Elsworth St. / Cactus Av.	Modify SB approach to provide 1 left turn lane, 1 shared left/through/right lane, and 1 right turn lane	Same	38.5%
		Provide 2nd EB left turn lane	Same	
67	Perris Bl. / Iris Av.	Provide NB right turn overlap phase	Same	28.2%
68	Perris Bl. / Krameria Av.	Provide 1 EB left turn lane	Same	14.4%
		Provide 1 WB left turn lane	Same	
		Provide WB right turn overlap phase	Same	
69	Kitching St. / Krameria Av.	Provide SB right turn overlap phase	Same	18.3%
70	Laselle St. / Krameria Av.	Provide EB right turn overlap phase	Same	41.0%
74	Evans Rd. / Ramona Expy.	Provide SB right turn overlap phase	Same	16.2%
		Provide 3rd WB through lane	Same	
		Provide WB right turn overlap phase	Same	
76	Meridian Pkwy. / Cactus Av.	Provide NB right turn overlap phase	Same	14.7%
		Modify WB approach to provide 2 left turn lanes, 1 through lane, 2 right turn lanes with overlap phase	Same	
77	Laselle St. / Eucalyptus Av.	Install traffic signal	Same	30.6%
78	Laselle St. / Cottonwood Av.	Provide 2nd EB through lane	Same	39.3%
80	Morrison St. / Cottonwood Av.	Provide 2nd EB through lane	Same	30.3%
82	Nason St. / SR-60 EB Ramps	Provide 1 NB right turn lane	Same	33.2%
		Modify EB approach to provide 1 shared left/through lane & 2 right turn lanes	Same	

TABLE 8-1: SUMMARY OF OFF-SITE INTERSECTION IMPROVEMENTS BY ANALYSIS SCENARIO

#	Intersection	Analysis Scenario: Horizon Year (2045) Without Project (Approved SP)	Analysis Scenario: Horizon Year (2045) With Project	Project Fair Share
83	Nason St. / Fir Av.	Provide SB right turn overlap phase	Same	33.8%
85	Nason St. / Cottonwood Av.	Modify EB approach to provide 2 left turn lanes & 1 shared through/right lane	Same	32.2%
86	Moreno Beach Dr. / Cottonwood Av.	Provide 1 EB left turn lane	Same	16.6%
		Provide 1 WB left turn lane	Same	
87	Redlands Bl. / SR-60 WB Ramps	Reconfigure interchange to provide 2 NB through lanes, 1 NB right turn lane, 2 SB through lane, 1 SB right turn lane, 1 WB left turn lane, 1 WB through lane, & 1 WB right turn lane	Same	27.1%
88	Redlands Bl. / SR-60 EB Ramps	Reconfigure interchange to provide 2 NB through lanes, 1 NB right turn lane, 2 SB through lanes, 1 SB right turn lane, 1 EB left turn lane, 1 EB through lane, & 1 EB right turn lane	Same	23.0%
91	Redlands Bl. / Alessandro Bl.	Install traffic signal	Same	51.3%
		Provide 2nd SB through lane	Same	
		Modify EB approach to provide a dedicated left turn lane and a shared through/right lane	Same	
92	Redlands Bl. / Cactus Av.	Install traffic signal	Same	27.1%
		Provide 1 NB right turn lane with overlap phase	Same	
		Provide 1 EB lef turn lane	Same	
		Provide 2 WB left turn lanes	Same	
		Provide a 2nd WB through lane	Same	
		Provide 1 WB right turn lane	Same	
93	Gillman Springs Rd. / Alessandro Bl.	Install traffic signal	Same	5.8%
		Provide 2nd and 3rd NB through lanes	Same	
		Provide 2nd and 3rd SB through lanes	Same	
		Provide 1 SB right turn lane	Same	
		Provide 2nd EB right turn lane	Same	
94	Cactus Av. / Alessandro Bl.	Install traffic signal	Same	(WLC Related Improvement)
		Provide 1 NB left turn lane	Same	
		Provide 2 NB right turn lanes with overlap phase	Same	
		Provide 1 EB right turn lane	Same	
		Provide 2 WB left turn lanes	Same	
95	WLC Pkwy. / Eucalyptus Av.	Install traffic signal	Same	(WLC Related Improvement)
		Provide 2nd NB left turn lane	Same	
		Provide 2nd NB through lane	Same	
		Provide 1 NB right turn lane	Same	
		Provide 1 SB left turn lane	Same	
		Provide 2nd and 3rd SB through lanes	Same	
		Provide 1 EB through lane	Same	
		Provide 2nd EB right turn lane	Same	
		Provide 1 WB left turn lane	Same	
		Provide 1 shared WB through/right lane	Same	
96	WLC Pkwy. / St. E - St. F	Construct 2-lane roundabout	Same	(WLC Related Improvement)
		Provide 2 NB through lanes	Same	
		Provide 2 SB through lanes and 1 SB free-right turn lane	Same	
		Provide 1 EB left turn lane & 1 EB shared left/through/right lane	Same	
		Provide 1 WB left turn lane & 1 WB shared left/through/right lane	Same	

TABLE 8-1: SUMMARY OF OFF-SITE INTERSECTION IMPROVEMENTS BY ANALYSIS SCENARIO

(Page 4 of 4)

#	Intersection	Analysis Scenario: Horizon Year (2045) Without Project (Approved SP)	Analysis Scenario: Horizon Year (2045) With Project	Project Fair Share
97	WLC Pkwy. / Alessandro Bl.	Construct 2-lane roundabout	Same	(WLC Related Improvement)
		Provide 1 NB through and 1 NB right turn lane	Same	
		Provide 1 SB left turn lane and 1 SB through lane	Same	
		Provide 1 WB left turn lane and 1 WB right turn lane	Same	
98	Street F / Alessandro Bl.	Construct 2- lane roundabout	Same	(WLC Related Improvement)
		Provide 1 SB shared left/right lane	Same	
		Provide 2 EB through lanes	Same	
		Provide 2 WB through lanes	Same	
99	Darwin Dr. / Alessandro Bl.	Install traffic signal	Same	25.7%
		Provide 1 NB shared left/through/right lane	Same	
		Provide 2nd EB through lane	Same	
		Provide 1 WB left turn lane	Same	
		Modify WB right turn lane to provide 2nd WB through lane	Same	

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EXHIBIT 8-1: FOCUS STUDY AREA HORIZON YEAR (2045) WITHOUT PROJECT (APPROVED SP) RECOMMENDED IMPROVEMENTS

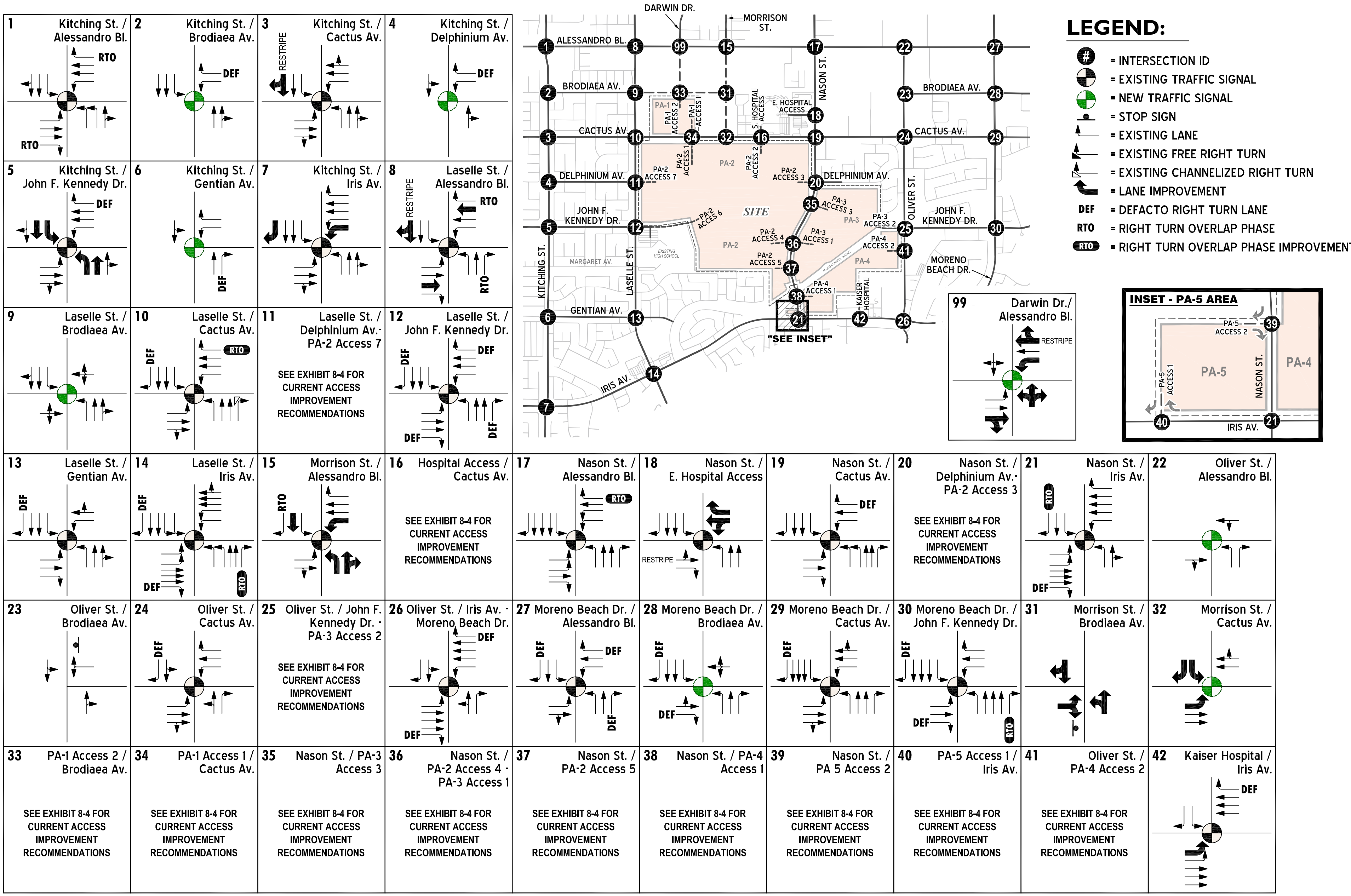


EXHIBIT 8-2: EXTENDED WESTERLY HORIZON YEAR (2045) WITHOUT PROJECT (APPROVED SP) RECOMMENDED IMPROVEMENTS

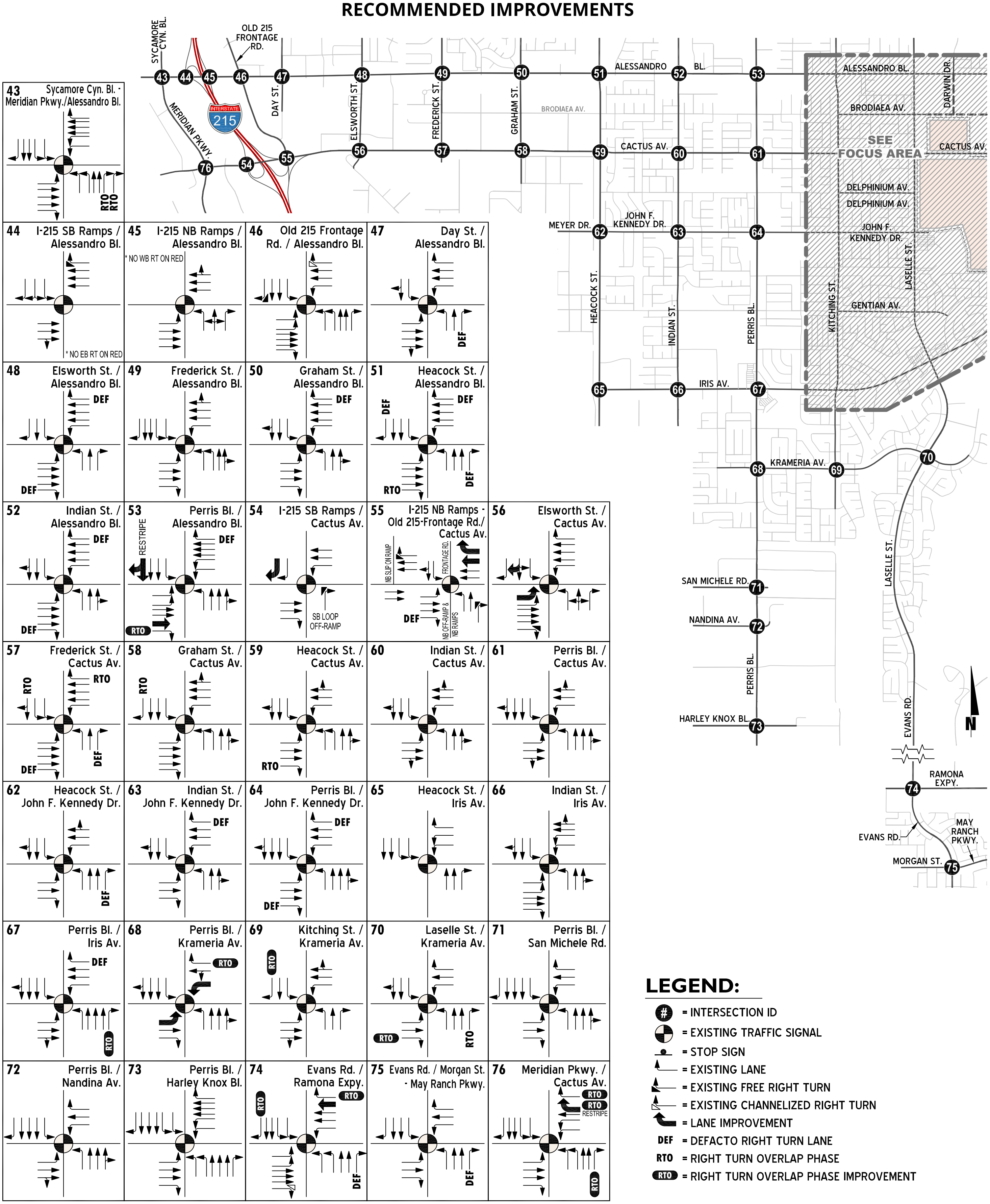


EXHIBIT 8-3: EXTENDED EASTERLY HORIZON YEAR (2045) WITHOUT PROJECT (APPROVED SP) RECOMMENDED IMPROVEMENTS

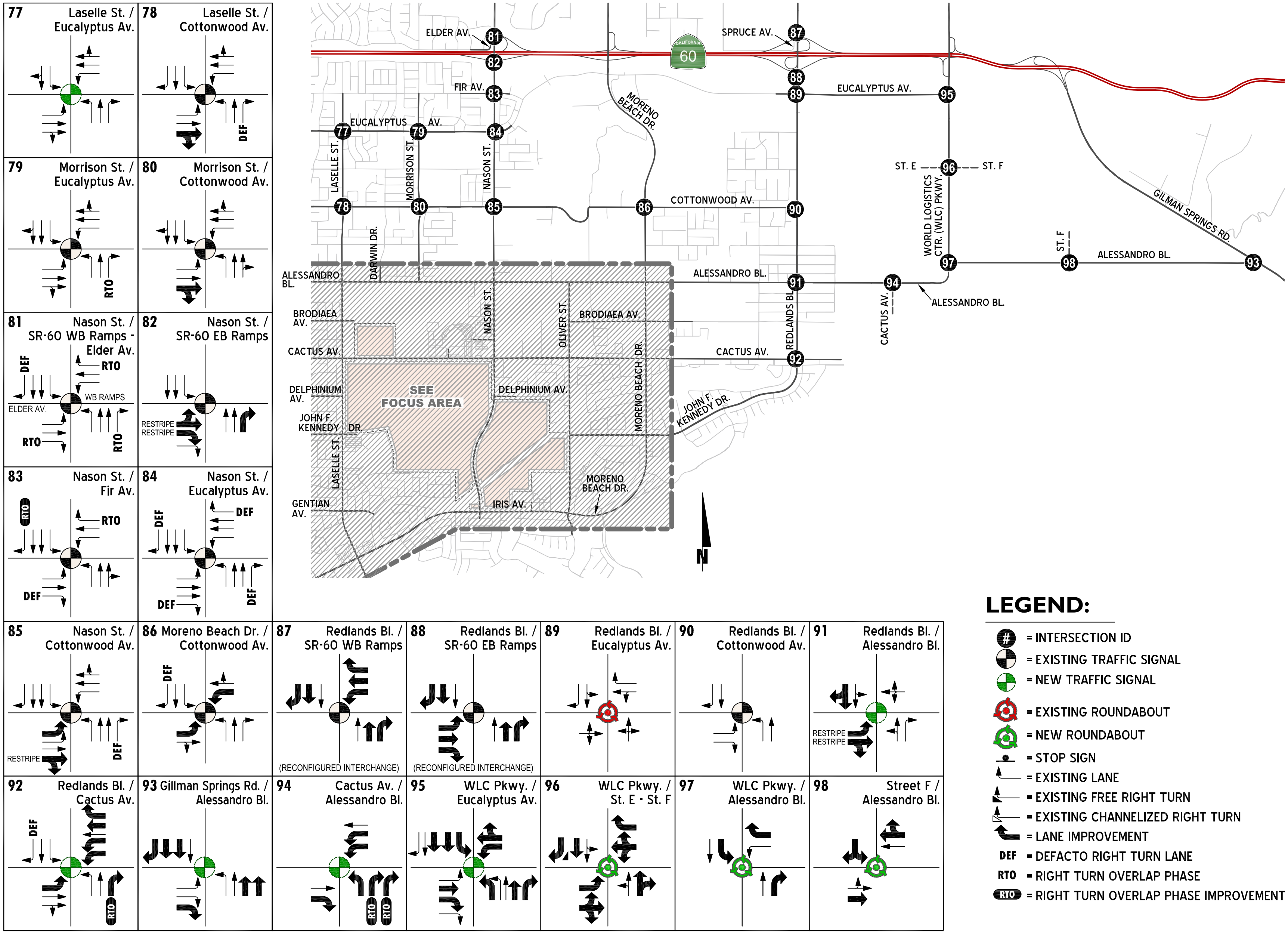


EXHIBIT 8-4: FOCUS STUDY AREA HORIZON YEAR (2045) WITH PROJECT RECOMMENDED IMPROVEMENTS

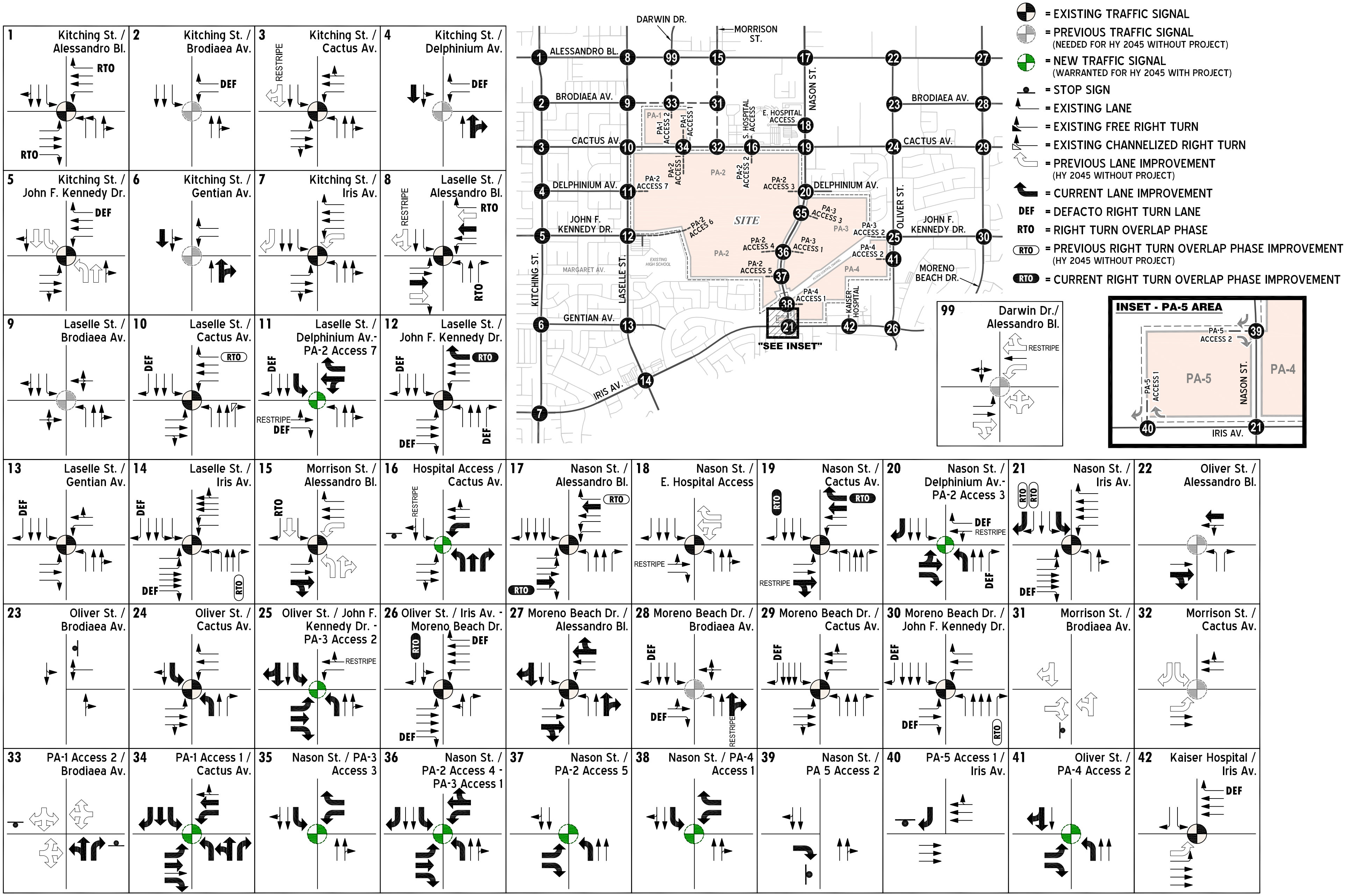


EXHIBIT 8-5: EXTENDED WESTERLY HORIZON YEAR (2045) WITH PROJECT RECOMMENDED IMPROVEMENTS

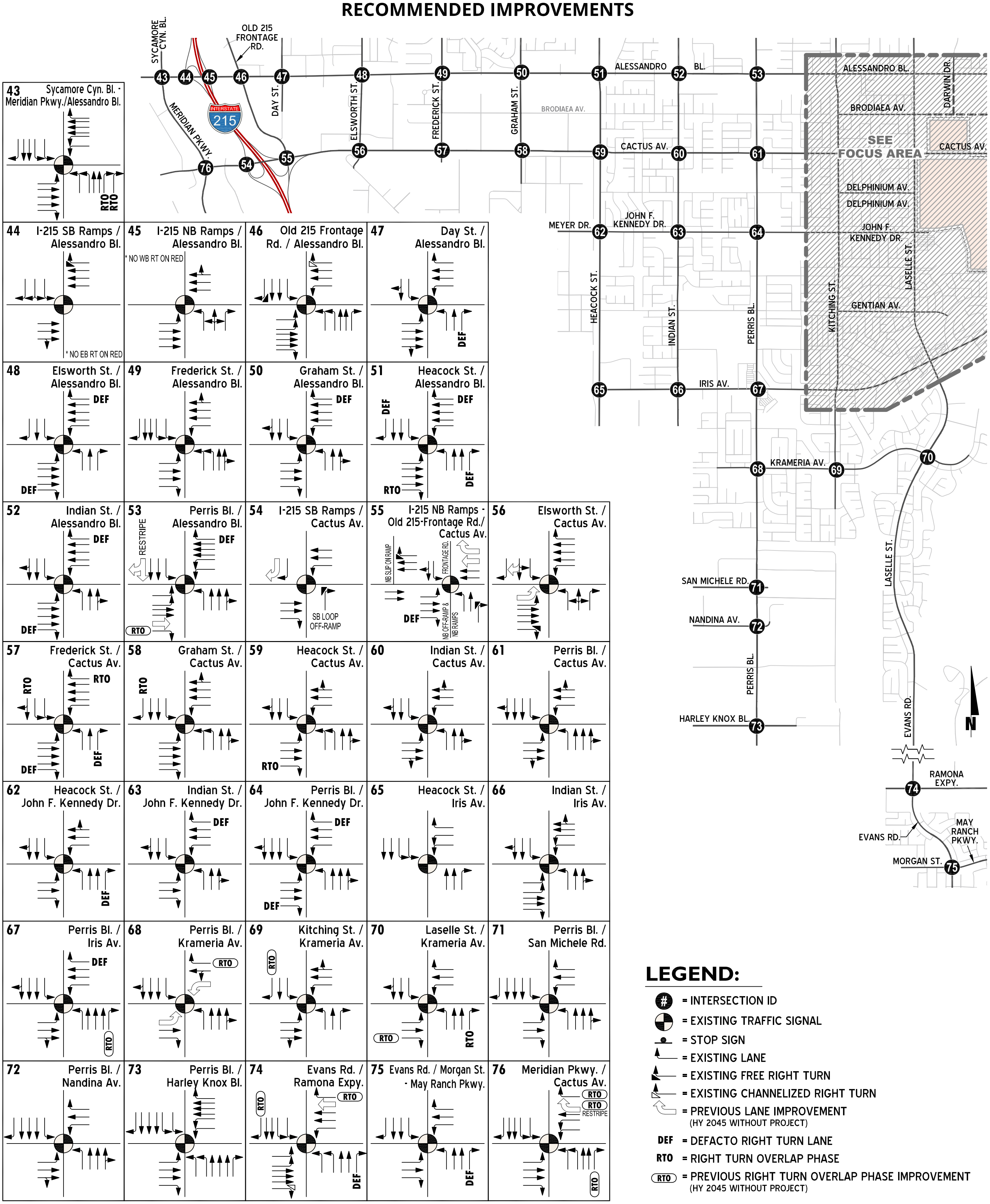
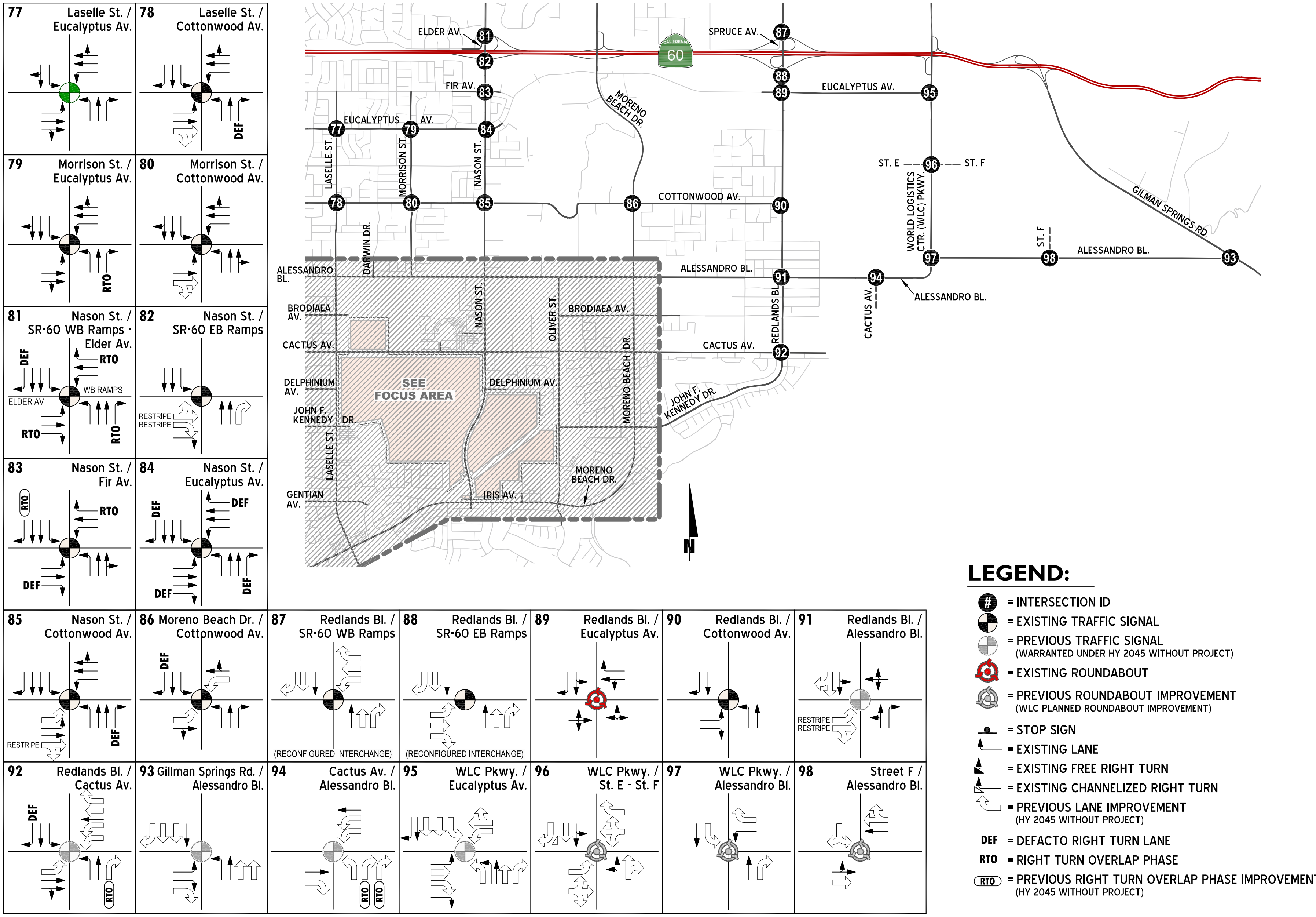


EXHIBIT 8-6: EXTENDED EASTERLY HORIZON YEAR (2045) WITH PROJECT RECOMMENDED IMPROVEMENTS



BICYCLE CIRCULATION

Existing Class II bike lanes that would serve the community are provided on Cactus Avenue, Nason Street, Moreno Beach Drive/Iris Avenue, Lasselle Street, and John F. Kennedy Drive. Class II bike lanes are what people may conventionally think of bike lanes, providing striped lanes designated for the use of bicycles on a street or highway. Access to all existing trails would be provided to the site.

The internal street network will contain an extensive bike network with Class II, buffered Class II and off-street paths, and will connect to the broader Moreno Valley bike network and support proposed micromobility modes (bikeshare, electric scooter). The project also proposes bicycle supporting features, such as end-of-trip bicycle facilities at employment uses, micromobility on-site and connecting to adjacent uses, such as schools and medical centers.

TRANSIT CIRCULATION

Most of the available public transportation is provided by the Riverside Transit Agency (RTA) via fixed route and paratransit bus services. RTA provides routes within the City that connect to major destinations such the Moreno Valley/March Field Metrolink Station, Perris Station Transit Center, University of California, Riverside (UCR), and Moreno Valley Mall.

Aquabella is served by three RTA bus routes. Route 20 proceeds along Alessandro Boulevard to Nason Street, with connections to Riverside University Hospital, then past Nason Street to Moreno Beach Drive, with connections to Kaiser Permanente Medical Center, along Iris Avenue, and past Lasselle Steet. Route 31 runs along Nason Street to the Riverside University Medical Center, with connections to the Moreno Valley Mall, Senior Center, and Mt. San Jacinto College. Route 41 proceeds along Lasselle Street to Alessandro Boulevard, to Nason Street with a connection to Riverside University Medical Center, along Cactus Road, and back to Lasselle Street.

The City's 2040 General Plan addresses ways to improve transit connectivity and develop other methods of attracting ridership. For example, to improve transit connectivity, the City will work with other local agencies to increase transit access through a combination of new routes and/or higher service frequency, expanded hours, and making the public transit experience more user friendly and attractive, such as through improved bus shelters that offer cooling/shade from the sun during drier months and protection against rainy/cold conditions during wetter months. As Moreno Valley expands its transit offerings, prioritization will be given to the needs of seniors, minorities, low-income, disabled, and transit-dependent residents to ensure that everyone can make the trips they need to live, work, and play to their fullest potential in Moreno Valley.

The project has begun coordination with RTA to implement the following transit improvements that are anticipated to improve transit access and connectivity for the project and broadly the rest of the City of Moreno Valley. The project recognizes that a major future employer of the City will be the World Logistics Center (WLC) logistics project, and that providing transit access from the Aquabella project to WLC during hours of operation is a primary focus of coordination with RTA. As indicated in *Aquabella Specific Plan Amendment Transportation Impact Assessment (Fehr & Peers, September, 2023)* (10), additional measures proposed by the project include:

- Discounted transit program for work trips
- Extend transit network coverage to existing and future employment centers, such as WLC

- Extend transit hours for all shift times, such as the midnight shift change at WLC
- Increase transit service frequency
- Implement Bus Rapid Transit (BRT) along Alessandro Boulevard
- Develop an on-site state-of-the-art mobility hub to bolster the effectiveness active transportation options (mobility hubs are places of connectivity that bring together multiple modes of travel and strengthen first-mile/last-mile connections to transit)

8.5 TRAFFIC SAFETY CONSIDERATIONS

The project tiered from the City's recent *Local Road Safety Plan (LRSP) (Fehr & Peers, August, 2022)* (11) to evaluate safety within the study area. The City completed the LRSP in August 2022 and established their commitment to prioritizing safety and eliminating traffic-related deaths and serious injuries on City streets. The LRSP identified collision trends and hot spot locations throughout the City and paired them with engineering and programmatic countermeasures. The LRSP also identified a five-year implementation approach and suggested funding sources.

The Citywide analysis reviewed reported injury collisions on local roadways between 2016 and 2020, acquired from the Transportation Injury Mapping System (TIMS). To better understand systemic collision patterns in the City, several contextual factors were analyzed in conjunction with collision characteristics. Key contextual factors include:

- Roadway classification
- Posted and observed speeds
- Signalized & unsignalized intersections and midblock locations
- Land use context, including proximity to industrial areas, schools, parks, and bus stops
- Presence of bicycle facilities and sidewalks
- Areas in the top 25th percentile in the California Communities Environmental Health Screening Tool: CalEnviroScreen 4.0

Collision data was paired with the key contextual factors which allowed for identification of the combinations of factors that contributed to a high number of all injury collisions, and combinations that led to a high number of fatal and severe collisions. Key takeaways from the analysis include:

- Divided Arterials and Divided Major Arterials in Moreno Valley make up just 7% of the total roadway centerline miles in the City, but almost 40% of the total injury collisions
- Streets with posted speeds 40 miles per hour (MPH) and above make up less than 30% of the total roadway miles, but over 90% of the total injury collisions
- 60% of injury collisions occur at signalized intersections
- 37% of all collisions and 42% of killed or severely injured (KSI) collisions involving victims 19 and under occurred within 1,000 feet of a school, compared to 29% of all injury collisions and 31% of all KSI collisions

After identifying collision trends and systemic issues, the project team and City staff collaborated to identify a set of emphasis areas and associated countermeasures. The following collision profiles were identified in the LRSP:

- Broadside Collisions on Divided Major Arterials – Unsignalized or Midblock
- Overnight Collisions on 45mph+ Streets – Signalized Intersections

- Hit Object, DUI Collisions – Unsignalized or Midblock
- Unsafe Speed Collisions in Industrial Areas – Signalized Intersections
- Broadside Motorcycle Collisions
- Wrong Side of Road Bicycle Collisions
- Pedestrian Collisions on Minor Arterials – Unsignalized and Midblock
- Pedestrian Crossing not in Crosswalk Collisions – Signalized Intersections
- Pedestrian In Road, Including Shoulder Collisions Near Schools, Parks, and Bus Stops
    - Includes John F Kennedy Drive at Lasselle Street
- Overnight Pedestrian and Bicycle Collisions – Signalized Intersections

The following hot spots were identified in the LRSP:

1. Iris Avenue between Heacock Street and Nason Street
2. Perris Boulevard – All Traffic Signals
3. Frederick Street at Sunnymead Boulevard
4. Lasselle Street between Cremello Way and Oleander Avenue
5. Kitching Street between Alessandro Boulevard and Cactus Avenue

The following maps were prepared in the project study area from the LRSP collision hot spot data:

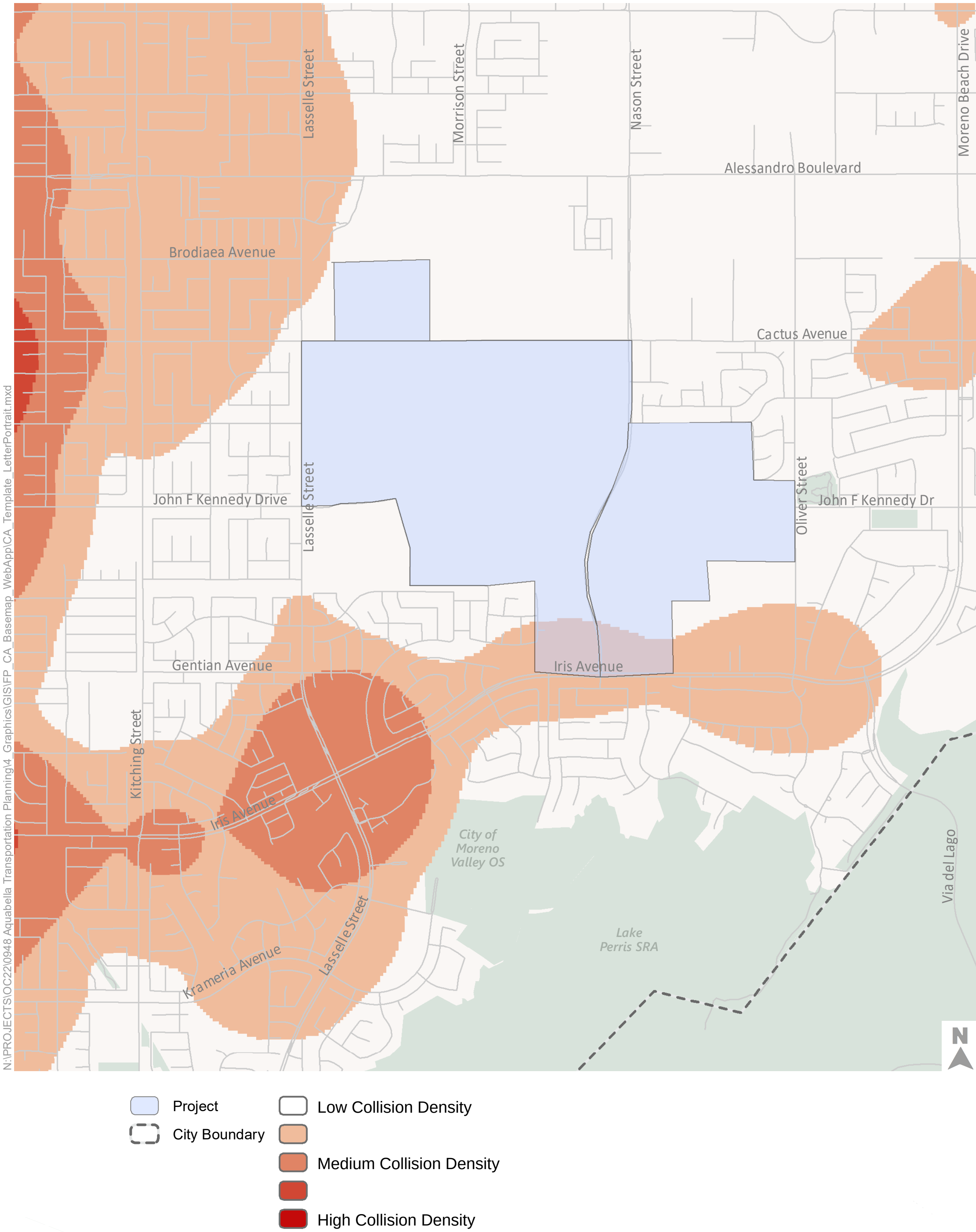
- Exhibit 8-7 summarizes hot spot collision records for all types of collisions
- Exhibit 8-8 summarizes hot spot collision records for vehicle collisions with bicyclists or pedestrians

As shown in the figures and identified in the list of hot spots above, there are some nearby corridors and intersections identified as priority areas in the LRSP, primarily the Iris Avenue corridor. The City recently leveraged the LRSP to receive grant funding for countermeasures along the corridor (Iris Avenue Corridor Safety Improvements/Heacock St. to Nason St. - Project 808 0036). Countermeasures in the design include traffic signal head retroreflective backplates, new warning and regulatory signage, object markers, yellow edgeline striping, yellow median nose paint, leading pedestrian interval traffic signal timing changes, advanced stop bar before crosswalk and upgrade to high-visibility crosswalk striping. Examples of these countermeasures are shown below in Exhibit 8-9.

The project shares the City's commitment to advance transportation safety for all who share Moreno Valley streets by eliminating fatal and severe injury collisions on City roadways. The comprehensive safety analysis performed in the study area identified only the intersection of John F Kennedy Drive at Lasselle Street as a collision hot spot directly adjacent to the project, with some hot sport locations within a half mile of the site. However, the project recognizes that the likeliness of collisions increases with higher traffic volumes expected to be generated by the project.

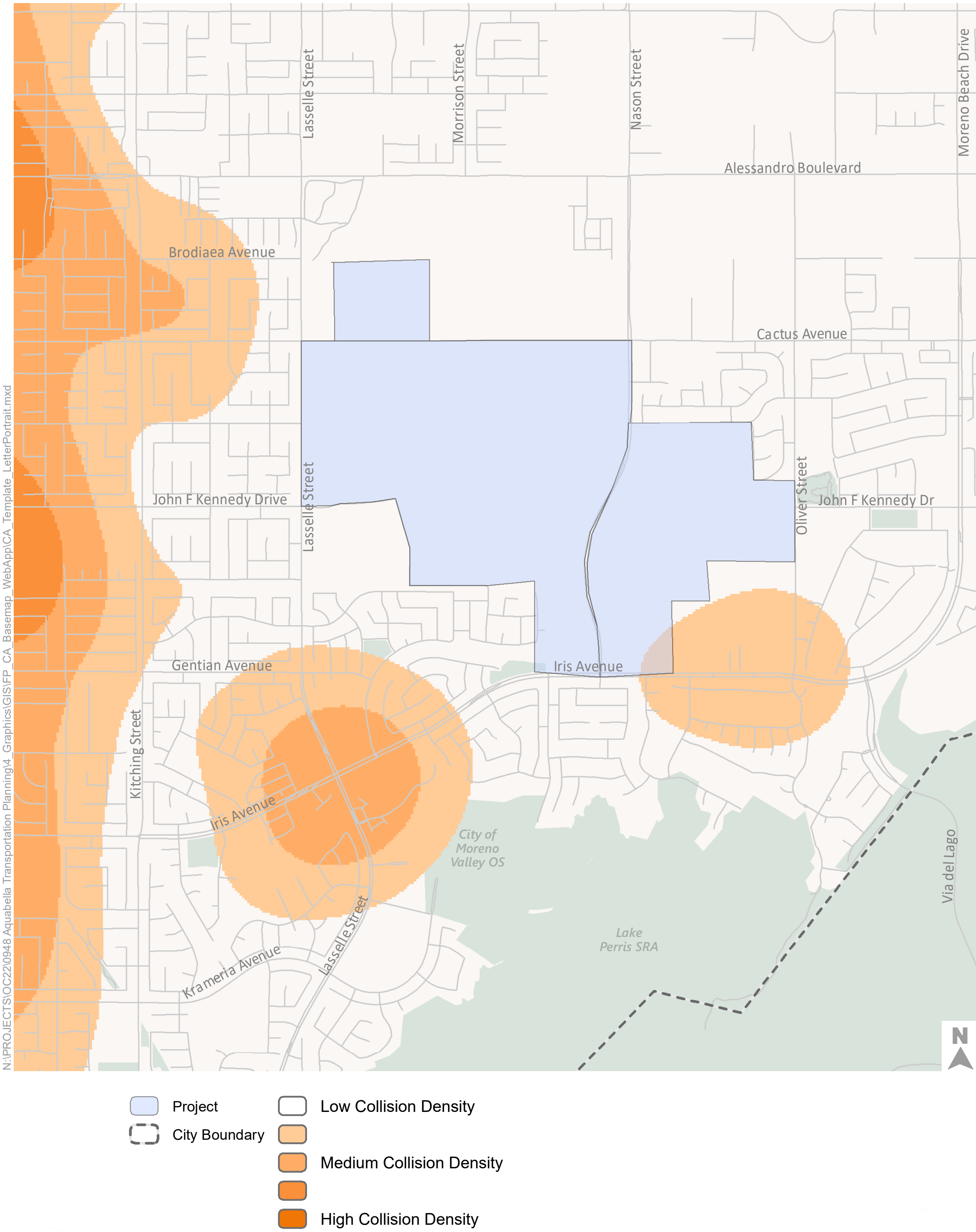
The project commits to work with the City of Moreno Valley to design onsite project roadway infrastructure and intersections consistent with design recommendations and collision countermeasures identified in the LRSP. It is recommended that new traffic signals should be designed with retroreflective backplates and leading pedestrian interval signal timing should be programmed at all intersections in which the project expects high pedestrian activity. The recommended intersection improvements at deficient study locations would not conflict with recommendations provided in the LRSP.

EXHIBIT 8-7: ALL COLLISIONS HEAT MAP (2016-2022)



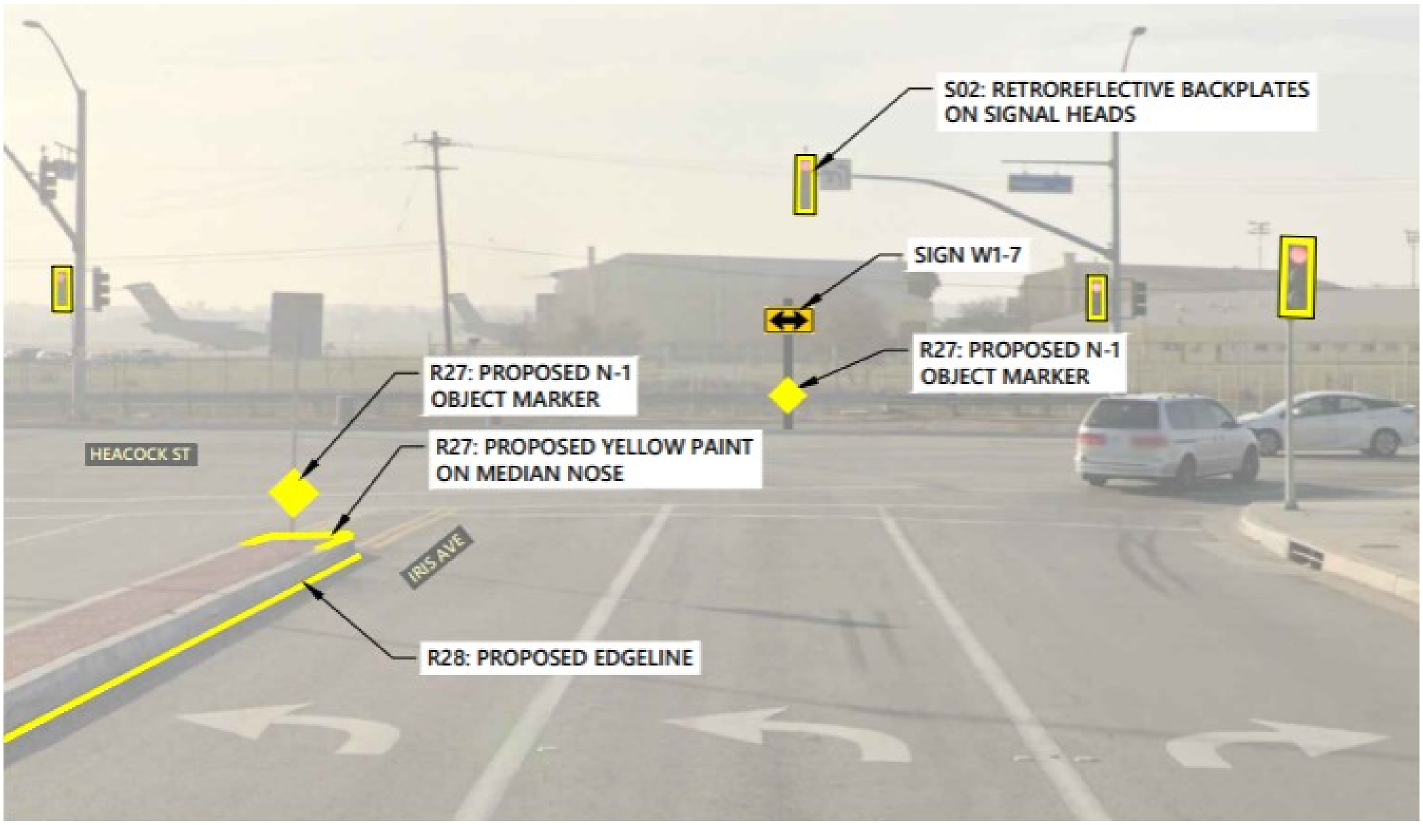
Source: Fehr & Peers

EXHIBIT 8-8: BIKE AND PEDESTRIAN COLLISIONS HEAT MAP (2016-2022)



Source: Fehr & Peers

EXHIBIT 8-9: CONCEPTUAL COUNTERMEASURE RECOMMENDATIONS AT IRIS AVENUE AND HEACOCK STREET



Source: Fehr & Peers

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