2.5 Traffic and Transportation/Pedestrian and Bicycle Facilities

This section is based on the *I-5 Widening from SR-73 to El Toro Road PA/ED Traffic Report* (June 2012) and discusses the impacts of the proposed project on traffic and circulation as well as pedestrian and bicycle facilities during construction (temporary impacts), after completion of the proposed project (opening year 2022), and in the design year (long-term impacts [2045]) in the Cities of Mission Viejo, Laguna Niguel, Laguna Hills, Laguna Woods, and Lake Forest within the Study Area. Also included in the Study Area are the arterial roadways and intersections in the vicinity of the freeway project. The Study Area also extends into portions of the nearby Cities of San Juan Capistrano and Irvine.

2.5.1 Regulatory Setting

The California Department of Transportation (Caltrans), as assigned by the Federal Highway Administration (FHWA), directs that full consideration should be given to the safe accommodation of pedestrians and bicyclists during the development of federal-aid highway projects (see 23 Code of Federal Regulations [CFR] 652). It further directs that the special needs of the elderly and the disabled must be considered in all federal-aid projects that include pedestrian facilities. When current or anticipated pedestrian and/or bicycle traffic presents a potential conflict with motor vehicle traffic, every effort must be made to minimize the detrimental effects on all highway users who share the facility.

In July 1999, the United States Department of Transportation (USDOT) issued an Accessibility Policy Statement pledging a fully accessible multimodal transportation system. Accessibility in federally assisted programs is governed by the USDOT regulations (49 CFR Part 27) implementing Section 504 of the Rehabilitation Act (29 United States Code [USC] 794). FHWA has enacted regulations for the implementation of the 1990 Americans with Disabilities Act (ADA), including a commitment to build transportation facilities that provide equal access for all persons. These regulations require application of the ADA requirements to federal-aid projects, including Transportation Enhancement Activities.

2.5.2 Affected Environment

2.5.2.1 Existing Roadway System

Interstate 5 (I-5) is a major north-south corridor connecting San Diego County in the south to Los Angeles County to the north. It traverses many cities, including cities in Orange County. Within the project limits, I-5 northbound (NB) is four lanes from SR-73 to La Paz Road, and I-5 southbound (SB) is four lanes from El Toro Road to State Route

73 (SR-73). Within the project limits, I-5 NB is five lanes between Alicia Parkway and La Paz Road to El Toro Road, and I-5 SB is five lanes at El Toro Road.

Auxiliary lanes exist on NB I-5 at the following locations: between Avery Parkway and Crown Valley Parkway, between Crown Valley Parkway and Oso Parkway, and between Alicia Parkway and El Toro Road. Auxiliary lanes exist on SB I-5 at the following locations: between El Toro Road and Alicia Parkway (two auxiliary lanes), between Alicia Parkway and La Paz, between La Paz Road and Oso Parkway (does not connect interchange to interchange), between Oso Parkway and Crown Valley Parkway (does not connect interchange to interchange), and between Crown Valley Parkway and Avery Parkway.

The analysis area for the assessment of traffic effects of the proposed project includes the freeway mainline from south of the I-5/Interstate 405 (I-405) interchange to south of Junipero Serra (both high-occupancy lanes [HOV] and general-purpose lanes), ramp termini (merging, diverging, and weaving), and intersections on the local street system (ramp intersections and those arterial intersections immediately adjacent to the interchanges). The existing roadway configuration and traffic conditions on I-5 are described in Sections 1.2.2 and 1.2.2.1 of this Initial Study/Environmental Assessment (IS/EA) and are summarized in this subsection.

There are no on-street parking spaces or bicycle facilities within the project limits on the I-5 mainline. No other modes of transportation exist or are proposed in the near future on the freeway mainline within the project limits.

Traffic volume is usually discussed in terms of average daily traffic (ADT) and/or intersection capacity utilization (ICU). The quality of traffic flow can be defined in terms of level of service (LOS). The measure used to provide an estimate of LOS on a freeway facility is the density of vehicles traveling on the facility at a specific time. There are six grades of LOS, ranging from LOS A (representing free flow traffic conditions with low volumes and high speeds, resulting in low densities) to F (representing conditions where the traffic volumes exceed capacity and result in forced-flow operations at low speeds, resulting in high densities and delays). Table 1.2-1 in Chapter 1 illustrates LOS from A through F.

2.5.2.2 Freeway Mainline Operations and LOS

Within the project limits, the existing (2011) peak-hour volumes on I-5 range from 6,019 to 13,439 vehicles in the NB direction and from 5,764 to 11,637 vehicles in the SB

direction. Truck traffic is estimated to be 3.5 percent of the total traffic in this segment of I-5 from SR-73 to El Toro Road, based on the 2011 Caltrans *Truck Traffic Report*.[1]

As shown in Table 2.5-1, the mainline within the project limits generally exceeds the Caltrans desired operating condition of LOS C for most segments. Most segments in both the NB and SB directions operate at LOS D, E, or F. Within the project limits, the a.m. peak hour is more congested on NB I-5, and the p.m. peak hour is more congested on SB I-5. Six NB mainline segments are operating at LOS F in the a.m. peak hour and two NB mainline segments are operating at LOS F in the p.m. peak hour. The remaining NB mainline segments are operating at LOS C and D in the a.m. peak hour and LOS C to E in the p.m. peak hour (four segments are operating at LOS E). In the SB direction, all mainline segments are operating at LOS D or better in the a.m. peak hour, and four segments in the p.m. peak hour are operating at LOS F. All of the other SB mainline segments are operating at LOS D or better in the a.m. peak hour and p.m. peak hour, with the exception of one segment (between Oso Parkway and Crown Valley Parkway) in the p.m. peak hour that is operating at LOS E.

2.5.2.3 Accident Rates

I-5 within the project limits experiences congestion and delay during peak hours and on the weekends/holidays. This condition is attributed to the limited mainline capacity and short merging distances at the on- and off-ramps. The Caltrans Traffic Accident Surveillance and Analysis System (TASAS) provides detailed accident rates for all highways in the State. Caltrans District 12 provided accident data for NB and SB I-5 between the Avery Parkway interchange area (postmile [PM] 12.3) and the El Toro Road interchange area (PM 18.99) for the period of July 2007 through June 2010.

During the three-year period from July 2007 through June 2010, there were 1,658 accidents within the proposed project limits, with one being fatal and 484 involving injuries. Three segments of the I-5 mainline within the project limits have a higher accident rate than the statewide average for total accidents; two of these segments also have a higher accident rate than the statewide average for fatality and injury accidents. Additionally, improvements to Study Area ramps are needed due to the high traffic demand, as shown in Table 2.5-1.

[1] http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/index.htm.

Table 2.5-1 Peak 15-Minute Mainline Operations and LOS Summary – 2011 Existing Conditions Northbound and Southbound Segments

Segments	AM Peak Hour		PM Peak Hour	
	Volume	LOS	Volume	LOS
Northbound Segments				
NB between Ortega Hwy & Junipero Serra	9,070	D	8,536	D
NB between Junipero Serra & SR-73	9,343	C	8,934	C
NB between SR-73 & Avery	6,019	C	7,024	D
NB between Avery & Crown Valley	6,219	**F**	7,391	E
NB between Crown Valley & Oso	7,619	**F**	9,007	**F**
NB between Oso & La Paz	8,799	**F**	8,997	E
NB between La Paz & Alicia	10,409	**F**	9,259	E
NB between Alicia & El Toro	12,249	**F**	9,816	**F**
NB between El Toro & Lake Forest	13,439	**F**	10,278	E
NB between Lake Forest & I-405	10,269	D	8,156	C
Southbound Segments				
SB between I-405 & Lake Forest	9,146	D	9,360	D
SB between Lake Forest & El Toro	10,280	C	11,637	**F**
SB between El Toro & Alicia	9,471	C	11,191	**F**
SB between Alicia & La Paz	8,609	C	10,630	**F**
SB between La Paz & Oso	8,209	D	9,690	**F**
SB between Oso & Crown Valley	8,262	D	9,166	E
SB between Crown Valley & Avery	6,446	C	7,413	D
SB between Avery & SR-73	5,764	C	6,898	C
SB between SR-73 & Junipero Serra	7,402	B	10,374	D
SB between Junipero Serra & Ortega Hwy	7,045	C	10,196	D

Notes:
Analysis is based on the peak 15-minute demand. Refer to the *Traffic Report* (June 2012) Table 2-2 for a summary of peak period conditions.
Grey shading represents segment location is outside of project limits.
A Bold **F** indicates LOS F condition.
I-405 = Interstate 405
LOS = level of service
NB = northbound
SB = southbound
SR-73 = State Route 73

2.5.2.4 Mainline Ramp Intersections and Local Arterial Intersections LOS Analysis

Local Arterial Intersections LOS

For the operational analysis of local arterial roadway intersections serving the freeway interchange ramps, the HCM 2010 average vehicle delay procedures are utilized to derive LOS. For local arterial intersections not serving freeway ramps, the intersection capacity utilization (ICU) methodology is used in accordance with the procedures of the local agencies and the County of Orange (County). The performance criteria for both the delay and ICU procedures are summarized in the *Traffic Report* (June 2012). For this analysis, ICU values are used to evaluate intersections in accordance with the procedures of the local cities and the County. A threshold of LOS D is generally utilized as the maximum acceptable intersection LOS. However some jurisdictions have adopted LOS E as the

maximum acceptable intersection LOS for specific locations. In addition, the Orange County Congestion Management Program (CMP) designates specific intersections on the CMP highway system as locations where LOS E must be maintained, unless the baseline (1991 conditions) is LOS F (in which case, the intersection's LOS F ICU may not increase by more than 0.1).

Table 2.5-4 provided later in this section shows the 2011 LOS for all of the mainline ramp intersections and local arterial intersections in the Study Area. All of the Study Area ramp intersections are operating at LOS C or better in the a.m. peak hour, with the exception of the Bake Parkway/I-5 NB ramps, which are operating at LOS D. All of the Study Area ramp intersections are operating at LOS C or better in the p.m. peak hour, with the exception of the following intersections: Lake Forest Drive and the I-5 SB ramps, El Toro Road and I-5 NB ramps, Avenida Carlota and the I-5 SB ramps, Cabot Road/La Paz Road and the I-5 SB ramps, and Crown Valley Parkway and the I-5 SB ramps, which are all operating at LOS D. All local arterial intersections are operating at LOS C or better in both the a.m. and p.m. peak hours with the exception of the following intersections: Bake Parkway/Jeronimo Road is operating at LOS D in the a.m. peak hour, and El Toro Road/Jeronimo Road is operating at LOS D in the p.m. peak hour.

Existing Freeway Ramp Performance

Freeway ramp performance was also assessed. To identify the project's impact on the operating condition of a freeway ramp, an LOS ranking scale was used. The LOS is based on peak hour volume freeway ramp threshold capacities.

The LOS E capacity represents an approximation of the number of vehicles that the freeway ramp can comfortably carry on a peak hour basis before it is considered to be at capacity. If the peak hour volume on a freeway ramp exceeds the LOS E capacity, then the peak hour LOS of the ramp is considered to be LOS F. To calculate the peak hour LOS for each freeway ramp, the peak hour volume on each ramp was divided by the capacity of the ramp (the LOS E capacity) to determine the peak hour demand to capacity (D/C) ratio for each ramp. As shown in Table 2.5-2, a LOS value is assigned to each D/C ratio range for use as a way to designate the performance of a freeway ramp.

Table 2.5-3 provides a summary of the existing ramp configurations, capacities, and peak-hour volumes together with the corresponding D/C ratios for 2011. All of the on- and off-ramps within the Study Area have D/C ratios less than 1.0, with the exception of the Crown Valley Parkway SB off-ramp, which has a D/C ratio greater than 1.0 in both the a.m. and the p.m. peak hours.

Table 2.5-2 Level of Service and Demand/Capacity Ratio

Level of Service	Demand/Capacity Ratio
A	≤ 0.600
B	0.610–0.700
C	0.710–0.800
D	0.810–0.900
E	0.910–1.000
F	> 1.000

2.5.2.5 Pedestrian and Bicycle Facilities

Pedestrian facilities (crosswalks and sidewalks) within the Study Area are located at the following freeway ramps, undercrossings, and overcrossings: Avery Parkway (NB off-ramp and SB on-ramp and the south side of the undercrossing), Crown Valley Parkway (NB off-ramp and SB on-ramp and the south side of the overcrossing), Oso Parkway (NB off-ramp and NB loop on-ramp, SB on-ramp and the south side of the overcrossing), La Paz Road (NB and SB on- and off-ramps and the north and south sides of the undercrossing), Alicia Parkway (NB off-ramp and the south side of the overcrossing), Los Alisos Boulevard overcrossing (north and south sides), and El Toro Road (SB on-ramp and the north and south side of the undercrossing).

A Class II (on-road striped) bike lane is provided along the north side of the Crown Valley Parkway overcrossing and along both sides of the La Paz Road undercrossing. The Aliso Creek Class I Bikeway follows Aliso Creek for approximately 15 miles (mi) through the County. This bikeway extends from Aliso and Wood Canyons Wilderness Park to Limestone Whiting Ranch Wilderness Park. A portion of the bikeway is aligned along Laguna Hills Drive and Paseo De Valencia. The Aliso Creek Class I Bikeway is off-road for this entire distance. The portion of the Aliso Creek Class I Bikeway (located within the project area) is off-road. This bikeway crosses the project area north of the I-5 interchange with Alicia Parkway to a point south of the Los Alisos Boulevard overcrossing.

Class I Bikeways accommodate commuter and recreational cyclists and pedestrian users. Aliso Creek Class I Bikeway is a 1.9 mi bikeway within the limits of the City of Laguna Hills. The bikeway segments in Mission Viejo and Laguna Hills are maintained by the County.

Table 2.5-3 Freeway Ramp Volume and Demand/Capacity Summary – Existing Conditions

Northbound Ramps								Southbound Ramps							
Location	Lanes			AM		PM		Location	Lanes			AM		PM	
	Ramp	Aux	Cap	Vol	D/C	Vol	D/C		Ramp	Aux	Cap	Vol	D/C	Vol	D/C
J.Serra NB Off-Ramp	1	0	1,500	490	0.33	350	0.23	J.Serra SB On-Ramp	1	0	1,080	460	0.43	520	0.48
J.Serra NB On-Ramp	1	1	1,080	760	0.70	730	0.68	J.Serra SB Off-Ramp	1	1	1,500	800	0.53	710	0.47
NB Connector Ramp to SR-73	2.5	2	5,000	3,200	0.64	1,840	0.37	SB Connector Ramp from SR-73	2.5	2	5,000	1,110	0.22	2,540	0.51
Avery NB Off-Ramp	1	0	1,500	600	0.40	670	0.45	Avery SB On-Ramp	1	0	1,080	310	0.29	530	0.49
Avery NB On-Ramp	1	1	1,500	800	0.53	1,020	0.68	Avery SB Off-Ramp	1	1	1,500	960	0.64	1,050	0.70
Crown Valley NB Off-Ramp	1	1	1,500	860	0.57	670	0.45	Crown Valley SB On-Ramp	1.5	1	1,800	560	0.31	770	0.43
Crown Valley NB Loop On-Ramp	1	0	1,500	870	0.58	770	0.51	Crown Valley SB Off-Ramp	1.5	1	2,250	2,290	1.02	2,540	1.13
Crown Valley NB Direct On-Ramp	1	1	1,500	1,390	0.93	1,440	0.96								
Oso NB Off-Ramp	1.5	1	2,250	660	0.29	1,130	0.50	Oso SB Direct On-Ramp	1	0	1,500	340	0.23	510	0.34
Oso NB Loop On-Ramp	1	0	1,500	550	0.37	380	0.25	Oso SB Loop On-Ramp	1	0	1,080	630	0.58	520	0.48
Oso NB Direct On-Ramp	1	0	1,500	1,290	0.86	740	0.49	Oso SB Off-Ramp	1.5	1	2,250	920	0.41	1,560	0.69
La Paz NB Off-Ramp	1	0	1,500	320	0.21	740	0.49	La Paz SB Direct On-Ramp	1	0	1,080	120	0.11	120	0.11
La Paz NB Loop On-Ramp	1	0	1,080	780	0.72	410	0.38	La Paz SB Loop On-Ramp	1	0	1,080	250	0.23	330	0.31
La Paz NB Direct On-Ramp	1	1	1,500	1,150	0.77	580	0.39	La Paz SB Off-Ramp	1	1	1,500	750	0.50	1,400	0.93
Alicia NB Off-Ramp	1	0	1,500	370	0.25	1,020	0.68	Alicia SB Direct On-Ramp	1	0	1,080	210	0.19	220	0.20
Alicia NB Loop On-Ramp	1	1	1,500	1,490	0.99	1,010	0.67	Alicia SB Loop On-Ramp	1	1	1,500	570	0.38	770	0.51
Alicia NB Direct On-Ramp	1	0	1,500	1,340	0.89	1,070	0.71	Alicia SB Off-Ramp	2	2	3,000	1,950	0.65	2,200	0.73
El Toro NB Off-Ramp	1	1	1,500	980	0.65	1,330	0.89	El Toro SB Direct On-Ramp	1	0	1,080	280	0.26	500	0.46
El Toro NB Loop On-Ramp	1	0	1,500	930	0.62	970	0.65	El Toro SB Loop On-Ramp	1	0	1,500	580	0.39	810	0.54
El Toro NB Direct On-Ramp	1	1	1,500	1,240	0.83	800	0.53	El Toro SB Off-Ramp	1.5	1	2,250	1,630	0.72	1,730	0.77
Lake Forest NB Off-Ramp	1	1	1,500	1,020	0.68	710	0.47	Lake Forest SB Direct On-Ramp	1	0	1,500	230	0.15	600	0.40
								Lake Forest SB Loop On-Ramp	1	0	1,080	290	0.27	320	0.30
Collector/Distributor NB Off	1.5	1	3,000	2,150	0.72	1,310	0.44	Collector/Distributor SB On	1	1	2,000	560	0.28	1,380	0.69
Lake Forest NB On-Ramp (to CD)	2	2	3,000	780	0.26	930	0.31	Lake Forest SB Off-Ramp (from CD)	2	2	3,000	1,570	0.52	2,670	0.89
Bake NB Off-Ramp (from CD)	2	2	3,000	940	0.31	520	0.17	Bake SB Direct On-Ramp (to CD)	1	0	1,500	20	0.01	120	0.08
Bake NB Loop On-Ramp (to CD)	1	0	1,500	220	0.15	1,100	0.73	Bake SB Loop On-Ramp (to CD)	1	0	1,080	170	0.16	510	0.47
Bake NB Direct On-Ramp (to CD)	2	2	3,000	2,160	0.72	2,850	0.95	Collector/Distributor from I-405 SB	2	2	4,000	840	0.21	1,520	0.38
Collector/Distributor to I-405 NB	2	2	4,000	1,530	0.38	1,970	0.49	Bake SB Off-Ramp (total)	3	2	4,500	2,680	0.60	2,340	0.52
Collector/Distributor to I-5 NB	2	2	4,000	2,840	0.71	3,700	0.93	Bake SB Off-Ramp (from CD)	1	0	1,500	1,730	1.15	1,540	1.03
								Bake SB Off-Ramp (from 405)	1	1	1,500	950	0.63	800	0.53
								Collector/Distributor from I-5 SB	1.5	1	3,000	2,830	0.94	3,440	1.15

Source: *I-5 Widening from SR-73 to El Toro Road Project Traffic Report* (June 2012).
Location outside of project limits
Location with D/C > 1.00

CD = collector-distributor
Aux = auxiliary
Cap = capacity
D/C = demand/capacity
I-405 = Interstate 405
I-5 = Interstate 5
NB = northbound
SB = southbound
SR-73 = State Route 73
Vol = volume

A portion of a separate County recreation facility, the Aliso Creek Regional Riding and Hiking Trail (a natural-surface dirt trail), is also aligned across the project area. The Aliso Creek Riding and Hiking Trail is a master-planned trail, proposed from Cooks Corner to the County's Aliso Beach Park. The Aliso Creek Trail is open beginning just south of the overcrossing of I-5 at Aliso Creek (south) to the entrance of Aliso and Wood Canyons Wilderness Park. Segments of the trail are also open beginning at Los Alisos Park, just north of I-5. The trail and bikeway are distinct and separate facilities between I-5 and Paseo de Valencia. The two routes remain separate, but parallel, along Paseo de Valencia before they separate again along Laguna Hills Drive. The trail and the bikeway become parallel again as they pass through Sheep Hills Park, before entering Aliso and Wood Canyons Wilderness Park.

2.5.3 Environmental Consequences

2.5.3.1 Temporary Impacts

No Build Alternative – Alternative 1

The No Build Alternative does not include a construction component and would retain the existing roadway. Therefore, the No Build Alternative would not result in temporary indirect or direct effects to traffic volumes or circulation.

Build Alternatives – Alternative 2 (Preferred Alternative) and Alternative 3

Temporary construction effects related to the Build Alternatives would occur. Under both Build Alternatives, continuous, uninterrupted access to I-5 throughout the duration of construction would be provided. The proposed project improvements include modifications to many of the interchanges throughout the project limits. Therefore, temporary ramp closures may occur during construction of interchange improvements. However, these closures would be limited to potential weekend closures and would not exceed a period of one week.

The Build Alternatives would involve modification of the I-5/Avery Parkway undercrossing and the I-5/La Paz Road undercrossing and replacement of the Los Alisos Boulevard overcrossing. Temporary traffic detour routes on I-5 would be necessary while falsework is being erected for construction of the new bridges. Throughout the duration of construction, the proposed construction sequencing is intended to provide continuous, uninterrupted access to I-5. Five lanes of traffic (four general purpose and one HOV) will be maintained in both the NB and SB directions along I-5, and at least one lane will be maintained on all ramps.

Pedestrian and bicycle access would be maintained along Avery Parkway and La Paz Road during replacement of the undercrossing structures and along Los Alisos Boulevard during replacement of the overcrossing structure. For the majority of the construction, the Aliso Creek Class I Bikeway will remain open to bicyclists and pedestrians. When needed, the Aliso Creek Class I Bikeway will be temporarily closed for short durations in the area under I-5, south of Los Alisos Boulevard, to protect the safety of bikeway users and construction workers. To ensure continuity of the Aliso Creek Class I Bikeway during the temporary closures at this location, temporary detours around this area would be provided. At the completion of grading, the bikeway segment at this location would be restored to its original alignments and to a condition as good as or better than prior to the project. The remainder of the bikeway east and west of I-5 would not be changed by the proposed project.

Due to the temporary nature of the project construction activities affecting traffic and circulation, and the fact that the standard project requirements would be followed to minimize impacts, the proposed project would not result in temporary indirect or direct adverse effects. The required Transportation Management Plan (TMP) prepared prior to project construction (see Chapter 1, Section 1.4.1 for details) would address traffic detours during construction. This TMP would also avoid and minimize construction-related traffic and circulation impacts of the proposed project.

2.5.3.2 Permanent Impacts

No Build Alternative – Alternative 1

Based on the information contained in the *Traffic Report*, and as shown in Table 2.5-4, the No Build Alternative would not meet the purpose and need to relieve congestion and reduce delay in the opening year (2022) or the future year (2045) and would result in indirect and direct impacts to traffic and transportation as outlined below.

Mainline Ramp Intersections and Local Arterial Intersections

Table 2.5-4 provides a comparison of the LOS for the I-5 ramp intersections and the local arterial intersections within the Study Area for the following conditions: 2011 existing, 2022 No Build, and future 2045 No Build.

2022 Opening Year No Build Conditions

As shown, none of the Study Area ramp and local arterial intersections exceed the performance standard for the applicable jurisdiction for 2011 and 2022. As shown in Table 2.5-4, there are no ramp intersections or arterial intersections that exceed the performance standard of the applicable jurisdiction for 2022 No Build conditions.

Table 2.5-4 Ramp and Arterial Intersection LOS Summary – 2011 Existing Conditions, 2022 and 2045 No Build Conditions

Segment	Jurisdiction	2011 Existing Conditions				2022 No Build Conditions				2045 No Build Conditions			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay/ ICU	LOS	Delay/ ICU	LOS	Delay/ ICU	LOS	Delay ICU	LOS	Delay/ ICU	LOS	Delay/ ICU	LOS
Ramp Intersections													
1. Bake & I-5 NB Ramps[1]	State ROW/Irv	36.4	D	8.2	A	60.8	**E[1]**	8.2	A	49.5	D	11.7	B
2. Bake & I-5 SB Ramps[1]	State ROW/Irv	14.4	B	21.8	C	18.7	B	31.4	C	31.1	C	57.4	**E[1]**
3. Lake Forest & I-5 NB Ramps	State ROW/LF	10.2	B	11.3	B	11.3	B	13.7	B	30	C	17.3	B
4. Lake Forest & I-5 SB Ramps[1]	State ROW/LH	24.4	C	54	D	27.7	C	78.7	**E[1]**	40.3	D	128.2	**F[2]**
5. El Toro & I-5 NB Ramps[1]	State ROW/LF	24.1	C	40.6	D	31.2	C	48.2	D	45.9	D	82	**F[1 2]**
6. I-5 SB Ramps & Ave Carlota[1]	State ROW/LH	24.1	C	35.8	D	25.8	C	43.2	D	34	C	97.1	**F[2]**
7. I-5 NB Ramps & Alicia	State ROW/MV	8.3	A	17.4	B	9	A	17.8	B	14.4	B	30.4	C
8. I-5 SB Ramps & Alicia	State ROW/LH	22.7	C	28.3	C	28	C	45.8	D	66.6	**E[2]**	100.5	**F[2]**
9. I-5 NB Ramp/Muirlands & La Paz	State ROW/MV	22.3	C	25.9	C	25.1	C	31.7	C	43.5	D	54.5	D
10. I-5 SB Ramps/Cabot & La Paz	State ROW/LH	30.2	C	53.7	D	35.8	D	45.6	D	85.8	**F[2]**	80.5	**F[2]**
11. I-5 NB Ramps & Oso	State ROW/MV	16.5	B	32.4	C	17.4	B	34.1	C	19.9	B	40.1	D
12. I-5 SB Ramps & Oso	State ROW/MV	11.3	B	18.4	B	11.3	B	20	C	13	B	24.4	C
13. I-5 NB Ramps & Crown Valley[1]	State ROW/MV	27.6	C	21	C	30.5	C	27.1	C	38.2	D	37.8	D
14. I-5 SB Ramps & Crown Valley[1]	State ROW/MV	30.1	C	47.1	D	36.2	D	65.1	**E[1]**	47.5	D	102.5	**F[2]**
15. I-5 NB Ramps & Avery	State ROW/MV	14.7	B	16	B	18.4	B	17.3	B	22.3	C	40.9	D
16. I-5 SB Ramps & Avery	State ROW/MV	16.1	B	19.4	B	16.3	B	30.4	C	21.9	C	56.1	**E[2]**
17. I-5 NB Ramps & J.Serra	State ROW/SJC	21.5	C	21.4	C	23.7	C	21.7	C	58.8	**E[2]**	69.6	**E[2]**
18. I-5 SB Ramps & J.Serra	State ROW/SJC	30.7	C	26.4	C	33.2	C	29.4	C	37.2	D	100.3	**F[2]**
Arterial Intersections													
19. Bake & Jeronimo	LF	0.86	D	0.73	C	0.79	C	0.75	C	0.82	D	0.9	D
20. Bake & Muirlands	Irv	0.6	A	0.67	B	0.64	B	0.73	C	0.75	C	0.93	**E[2]**
21. Bake & Rockfield	Irv	0.55	A	0.73	C	0.59	A	0.8	C	0.72	C	0.89	D
22. Bake & Irvine Center	Irv	0.32	A	0.39	A	0.34	A	0.45	A	0.55	A	0.56	A
23. Lake Forest & Jeronimo	LF	0.61	B	0.65	B	0.66	B	0.74	C	0.77	C	0.92	**E[2]**
24. Lake Forest & Muirlands	LF	0.5	A	0.72	C	0.59	A	0.75	C	0.79	C	0.88	D
25. Lake Forest & Rockfield	LF	0.54	A	0.65	B	0.62	B	0.74	C	0.84	D	0.91	**E[2]**
26. ICD/Moulton & Lake Forest[1]	LH	0.38	A	0.45	A	0.46	A	0.54	A	0.6	A	0.81	D
27. El Toro & Jeronimo	LF	0.64	B	0.84	D	0.69	B	0.88	D	0.92	**E[2]**	0.95	**E[2]**
28. El Toro & Muirlands	LF	0.58	A	0.72	C	0.64	B	0.77	C	0.8	C	0.89	D
29. El Toro & Rockfield	LF	0.56	A	0.66	B	0.59	A	0.69	B	0.66	B	0.79	C
30. El Toro & Ave de la Carlota[1]	LH	0.6	A	0.71	C	0.68	B	0.75	C	0.87	D	0.83	D
31. Paseo de Valencia & El Toro	LW	0.46	A	0.59	A	0.51	A	0.66	B	0.57	A	0.83	D
32. El Toro & Moulton[1]	LW	0.53	A	0.59	A	0.62	B	0.68	B	0.85	D	0.93	**E[1]**
33. Jeronimo & Alicia	MV	0.75	C	0.69	B	0.76	C	0.73	C	0.81	D	0.8	C
34. Alicia & Muirlands	MV	0.72	C	0.79	C	0.73	C	0.83	D	0.76	C	0.96	**E[2]**

Table 2.5-4 Ramp and Arterial Intersection LOS Summary – 2011 Existing Conditions, 2022 and 2045 No Build Conditions

Segment	Jurisdiction	2011 Existing Conditions				2022 No Build Conditions				2045 No Build Conditions			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay/ ICU	LOS	Delay/ ICU	LOS	Delay/ ICU	LOS	Delay ICU	LOS	Delay/ ICU	LOS	Delay/ ICU	LOS
35. Paseo de Valencia & Alicia	LH	0.61	B	0.6	A	0.67	B	0.67	B	0.79	C	0.83	D
36. Moulton & Alicia	LH	0.59	A	0.6	A	0.64	B	0.64	B	0.68	B	0.71	C
37. Marguerite & La Paz	MV	0.6	A	0.67	B	0.62	B	0.73	C	0.66	B	0.85	D
38. La Paz & Paseo de Valencia	LH	0.45	A	0.48	A	0.49	A	0.51	A	0.58	A	0.59	A
39. Moulton & La Paz	LH	0.43	A	0.41	A	0.48	A	0.44	A	0.56	A	0.53	A
40. Marguerite & Oso	MV	0.75	C	0.71	C	0.8	C	0.73	C	0.9	D	0.81	D
41. Cabot & Oso	LH	0.54	A	0.71	C	0.56	A	0.75	C	0.62	B	0.81	D
42. Moulton & Oso	LH	0.49	A	0.59	A	0.5	A	0.6	A	0.57	A	0.67	B
43. Marguerite & Crown Valley[1]	MV	0.6	A	0.72	C	0.74	C	0.81	D	1	**E[1]**	1.07	**F[2]**
44. Cabot & Crown Valley	LN	0.57	A	0.69	B	0.62	B	0.74	C	0.81	D	0.83	D
45. Moulton & Crown Valley[1]	LN	0.54	A	0.57	A	0.62	B	0.68	B	0.84	D	0.91	**E[1]**
46. Camino Capistrano & Colinas	LN	0.47	A	0.53	A	0.53	A	0.56	A	0.67	B	0.64	B
47. Cabot & Paseo de Colinas	LN	0.6	A	0.51	A	0.63	B	0.56	A	0.68	B	0.72	C
48. Golden Lantern & Colinas	LN	0.81	D	0.63	B	0.89	D	0.7	B	1.1	**F[2]**	0.89	D
49. Marguerite & Avery	MV	0.74	C	0.75	C	0.8	C	0.83	D	0.99	**E[2]**	1.04	**F[2]**
50. Camino Capistrano & Avery	MV	0.48	A	0.49	A	0.57	A	0.54	A	0.77	C	0.67	B
51. Rancho Viejo & J.Serra	SJC	0.4	A	0.44	A	0.47	A	0.49	A	0.59	B	0.62	B
52. Camino Capistrano & J.Serra	SJC	0.4	A	0.32	A	0.45	A	0.39	A	0.57	B	0.58	A

Notes:

Grey shading indicates intersection location is outside of project limits

LOS D is the maximum acceptable LOS unless noted otherwise.

[1] = Intersection with LOS E as maximum acceptable LOS.

[2] = Intersection exceeds the LOS performance criteria for delay or ICU.

Irv = Irvine
I-405 = Interstate 405
I-5 = Interstate 5
ICU = intersection capacity utilization
LF = Lake Forest
LH = Laguna Hills
LN = Laguna Niguel
LW = Laguna Woods
MV = Mission Viejo
NB = northbound
ROW = right-of-way
SB = southbound
SJC = San Juan Capistrano
SR-73 = State Route 73

Ramp Intersection Delay		Arterial Intersection ICU	
LOS	Delay	LOS	ICU
A	≤ 10	A	<0.61
B	>10–20	B	0.61–0.70
C	> 20–35	C	0.71–0.80
D	> 35–55	D	0.81–0.90
E	> 55–80	E	0.91–1.00

2045 Future Year No Build Conditions

As shown in Table 2.5-4, the following ramps and local arterial intersections exceed the performance standard of the applicable jurisdiction for 2045 No Build conditions:

Ramp Intersections

- Lake Forest Drive/I-5 SB Ramps (Caltrans/Laguna Hills) – PM Peak Hour
- El Toro Road/I-5 NB Ramps (Caltrans/Lake Forest) – PM Peak Hour
- I-5 SB Ramps/Avenida de la Carlota (Caltrans/Laguna Hills) – PM Peak Hour
- I-5 SB Ramps/Alicia Parkway (Caltrans/Laguna Hills) – AM and PM Peak Hour
- I-5 SB Ramps/Cabot Road & La Paz Road (Caltrans/Laguna Hills) – AM and PM Peak Hour
- I-5 SB Ramps/Crown Valley Parkway (Caltrans/Mission Viejo) – PM Peak Hour
- I-5 SB Ramps/Avery Parkway (Caltrans/Mission Viejo) – PM Peak Hour
- I-5 NB Ramps/Junipero Serra Road (Caltrans/San Juan Capistrano) – AM and PM Peak Hour
- I-5 SB Ramps/Junipero Serra Road (Caltrans/San Juan Capistrano) – PM Peak Hour

Arterial Intersections

- Bake Parkway/Muirlands Boulevard (Irvine) – PM Peak Hour
- Lake Forest Drive/Jeronimo Road (Lake Forest) – PM Peak Hour
- Lake Forest Drive/Rockfield Boulevard (Lake Forest) – PM Peak Hour
- El Toro Road/Jeronimo Road (Lake Forest) – AM and PM Peak Hour
- Alicia Parkway/Muirlands Boulevard (Mission Viejo) – PM Peak Hour
- Marguerite Parkway/Crown Valley Parkway (Mission Viejo) – PM Peak Hour
- Golden Lantern/Paseo de Colinas (Laguna Niguel) – a.m. Peak Hour
- Marguerite Parkway/Avery Parkway (Mission Viejo) – AM and PM Peak Hour

Table 2.5-4 shows that traffic volumes on I-5 ramp intersections and adjacent arterial intersections will continue to increase, and LOS will continue to deteriorate within the Study Area for future year (2045) conditions, unless freeway and ramp improvements are implemented to reduce traffic congestion and improve the LOS to acceptable standards.

2.5.3.3 Mainline Operations and LOS

As shown in Table 2.5-5, the No Build Alternative would not meet the purpose and need to relieve congestion and reduce delay in the opening year (2022) or the future year (2045) and would result in indirect and direct impacts to traffic and transportation.

Table 2.5-5 Peak 15-Minute Mainline Operations and LOS Summary – Existing 2011, 2022, and 2045 No Build Conditions Northbound and Southbound Segments

Segments	Existing Conditions 2011				2022 No Build Conditions				2045 No Build Conditions			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS
Northbound Segments												
NB between Ortega Hwy & Junipero Serra	9,070	D	8,536	D	9,514	D	9,030	D	10,443	E	10,059	D
NB between Junipero Serra & SR-73	9,343	C	8,934	C	9,928	C	9,502	C	11,150	D	10,689	D
NB between SR-73 & Avery	6,019	C	7,024	D	6,288	F	7,382	D	7,222	F	8,127	F
NB between Avery & Crown Valley	6,219	F	7,391	E	6,538	F	7,708	F	7,606	F	8,347	F
NB between Crown Valley & Oso	7,619	F	9,007	F	7,968	F	9,462	F	9,100	F	10,363	F
NB between Oso & La Paz	8,799	F	8,997	E	9,198	F	9,535	F	10,505	F	10,614	F
NB between La Paz & Alicia	10,409	F	9,259	E	10,908	F	9,881	E	12,465	F	11,129	F
NB between Alicia & El Toro	12,249	F	9,816	F	12,888	F	10,490	F	14,474	F	11,832	F
NB between El Toro & Lake Forest	13,439	F	10,278	E	14,228	F	11,068	E	16,403	F	12,661	F
NB between Lake Forest & I-405	10,269	D	8,156	C	10,798	C	8,789	C	12,404	F	10,047	D
Southbound Segments												
SB between I-405 & Lake Forest	9,146	D	9,360	D	9,251	D	9,976	F	10,300	F	11,182	F
SB between Lake Forest & El Toro	10,280	C	11,637	F	10,478	E	12,456	F	11,834	F	13,832	F
SB between El Toro & Alicia	9,471	C	11,191	F	9,660	F	12,086	F	10,963	F	13,628	F
SB between Alicia & La Paz	8,609	C	10,630	F	8,892	C	11,603	F	10,081	D	12,737	F
SB between La Paz & Oso	8,209	D	9,690	F	8,423	E	10,583	F	9,430	E	11,638	F
SB between Oso & Crown Valley	8,262	D	9,166	E	8,495	E	10,053	F	9,524	F	11,130	F
SB between Crown Valley & Avery	6,446	C	7,413	D	6,618	C	8,143	E	7,340	D	9,062	E

Table 2.5-5 Peak 15-Minute Mainline Operations and LOS Summary – Existing 2011, 2022, and 2045 No Build Conditions Northbound and Southbound Segments

Segments	Existing Conditions 2011				2022 No Build Conditions				2045 No Build Conditions			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS
SB between Avery & SR-73	5,764	C	6,898	C	5,945	C	7,553	D	6,626	C	8,394	D
SB between SR-73 & Junipero Serra	7,402	B	10,374	D	7,906	C	10,920	D	8,956	C	11,720	**F**
SB between Junipero Serra & Ortega Hwy	7,045	C	10,196	D	7,539	C	10,619	E	8,568	D	11,130	E

Notes: Analysis is based on the peak 15-minute demand. Refer to Traffic Report (June 2012) Tables 2-2, 3-2 and 4-2 for the summary of peak period conditions.
Grey shading represents segment location is outside of project limits
A Bold F indicates LOS F condition
I-405 = Interstate 405
I-5 = Interstate 5
LOS = level of service
NB = northbound
SB = southbound
SR-73 = State Route 73

2022 Opening Year

Table 2.5-5 shows that traffic volumes on mainline I-5 would continue to increase and LOS will continue to deteriorate within the Study Area for opening year 2022 conditions, unless freeway improvements are implemented to reduce traffic congestion and improve the LOS.

Table 2.5-5 shows that for the mainline, the peak-hour traffic volume would increase from a range of 6,019 to 13,439 vehicles in the NB direction and 5,764 to 11,637 vehicles in the SB direction for 2011 to a projected range of 6,288 to 14,228 vehicles in the NB direction and 5,945 to 12,456 vehicles in the SB direction for 2022.

The table also shows that the mainline segments are projected to operate at LOS ranging from C to F (most segments are projected to operate at LOS D, E, or F) in 2022. In the opening year (2022), four NB segments are projected to operate at LOS F in both the a.m. and the p.m. peak hours, and one SB segment is projected to operate at LOS F in both the a.m. and p.m. peak hour.

2045 Future Year

Table 2.5-5 shows that for the mainline, the peak-hour traffic volume would increase from a range of 6,019 to 13,439 vehicles in the NB direction and 5,764 to 11,637 vehicles in the SB direction for 2011 to a projected range of 7,222 to 16,403 vehicles in the NB direction and 6,626 to 13,832 vehicles in the SB direction for 2045.

The table also shows that the mainline segments are projected to operate at LOS ranging from C to F (most segments are projected to operate at LOS D, E, or F) in 2045. In 2045, seven NB segments are projected to operate at LOS F in both the a.m. and the p.m. peak hours, and four SB segments are projected to operate at LOS F in the both the a.m. and the p.m. peak hours. Traffic demand will exceed capacity and speeds will vary greatly, resulting in substantial delays.

Alternative 2 (Preferred Alternative)

Mainline Ramp Intersections and Local Arterial Intersections

Table 2.5-6 provides a comparison of the LOS for the I-5 ramp intersections and the local arterial intersections within the Study Area for the following conditions: existing, opening year 2002 (with Alternative 2), and Future Year 2045 (with Alternative 2). As shown, none of the Study Area ramp and local arterial intersections exceed the performance standard for the applicable jurisdiction for 2011 existing conditions.

2022 Opening Year

As shown, none of the Study Area ramp and local arterial intersections exceed the performance standard for the applicable jurisdiction for opening year 2022 Alternative 2 conditions.

2045 Future Year

As shown, the following intersections exceed the performance standard of the applicable jurisdiction with implementation of Alternative 2:

- Lake Forest Drive/I-5 SB Ramps (Caltrans/Laguna Hills) – PM Peak Hour
- I-5 SB Ramps/Avenida de la Carlota (Caltrans/Laguna Hills) – PM Peak Hour
- I-5 SB Ramps/Alicia Parkway (Caltrans/Laguna Hills) – AM and PM Peak Hour
- I-5 SB Ramps/Cabot Road/La Paz Road (Caltrans/Laguna Hills) – AM and PM Peak Hour
- I-5 SB Ramps/Crown Valley Parkway (Caltrans/Mission Viejo) – PM Peak Hour
- I-5 NB Ramps/Junipero Serra Road (Caltrans/San Juan Capistrano) – AM and PM Peak Hour

Table 2.5-6 Ramp and Arterial Intersection LOS Summary – 2011 Existing Conditions, 2022, and 2045 Alternative 2 (Preferred Alternative) Conditions

Segment	Jurisdiction	2011 Existing Conditions				2022 Alternative 2 Conditions				2045 Alternative 2 Conditions			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay/ ICU	LOS	Delay/ ICU	LOS	Delay/ ICU	LOS	Delay/ ICU	LOS	Delay/ ICU	LOS	Delay/ ICU	LOS
Ramp Intersections													
1. Bake Pkwy & I-5 NB Ramps[1]	State ROW/Irv	36.4	D	8.2	A	62.9	**E[1]**	8.3	A	54.1	D	12.2	B
2. Bake Pkwy & I-5 SB Ramps[1]	State ROW/Irv	14.4	B	21.8	C	18.6	B	31.5	C	30.2	C	57.9	**E[1]**
3. Lake Forest Dr & I-5 NB Ramps	State ROW/LF	10.2	B	11.3	B	11.3	B	13.7	B	29.4	C	17.3	B
4. Lake Forest Dr & I-5 SB Ramps[1]	State ROW/LH	24.4	C	54	D	27.6	C	79.4	**E[1]**	40.6	D	132.7	**F[2]**
5. El Toro Rd & I-5 NB Ramps[1]	State ROW/LF	24.1	C	40.6	D	26.4	C	25.7	C	31.1	C	28.4	C
6. I-5 SB Ramps & Ave Carlota[1]	State ROW/LH	24.1	C	35.8	D	25.8	C	38.2	D	30.2	C	81.6	**F[2]**
7. I-5 NB Ramps & Alicia Pkwy	State ROW/MV	8.3	A	17.4	B	8.9	A	17.5	B	10.9	B	30.9	C
8. I-5 SB Ramps & Alicia Pkwy	State ROW/LH	22.7	C	28.3	C	22.2	C	32.7	C	59.9	**E[2]**	102.1	**F[2]**
9. I-5 NB Ramp/Muirlands Blvd & La Paz RD	State ROW/MV	22.3	C	25.9	C	21.7	C	26.9	C	23.2	C	41.4	D
10. I-5 SB Ramps/Cabot Rd & La Paz Rd	State ROW/LH	30.2	C	53.7	D	27.3	C	42	D	69.3	**E[2]**	63.2	**E[2]**
11. I-5 NB Ramps & Oso Pkwy	State ROW/MV	16.5	B	32.4	C	17.4	B	33.2	C	18.6	B	39.8	D
12. I-5 SB Ramps & Oso Pkwy	State ROW/MV	11.3	B	18.4	B	11.3	B	22.1	C	12.7	B	27.4	C
13. I-5 NB Ramps & Crown Valley Pkwy[1]	State ROW/MV	27.6	C	21	C	10.7	B	10.3	B	37.8	D	24.4	C
14. I-5 SB Ramps & Crown Valley Pkwy[1]	State ROW/MV	30.1	C	47.1	D	36	D	62.8	**E[1]**	45.1	D	103.6	**F[2]**
15. I-5 NB Ramps & Avery Pkwy	State ROW/MV	14.7	B	16	B	14.3	B	14.6	B	14.7	B	14.9	B
16. I-5 SB Ramps & Avery Pkwy	State ROW/MV	16.1	B	19.4	B	15.6	B	16.7	B	18.9	B	17.6	B
17. I-5 NB Ramps & J. Serra Rd	State ROW/SJC	21.5	C	21.4	C	24.2	C	21.8	C	67.3	**E[2]**	70.8	**E[2]**
18. I-5 SB Ramps & J. Serra Rd	State ROW/SJC	30.7	C	26.4	C	33.3	C	29.3	C	37.3	D	98.8	**F[2]**
Arterial Intersections													
19. Bake Pkwy & Jeronimo Rd	LF	0.86	D	0.73	C	0.79	C	0.75	C	0.81	D	0.9	D
20. Bake Pkwy & Muirlands Blvd	Irv	0.6	A	0.67	B	0.64	B	0.72	C	0.75	C	0.94	**E[2]**
21. Bake Pkwy & Rockfield Blvd	Irv	0.55	A	0.73	C	0.6	A	0.8	C	0.72	C	0.89	D
22. Bake Pkwy & Irvine Center Dr	Irv	0.32	A	0.39	A	0.33	A	0.45	A	0.54	A	0.56	A
23. Lake Forest Pkwy & Jeronimo Rd	LF	0.61	B	0.65	B	0.66	B	0.74	C	0.77	C	0.91	**E[2]**
24. Lake Forest Dr & Muirlands Blvd	LF	0.5	A	0.72	C	0.59	A	0.75	C	0.78	C	0.87	D
25. Lake Forest Dr & Rockfield Blvd	LF	0.54	A	0.65	B	0.62	B	0.74	C	0.83	D	0.9	D
26. ICD/Moulton Pkwy & Lake Forest Dr[1]	LH	0.38	A	0.45	A	0.46	A	0.54	A	0.6	A	0.8	C
27. El Toro Rd & Jeronimo Rd	LF	0.64	B	0.84	D	0.69	B	0.87	D	0.92	**E[2]**	0.93	**E[2]**
28. El Toro Rd & Muirlands Blvd	LF	0.58	A	0.72	C	0.64	B	0.77	C	0.8	C	0.89	D
29. El Toro Rd & Rockfield Blvd	LF	0.56	A	0.66	B	0.59	A	0.69	B	0.65	B	0.8	C
30. El Toro Rd & Ave de la Carlota[1]	LH	0.6	A	0.71	C	0.68	B	0.74	C	0.88	D	0.81	D
31. Paseo de Valencia & El Toro Rd	LW	0.46	A	0.59	A	0.5	A	0.66	B	0.55	A	0.82	D
32. El Toro Rd & Moulton Pkwy[1]	LW	0.53	A	0.59	A	0.61	B	0.68	B	0.8	D	0.9	D
33. Jeronimo Rd & Alicia Pkwy	MV	0.75	C	0.69	B	0.76	C	0.72	C	0.79	C	0.77	C
34. Alicia Pkwy & Muirlands Blvd	MV	0.72	C	0.79	C	0.73	C	0.83	D	0.75	C	0.94	**E[2]**

Table 2.5-6 Ramp and Arterial Intersection LOS Summary – 2011 Existing Conditions, 2022, and 2045 Alternative 2 (Preferred Alternative) Conditions

Segment	Jurisdiction	2011 Existing Conditions				2022 Alternative 2 Conditions				2045 Alternative 2 Conditions			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay/ ICU	LOS	Delay/ ICU	LOS	Delay/ ICU	LOS	Delay/ ICU	LOS	Delay/ ICU	LOS	Delay/ ICU	LOS
35. Paseo de Valencia & Alicia Pkwy	LH	0.61	B	0.6	A	0.66	B	0.66	B	0.77	C	0.81	D
36. Moulton Pkwy & Alicia Pkwy	LH	0.59	A	0.6	A	0.63	B	0.63	B	0.65	B	0.66	B
37. Marguerite Pkwy & La Paz Rd	MV	0.6	A	0.67	B	0.61	B	0.7	B	0.67	B	0.81	D
38. La Paz Rd & Paseo de Valencia	LH	0.45	A	0.48	A	0.49	A	0.51	A	0.54	A	0.6	A
39. Moulton Pkwy & La Paz Rd	LH	0.43	A	0.41	A	0.46	A	0.44	A	0.52	A	0.53	A
40. Marguerite Pkwy & Oso Pkwy	MV	0.75	C	0.71	C	0.79	C	0.72	C	0.87	D	0.8	C
41. Cabot Rd & Oso Pkwy	LH	0.54	A	0.71	C	0.58	A	0.73	C	0.68	B	0.8	C
42. Moulton Pkwy & Oso Pkwy	LH	0.49	A	0.59	A	0.5	A	0.61	A	0.54	A	0.66	B
43. Marguerite Pkwy & Crown Valley Pkwy[1]	MV	0.6	A	0.72	C	0.74	C	0.82	D	1	**E[1]**	1.07	**F[2]**
44. Cabot Rd & Crown Valley Pkwy	LN	0.57	A	0.69	B	0.64	B	0.74	C	0.8	D	0.85	D
45. Moulton Pkwy & Crown Valley Pkwy[1]	LN	0.54	A	0.57	A	0.62	B	0.68	B	0.82	D	0.9	D
46. Camino Capistrano & Paseo de Colinas	LN	0.47	A	0.53	A	0.53	A	0.44	A	0.66	B	0.5	A
47. Cabot & Paseo de Colinas	LN	0.6	A	0.51	A	0.64	B	0.56	A	0.71	C	0.72	C
48. Golden Lantern & Colinas	LN	0.81	D	0.63	B	0.9	D	0.71	C	1.11	**F[2]**	0.89	D
49. Marguerite Pkwy & Avery Pkwy	MV	0.74	C	0.75	C	0.76	C	0.71	C	0.85	D	0.86	D
50. Camino Capistrano & Avery Pkwy	MV	0.48	A	0.49	A	0.57	A	0.55	A	0.77	C	0.67	B
51. Rancho Viejo Rd & J Serra Rd	SJC	0.4	A	0.44	A	0.46	A	0.49	A	0.59	B	0.62	B
52. Camino Capistrano & J Serra Rd	SJC	0.4	A	0.32	A	0.44	A	0.39	A	0.57	B	0.59	A

Notes:

Grey shading indicates intersection location is outside of project limits

LOS D is the maximum acceptable LOS unless noted otherwise.

[1] = Intersection with LOS E as maximum acceptable LOS.

[2] = Intersection exceeds the LOS performance criteria for delay or ICU.

Irv = Irvine
I-405 = Interstate 405
I-5 = Interstate 5
ICU = intersection capacity utilization
LF = Lake Forest
LH = Laguna Hills
LN = Laguna Niguel
LW = Laguna Woods
MV = Mission Viejo
NB = northbound
ROW = right-of-way
SB = southbound
SJC = San Juan Capistrano
SR-73 = State Route 73

Ramp Intersection Delay		Arterial Intersection ICU	
LOS	Delay	LOS	ICU
A	≤ 10	A	<0.61
B	>10–20	B	0.61–0.70
C	> 20–35	C	0.71–0.80
D	> 35–55	D	0.81–0.90
E	> 55–80	E	0.91–1.00

- I-5 SB Ramps/Junipero Serra Road (Caltrans/San Juan Capistrano) – PM Peak Hour
- Bake Parkway/Muirlands Boulevard (Irvine) – PM Peak Hour
- Lake Forest Drive/Jeronimo Road (Lake Forest) – PM Peak Hour
- El Toro Road/Jeronimo Road (Lake Forest) – AM and PM Peak Hour
- Alicia Parkway/Muirlands Boulevard (Mission Viejo) – PM Peak Hour
- Marguerite Parkway/Crown Valley Parkway (Mission Viejo) – PM Peak Hour
- Street of the Golden Lantern/Paseo de Colinas (Laguna Niguel) – a.m. Peak Hour

2.5.3.4 Mainline Operations and LOS Opening Year

Table 2.5-7 provides a comparison of the I-5 mainline traffic volumes and LOS for the following conditions: existing, opening year 2022 (with Alternative 2), and future year 2045 (with Alternative 2). Table 2.5-8 provides the same comparison for the I-5 HOV lanes. As stated previously, in the 2011 existing condition, six NB freeway segments are operating at LOS F in the a.m. peak hour, two NB segments are operating at LOS F in the p.m. peak hour, no SB segments are operating at LOS F in the a.m. peak hour, and four SB segments are operating at LOS F in the p.m. peak hour.

Opening Year 2022

In 2022, with implementation of Alternative 2, four NB freeway segments are projected to operate at LOS F in the a.m. peak hour, two NB segments are projected to operate at LOS F in the p.m. peak hour, no SB segments are projected to operate at LOS F in the a.m. peak hour, and three SB segments are projected to operate at LOS F in the p.m. peak hour.

Future Year 2045

In 2045, with implementation of Alternative 2, seven NB freeway segments are projected to operate at LOS F in the a.m. peak hour, three NB segments are projected to operate at LOS F in the p.m. peak hour, two SB segments are forecast to operate at LOS F in the a.m. peak hour, and five SB segments are forecast to operate at LOS F in the p.m. hour.

Alternative 3

Mainline Ramp Intersections and Local Arterial Intersections

Table 2.5-9 provides a comparison of the I-5 ramp intersections and the local arterial intersections within the Study Area for the following conditions: existing year 2011, opening year 2022 (with Alternative 3), and future year 2045 (with Alternative 3).

Table 2.5-7 Peak 15-Minute Mainline Operations and LOS Summary – Existing 2011, 2022, and 2045 Alternative 2 (Preferred Alternative) Conditions Northbound and Southbound Segments

Segments	Existing Conditions 2011				2022 Alternative 2 Conditions				2045 Alternative 2 Conditions			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS
Northbound Segments												
NB btwn Ortega Hwy & Junipero Serra Rd	9,070	D	8,536	D	9,544	D	9,051	D	10,534	E	10,112	D
NB btwn Junipero Serra Rd & SR-73	9,343	C	8,934	C	9,958	C	9,523	C	11,241	D	10,742	D
NB btwn SR-73 & Avery Pkwy	6,019	C	7,024	D	6,384	C	7,424	D	7,524	**F**	8,007	D
NB btwn Avery Pkwy & Crown Valley Pkwy	6,219	**F**	7,391	E	6,644	E	7,750	E	7,928	**F**	8,252	**F**
NB btwn Crown Valley Pkwy & Oso Pkwy	7,619	**F**	9,007	**F**	8,094	E	9,504	**F**	9,504	**F**	10,251	**F**
NB btwn Oso Pkwy & La Paz Rd	8,799	**F**	8,997	E	9,364	**F**	9,588	C	10,969	**F**	10,537	C
NB btwn La Paz Rd & Alicia PKwy	10,409	**F**	9,259	E	11,104	**F**	9,945	E	12,999	**F**	11,068	E
NB btwn Alicia Pkwy & El Toro Rd	12,249	**F**	9,816	**F**	12,844	**F**	10,492	**F**	14,537	**F**	11,484	**F**
NB btwn El Toro Rd & Lake Forest Dr	13,439	**F**	10,278	E	14,034	**F**	11,007	E	15,719	**F**	12,055	E
NB btwn Lake Forest Dr & I-405	10,269	D	8,156	C	10,604	D	8,728	C	11,720	C	9,516	C
Southbound Segments												
SB btwn I-405 & Lake Forest Dr	9,146	D	9,360	D	9,534	D	10,006	**F**	9,840	D	11,277	**F**
SB btwn Lake Forest Dr & El Toro Rd	10,280	C	11,637	**F**	10,806	C	12,486	**F**	11,330	**F**	13,956	**F**
SB btwn El Toro Rd & Alicia Pkwy	9,471	C	11,191	**F**	10,019	C	12,136	**F**	10,610	**F**	13,810	**F**
SB btwn Alicia Pkwy & La Paz Rd	8,609	C	10,630	**F**	9,221	C	11,673	D	9,890	C	13,342	**F**
SB btwn La Paz Rd & Oso Pkwy	8,209	D	9,690	**F**	8,738	C	10,653	D	9,250	C	12,252	E
SB btwn Oso Pkwy & Crown Valley Pkwy	8,262	D	9,166	E	8,801	C	10,123	C	9,310	C	11,744	D
SB btwn Crown Valley Pkwy & Avery Pkwy	6,446	C	7,413	D	6,858	C	8,213	D	7,210	C	9,695	E
SB btwn Avery Pkwy & SR-73	5,764	C	6,898	C	6,155	C	7,633	D	6,510	C	9,037	D
SB btwn SR-73 & Junipero Serra Rd	7,402	B	10,374	D	7,917	C	10,941	D	8,988	C	11,791	**F**
SB btwn Junipero Serra Rd & Ortega Hwy	7,045	C	10,196	D	7,550	C	10,640	E	8,600	D	11,201	E

Notes:

Analysis is based on the peak 15-minute demand. Refer to Traffic Report (June 2012) Tables 2-2, 3-9 and 4-10 for the summary of peak period conditions.

Grey shading represents segment location is outside of project limits.

A **Bold F** indicates LOS F condition

I-405 = Interstate 405

I-5 = Interstate 5

LOS = level of service

NB = northbound

SB = southbound

SR-73 = State Route 73

Table 2.5-8 HOV Lane and Volume Summary – Existing 2011, 2022, and 2045 Alternative 2 (Preferred Alternative) Conditions Northbound and Southbound Segments

Segments	Existing Conditions 2011			2022 Alternative 2 Conditions			2045 Alternative 2 Conditions		
	Number of Lanes	AM Peak Hour	PM Peak Hour	Number of Lanes	AM Peak Hour	PM Peak Hour	Number of Lanes	AM Peak Hour	PM Peak Hour
	HOV	HOV Volume	HOV Volume	HOV	HOV Volume	HOV Volume	HOV	HOV Volume	HOV Volume
Northbound Segments									
NB between Ortega Hwy & Junipero Serra	1	1,280	1,070	1	1,320	1,170	1	1,400	1,370
NB between Junipero Serra & SR-73	1	1,060	1,050	1	1,170	1,160	1	1,410	1,380
NB between SR-73 & Avery	1	1,060	1,050	1	1,170	1,160	1	1,410	1,380
NB between Avery & Crown Valley	1	1,180	1,160	1	1,290	1,270	1	1,530	1,490
NB between Crown Valley & Oso	1	1,310	1,250	1	1,410	1,360	1	**1,610**	1,580
NB between Oso & La Paz	1	1,440	1,370	1	1,510	1,470	1	**1,660**	**1,670**
NB between La Paz & Alicia	1	1,550	1,470	1	1,600	1,550	1	**1,700**	**1,720**
NB between Alicia & El Toro	1	**1,680**	1,580	1	2,010	1,810	1	2,710	2,300
NB between El Toro & Lake Forest	2	1,880	1,680	2	2,080	1,910	2	2,510	2,380
NB between Lake Forest & I-405	2	1,880	1,680	2	2,020	1,900	2	2,320	2,370
Southbound Segments									
SB between I-405 & Lake Forest	2	1,480	2,310	2	1,660	2,570	2	2,050	3,110
SB between Lake Forest & El Toro	2	1,340	2,130	2	1,550	2,470	2	2,000	3,170
SB between El Toro & Alicia	1	1,240	**1,930**	2[1]	1,470	2,250	2[1]	1,950	2,910
SB between Alicia & La Paz	1	1,130	**1,800**	1	1,230	**1,790**	1	1,430	**1,780**
SB between La Paz & Oso	1	1,030	**1,640**	1	1,130	**1,680**	1	1,330	**1,770**
SB between Oso & Crown Valley	1	910	1,500	1	1,010	1,580	1	1,210	**1,740**
SB between Crown Valley & Avery	1	780	1,350	1	880	1,470	1	1,080	**1,720**
SB between Avery & SR-73	1	680	1,230	1	780	1,380	1	980	**1,690**
SB between SR-73 & Junipero Serra	1	680	1,230	1	780	1,380	1	980	**1,690**
SB between Junipero Serra & Ortega Hwy	1	840	1,380	1	880	1,480	1	970	**1,690**

Source: Traffic Report (June 2012) Tables 2-1, 3-8 and 4-9 for the HOV Lane Alternative 2 conditions.

Notes:

Grey shading represents segment location is outside of project limits.

A **bold** volume number indicates the HOV volume exceeds 1,600 vehicles per hour per lane

Note [1]: Indicates that the lane geometry changed from the No Build condition

HOV = high occupancy vehicle lane
I-405 = Interstate 405
I-5 = Interstate 5
NB = northbound
SB = southbound
SR-73 = State Route 73

Table 2.5-9 Ramp and Arterial Intersection LOS Summary – 2011 Existing Conditions, 2022, and 2045 Alternative 3 Conditions

Segment	Jurisdiction	2011 Existing Conditions				2022 Alternative 3 Conditions				2045 Alternative 3 Conditions			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay/ ICU	LOS	Delay/ ICU	LOS	Delay/ ICU	LOS	Delay/ ICU	LOS	Delay/ ICU	LOS	Delay/ ICU	LOS
Ramp Intersections													
1. Bake Pkwy & I-5 NB Ramps[1]	State ROW/Irv	36.4	D	8.2	A	62.6	**E[1]**	8.3	A	57.3	**E[1]**	12.4	B
2. Bake Pkwy & I-5 SB Ramps[1]	State ROW/Irv	14.4	B	21.8	C	18.6	B	31.7	C	29.7	C	58.4	**E[1]**
3. Lake Forest Dr & I-5 NB Ramps	State ROW/LF	10.2	B	11.3	B	11.3	B	13.7	B	29.2	C	17.3	B
4. Lake Forest Dr & I-5 SB Ramps[1]	State ROW/LH	24.4	C	54	D	27.7	C	79.7	**E[1]**	42.7	D	133.8	**F[2]**
5. El Toro Rd & I-5 NB Ramps[1]	State ROW/LF	24.1	C	40.6	D	26.6	C	25.7	C	32	C	27.5	C
6. I-5 SB Ramps & Ave Carlota[1]	State ROW/LH	24.1	C	35.8	D	25.3	C	38	D	31.4	C	80.2	**F[2]**
7. I-5 NB Ramps & Alicia Pkwy	State ROW/MV	8.3	A	17.4	B	9.3	A	17.5	B	14.8	B	30.2	C
8. I-5 SB Ramps & Alicia Pkwy	State ROW/LH	22.7	C	28.3	C	22.4	C	32.8	C	51.7	D	103	**F[2]**
9. I-5 NB Ramp/Muirlands Blvd & La Paz Rd	State ROW/MV	22.3	C	25.9	C	21.4	C	28.7	C	22.8	C	51.2	D
10. I-5 SB Ramps/Cabot Rd & La Paz Rd	State ROW/LH	30.2	C	53.7	D	28.1	C	41.6	D	76.5	**E[2]**	60.6	**E[2]**
11. I-5 NB Ramps & Oso Pkwy	State ROW/MV	16.5	B	32.4	C	17.4	B	33.6	C	18.1	B	43.7	D
12. I-5 SB Ramps & Oso Pkwy	State ROW/MV	11.3	B	18.4	B	11.4	B	23	C	13.3	B	30	C
13. I-5 NB Ramps & Crown Valley Pkwy [1]	State ROW/MV	27.6	C	21	C	10.9	B	10	B	38	D	26.1	C
14. I-5 SB Ramps & Crown Valley Pkwy [1]	State ROW/MV	30.1	C	47.1	D	37.2	D	62.6	**E[1]**	47	D	103.7	**F[2]**
15. I-5 NB Ramps & Avery Pkwy	State ROW/MV	14.7	B	16	B	14.3	B	14.5	B	14.5	B	14.6	B
16. I-5 SB Ramps & Avery Pkwy	State ROW/MV	16.1	B	19.4	B	15.7	B	16.7	B	18.9	B	17.8	B
17. I-5 NB Ramps & J. Serra Rd	State ROW/SJC	21.5	C	21.4	C	24.6	C	21.8	C	75.1	**E[2]**	71	**E[2]**
18. I-5 SB Ramps & J. Serra Rd	State ROW/SJC	30.7	C	26.4	C	33.5	C	29.3	C	38.3	D	98.5	**F[2]**
Arterial Intersections													
19. Bake Pkwy & Jeronimo Rd	LF	0.86	D	0.73	C	0.79	C	0.75	C	0.81	D	0.89	D
20. Bake Pkwy & Muirlands Blvd	Irv	0.6	A	0.67	B	0.64	B	0.73	C	0.76	C	0.94	**E[2]**
21. Bake Pkwy & Rockfield Blvd	Irv	0.55	A	0.73	C	0.61	B	0.8	C	0.73	C	0.89	D
22. Bake Pkwy & Irvine Center Dr	Irv	0.32	A	0.39	A	0.34	A	0.45	A	0.54	A	0.56	A
23. Lake Forest Dr & Jeronimo Rd	LF	0.61	B	0.65	B	0.66	B	0.74	C	0.76	C	0.91	**E[2]**
24. Lake Forest Dr & Muirlands Blvd	LF	0.5	A	0.72	C	0.59	A	0.75	C	0.77	C	0.86	D
25. Lake Forest Dr & Rockfield Blvd	LF	0.54	A	0.65	B	0.62	B	0.74	C	0.83	D	0.9	D
26. ICD/Moulton Pkwy & Lake Forest Dr[1]	LH	0.38	A	0.45	A	0.46	A	0.54	A	0.61	B	0.8	C
27. El Toro Rd & Jeronimo Rd	LF	0.64	B	0.84	D	0.7	B	0.87	D	0.93	**E[2]**	0.93	**E[2]**
28. El Toro Rd & Muirlands Rd	LF	0.58	A	0.72	C	0.64	B	0.77	C	0.8	C	0.89	D
29. El Toro Rd & Rockfield Rd	LF	0.56	A	0.66	B	0.59	A	0.69	B	0.65	B	0.79	C
30. El Toro Rd & Ave de la Carlota[1]	LH	0.6	A	0.71	C	0.68	B	0.75	C	0.89	D	0.81	D
31. Paseo de Valencia & El Toro Rd	LW	0.46	A	0.59	A	0.5	A	0.66	B	0.55	A	0.82	D
32. El Toro Rd & Moulton Pkwy [1]	LW	0.53	A	0.59	A	0.61	B	0.68	B	0.79	C	0.88	D
33. Jeronimo Rd & Alicia Pkwy	MV	0.75	C	0.69	B	0.76	C	0.71	C	0.79	C	0.77	C
34. Alicia Pkwy & Muirlands Blvd	MV	0.72	C	0.79	C	0.73	C	0.82	D	0.76	C	0.93	**E[2]**

Table 2.5-9 Ramp and Arterial Intersection LOS Summary – 2011 Existing Conditions, 2022, and 2045 Alternative 3 Conditions

Segment	Jurisdiction	2011 Existing Conditions				2022 Alternative 3 Conditions				2045 Alternative 3 Conditions			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay/ ICU	LOS	Delay/ ICU	LOS	Delay/ ICU	LOS	Delay/ ICU	LOS	Delay/ ICU	LOS	Delay/ ICU	LOS
35. Paseo de Valencia & Alicia Pkwy	LH	0.61	B	0.6	A	0.66	B	0.65	B	0.75	C	0.81	D
36. Moulton Pkwy & Alicia Pkwy	LH	0.59	A	0.6	A	0.62	B	0.63	B	0.64	B	0.65	B
37. Marguerite Pkwy & La Paz Rd	MV	0.6	A	0.67	B	0.61	B	0.7	B	0.65	B	0.78	C
38. La Paz Rd & Paseo de Valencia	LH	0.45	A	0.48	A	0.49	A	0.51	A	0.54	A	0.6	A
39. Moulton Pkwy & La Paz Rd	LH	0.43	A	0.41	A	0.46	A	0.44	A	0.51	A	0.51	A
40. Marguerite Pkwy & Oso Pkwy	MV	0.75	C	0.71	C	0.79	C	0.72	C	0.88	D	0.82	D
41. Cabot Rd & Oso	LH	0.54	A	0.71	C	0.59	A	0.74	C	0.69	B	0.83	D
42. Moulton & Oso Pkwy	LH	0.49	A	0.59	A	0.51	A	0.6	A	0.55	A	0.67	B
43. Marguerite Pkwy & Crown Valley Pkwy [1]	MV	0.6	A	0.72	C	0.74	C	0.82	D	1	**E[1]**	1.05	**F[2]**
44. Cabot Rd & Crown Valley Pkwy	LN	0.57	A	0.69	B	0.64	B	0.74	C	0.8	C	0.83	D
45. Moulton Pkwy & Crown Valley Pkwy[1]	LN	0.54	A	0.57	A	0.63	B	0.68	B	0.84	D	0.89	D
46. Camino Capistrano & Colinas	LN	0.47	A	0.53	A	0.53	A	0.43	A	0.65	B	0.48	A
47. Cabot Rd & Paseo de Colinas	LN	0.6	A	0.51	A	0.65	B	0.57	A	0.72	C	0.75	C
48. Golden Lantern & Paseo de Colinas	LN	0.81	D	0.63	B	0.9	D	0.71	C	1.11	**F[2]**	0.9	D
49. Marguerite Pkwy & Avery Pkwy	MV	0.74	C	0.75	C	0.76	C	0.72	C	0.84	D	0.85	D
50. Camino Capistrano & Avery Pkwy	MV	0.48	A	0.49	A	0.57	A	0.54	A	0.78	C	0.65	B
51. Rancho Viejo Rd & J Serra Rd	SJC	0.4	A	0.44	A	0.47	A	0.49	A	0.6	B	0.61	B
52. Camino Capistrano & J Serra Rd	SJC	0.4	A	0.32	A	0.44	A	0.39	A	0.57	B	0.59	A

Notes:
Grey shading indicates intersection location is outside of project limits.
LOS D is the maximum acceptable LOS unless noted otherwise.
[1] = Intersection with LOS E as maximum acceptable LOS.
[2] = Intersection exceeds the LOS performance criteria for delay or ICU.

I-405 = Interstate 405
I-5 = Interstate 5
Irv = Irvine
ICU = intersection capacity utilization
LF = Lake Forest
LH = Laguna Hills
LN = Laguna Niguel
LOS = level of service
LW = Laguna Woods
MV = Mission Viejo
NB = northbound
ROW = right-of-way
SB = southbound
SJC = San Juan Capistrano
SR-73 = State Route 73

Ramp Intersection Delay		Arterial Intersection ICU	
LOS	Delay	LOS	ICU
A	≤ 10	A	<0.61
B	>10–20	B	0.61–0.70
C	> 20–35	C	0.71–0.80
D	> 35–55	D	0.81–0.90
E	> 55–80	E	0.91–1.00

2022 Opening Year

As shown, none of the Study Area ramp and local arterial intersections exceed the performance standard for the applicable jurisdiction for the 2022 opening year with implementation of Alternative 3.

2045 Future Year

As shown in Table 2.5-9, the following intersections exceed the performance standard of the applicable jurisdiction for 2045 with implementation of Build Alternative 3:

- Lake Forest Drive/I-5 SB Ramps (Caltrans/Laguna Hills) – PM Peak Hour
- I-5 SB Ramps/Avenida de la Carlota (Caltrans/Laguna Hills) – PM Peak Hour
- I-5 SB Ramps/Alicia Parkway (Caltrans/Laguna Hills) – PM Peak Hour
- I-5 SB Ramps/Cabot & La Paz Road (Caltrans/Laguna Hills) – AM and PM Peak Hour
- I-5 SB Ramps/Crown Valley Parkway (Caltrans/Mission Viejo) – PM Peak Hour
- I-5 NB Ramps/J. Serra Road (Caltrans/San Juan Capistrano) – AM and PM Peak Hour
- I-5 SB Ramps/Junipero Serra Road (Caltrans/San Juan Capistrano) – PM Peak Hour
- Bake Parkway/Muirlands Boulevard (Irvine) – PM Peak Hour
- Lake Forest Drive/Jeronimo Road (Lake Forest) – PM Peak Hour
- El Toro Road/Jeronimo Road (Lake Forest) – AM and PM Peak Hour
- Alicia Parkway/Muirlands Boulevard (Mission Viejo) – PM Peak Hour
- Marguerite Parkway/Crown Valley Parkway (Mission Viejo) – PM Peak Hour
- Street of the Golden Lantern/Paseo de Colinas (Laguna Niguel) – a.m. Peak Hour

2.5.3.5 Mainline Operations and LOS

Table 2.5-10 provides a comparison of the I-5 mainline traffic volumes and LOS for the following conditions: existing year 2011, opening year 2022 (with Alternative 3), and future year 2045 (with Alternative 3). Table 2.5-11 provides the same comparison for the I-5 HOV lanes.

Opening Year 2022

As shown in Table 2.5-10, in opening year 2022 with implementation of Alternative 3, three NB freeway segments are projected to operate at LOS F in the a.m. peak hour, one NB segment is projected to operate at LOS F in the p.m. peak hour, no SB segments are projected to operate at LOS F in the a.m. peak hour, and three SB segments are projected to operate at LOS F in the p.m. peak hour.

Table 2.5-10 Peak 15-Minute Mainline Operations and LOS Summary – Existing 2011, 2022, and 2045 Alternative 3 Conditions Northbound and Southbound Segments

Segments	Existing Conditions 2011				2022 Alternative 3 Conditions				2045 Alternative 3 Conditions			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS
Northbound Segments												
NB between Ortega Hwy & Junipero Serra	9,070	D	8,536	D	9,575	D	9,051	D	10,645	E	10,132	D
NB between Junipero Serra & SR-73	9,343	C	8,934	C	9,989	C	9,523	C	11,352	D	10,762	D
NB between SR-73 & Avery	6,019	C	7,024	D	6,422	C	7,434	D	7,636	F	7,890	F
NB between Avery & Crown Valley	6,219	F	7,391	E	6,682	E	7,770	E	8,040	F	8,140	F
NB between Crown Valley & Oso	7,619	F	9,007	F	8,132	C	9,524	E	9,606	F	10,100	F
NB between Oso & La Paz	8,799	F	8,997	E	9,392	C	9,608	C	11,061	F	10,380	F
NB between La Paz & Alicia	10,409	F	9,259	E	11,132	F	9,965	D	13,081	F	10,900	F
NB between Alicia & El Toro	12,249	F	9,816	F	12,862	F	10,512	F	14,599	F	11,270	F
NB between El Toro & Lake Forest	13,439	F	10,278	E	14,052	F	11,026	E	15,781	F	11,860	E
NB between Lake Forest & I-405	10,269	D	8,156	C	10,612	D	8,736	C	11,731	C	9,340	C
Southbound Segments												
SB between I-405 & Lake Forest	9,146	D	9,360	D	9,524	D	10,016	F	9,830	F	11,308	F
SB between Lake Forest & El Toro	10,280	C	11,637	F	10,806	C	12,506	F	11,340	F	14,015	F
SB between El Toro & Alicia	9,471	C	11,191	F	10,029	C	12,166	F	10,660	F	13,925	F
SB between Alicia & La Paz	8,609	C	10,630	F	9,231	C	11,713	D	9,950	D	13,438	D
SB between La Paz & Oso	8,209	D	9,690	F	8,737	C	10,693	D	8,300	C	12,348	D
SB between Oso & Crown Valley	8,262	D	9,166	E	8,799	C	10,163	C	9,350	C	11,840	D
SB between Crown Valley & Avery	6,446	C	7,413	D	6,846	C	8,253	D	7,240	C	9,791	E
SB between Avery & SR-73	5,764	C	6,898	C	6,143	C	7,673	D	6,530	C	9,133	D
SB between SR-73 & Junipero Serra	7,402	B	10,374	D	7,928	C	10,962	D	9,009	C	11,610	F
SB between Junipero Serra & Ortega Hwy	7,045	C	10,196	D	7,561	C	10,661	E	8,621	D	11,032	E

Notes:
Analysis is based on the peak 15-minute demand. Refer to Traffic Report (June 2012) Tables 2-2, 3-16 and 4-20 for the summary of peak period conditions.
Grey shading represents segment location is outside of project limits.
A **Bold** F indicates LOS F condition.
I-405 = Interstate 405
I-5 = Interstate 5
LOS = level of service
NB = northbound
SB = southbound
SR-73 = State Route 73

Table 2.5-11 HOV Lane and Volume Summary – Existing 2011, 2022, and 2045 Alternative 3 Conditions Northbound and Southbound Segments

Segments	Existing Conditions 2011			2022 Alternative 2 Conditions			2045 Alternative 2 Conditions		
	Number of Lanes	AM Peak Hour	PM Peak Hour	Number of Lanes	AM Peak Hour	PM Peak Hour	Number of Lanes	AM Peak Hour	PM Peak Hour
	HOV	HOV Volume	HOV Volume	HOV	HOV Volume	HOV Volume	HOV	HOV Volume	HOV Volume
Northbound Segments									
NB between Ortega Hwy & Junipero Serra	1	1,280	1,070	1	1,320	1,170	1	1,410	1,370
NB between Junipero Serra & SR-73	1	1,060	1,050	1	1,180	1,160	1	1,420	1,380
NB between SR-73 & Avery	1	1,060	1,050	1	1,180	1,160	1	1,420	1,380
NB between Avery & Crown Valley	1	1,180	1,160	1	1,300	1,270	1	1,540	1,490
NB between Crown Valley & Oso	1	1,310	1,250	1	1,410	1,360	1	**1,620**	1,580
NB between Oso & La Paz	1	1,440	1,370	1	1,510	1,470	1	**1,670**	**1,670**
NB between La Paz & Alicia	1	1,550	1,470	1	1,600	1,550	1	**1,720**	**1,740**
NB between Alicia & El Toro	1	**1,680**	1,580	2[1]	2,020	1,820	2[1]	2,730	2,320
NB between El Toro & Lake Forest	2	1,880	1,680	2	2,090	1,910	2	2,520	2,380
NB between Lake Forest & I-405	2	1,880	1,680	2	2,020	1,900	2	2,320	2,370
Southbound Segments									
SB between I-405 & Lake Forest	2	1,480	2,310	2	1,670	2,560	2	2,060	3,080
SB between Lake Forest & El Toro	2	1,340	2,130	2	1,560	2,460	2	2,010	3,140
SB between El Toro & Alicia	1	1,240	**1,930**	2[1]	1,470	2,240	2[1]	1,960	2,880
SB between Alicia & La Paz	1	1,130	**1,800**	1	1,230	**1,790**	1	1,330	**1,770**
SB between La Paz & Oso	1	1,030	**1,640**	1	1,130	**1,680**	1	1,330	**1,770**
SB between Oso & Crown Valley	1	910	1,500	1	1,010	1,580	1	1,210	**1,740**
SB between Crown Valley & Avery	1	780	1,350	1	880	1,470	1	1,080	**1,720**
SB between Avery & SR-73	1	680	1,230	1	780	1,380	1	980	**1,690**
SB between SR-73 & Junipero Serra	1	680	1,230	1	780	1,380	1	980	**1,690**
SB between Junipero Serra & Ortega Hwy	1	840	1,380	1	880	1,480	1	970	**1,690**

Source: Traffic Report (June 2012) Tables 2-1, 3-15 and 4-19 for the HOV Lane Alternative 3 conditions.

Notes:

Grey shading represents segment location is outside of project limits.

A **bold** volume number indicates the HOV volume exceeds 1,600 vehicles per hour per lane.

Note [1]: Indicates that the lane geometry changed from the No Build condition

HOV = high occupancy vehicle lane

I-405 = Interstate 405

I-5 = Interstate 5

NB = northbound

SB = southbound

SR-73 = State Route 73

Future Year 2045

As shown in Table 2.5-10, for 2045 with implementation of Alternative 3, seven NB freeway segments are projected to operate at LOS F in the a.m. peak hour, six NB segments are projected to operate at LOS F in the p.m. peak hour, three SB segments are forecast to operate at LOS F in the a.m. peak hour, and four SB segments are forecast to operate at LOS F in the p.m. hour.

Mainline Ramp Queuing Analysis 2045 Conditions

Table 2.5-12 shows the projected queue formations for the off-ramps and metered on-ramps within the project area for 2045 Alternative 2 conditions, and Table 2.5-11 shows projected queue formations for 2045 Alternative 3 conditions.

Table 2.5-12 Off-Ramp Queue Analysis – 2045 Build Alternative 2 (Preferred Alternative) Conditions

Location	Storage[1] (ft)	AM Peak Hour Queues		PM Peak Hour Queues	
		50th Percentile (ft)	95th Percentile (ft)	50th Percentile (ft)	95th Percentile (ft)
Avery NB Off-Ramp	1,040	119	228	170	260
Avery SB Off-Ramp (Opt. A)	1,270	165	218	158	235
Avery SB Off-Ramp (Opt. B)	1,930	127	181	230	327
Crown Valley NB Off-Ramp	1,425	147	207	150	231
Crown Valley SB Off-Ramp	820	409	571	660	810
Oso NB Off-Ramp	1,800	289	482	527	753
Oso SB Off-Ramp	1,650	195	262	444	619
La Paz NB Off-Ramp	1,150	93	165	246	430
La Paz SB Off-Ramp	1,225	149	229	442	666
Alicia NB Off-Ramp	1,350	94	142	288	418
Alicia SB Off-Ramp	1,575	486	713	896	1,157
El Toro NB Off-Ramp	1,250	208	385	277	437
El Toro SB Off-Ramp	925	281	421	684	847

Source: I-5 Widening from SR-73 to El Toro Road Project Traffic Report (June 2012).
50th percentile = 50th percentile queue length (feet)
95th percentile = 95th percentile queue length (feet)
[1] Storage represents the length of the off-ramp (feet) from the mainline diverge point to the intersection.
Note: When volume and/or 95th percentile volume exceeds intersection capacity, longer queue lengths than indicated may form. Refer to Queue worksheets in Appendix H for locations.
ft = feet
I-405 = Interstate 405
I-5 = Interstate 5
NB = northbound
SB = southbound
SR-73 = State Route 73

Build Alternative 2 (Preferred Alternative)

As shown in Table 2.5-12, no locations in 2045 are projected to have traffic queue lengths that would exceed the length of the ramp.

Build Alternative 3

As shown in Table 2.5-13, the length of the 2045 p.m. peak-hour queue at the Crown Valley Parkway SB off-ramp is projected to exceed the length of the ramp. The length of the ramp at this location is approximately 805 ft and the length of the p.m. peak hour queue is projected to be 817 ft. However, at this location two auxiliary lanes are provided, which prevents the queue from extending onto the mainline general-purpose lanes.

Mainline Vehicle Hours Traveled/Vehicle Miles Traveled for 2045 Conditions – Alternative 2 (Preferred Alternative) and Alternative 3

The vehicle hours traveled (VHT)/vehicle miles traveled (VMT) analysis provided in Section 2.13, Air Quality (subsection 2.13.3.4) of this IS/EA, shows that VHT associated with the Build Alternatives would increase from the No Build Alternative by 0.05 percent for Alternative 2 and 0.13 percent for Alternative 3. VMT would increase at a higher rate than VHT, which indicates that although traffic volumes increase slightly, congestion and travel time would decrease with implementation of the Build Alternatives.

Table 2.5-13 Off-Ramp Queue Analysis – 2045 Build Alternative 3 Conditions

Location	Storage[1]	AM Peak Hour Queues		PM Peak Hour Queues	
		50th %'ile	95th %'ile	50th %'ile	95th %'ile
Avery NB Off-Ramp	1,040'	123'	233'	166'	259'
Avery SB Off-Ramp (Opt. A)	1,270'	172'	225'	169'	251'
Avery SB Off-Ramp (Opt. B)	1,930'	148'	201'	248'	356'
Crown Valley NB Off-Ramp	1,425'	167'	234'	138'	217'
Crown Valley SB Off-Ramp	805'	510'	647'	666'	817'
Oso NB Off-Ramp	1,725'	305'	511'	529'	755'
Oso SB Off-Ramp	1,750'	195'	267'	561'	694'
La Paz NB Off-Ramp	1,150'	120'	176'	350'	567'
La Paz SB Off-Ramp	1,175'	156'	243'	423'	647'
Alicia NB Off-Ramp	1,350'	113'	184'	289'	419'
Alicia NB SB -Ramp	1,425'	473'	701'	893'	1,154'
El Toro NB Off-Ramp	1,300'	213'	394'	275'	425'
El Toro SB Off-Ramp	925'	283'	422'	669'	831'

Source: I-5 Widening from SR-73 to El Toro Road Project Traffic Report (June 2012)
Queue exceeds ramp storage length
50th %'ile = 50th percentile queue length (feet)
95th %'ile = 95th percentile queue length (feet)
[1] Storage represents the length of the off-ramp (feet) from the mainline diverge point to the intersection.
Note: When volume and/or 95th percentile volume exceeds intersection capacity, longer queue lengths than indicated may form. Refer to Queue worksheets in Appendix H for locations.

Compatibility With Local General Plan Circulation Elements

As discussed in Section 2.1, Land Use (Table 2.1-2), the proposed project (both Alternative 2 and Alternative 3) is compatible with the Circulation Elements of the City of Lake Forest General Plan, the City of Laguna Woods General Plan, the City of Laguna Hills General Plan, the City of Mission Viejo General Plan, the City of Laguna Niguel General Plan, and the City of San Juan Capistrano General Plan, and the Transportation Element of the Orange County General Plan.

Pedestrian and Bicycle Facilities

Pedestrian and bicycle facilities under the No Build condition are discussed in Section 2.5.2, Affected Environment, of this IS/EA.

Build Alternatives – Alternative 2 (Preferred Alternative) and Alternative 3

Compared to the No Build Alternative, both Build Alternatives would improve pedestrian and bicycle access at the Avery Parkway and La Paz Road interchanges, and therefore would not result in any indirect or direct impacts. The undercrossings at both of these interchanges will be replaced as part of this project. Standard outside shoulders, which would accommodate bicycles, will be provided throughout the majority of the Avery Parkway and La Paz Road interchanges in the eastbound (EB) and westbound (WB) directions. Additionally, dedicated bicycle lanes will be provided on La Paz Road between the right-turn lanes and through lanes in both directions. Sidewalks will also be provided through both of these interchanges in both the EB and WB directions. The proposed improvements facilitate pedestrian travel by providing ADA-compliant sidewalks, access ramps, and crosswalks throughout the project limits at all curb returns and sidewalks being constructed.

2.5.4 Avoidance, Minimization, and/or Mitigation Measures

Construction of either of the Build Alternatives would provide overall positive impacts (i.e., reduce congestion and traffic delay) along I-5 within the project limits. The addition of the general purpose lanes and extension of the HOV lane would increase the capacity of the freeway, and as a result, reduce mainline congestion and freeway travel time.

Temporary ramp closures would result in traffic delays during construction of the proposed project. However, as stated earlier, these closures would be limited to weekends and would not exceed a period of one week. As discussed in Section 1.3, Project Description, and required by measure TRA-1, the TMP would include minimization and avoidance measures consisting of alternate routes and detours for pedestrians, bicycles, and vehicles during construction activities.

TRA-1 A Transportation Management Plan (TMP) will be completed in consultation with the California Department of Transportation (Caltrans) and included in the Plans, Specifications, and Estimates (PS&E) for implementation by the contractor prior to and during construction of any improvements.

The TMP will consist of, but not be limited to, the following elements to avoid and minimize traffic inconvenience caused by construction activities:

- **Traffic Control:** Traffic control elements, such as lane/shoulder closures and temporary signing/striping on the Interstate 5 (I-5) ramps and the I-5 mainline will be required. All traffic lanes will be kept open during construction, with the exception of overnight closures. Ramp closures will be limited to weekend closures and would not exceed a period of one week. Also, funds have been allocated as part of the Transportation Management Plan (TMP) so that compensation can be provided to the cities for possible increased police services during construction.
- **Construction Zone Enhanced Enforcement Program (COZEEP):** Through coordination with Caltrans and the California Highway Patrol (CHP), this program was developed to provide a safer work zone for both construction workers and the motoring public. The program uses two CHP officers who enforce lane closures and also provide a visual deterrent to errant/speeding vehicles.
- **Public Awareness Campaign (PAC):** Vehicles traveling through the construction zone would likely experience longer than normal delays. To reduce these delays and confusion to the motoring public during construction activities, the Orange County Transportation Authority (OCTA), in conjunction with Caltrans, will implement a PAC. The purpose of the PAC is to keep the surrounding community abreast of the project's progress and construction activities that could affect their travel plans. The use of mailers/flyers, local newspapers advertising, local radio information, and public meetings, as appropriate, will be effective tools for disseminating this information.
- **Signing:** Information signage will be posted on I-5 and the local arterials prior to and during construction to inform motorists of delays, ramp closures, and alternate routes. Encroachment permits will be

required from the cities for placement of signage on local arterials during construction.

- **Emergency Access:** Adequate local emergency access will be provided at all times to adjacent uses. Proper detours and warning signs would be established to ensure public safety. The TMP will be devised so that construction will not interfere with any emergency response or evacuation plans.
- **Pedestrian Access:** A pedestrian and bicycle lane detour plan will be provided to accommodate sidewalk and bicycle lane closures.