Chapter 1 – Proposed Project

California participated in the "Surface Transportation Project Delivery Pilot Program" (Pilot Program) pursuant to 23 United States Code (USC) 327, for more than five years, beginning July 1, 2007, and ending September 30, 2012. MAP-21 (P.L. 112-141), signed by President Obama on July 6, 2012, amended 23 USC 327 to establish a permanent Surface Transportation Project Delivery Program. As a result, the California Department of Transportation (Caltrans) entered into a Memorandum of Understanding pursuant to 23 USC 327 (NEPA Assignment MOU) with the Federal Highway Administration (FHWA). The NEPA Assignment MOU became effective October 1, 2012, and was renewed on December 23, 2016 for a term of five years. In summary, the Department continues to assume FHWA responsibilities under NEPA and other federal environmental laws in the same manner as was assigned under the Pilot Program, with minor changes. With NEPA Assignment, FHWA assigned and the Department assumed all of the United States Department of Transportation Secretary's responsibilities under NEPA. This assignment includes projects on the State Highway System and Local Assistance Projects off of the State Highway System within the State of California, except for certain categorical exclusions that FHWA assigned to Caltrans under the 23 USC 326 CE Assignment MOU, projects excluded by definition, and specific project exclusions.

1.1 Introduction

Caltrans District 12, in partnership with the Orange County Transportation Authority (OCTA), proposes to modify and improve the existing Interstate 5 (I-5)/El Toro Road Interchange in the cities of Laguna Hills, Laguna Woods, and Lake Forest in Orange County, California. The project limits on I-5 extend from approximately 0.1 mile south of Los Alisos Boulevard Overcrossing (Post Mile [PM] 17.8) to 0.4 mile north of Ridge Route Drive (PM 19.7), and on El Toro Road from Rockfield Boulevard to Paseo De Valencia, a distance of 1.9 miles (See Figure 1-1, Project Vicinity map). Two Build Alternatives (including Design Option B) and the No Build Alternative are being considered. Caltrans, as assigned by the FHWA, is the lead agency under the National Environmental Policy Act (NEPA). Caltrans is also the lead agency under the California Environmental Quality Act (CEQA).

The I-5 corridor serves as a vital north-south link throughout the State and provides for the interregional, interstate, and international movement of goods and vehicles from the Mexican border south of San Diego to the Oregon state line. It is a major link between San Diego, Orange and Los Angeles counties. In Orange County, I-5 (also known as Santa Ana Freeway), serves as the linkage connecting Orange County to Los Angeles County and San Diego County. Within the Study Area, I-5 serves the cities of Laguna Hills, Laguna Woods, and Lake Forest. There are two toll roads, State Route 133 (SR 133), which is north of the project limits that connects to I-5 north of the Interstate 405 (I-405)/I-5 Interchange, and State Route 73 (SR 73), which is approximately 3 miles south of the project limits and connects to I-5.

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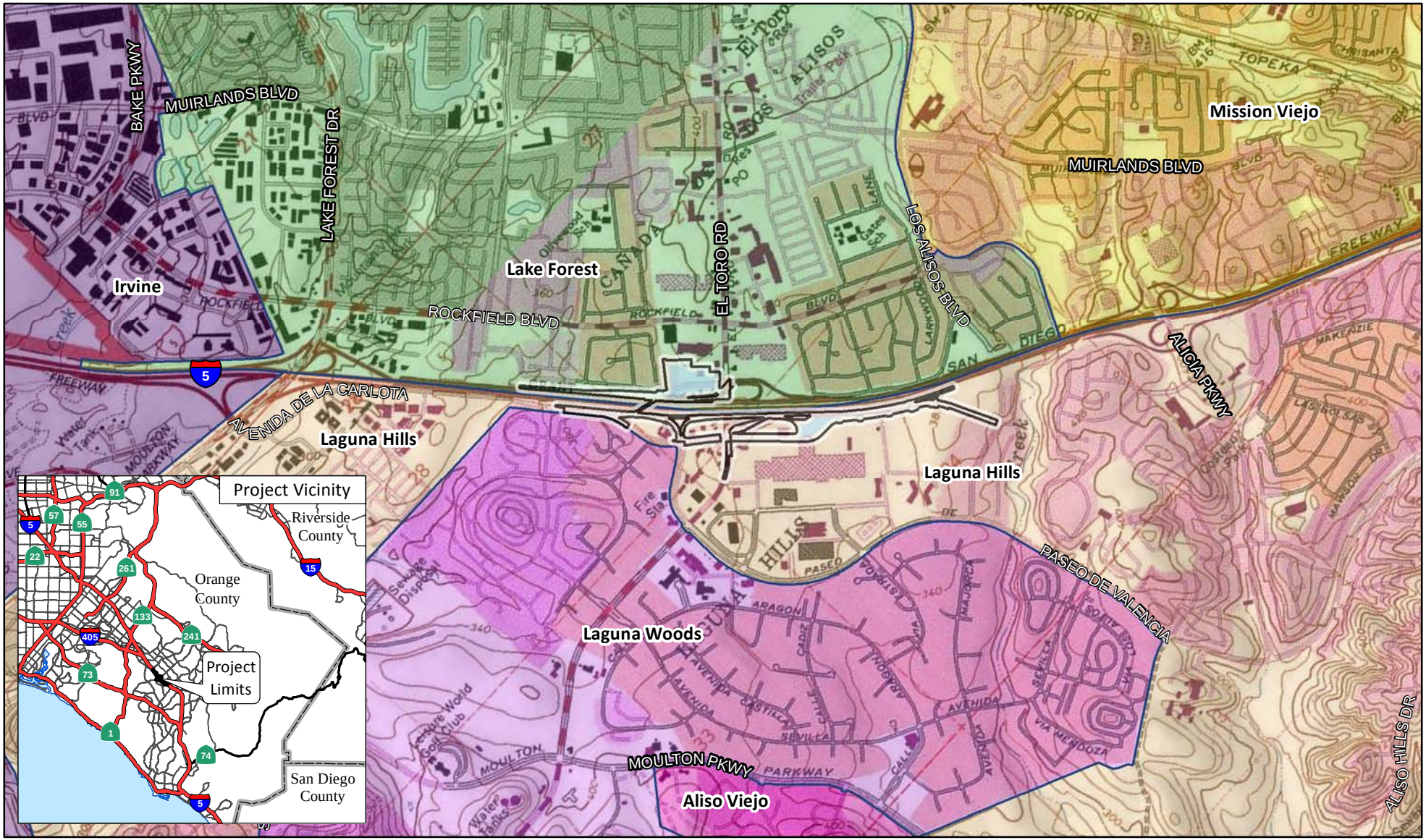

LEGEND

Project Limits

City Jurisdictions

- Aliso Viejo
- Irvine
- Laguna Hills
- Laguna Woods
- Lake Forest
- Mission Viejo

0 1000 2000
FEET

SOURCE: Google (2017); OC Parks (2017); Caltrans (12/18/2018)

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FIGURE 1.1

I-5/El Toro Road Interchange Project

Project Vicinity Map

12-ORA-5 PM 17.8/19.7

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In addition to serving as the primary I-5 access to adjacent cities, the I-5/El Toro Road Interchange is also the primary access to the Five Lagunas (formerly Laguna Hills Mall) and the adjacent retirement community of Laguna Woods (formerly known as Leisure World). Land uses within and adjacent to the project limits include residential, recreational, commercial, and educational. All of the adjacent communities using the I-5/El Toro Road Interchange for I-5 access are fully developed, and high demand, coupled with short spacing between adjacent local intersections, have resulted in heavy traffic congestion during the weekdays peak hours, weekends, and holidays.

In the vicinity of the I-5/El Toro Road Interchange, I-5 has five existing general-purpose lanes, an auxiliary lane, and one high-occupancy vehicle (HOV) lane in the northbound direction. A second HOV lane picks up just north of the I-5/El Toro Road Interchange. In the southbound direction, the existing configuration includes five general-purpose lanes, one auxiliary lane, and two HOV lanes that merge into one just south of the El Toro Road Undercrossing.

The Build Alternatives are included in the Southern California Association of Governments' (SCAG's) 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) under RTP ID 2M0717 and in the 2019 Federal Transportation Improvement Program under Project ID ORA131105 (refer to Appendix D). If a Build Alternative is identified as the Preferred Alternative, it will be funded by OCTA with the Renewed Measure M (M2) Freeway Program. Measure M is the 0.5-cent sales tax for transportation improvements first approved by Orange County voters in 1990 and renewed by voters for a 30-year extension in 2006. The combined measures raise the sales tax in Orange County by 0.5 cent through 2041 to alleviate traffic congestion. The improvement of the I-5/El Toro Road Interchange is identified as "Project D" in the program. Moving forward, the Build Alternatives will also seek federal and other funding sources, including State Transportation Improvement Program (STIP) funding.

1.2 Purpose and Need

1.2.1 Purpose

The purpose of the project is to:

- Improve traffic flow and traffic signal optimization
- Reduce traffic congestion at and through adjacent local street intersections
- Reduce freeway ramp queuing

The Build Alternatives (including Design Option B) would improve existing and future regional mobility and traffic flow to and from the local street network, be consistent with local planning, and consider impacts to rights-of-way. In addition, congestion relief on the mainline ramps and local streets would serve to improve mobility.

1.2.2 Need

The area within the I-5/El Toro Road Interchange experiences:

- Heavy peak-hour congestion and traffic delays due to the high traffic volumes

- Geometric deficiencies related to inadequate signal operations and intersection spacing
- Major delays due to traffic queueing at the intersections of the on- and off-ramps and local streets

This has affected both the traffic operations and circulation within the Study Area.

1.2.3 Capacity, Transportation Demand, and Safety

1.2.3.1 Levels of Service

Freeway traffic flow can be defined in terms of level of service (LOS). For freeways, there are six defined LOS, ranging from LOS A to LOS F. LOS A represents free traffic flow with low traffic volumes and high speeds, and LOS F represents traffic volumes that exceed the facility capacity and result in forced flow operations at low speeds, as shown on Figure 1-2 LOS Thresholds for a Basic Freeway Segment. As shown on Figure 1-2, traffic volumes on a facility such as I-5 substantially affect travel speeds and times.

Table 1.1 Existing (2017)/No Build 2030/2050 – Mainline, Ramps, and Intersection Volumes and Levels of Service, provides information on the existing (2017) traffic volumes and LOS in numbers of vehicles traveling on mainline, weaving, ramps, and intersection segments of northbound and southbound I-5 during the AM peak hour and PM peak hour. Traffic volumes are also shown for the No Build Alternative in 2030 and 2050. As shown, there is directional travel demand with higher traffic volumes along northbound I-5 in the AM peak hour and southbound in the PM peak hour. As a result, without improvements, most of the study segments on northbound and southbound I-5, including ramps and intersections, and traffic operations, are expected to worsen by 2030 (Opening Year) and continue to worsen by 2050 (Design Year).

1.2.3.2 Travel Speeds

Table 1.2, Average Travel Speeds, summarizes the peak-hour travel speeds on northbound and southbound segments of I-5 for existing conditions (2017) and the No Build Alternative in 2030 and 2050. There is a strong correlation with directional volumes and LOS with the effect on travel speeds.

1.2.3.3 Accidents and Safety in the Interstate 5 Corridor

Accident data for the project limits of I-5 were provided by Caltrans for a 33-month period from April 1, 2014–December 31, 2016. As shown in Table 1.3, a total of 627 accidents occurred on the project limits of I-5, including on and off ramps. The majority of the accidents (92 percent) occurred on the I-5 mainline, with 8 percent occurring at the on- and off-ramps. Approximately 45 percent of the accidents occurred in the northbound AM peak hour and southbound PM peak hours. As shown in Tables 1.3 and 1.4, the accident rates at six locations were higher than the statewide averages for total accidents and/or total fatality and injury accidents for similar facilities.

Figure 1-2: LOS Thresholds for a Basic Freeway Segment

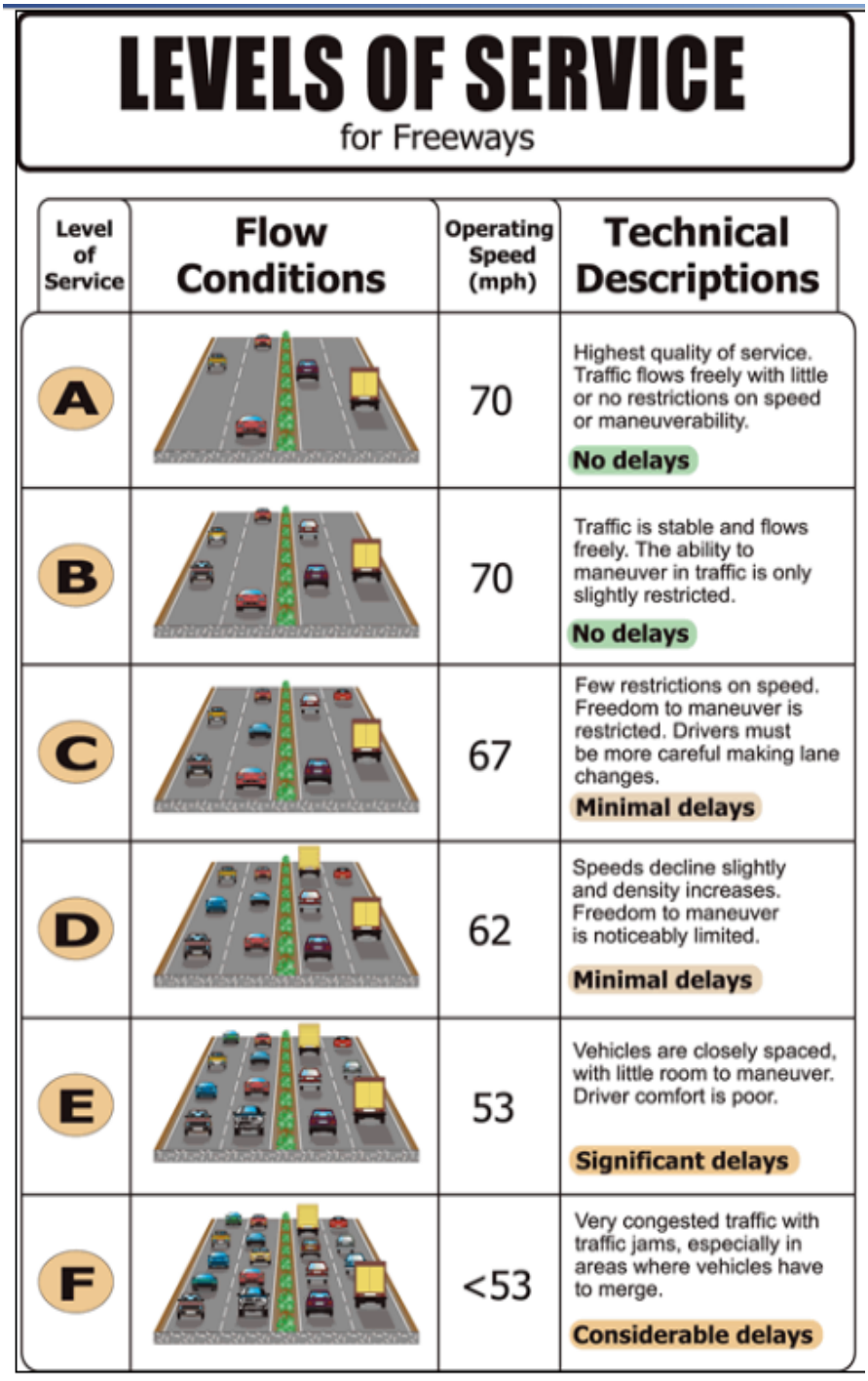

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Table 1.1: Existing (2017)/No Build (2030/2050) - Mainline, Ramps, and Intersection Volumes and Level of Service

Roadway	Count Location	Existing (2017) Volumes		Existing (2017) LOS		Opening Year (2030) No Build Volumes		Opening Year (2030) No Build LOS		Future (2050) No Build Volumes		Future (2050) No Build LOS	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
I-5 Mainline													
I-5 Northbound	Alicia Pkwy On-Ramp to El Toro Rd Off-Ramp	11,649	9,415	E	D	11,893	9,874	E	D	12,269	10,580	E	D
	El Toro Rd Off-Ramp to El Toro Rd (Loop) On-Ramp	10,475	8,061	E	D	10,727	8,472	F	D	11,158	9,102	F	D
	El Toro Rd (Loop) On-Ramp to El Toro Rd On-Ramp	11,276	9,021	F	D	11,545	9,446	F	F	11,995	10,098	F	E
	El Toro Rd On-Ramp to Lake Forest Dr	12,539	9,451	F	D	12,896	9,934	F	D	13,483	10,675	F	D
I-5 Southbound	Lake Forest Dr On-Ramp and Carlota/Valencia Off-Ramp	9,583	11,031	D	E	9,957	11,417	D	E	10,531	12,007	D	E
	Carlota/Valencia Off- Ramp and Carlota/Valencia On-Ramp	7,974	9,725	D	E	8,309	10,045	D	E	8,828	10,538	D	E
	Carlota/Valencia On- Ramp and El Toro Rd On-Ramp	8,697	10,528	D	E	9,071	10,943	D	F	9,651	11,583	E	F
	El Toro Rd On- Ramp and Alicia Pkwy Off-Ramp	9,074	11,173	D	F	9,464	11,585	D	E	10,069	12,264	D	E
Weave Segment – Mainline**													
I-5 Northbound	Alicia Pkwy On-ramp to El Toro Rd Off-Ramp	-	-	F	F	-	-	F	F	-	-	F	F
	El Toro On-Ramp to Lake Forest Dr Off-Ramp	-	-	F	D	-	-	F	D	-	-	F	E
I-5 Southbound	Lake Forest On-Ramp to El Toro Rd Off-Ramp	-	-	D	E	-	-	D	E	-	-	E	F
	El Toro On-Ramp to Alicia Pkwy Off-Ramp	-	-	-	-	-	-	D	F			E	F
Ramps													
I-5 Northbound	Alicia Pkwy On-Ramp form WB Alicia Pkwy	1,350	1,043	E	D	1,391	1,067	E	D	1,428	1,095	E	D
	El Toro Rd Off-Ramp	945	1,245	E	E	1,022	1,284	D	C	1,096	1,345	D	E
	El Toro Rd (Loop) On-Ramp from EB El Toro Rd	801	960	F	C	818	974	F	D	837	996	F	D
	El Toro Rd On-Ramp from WB El Toro Rd	1,242	720	E	C	1,251	725	F	D	1,265	734	F	D
	Lake Forest Dr. Off-Ramp	1,100	750	E	D	1,125	788	E	E	1,161	845	E	E
I-5 Southbound	Lake Forest Dr. On Ramp from EB Lake Forest Dr	210	529	C	C	224	564	C	D	245	619	D	E
	El Toro Rd Off-Ramp	1,670	1,528	C	C	1,709	1,594	C	D	1,764	1,691	C	D
	Hook On-Ramp from WB Carlota	723	803	C	D	762	898	C	F	823	1,045	D	F
	El Toro Rd On-Ramp from EB El Toro Rd	321	588	C	F	349	588	C	D	392	608	D	E
	Alicia Pkwy Off-Ramp	1,708	2,036	C	C	1,747	2,083	C	D	1,793	2,138	C	D
Intersections***													
I-5 SB Ramps/Paseo De Valencia	Avenida De La Carlota	3,179	3,934	D	E	3,277	4,111	D	F	3,425	4,377	E	F
Avenida De La Carlota	El Toro Rd	4,372	6,200	D	F	4,805	6,429	D	F	5,427	6,772	D	F
I-5 NB Ramps/Bridger Road	El Toro Rd	5,419	6,303	E	E	5,823	6,516	F	E	6,391	6,840	F	F
Rockfield Blvd	El Toro Rd	4,591	5,808	C	D	4,915	5,976	D	D	5,410	6,339	D	E
Paseo De Valencia	El Toro Rd	3,097	4,122	B	C	3,243	4,273	C	D	3,448	4,504	C	D
SB I-5 Ramp[1]	Avenida De La Carlota	-	-	-	-	-	-	-	-	-	-	-	-

Source: Traffic Volumes Report (March 2018) and Traffic Study Report (August 2018) * Den/Del – Density/Delay: Density is calculated for Mainline, Weave Segment, and Ramps. Delay is a unit of measurement at Intersections. ** Weaving Segments consists of the 2 right most lanes (slow lane and auxiliary lane of the identified segment. ***AM/PM Volumes are based on Peak Hour - Total Approach Volumes. Notes: and bold indicates unacceptable F conditions. represents City Agencies having jurisdiction over the cited segment. ICU methodology was used to calculate V/C and LOS. . Represents improved LOS. Represents degraded LOS. "Peak hour" is defined as the 1 hour during the morning or evening commute that has the highest traffic volumes as follows: AM peak hour – 8:00 to 9:00 AM; PM peak hour – 5:00 to 6:00 PM. (-) demand exceeds capacity.
Carlota/Valencia = Avenida De La Carlota/Paseo De Valencia
[1] The southbound I-5 ramp at Avenida De La Carlota was not evaluated for the existing condition.
EB = eastbound
I-5 = Interstate 5
ICU = Intersection Capacity Utilization
NB = northbound
SB = southbound
V/C = volume-to-capacity
WB = westbound

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Table 1.2: Existing (2017)/No Build 2030/2050 - Average Travel Speeds

I-5 Freeway Mainline General Purpose Lanes (Alicia Pkwy to Lake Forest Drive) – Average Speeds (mph)		
I-5 Mainline GP Lanes	**No Build**	
	AM	**PM**
Existing (2017)		
I-5 Northbound	52	57
I-5 Southbound	66	42
Opening Year (2030)		
I-5 Northbound	40	60
I-5 Southbound	61	50
Future (2050)		
I-5 Northbound	39	57
I-5 Southbound	59	48

Source: Traffic Study Report (August 2018)
GP = general purpose

Table 1.3: Interstate 5 Accident History (April 1, 2014–December 31, 2016)

Location	Total Accidents	Total Fatalities	Total Fatalities & Injuries	Total Accident Rate[1]		Total Fatality and Injury Accident Rate[1]	
				Actual	Statewide Average	Actual	Statewide Average
NB I-5 Mainline Alicia Pkwy to Lake Forest Dr	203	1	63	0.57	1.10	0.18	0.33
SB I-5 Mainline Alicia Pkwy to Lake Forest Dr	373	1	137	1.04	1.10	**0.38**	0.33
Total I-5 Mainline Alicia Pkwy to Lake Forest Dr	**576**	**2**	**200**	**0.79**	**1.10**	**0.28**	**0.33**
NB I-5 Off-Ramp El Toro Rd/Bridger Rd	17	0	4	0.92	0.92	0.22	0.32
SB I-5 On-Ramp from EB El Toro Rd	10	0	2	**1.07**	0.56	**0.21**	0.19
NB I-5 Loop On-Ramp from EB El Toro Rd	13	0	6	0.66	0.71	**0.31**	0.23
SB I-5 Hook On-Ramp from Carlota/Valencia	6	0	2	**0.50**	0.48	**0.17**	0.14
NB I-5 On-Ramp from WB El Toro Rd	18	0	7	**1.11**	0.56	**0.43**	0.19
SB I-5 Hook Off-Ramp Carlota/ Valencia	24	0	10	**1.60**	0.78	**0.67**	0.23
NB I-5 Off-Ramp Lake Forest Dr	7	7	1	.47	0.92	0.07	0.32
Total I-5 Ramps in Study Area	**627**	**0**	**183**	**0.90**	**0.70**	**0.30**	**0.23**

Source: *Traffic Study Report* (August 2018).
Indicates an accident rate along I-5 that is higher than the Statewide average accident rate
1 For mainline sections, the accident rate is the number of accidents per million vehicle miles. For ramps, the accident rate is the number of accidents per million vehicles.
Carlota/Valencia = Avenida De La Carlota/Paseo De Valencia
EB = eastbound
I-5 = Interstate 5
NB = northbound
SB = southbound
WB = westbound

Table 1.4: Accident Rates on Interstate 5 Higher than the Statewide Average for Similar Facilities

Accident Location	Comparison to the Statewide Average Rate for Total Accidents	Comparison to the Statewide Average Rate for Total Fatality and Injury Accidents
SB I-5 Mainline Alicia Pkwy to Lake Forest Dr	-	16% higher
SB I-5 On-Ramp from EB El Toro Rd	91% higher	11% higher
NB I-5 Loop On-Ramp from EB El Toro Rd	-	35% higher
SB I-5 Hook On-Ramp from Carlota/Valencia	4% higher	21% higher
NB I-5 On-Ramp from WB El Toro Rd	98% higher	126% higher
SB I-5 Hook Off-Ramp Carlota/ Valencia	105% higher	191% higher

Source: *Traffic Study Report* (August 2018).
(-) Location experiences lower average accident rates than the Statewide average.
EB = eastbound SB = southbound
I-5 = Interstate 5 WB = westbound
NB = northbound

It was determined from a review of the accident data that rear-end collisions were the most common accident type, accounting for approximately 60 percent of all accidents. Other key accident types included broadsides, sideswipes and hit-objects. Rear-end collisions are typically related to traffic congestion in chokepoint areas and are associated with sudden attempts to stop when traffic volumes exceed the capacity of the road. The majority of sideswipe accidents can usually be attributed to lane weaving and narrow lane widths.

Improvements to the I-5 corridor include modifying and relocating the I-5/El Toro Road On-/Off-Ramps and using some of the existing auxiliary lanes to provide additional ramp storage and/or to reconfigure the geometry of the I-5/El Toro Road Interchange. These improvements would add freeway capacity to the I-5 mainline, thus improving the LOS. This would improve mobility by relieving traffic congestion, which in turn would reduce rear-end accidents in the area. The improvements would allow vehicles to merge easier throughout the corridor, thereby reducing sideswipe occurrences by giving drivers more time and space to merge with adjacent traffic.

1.2.4 Operational Deficiencies

Operational deficiencies are related to capacity, weaving, and auxiliary lanes. These deficiencies would be corrected by designing and constructing the Build Alternatives. The Build Alternatives (including Design Option B) do require implementation of nonstandard design features, which are discussed below under Section 1.4.1.1 Non-Delegated and Delegated Design Features.

1.2.5 Social Demands or Economic Development

I-5 is a corridor of regional and statewide importance, because it is the only major freeway corridor for commerce and daily commuters connecting San Diego to Los Angeles County with interchanges to the State Route 1, State Route 74, SR 73, I-405, SR 133, State Route 261, State Route 55 (SR 55) and State Route 22 (SR 22). It is also one of the main routes to beaches and tourist attractions in Orange County's coastal communities.

The Build Alternatives are consistent with the I-5 Route Concept Report (RCR), developed by the Caltrans Division of Planning and approved in April 2000. The RCR shows I-5 as an ultimate 10-lane facility with 4 mixed-flow lanes and 1 HOV lane in each direction from 0.1 mile south of Avenida Pico to the Los Angeles County line.

1.2.5.1 Regional Plans

Growth management and control plans and programs in the Study Area include SCAG's RTP/SCS, OCTA's Long-Range Transportation Plan (LRTP), and OCTA's Congestion Management Plan.

The RTP/SCS is a long-range visioning plan that balances future mobility and housing needs with economic, environmental and public health goals. The 2016 RTP/SCS states benefits would be in the following categories: savings resulting from reduced travel delay, air quality improvements, safety improvements, and reductions in vehicle operating costs. The plan will provide a return of $2 for every dollar invested. It would result in an 8-percent reduction in greenhouse gas emissions per capita by 2020—an 18-percent reduction by 2035 and a 21 percent reduction by 2040—compared with 2005 levels. Regional air quality would improve under the Plan, as cleaner fuels and new vehicle technologies would be implemented. The combined percentage of work trips made by carpooling, active transportation and public transit would increase by about 4 percent. The number of vehicle miles traveled (VMT) per capita would be reduced by more than seven percent and vehicle hours traveled (VHT) per capita by 17 percent (for automobiles and light-/medium-duty trucks) as a result of more location-efficient land use patterns and improved transit service. Daily travel by transit would increase by nearly one-third as a result of improved transit service and more transit-oriented development patterns. More than 351,000 additional new jobs annually would be created, due to the region's increased competitiveness and improved economic performance. The Plan would reduce the amount of previously undeveloped (greenfield) lands converted to more urbanized uses by 23 percent.

OCTA's LRTP provides a blueprint for transportation improvements for Orange County. OCTA updates the LRTP about every 4 years. The general goals of the LRTP are to assess the performance of the transportation system over a more than 20-year horizon, and to identify the projects that best address the needs of the system based on expected population, housing, and employment growth, while taking forecast financial assumptions into account. The Build Alternatives (including Design Option B) are included in the 2018 LRTP.

In June 1990, the passage of the Proposition 111 gas tax increase required California's urbanized areas to adopt a Congestion Management Plan. OCTA is responsible for developing, monitoring and reporting on the Orange County Congestion Management Program every 2 years. The 2017 CMP was just approved by OCTA. The goals of Orange County's Congestion Management Plan are to support regional mobility objectives by reducing traffic congestion; providing a mechanism for coordinating land use and development decisions that support the regional economy; and determining gas tax fund eligibility. To meet these goals, the Congestion Management Plan contains a number of policies designed to monitor and address system performance issues. OCTA developed the policies that make up Orange County's Congestion Management Plan in coordination with local jurisdictions, Caltrans, and the South Coast Air Quality Management District. As part

of this plan, required elements identified include traffic LOS standards, performance measures, travel demand, land use analysis program, and capital improvement programs.

1.2.5.2 Local Plans

The California Department of Finance through its Total Estimated and Projected Population for California and Counties, forecasts the total Orange County population for 2030 (Design Year) to be 3,433,510 and for 2050 (Build Year) to be 3,615,935. Existing land use plans for the Study Area include the General Plan Land Use Elements for the City Laguna Hills, the City of Laguna Woods, and the City of Lake Forest. These land use plans identify opportunities for future growth and development within these three cities and are discussed in Section 2.1 (Land Use) of this document. Population growth is anticipated; however, because the cities are built out, most additional population and employment growth is expected to take place through the natural increase and redevelopment of existing land uses or the infill development of vacant parcels. Land uses within the Study Area are already established, with limited opportunity for a new, unplanned, large-scale development. In addition, Section 2.1 also discusses the Master Plan of Arterial Highways and Long Range Transportation Plan administered by OCTA. These plans ensure that a regional highway network would be planned, developed, and preserved in order to improve the existing freeway system within Orange County and address projected future planned growth.

This Build Alternatives are consistent with the Master Plan of Arterial Highways designation for El Toro Road, a local arterial. El Toro Road is classified as a Principal Arterial to the east of I-5, and a Major Arterial to the west of I-5 (refer to Section 2.1, Land Use, for details of these designations).

1.2.6 Legislation

The I-5/El Toro Road Interchange Project is part of a larger suite of transportation improvements included in Orange County's 30-year M2 Plan. M2, the 0.5-cent transportation sales tax, is planned to provide more than $15 billion in transportation improvements in Orange County through 2041 (2011 to 2041). M2 is composed of the following transportation improvement programs: freeways, local streets and roads, and transit. Up to 43 percent of the funds would go to freeway projects, 32 percent to streets, and 25 percent to transit projects.

The Measure M2 Next 10 Delivery Plan provides guidance for what can be accomplished over the 10 years between 2017 and 2026. The capacity and operational improvements of the Build Alternatives (including Design Option B) are discussed in the Next 10 Delivery Plan as Project D.

In addition, two unique environmental programs, the Freeway Environmental Mitigation Program and Environmental Cleanup Program are part of M2. The Environmental Mitigation Program includes the allocation of funds to acquire land and fund restoration projects as part of the mitigation efforts and streamlined approval process for 13 M2 freeway improvement projects. To guide the restoration efforts, OCTA developed a Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP). The Environmental Mitigation Program receives 5 percent of the M2 funding for freeway projects. The Environmental Cleanup Program

receives 2 percent of the overall M2 funds and aims to cleanup roadway runoff by funding local agencies' water quality improvement projects through a competitive grant program.

The M2 program was publicly reviewed through a Program Environmental Impact Report prior to voters approving the ballot measure in November 2006. Since 2008, the M2 program has been included in the SCAG RTP/SCS, and the associated Program Environmental Impact Report prepared by SCAG.

1.2.6.1 Orange County Transportation Authority Natural Community Conservation Plan/Habitat Conservation Plan

OCTA's NCCP/HCP was approved with Federal and State resource agencies as signatories. The purpose of the OCTA NCCP/HCP is to provide an effective framework to protect native biological diversity, habitat for native species, natural communities, and local ecosystems throughout Orange County (i.e., the Plan Area), while improving and streamlining the environmental permitting process for impacts of Covered Activities on sensitive, threatened, and endangered species and their habitats. Environmental impacts will be mitigated under OCTA's M2 Environmental Mitigation Program (EMP). The goals of the EMP are to engage in comprehensive mitigation to provide higher-value environmental benefits such as habitat protection, wildlife corridors/linkages, and resource preservation, in exchange for a streamlined project review and permitting process for the freeway program. The Build Alternatives are considered a covered action and is in conformance with OCTA NCCP/HCP, Implementing Agreement, and the NCCP/HCP Agreement.

1.2.7 Modal Interrelationships and System Linkages

I-5 is an integral component of the transportation system in Orange County. It is a major north–south route of the Interstate Highway System in the U.S. state of California. It begins at the Mexico–United States border at the San Ysidro crossing, goes north across the length of California, and crosses into Oregon south of the Medford-Ashland metropolitan area. It is the most important and most heavily used major north-south route on the Pacific Coast. I-5 is part of the California Freeway and Expressway System, and is part of the National Highway System, a network of highways that are considered essential to the country's economy, defense, and mobility by the FHWA. Locally, I-5 has several interchanges with a number of other freeways, providing access to the countywide and regional freeway systems. It is also a major corridor for goods movement in Southern California via I-405, SR 22, State Route 91. In addition, I-5 provides a connection with John Wayne Airport via SR 55, I-405, SR-133, and Jamboree Road. The proposed Build Alternatives (including Design Option B) include interchange improvements and would enhance operations and mobility in the I-5 corridor, thereby improving mobility in this part of Orange County.

The Los Angeles–San Diego–San Luis Obispo (LOSSAN) rail corridor is a 351-mile rail line that runs through six counties in Southern California. Also known as Amtrak's Pacific Surfliner Corridor, the LOSSAN corridor serves Southern California's coastal population and Los Angeles and San Diego. Last year, more than 7.4 million trips were taken on the LOSSAN rail corridor, including 4.5 million on Metrolink and COASTER commuter trains, and 2.9 million on Amtrak's Pacific Surfliner service, making it the busiest state supported intercity passenger rail route in the nation in FY

2018/18. The LOSSAN rail corridor also hosts BNSF Railway and Union Pacific Railroad freight trains, making it a critical component of the region's transportation system. Major legislative priorities for LOSSAN are to secure sustainable funding, connectivity and integration, and infrastructure, service and safety improvements. The LOSSAN Agency website states that it uses shared staff from the OCTA. Amtrak and Metrolink are both commuter rail lines that provide service to the cities of Lake Forest, Laguna Woods, and Laguna Hills, amongst other cities in Orange County and connecting counties of Los Angeles, San Diego, and San Bernardino. The closest Metrolink station to the project limits is at 15215 Barranca Parkway, Irvine, 92618. The two closest Amtrak Stations are Irvine Station (15215 Barranca Parkway, Irvine, 92618) and San Capistrano Station (26701 Verdugo Street, San Juan Capistrano, 92675). The cities of Laguna Woods, Laguna Hills, and Lake Forest subsidize the cost of taxi travel for their residents who are at least 60 years of age. This is funded by OCTA's M2 0.5-cent sales tax and is designed to provide door-to-door taxi service.

OCTA bus routes service the vicinity of the project limits as discussed below.

According to OCTA's Transit Planning Unit, Routes 83, 87, 89, 91, and 177 all pass within 0.5 mile of El Toro Road and I-5:

- **Route 83:** Anaheim–Laguna Hills: via Interstate 5/Main Street
- **Route 87:** Rancho Santa Margarita–Laguna Niguel: via Alicia Parkway
- **Route 89:** Mission Viejo–Laguna Beach: via El Toro Road /Laguna Canyon Road
- **Route 91:** Laguna Hills–San Clemente: via Paseo de Valencia/Camino Capistrano/Del Obispo Street
- **Route 177:** Foothill Ranch–Laguna Hills: via Lake Forest Drive/Muirlands Boulevard/Los Alisos Boulevard

Route 90 is about 1 mile away:

- **Route 90:** Tustin–Dana Point: via Irvine Center Drive/Moulton Parkway/Golden Lantern Street

Route 86 is 1.35 miles away:

- **Route 86:** Costa Mesa – Mission Viejo: via Alton Parkway/Jeronimo Road

There is one Park and Ride facility, the Laguna Hills Transportation Center Park and Ride near the project limits. It is near Los Alisos Boulevard at 24282 Calle De Los Caballeros, Laguna Hills.

1.2.8 Independent Utility and Logical Termini

Logical termini are defined as rational endpoints for transportation improvement and analysis of the potential environmental impacts of a Build Alternatives. The termini of the Build Alternatives are logical, extending on I-5 from PM 17.9 to PM 19.7 in the north-south direction, and includes El Toro Road from Rockfield Boulevard to Paseo

De Valencia in the east-west direction. The endpoints of the Build Alternatives on I-5 were limited to the extension of the existing auxiliary lanes to Lake Forest Drive to the north and Alicia Parkway to the south and the modifications/addition of on- and off-ramp connections to the mainline. The endpoints on El Toro Road in the east-west direction from Rockfield Boulevard to Paseo de Valencia were dependent on vehicle queueing analysis at ramp meters and at study intersections and storage evaluation at freeway off-ramps. The Build Alternatives would address the transportation deficiencies between the two endpoints and existing and future projected congestion.

A project is defined as having independent utility if it meets the project purpose in the absence of other improvements in the project limits or in other parts of the corridor. The improvements proposed at the I-5/El Toro Road Interchange have independent utility in that they address specific issues and deficiencies within the project limits where increased traffic delays have been identified. The project purpose is to improve traffic flow and traffic signal optimization, reduce traffic congestion, and reduce freeway ramp queuing. This purpose is proposed to be achieved even if no other improvements are made in the area. As such, the Build Alternatives have independent utility, as they do not rely on other projects to address the identified need in the I-5 corridor. Furthermore, the Build Alternatives would not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

1.2.9 Air Quality Improvements

The Build Alternatives would improve the I-5/El Toro Road Interchange and modify ramps and intersections. These improvements would contribute to emissions reductions during operation of the Build Alternatives because they are projected to relieve congestion. In addition, transportation control measures would include ramp meters.

1.3 Project Description

This section describes the proposed action and the project alternatives that were developed to meet the identified purpose and need of the project, while avoiding or minimizing environmental impacts. Caltrans initially studied four Build Alternatives (including Design Option B) and the No Build Alternative. Two Build Alternatives, Alternative 1 - Intersection Modification and Alternative 3 - Diverge Diamond Interchange, were removed from further consideration and are discussed in Section 1.4.5, Alternatives Considered but Eliminated from Further Discussion. The Alternatives being analyzed and considered as part of this Initial Study/Environmental Assessment (IS/EA) are:

- Alternative 2 - Flyover
- Alternative 4 - Southbound Collector Distributor and Hook Ramps (includes Design Option B)
- No Build Alternative

The Build Alternatives are in Orange County on I-5 and the El Toro Road Interchange within the cities of Laguna Hills, Lake Forest, and Laguna Woods. The

project limits extend from 0.1 mile south of Los Alisos Boulevard Overcrossing (PM 17.8) to 0.4 mile north of Ridge Route Drive (PM 19.7), and on El Toro Road from Rockfield Boulevard to Paseo De Valencia. The total length of the project limits is 1.9 miles. Within the limits of the Build Alternatives (and after completion of the I-5 Widening Project in 2024), I-5 will be a 12-lane divided highway facility with 5 mixed flow lanes and 5 HOV lanes in each direction (see Section 1.4.1 for details). The purpose of the proposed project is to improve traffic flow and traffic signal optimization, to reduce traffic congestion at and through adjacent local street intersections, and to reduce freeway ramp queuing.

1.4 Alternatives

This IS/EA evaluates two Build Alternatives (including Design Option B) and the No Build Alternative. Both Build Alternatives (including Design Option B) under consideration include design features that meet the purpose and need of the proposed project while avoiding and minimizing environmental impacts. All alternatives are discussed and compared in Table 1.13 Comparison of Alternatives. Please refer to Appendix G for Build Alternative Plans.

The Build Alternatives (including Design Option B) contain a number of standardized project measures that are employed on most, if not all, Caltrans projects and were not developed in response to any specific environmental impact resulting from the Build Alternatives. Many of these standardized measures are discussed in the section below, Common Design Features (Other Project Elements) but are addressed in more detail in the Environmental Consequences sections found in Chapter 2.

1.4.1 Project Alternatives

1.4.1.1 Common Design Features of the Build Alternatives (Including Design Option B)

This section discusses the common design features of the Build Alternatives (including Design Option B). The I-5/El Toro Road Interchange is a complex interchange with heavy traffic volumes, closely spaced intersections, varied land uses, and many deficiencies. As a result, the design proposed for the two Build Alternatives (including Design Option B) is unique and the common design features are limited, as seen below. Additionally, there are other features that are common to both Build Alternatives (including Design Option B) and are also discussed below:

- Both Build Alternatives (including Design Option B) extend the existing auxiliary lane in the northbound direction from Lake Forest Drive to the proposed westbound El Toro Road On-Ramp from Bridger Road.
- Utilities would be protected in place, adjusted or relocated within the project limits, as needed, to accommodate the proposed improvements. Coordination with the utilities of the affected facilities (Southern California Gas Company, Southern California Edison, AT&T Communications, El Toro Water District, Cox Communications, and Santa Margarita Water District) is ongoing and required to further define relocation strategies, project requirements, and to identify and develop agreements needed to implement strategies. Utilities being affected or in conflict include electric, communications, gas, water, and sanitary sewer. Utility

coordination and verification will be continued through the development of the final design phase of the Build Alternatives. The details of the utility conflicts for the two Build Alternatives (including Design Option B) are found in Section 2.3, Utilities, of this IS/EA.

- Vegetation within the project limits is mostly comprised of ornamental landscape within community parks, businesses, residential streets, and adjacent to I-5. The majority of species are nonnative. Existing planting and irrigation systems removed during roadway construction will be replaced in accordance with Caltrans' current design standards. Planting design would consider safety, maintainability, and aesthetic compatibility with adjacent urban communities. Caltrans would provide replacement landscaping and permanent irrigation with a 3-year plant establishment period.
- Sidewalks, curbs, and gutters where impacted by the Build Alternatives (including Design Option B) would be reconstructed to meet current Americans with Disabilities Act Standards (28 Code of Federal Regulations 35.151) in order to maintain access for all community members. Existing curb ramps at all crosswalks within the project limits that are affected by the Build Alternatives (including Design Option B) will be reconstructed to Caltrans latest standards (2015 Revised Standard Plan RSP A88A).
- During the Design and Construction Phases, a Transportation Management Plan (TMP) will be updated and coordinated with the cities of Laguna Woods, Lake Forest, Laguna Hills, businesses, emergency services, and educational institutions in the Study Area. This plan will include strategies and measures to avoid and minimize disruption to local access, roadways, and bicyclist and pedestrian facilities during construction.
- Context-sensitive solutions will be considered to help reflect the unique character of the community, reduce the visual effects of the Build Alternatives and provide compatibility with existing resources and features. Contextual elements such as retaining walls, bridge abutments, lighting, landscaping, sound walls, and slopes would be considered for application of the following solutions:
    - During construction, lighting would be shielded and/or focused on work areas to minimize ambient spillover into adjacent areas.
    - Grading cuts and fills would be contoured to visually blend with the surrounding landscape to the extent practical.
    - The color and aesthetic treatment of the highway and associated structures, such as retaining walls, medians, bridge abutments and columns would be applied consistently with other highway structures in the project limits.
    - The Build Alternatives would retain as much existing vegetation as possible.
- Construction equipment and vehicles will be properly tuned and maintained. All construction equipment will use low sulfur fuel as required by California Code of Regulations Title 17, Section 93114.
- The project's contractors will comply with the following rules and regulations of the South Coast Air Quality Management District:

  - Rule 401 - Visible Emissions. Rule 401 states that no person shall discharge air contaminants of specified opacity for more than 3 minutes in 1 hour.
  - Rule 402 - Nuisance. Under Rule 402, no air contaminant shall be released into the atmosphere that causes a public nuisance. The rule prohibits discharge of air contaminants that could cause injury, detriment, nuisance, or annoyance to the public. An offensive odor can be considered a nuisance or annoyance.
  - Rule 403 – Fugitive Dust. The purpose of this rule is to reduce the amount of particulate matter entrained in the ambient air as a result of anthropogenic (manmade) fugitive dust sources by requiring actions to prevent, reduce or mitigate fugitive dust emissions.
  - Rule 403.1 – Supplemental Fugitive Dust Control Requirements for Orange County Sources. The purpose of this rule is to reduce or prevent the amount of fine particulate matter (PM_{10}) entrained in the ambient air from anthropogenic (man-made) fugitive dust sources.
  - Rule 404 – Particulate Matter – Concentration. Under Rule 404, a person shall not discharge into the atmosphere from any source, particulate matter in excess of the concentration at standard conditions, as specified in the rule.
  - Rule 405 – Solid Particulate Matter – Weight. Under Rule 405, a person shall not discharge into the atmosphere from any source, solid particulate matter including lead and lead compounds, in excess of the rates specified in the rule.

- The Build Alternatives are covered under the OCTA Conservation Plan (i.e., Project G). The OCTA M2 Conservation Plan includes Streambed Program Guidelines (Conservation Plan Appendix E), which outline potential conditions and the process for submittal of a project-level Notification of Lake or Streambed Alterations and the issuance for individual Lake or Streambed Alteration Agreements for this project pursuant to California Fish and Game Code sections 1600–1616. All OCTA M2 projects will require consultation per OCTA's NCCP/ HCP. The Streambed Program requires the evaluation of streambed avoidance options and specification of minimization measures prior to compensatory mitigation and ensures adequate mitigation based on habitat and type of aquatic resource to address state regulatory obligations.
- OCTA and Caltrans have worked with the United States Army Corps of Engineers (USACE) to define a Programmatic Individual Permit for the 13 M2 freeway projects that establishes Letter of Permission procedures. This Permit (SPL-201200830-VCL) streamlines the individual project-level Section 404 permitting for the M2 freeway projects. On a parallel process, the State Water Resource Control Board (SWRCB) has committed to following the same process established for the Section 404 permitting. For the USACE to issue the 404 Programmatic Permit, the SWRCB must first issue a General 401 Certification. Advanced mitigation is being provided for the General 401 Certification and is consistent with the compensatory mitigation credits required for the USACE Permit.
- Potential temporary construction site BMPs include, but are not limited to, gravel bags, fiber rolls, street sweeping, drainage inlet protection, concrete washout

bins, and bonded fiber matrix. Potential permanent treatment BMPs include, but are not limited to, infiltration devices, media filters, biofiltration strips and swales, and detention basins. These would be placed throughout the project limits but ideally along the on- and off-ramps.

- A maintenance vehicle pullout would be provided for accessing controller cabinets where possible.
- All lighting that would be impacted within the project limits would be replaced. Intersection lighting will also be replaced. New lighting would be proposed along on and off ramps.
- Transportation Systems Management (TSM) elements have been included in the Build Alternatives (including Design Option B). These elements include:
    - Improved ramp metering hardware and software
    - Upgraded traffic signals interconnected and coordinated with adjacent signals and ramp meters
    - Intelligent Transportation System elements including fiber-optic and other communication systems for improved connectivity and remote management; closed-circuit television coverage of the entire freeway mainline, ramps, and adjacent arterials, video detection systems, and vehicle detection systems for volume, speed, and vehicle classification
    - On- and off-ramps designed to limit impacts to non-motorized travel
    - An extension of an existing auxiliary lane in the northbound I-5 direction
    - Traveler information management system improvements to enhance dissemination of real-time information for roadway conditions
    - Camera surveillance

Both Build Alternatives (including Design Option B) also consist of transportation demand management (TDM), as they provide travel time savings, operating cost savings, and increase travel reliability that indirectly results in a reduction of greenhouse gas emissions from exiting levels (98,372 metric tons/year). For details, please refer to Section 2.11 Air Quality, and Chapter 3, Climate Change.

Drainages

Common drainage improvements for the Build Alternatives (including Design Option B) are shown in Table 1.5 below:

Table 1.5: Common Drainage Improvements

No.	Approximate Station	Location	Proposed Work
1	234+50 to 235+60	Southbound I-5 On-Ramp at edge of travel way	Remove/Replace Graded Lined Drain, Remove/replace inlet

There is only one channel in the Study Area in the vegetated area within the northbound I-5 on-ramp loop from El Toro Road. No work is proposed to the channel under the Build Alternatives (including Design Option B).

Noise Attenuation

Noise abatement in the form of soundwalls (also referred to as Noise Barriers) was evaluated and considered for the Build Alternatives (including Design Option B). Noise abatement is included as part of the Build Alternatives only if constructing the abatement is feasible and reasonable. Noise abatement is considered feasible from an acoustical perspective if it predicts to provide at least a 5-decibel (dB) noise reduction at an impacted receptor. Feasibility is an engineering consideration that may be restricted by factors such as access requirements for driveways, topography, presence of underground and aboveground utilities, and safety.

The overall reasonableness of noise abatement is determined by three factors: the noise reduction design goal (7 dB for at least one or more receptors), the cost of noise abatement, and the viewpoints of benefited receptors (including property owners and residents of the benefited receptors). The viewpoints of the benefited receptors will be completed in spring of 2019 and results would be included in the Final Environmental Document. Both Noise Barriers (NB No.) S236 and S229/S235 meet the feasible and reasonable (except for viewpoints) criteria and are common to both Build Alternatives (including Design Option B).

NB No. S236 is a 1,766-foot-long barrier on the northbound side of I-5 between El Toro Road and Ridge Route Road modeled at 16 feet high at the edge of the proposed State right-of-way. Currently there is an existing soundwall (14 feet to 16 feet high with a majority of the wall's length at 16 feet high) on the existing State right-of-way that shields residences from I-5 traffic noise. A little more than half of the existing length of the soundwall would need to be demolished to accommodate the Build Alternatives (including Design Option B) in this area.

NB Nos. S229/S235 would replace the existing soundwall on the southbound side of I-5 between Ridge Route Road and El Toro Road, which is at the existing State right-of-way and adjacent to St. George Episcopal Church. The proposed noise barrier would be approximately 975 ft long and 16 feet high at the right edge of shoulder on I-5 southbound off-ramp to Avenida De La Carlota/Paseo De Valencia.

Right-of-Way Acquisitions

There is only one full property acquisition, as shown in Table 1.6, below, that is common to both Build Alternatives (except Alternative 4, Design Option B).

Table 1.6: Common Right of Way Acquisitions

Assessor's Parcel Number	Land Use Designations	Full Acquisition (sf)	Partial Acquisition (sq ft)	TCE (sf)
Non-Residential				
616-033-05	Commercial	33,285		

sf = square feet
TCE = temporary construction easement

Signage

All existing State signs would be removed and relocated to accommodate the interchange improvement. All existing State signs at the on-/off-ramps would be replaced and relocated to the new edge of shoulders.

Design Exceptions

The Build Alternatives (including Design Option B) would require design exceptions at various locations within the project limits, refer to Appendix I. Design exceptions are necessary when the proposed design deviates from the standard design features presented in the Caltrans *Highway Design Manual* (2018). The following Non-Delegated Design Features common to the Build Alternatives (including Design Option B) would include: Stopping Sight Distance, Standards for Superelevation, Stopping Sight Distance, Lane Width, Shoulder Width/Horizontal Clearances, Median Standard Width, and Location and Design of Ramp Intersections on the Crossroads. The following District Delegated Design Features common to the Build Alternatives (including Design Option B) would include Decision Sight Distance, Superelevation Transitions—General, Superelevations Transitions—Runoff, Vertical Curves, Side Slope Standards, Median Width— Standards, Outer Separation, Ramps, General, Lane Drops, and Ramps, Ramp Metering, and Metered Freeway Entrance Ramps.

Other Project Elements (Standardized Project Measures)

The Build Alternatives (including Design Option B) contain several standardized project measures that are employed on most, if not all, Caltrans projects. The use of these measures with the Build Alternatives (including Design Option B) is described in more detail in Chapter 2 of this IS/EA as Project Features (PF) (per title of subsection) and numbered. For example, a Project Feature applicable to water quality would be titled and listed as PF-WQ-1.

- **Water Quality and Storm Water Runoff**
    - **Caltrans Standard Specification 13-1.01D (2)-Regulatory Requirements:** Order No. 2012-0011-DWQ, National Pollutant Discharge Elimination System (NPDES) Permit No. CAS000003: The Caltrans Statewide NPDES Stormwater Permit requires the implementation Design Pollution Prevention and Treatment BMPs to minimize potential water quality and hydrological impacts associated with operation of the Build Alternatives (PF-WQ-1), (PF-WQ-4) and (PF-WQ-5).
    - **Caltrans Standard Specification 13-1.01D (2)-Regulatory Requirements Order No. 2009-0009-DWQ, NPDES General Permit No. CAS000002:** The project will comply with NPDES Permit for Construction Activities as well as implement the BMPs specified in Caltrans Stormwater Management Plan (Caltrans 2016b) (PF-WQ-2)
    - **Caltrans Standard Specification 13-1.01D (4)-Water Pollution Control Manager:** The project will be required to prepare and implement an acceptable Stormwater Pollution Prevention Plan (SWPPP). The SWPPP shall contain BMPs that have demonstrated effectiveness at reducing storm water pollution (PF-WQ-3).
    - **Caltrans Standard Specification 13-3.01D (2)-Construction Site Dewatering:** The project will comply with Order No. R9-2015-0013, NPDES No. CAG919003, General Waste Discharge Requirements for Groundwater Extraction Discharges to Surface Waters within the San Diego Region (PF-WQ-6)
- **Community**

- **Caltrans Standard Specification 5-1.31:** Requires that the job site be neatly maintained in areas visible to the public. (PF-CI-1)
- **Caltrans Standard Specifications Section 5-1.39:** Before Contract acceptance, restore damaged work to the same state of completion as before the damage. (PF-CI-2)
- **Caltrans Standard Specifications Section 7-1.03:** Construction activities must not inconvenience the public or abutting property owners. Schedule and conduct work to avoid unnecessary inconvenience to the public and abutting property owners. (PF-CI-3)
- **Caltrans Standard Specifications Section 7-1.04:** Do not construct a temporary facility that interferes with the safe passage of traffic. Control dust resulting from the work, inside and outside the right-of-way. Move workers, equipment, and materials without endangering traffic. Whenever your activities create a condition hazardous to the public, furnish, erect and maintain those fences, temporary railing, barricades, lights, signs, and other devices and take any other necessary protective measures to prevent damage or injury to the public. Provide flaggers whenever necessary to ensure that the public is given safe guidance through the work zone. (PF-CI-4)

- **Cultural**
  - **Caltrans Standard Specification 14-2.03A: Discovery of Cultural Materials.** If cultural materials are discovered during site preparation, grading, or excavation, the construction Contractor will divert all earthmoving activity within and around the immediate discovery area until a qualified archaeologist can assess the nature and significance of the find. At that time, coordination will be maintained with the California Department of Transportation (Caltrans) District 12 Environmental Branch Chief or the District 12 Native American Coordinator to determine an appropriate course of action. If the discovery of cultural materials occurs outside the Caltrans right-of-way, then coordination with the appropriate local agency will be conducted as well. (PF-CUL-1)
  - **Caltrans Standard Specification 14-2.03A: Discovery of Human Remains.** If human remains are discovered during site preparation, grading, or excavation, California State Health and Safety Code (H&SC) Section 7050.5 states that further disturbances and activities shall cease in any area or nearby area suspected to overlie remains, and the Orange County Coroner shall be contacted. If the remains are thought to be Native American, the Coroner will notify the Native American Heritage Commission, who pursuant to California Public Resources Code (PRC) Section 5097.98, will then notify the Most Likely Descendant (MLD). At that time, the persons who discovered the remains will contact the Caltrans District 12 Environmental Branch Chief or the District 12 Native American Coordinator so that they may work with the MLD on the respectful treatment and disposition of the remains. Further provisions of California PRC 5097.98 are to be followed as applicable. (PF-CUL-2)

- **Geology/Soil/Seismicity/Topography**

- **Caltrans Standard Specifications 48-2.02. B and Section 19 Earthwork General:** The project will comply with the most current Caltrans procedures and design criteria regarding seismic design to mitigate any adverse effects related to seismic ground shaking. Earthwork will be performed in accordance with Caltrans Standard Specifications, Section 19, which require standardized measures related to compacted fill, over-excavation and re-compaction, and retaining walls, among other requirements. Moreover, Caltrans Highway Design Manual (HDM) Topic 113, Geotechnical Design Report, would require that a site-specific, geotechnical field investigation is performed for the proposed project during the design phase (PF-GEO-1).

- **Paleontology**
  - **Caltrans Standard Specification 14-7.03:** If unanticipated paleontological resources are discovered all work within 60 feet of the discovery must cease and the construction resident engineer must be notified. Work cannot continue near the discovery until authorized. (PF-PAL-1)
- **Hazardous Waste and Materials**
  - **Caltrans Standard Specification Section 14-11.12:** Should construction activities result in the disturbance of traffic striping and pavement marking materials, the generated wastes would be disposed of at an appropriate, permitted disposal facility as determined by a lead specialist. (PF-HAZ-1)
  - **Caltrans Standard Specification Section 13-4.03G:** Controls dewatering work and discharge activities associated with dewatering. (PF-HAZ-2)
  - **Caltrans Standard Specification Section 13-4.03E(2) and Unknown Hazards Procedures in Caltrans Construction Manual (July 2017):** During construction, the construction contractor will monitor soil excavation for visible soil staining, odor, and the possible presence of unknown hazardous material sources. If hazardous material contamination or sources are suspected or identified during project construction activities, the construction contractor will be required to cease work in the area and to have an environmental professional evaluate the soils and materials to determine the appropriate course of action required, consistent with the Unknown Hazards Procedures in Chapter 7 in the Caltrans' Construction Manual. (PF-HAZ-3)
- **Air Quality**
  - The construction contractor must comply with Caltrans' Standard Specifications in Section 14-9 (2015) to minimize impacts to air quality. (PF-AQ-1)
  - Section 14-9.02 specifically requires compliance by the contractor with all applicable laws and regulations related to air quality, including air pollution control district and air quality management district regulations and local ordinances. (PF-AQ-2)
  - Section 14-9.03 is directed at controlling dust. If dust palliative materials other than water are to be used, material specifications are described in Section 18. (PF-AQ-3)

- **Noise**
  - **Caltrans Standard Specifications Section 14.8-02:** Control and monitor noise resulting from work activities. Do not exceed 86 A-weighted decibel instantaneous noise level dBA L_{max} at 50 feet from the job site from 9 p.m. to 6 a.m. (PF-N-1)
- **Utilities and Emergency Services**
  - **Caltrans Standard Specifications Section 12-4:** The TMP will detail a plan for the umbrella standard specifications, under Section 12-4 Maintaining Traffic, regarding temporary closures, detour plans, and coordination with law enforcement, fire protection, and emergency medical services. (PF-UES-1) (PF-UES-2)
- **Traffic**
  - **Caltrans Standard Specifications Section 12-4:** The TMP will detail a plan for the umbrella standard specification of 12-4 Maintaining Traffic and any applicable sections (i.e. 12-4.01 General, 12-4.02 Traffic Control Systems, 12-4.03 Falsework Openings 12-4.04 Pedestrian Facilities, etc.). (PF-TRA-1)

1.4.1.2 Unique Design Features

The following discussion addresses the unique features of the Build Alternatives (including Design Option B) as they relate to implementation of the Build Alternatives (see Appendix H, Layout Plans).

Alternative 2: Flyover

Alternative 2 proposes a flyover structure that directly connects the southbound I-5 traffic to El Toro Road by traversing over the existing I-5 freeway and joining with the newly aligned Bridger Road north of the freeway. The height of this flyover at its highest point is estimated at 32 feet from the I-5 freeway mainline travel lanes. The existing northbound I-5 on-ramp from westbound El Toro Road would be removed and replaced with a proposed on-ramp from Bridger Road, north of the new flyover structure. The existing I-5 southbound hook off-ramp would be realigned to provide access to westbound El Toro Road. To accommodate the new southbound flyover off-ramp and the realigned existing on-ramp, Bridger Road would be will be closed and properties between the mainline freeway and ramps would be acquired. A portion of Avenida De La Carlota would be reconstructed to accommodate the proposed improvements.

Drainages

Drainage Improvements unique for Alternative 2 are shown in Table 1.7 below:

Table 1.7: Alternative 2 Drainage Improvements

No.	Approximate Station	Location	Proposed Work
1	235+00 to 242+00	Southbound I-5 off-ramp leading to Avenida De La Carlota	Remove/replace inlet and add reinforced concrete pipe extension
2	235+00	Southbound I-5 on-ramp from Avenida De La Carlota, edge of shoulder to El Toro Rd.	Remove/replace inlet and add reinforced concrete pipe extension
3	235+00	Southbound I-5 off-ramp to El Toro	Remove/replace inlet and add reinforced concrete pipe extension
4	220+20	At end of southbound I-5 flyover off-ramp to Bridger Rd.	Remove/replace inlet and add reinforced concrete pipe extension
5	222+00	At end of southbound I-5 flyover off-ramp to Bridger Rd.	Remove/replace inlet and add reinforced concrete pipe extension
6	220+54	At beginning of southbound I-5 flyover off-ramp to Bridger Rd.	Add inlet and reinforced concrete pipe extension
7	241+00	At beginning of southbound I-5 flyover off-ramp to Bridger Rd.	Add inlet and reinforced concrete pipe extension
8	235+60 and 235+90	Northbound I-5 on-ramp from Bridger Road	Remove and replace existing inlet and pipe
9	222+20	New northbound I-5 on-ramp from westbound El Toro Road	Add new inlet and reinforced concrete pipe

Structures

Southbound I-5 EB El Toro Road Off-Ramp Flyover:

A new flyover structure is proposed that would connect the southbound I-5 traffic to El Toro Road.

Retaining Walls

Proposed retaining wall locations, lengths, and maximum heights for Alternative 2 would be as follows (see Appendix H, Layout Plans):

- Southbound I-5 Off-Ramp to eastbound El Toro Road, Right 1 (Rt 1) (493 feet in length, with a maximum height of 20 feet)
- Southbound I-5 Off-Ramp to eastbound El Toro Road, Left 1 (Lt 1) (418 feet in length, max height 18 feet)
- Southbound I-5 Off Ramp to eastbound El Toro Road, Rt 2 (577 feet in length, max height 22 feet)
- Southbound I-5 Off Ramp to eastbound El Toro Road, Lt 2 (884 feet in length, max height 18 feet)
- Northbound I-5 On-Ramp, Rt (2,143 feet in length, max height 6 feet), combined with soundwall, but soundwall height is not included here.

Right of Way Acquisitions

Right of-way acquisitions (both full and partial), as well as TCEs that are unique for Alternative 2, are shown in Table 1.8.

Table 1.8: Unique to Alternative 2 Right-of-Way Acquisitions

Alternative 2				
Assessor's Parcel Number	**Land Use Designations**	**Full Acquisition (sq. ft)**	**Partial Acquisition (sq. ft)**	**TCE**
NON-RESIDENTIAL				
617-053-05	Commercial	19200		
617-053-10	Commercial	56700		
617-053-03	Commercial	137660		
616-033-02	Commercial	21520		
616-033-03	Commercial	21425		
616-033-04	Commercial	9970		
617-185-07	Community Park/Open Space		45040	77930
617-185-08	Cavanaugh Mini Park Playground		13750	
616-022-04	Village Commercial[1]		1660	2815
N/A	Major Street (Avenida De La Carlota)		13410	1030

[1] Village Commercial land use designation intends to establish a community core where commercial, civic, and high-density residential uses would be appropriate. The area will contain enhanced pedestrian areas that conveniently link commercial, residential, and civic activity areas. Typical uses include those associated with large regional malls, as well as medical center, financial institutions, institutional and government uses, automobile-related services, community facilities, professional offices, and high density residential uses (Source: City of Laguna Hills, General Plan Land Use Map, March 2015 (accessed January 10, 2019).

N/A = not applicable
sq ft = square feet
TCE = temporary construction easement

Design Exceptions

There are no Non-Delegated Design Features unique to Alternative 2. The following District Delegated Design Features unique to Alternative 2 would include: Ramps, Ramp Metering, and Metered Freeway Entrance Ramps. For details, refer to Appendix I.

1.4.1.3 Alternative 4: Collector-Distributor and Hook Ramps

Alternative 4 proposes a new hook-style interchange with new southbound I-5 ramps that would connect to a new signalized intersection with Avenida De La Carlota south of the existing freeway overcrossing structure. The new ramp would require acquisition of property from the Five Lagunas (formerly the Laguna Hills Mall) parking area. This alternative also proposes a southbound collector-distributor system beginning at the existing southbound off-ramp to El Toro Road and ending at the Los Alisos Boulevard overcrossing. The existing El Toro Road undercrossing bridge would be widened on the west side, the existing southbound hook on- and off-ramps to and from Avenida De La Carlota would be realigned, and the alignment of Avenida De La Carlota south of El Toro Road would be shifted to the west, adjacent

to the Five Lagunas shopping center, to accommodate the proposed collector-distributor road and the proposed southbound hook on- and off-ramps south of El Toro Road. The existing northbound I-5 on-ramp from westbound El Toro Road would be modified to extend further before connecting to I-5. A portion of Bridger Road would be reconstructed to accommodate modifications to this on-ramp. A portion of Avenida De La Carlota between Paseo de Valencia and El Toro Road would also be realigned and reconstructed. The design of Alternative 4 has taken into consideration the entitlement (layout and density) for the Five Lagunas project approved by the City of Laguna Hills in March 2016. The property owner is currently revising their plans for the Five Lagunas project and these revisions will need to be processed through the City of Laguna Hills. As part of this review, the City will identify additional mitigation measures or other requirements to address any proposed increase in density or changes in layout/design.

Drainages

Drainage Improvements unique for Alternative 4 are shown in Table 1.9 below:

Table 1.9: Unique to Alternative 4 Drainage Improvements

No.	Approximate Station	Location	Proposed Work
1	340' LT of 220+40[1]	Intersection at southbound I-5 On-ramp from Avenida De la Carlota and El Toro Rd	Remove/replace inlet and add reinforced concrete pipe extension
2	207+50 to 213+30	Southbound I-5 shoulder/edge of travel way	Eleven drainage systems in this location with the following work: Remove/replace inlet and add reinforced concrete pipe extension
3	199+00	Southbound I-5 shoulder/edge of travel way	Remove/replace inlet and add reinforced concrete pipe extension
4	188+00	Southbound I-5 shoulder/edge of travel way	Remove/replace inlet and add reinforced concrete pipe extension
5	150' LT of 217+50 to 219+40	Southbound I-5 on-ramp from eastbound El Toro Rd.	Six drainage systems in this location with the following work: Remove/replace inlet and add reinforced concrete pipe extension
6	24+00 to 33+00	Southbound I-5 along Avenida De La Carlota	Add new reinforced concrete pipe inlet, remove/replace inlet, remove/replace catch basin
7	239+00	Northbound I-5 on-ramp from Bridger Road	Remove/replace inlet and add reinforced concrete pipe extension
8	300' LT of 206+05[1]	Southbound I-5 at new Avenida De Carlota Alignment	Replace Inlet
9	340' LT of 210+10[1]	New southbound I-5 off-ramp to Avenida De Carlota	New pipe and new inlet
10	370' LT of 209+00[1]	New southbound I-5 on-ramp from Avenida De La Carlota	New pipe and new inlet

[1] Approximate station location is with reference to the mainline station.

Structures

El Toro Road Undercrossing (Bridge No. 55-0235R/L) - Structure Widening:
This widening is needed to accommodate the Collector-Distributor Road.

Retaining Walls

Proposed retaining wall locations, lengths, and maximum heights for Alternative 4 would be as follows:

- Northbound I-5 between On-ramp and mainline, Rt (100 feet in length, maximum height of 8 feet)
- Northbound I-5 On-Ramp, Rt 1 (1,234 feet in length, maximum height of 12 feet), combined with soundwall, but the soundwall height is not included here
- Northbound I-5 On-Ramp, Rt 2 (688 feet in length, maximum height of 6 feet), combined with soundwall, but the soundwall height is not included here
- Southbound Collector-Distributor road to southbound I-5, Lt 1 (210 feet in length, maximum height of 10 feet)
- Southbound Collector-Distributor road to southbound I-5, Lt 2 (227 feet in length, maximum height of 8 feet)
- Along southbound Collector-Distributor road, Lt 1 (877 feet in length, maximum height of 12 feet)
- Southbound I-5 Hook On-Ramp 1, Lt (487 feet in length, maximum height of 10 feet)
- Southbound I-5 Hook Off-Ramp 1, Lt (271 feet in length, maximum height 10 feet)
- Along southbound Collector-Distributor road, Lt 2 (508 feet in length, maximum height of 18 feet)
- Southbound I-5 Hook On-Ramp 2, Lt (486 feet in length, maximum height of 18 feet)
- Southbound I-5 Hook Off-Ramp 2, Lt (397 feet in length, maximum height of 4 feet)
- Along southbound Collector-Distributor road, Lt 3 (666 feet in length, maximum height of 4 feet)

Right-of-Way Acquisitions

Right-of-way acquisitions (both full and partial) as well as TCEs that are unique for Alternative 4 are shown in Table 1.10 below.

Table 1.10: Unique Alternative 4 Right-of-Way Acquisitions

Alternative 4				
Assessor's Parcel Number	**Land Use Designations**	**Full Acquisition (sq. ft)**	**Partial Acquisition (sq. ft)**	**TCE**
Non-Residential				
617-053-05	Commercial		380	1060
617-053-10	Commercial		1325	2625
617-053-03	Commercial		235	765
617-185-07	Community Park/Open Space		29185	78205
617-185-08	Cavanaugh Mini Park Playground		6760	1860
621-051-34	Village Commercial[1]		23390	4320
621-051-35	Village Commercial		191410	11890
621-051-33	Village Commercial		13310	2590
621-051-29	Village Commercial		18350	3840
621-051-25	Village Commercial		1730	1200
620-491-15	Village Commercial		4850	1185
620-491-23	Village Commercial		11745	4140
620-491-16	Village Commercial		4720	1650
620-491-17	Village Commercial		1945	1265
620-491-25	Village Commercial			1695
620-491-26	Village Commercial		2170	1360
620-492-01	Village Commercial		3765	4195
616-022-04	Village Commercial		775	1045
616-022-03	Village Commercial		1775	3340
616-032-08	Village Commercial		3090	3385
621-052-02	Village Commercial	40740		

[1] Village Commercial land use designation intends to establish a community core where commercial, civic, and high-density residential uses would be appropriate. The area will contain enhanced pedestrian areas that conveniently link commercial, residential, and civic activity areas. Typical uses include those associated with large regional malls, as well as medical center, financial institutions, institutional and government uses, automobile-related services, community facilities, professional offices, and high-density residential uses (Source: City of Laguna Hills, General Plan Land Use Map, March 2015 (accessed January 10, 2019).

N/A = not applicable
sq ft = square feet
TCE = temporary construction easement

Design Exceptions:

The following Non-Delegated Design Features unique to Alternative 4 would include Weaving Sections. The following District Delegated Design Features unique to Alternative 4 would include Superelevation of Compound Curves, Compound Curves, and Standards for Grade. For details, refer to Appendix I.

1.4.1.4 Alternative 4 - Design Option B

Design Option B proposes improvements for the northbound I-5 on-ramp from El Toro Road. The existing northbound I-5 on-ramp from westbound El Toro Road would be removed and replaced with a proposed on-ramp from Bridger Road; therefore, a new alignment of the northbound I-5 on-ramp from Bridger Road would be required. Bridger Road would be reconstructed to accommodate the proposed

northbound I-5 on-ramp, and a continuous-median left-turn lane would be proposed to provide access to local businesses from Bridger Road. Table 1.11 consists of the only differences between Alternative 4 and Alternative 4 Option B. All other right-of-way requirements and design exceptions are the same as Alternative 4.

Table 1.11: Alternative 4 Design Option B Right-of-Way Acquisitions (in sq ft)

Alternative 4 Option B				
Parcel No.	**Land Use Designations**	**Full Take**	**Partial Take**	**TCE**
Non-Residential				
617-185-07	Community Park/Open Space		45040	78160
617-185-08	Cavanaugh Park Playground		13750	
616-033-05[1]	Commercial			

[1] No acquisitions will take place for this parcel under Alternative 4 Option B
sq ft = square feet
TCE = temporary construction easement

1.4.1.5 Project Costs

The funding for the Build Alternatives are from M2, Regional Surface Transportation Program, and State Transportation Improvement Program funds and is funded through Project Approval and Environmental Document (PA&ED) and Design phases. The roadway, structure, right-of-way, and total capital costs are described below in Table 1.12.

Table 1.12: Summary of Costs

Build Alternatives	Roadway Items	Structure Items	Right-of-Way Cost	Total Capital Outlay[1]
Build Alternative 2	$48,128,400	$17,350,744	$74,908,000	$140,388,000
Build Alternative 4	$61,462,600	$2,776,761	$141,135,000	$205,375,000
Build Alternative 4 (with Option B)	$60,725,100	$2,776,761	$132,682,000	$196,184,000

Source: California Department of Transportation (March 2019).
[1] Total Capital Outlay Cost are rounded up

1.4.2 Project and Construction Schedule

Design of the Build Alternatives is anticipated to be completed in 2027. Construction is anticipated to take approximately 3 years for Alternative 2, and 2.5 years for Alternative 4, with opening year estimated to be 2030. The proposed work may require long-term (approximately more than 10 days at a time) partial closures of travel lanes. Partial closures would leave one travel lane open for use in both northbound and southbound directions of travel. A Preliminary TMP was prepared in 2018 (Appendix J) for the Build Alternatives (including Design Option B) and will be finalized during the design phase. As outlined in Deputy Directive 60-R-2, this TMP

is a living document, subject to change as required by changing circumstances. If there is material change to the project scope that would affect the function or adequacy of the TMP, then changes to the TMP must be addressed. If traffic conditions within or adjacent to the project limits demonstrate that TMP elements need to be adjusted to adequately address congestion, then the TMP will be altered accordingly. This TMP is included as a Project Feature (PF-TRA-1; refer to Section 2.4, Traffic and Transportation/Pedestrian and Bicycle Facilities, for further information) to help facilitate traffic movement during the construction phase.

1.4.2.1 Construction Staging

Due to the complexity and uniqueness of the two Build Alternatives (including Design Option B), they would be constructed in varying stages as discussed below. TCEs would be needed within the interchange reconstruction limits. Staging for the proposed construction work would be located within these TCEs. Specific staging locations as well as fill-and-borrow sites will be determined by the construction contractor during the construction phase, but all locations would remain within the project limits. There are no long-term full closures of ramps or the freeway; however, throughout the construction phase, most closures would be partial and temporary, with some weekend closures.

Alternative 2 is proposed to be constructed in five preliminary stages as discussed below:

- Stage 1 would involve:
  a. Constructing a new retaining wall with a soundwall, including necessary on-ramp facilities along the northbound tangent ramp through Cavanaugh Mini Park
  b. Realigning Avenida De La Carlota
  c. A new retaining wall would be constructed north of the existing southbound I-5 off ramp.
- Stage 2 would involve restriping the northbound and southbound I-5 to construct the center column of the new off-ramp bridge.
- Stage 3 would involve:
  a. Restriping the northbound and southbound I-5 towards the median
  b. Construction of bridge abutments and exterior columns would begin on both northbound and southbound I-5 shoulders
  c. Construction of new retaining walls and related facilities along the southbound I-5 shoulder north of the existing southbound off-ramp and along Bridger Road
  d. Construction of the new northbound on-ramp
- State 4 would consist of constructing the new off-ramp bridge superstructure.
- Stage 5 involves:

a. Minor modifications to the southbound El Toro Road off-ramp

b. Minor improvements to the local city streets

c. A new northbound on-ramp via Bridger Road and a new southbound El Toro Road off-ramp structure would be constructed

Alternative 4 is proposed to be constructed in three preliminary stages as discussed below:

- Stage 1 would involve the construction of :
  a. A new alignment of Avenida De La Carlota south of El Toro Road, including proposed southbound on and off hook ramp terminus.

  b. The construction of southbound I-5/El Toro Road undercrossing structure columns and abutments.

  c. Temporary railing (type K) installation along southbound mainline shoulder.

  d. Southbound I-5/El Toro Road hook ramp restriping for lane reduction and reduced capacity.

  e. The construction of a new retaining wall with soundwall, including necessary on ramp facilities, along the northbound ramp through Cavanaugh Mini Park, starting near the cul-de-sac on Bridger Road going north to the project limit.

- Stage 2 would involve:
  a. Continuation of the construction of southbound I-5/El Toro Road undercrossing structure.

  b. Construction of southbound I-5/El Toro Road hook on-ramp widening north and south of El Toro Road, including portions of proposed retaining wall south of the bridge towards the existing southbound I-5 tangent ramp.

  c. Construction of the remainder of the new southbound hook on-ramp, southbound mainline I-5 widening south of the proposed hook ramp, and city street improvements, including retaining walls and related facilities,

  d. Construction of tie-in between the existing northbound I-5 ramp and new on-ramp alignment via a 55-hour closure and place traffic onto new ramp facility.

- Stage 3 would involve:
  a. Completion of the I-5/El Toro Road undercrossing bridge widening, existing southbound hook ramp widening and pavement sections south of the bridge constructed in Stage 2.

  b. Placing traffic onto the new alignment of the existing southbound hook ramp north of El Toro Road via bridge widening and merging into existing freeway lanes south of the bridge.

c. Construction of the remainder of the proposed southbound hook off-ramp retaining walls and pavement section south of El Toro Road.

d. Construction of the remainder of southbound mainline pavement widening near the proposed on and off hook ramps.

e. Construction of the remainder of southbound mainline widening north of I-5/El Toro Road southbound hook on-ramp.

1.4.3 No Build Alternative

The No Build Alternative proposes no action, where no construction or improvements would be made to the I-5/El Toro Road Interchange apart from proposed projects that are under development or concurrently in construction as discussed in Section 2.15, Table 2.15.1, Cumulative Impacts. The No Build Alternative (2030 and 2050 conditions) would leave the interchange in the planned configuration as proposed as part of the I-5 Widening Project (EA 0K020_).

This alternative provides a baseline for comparison of environmental impacts under the Build Alternative. For the purposes of this document, the baseline conditions for CEQA and NEPA are different. For CEQA Analysis, baseline (e.g., existing 2017) conditions are compared to future conditions (Opening Year [2030] and Design Year [2050]. For purposes of NEPA Analysis, the No Build/baseline conditions (2030 and 2050) are compared to Build (2030 and 2050) conditions.

The I-5 Widening Project is currently in the design phase, and construction is planned to be completed in 2024; hence, it was considered for NEPA baseline conditions. The I-5 Widening Project proposes to add GP lanes in each direction on I-5 between Avery Parkway and Alicia Parkway and extend the second HOV lane from Alicia Parkway to El Toro Road. The I-5 Widening Project limits on I-5 extend from 0.5 mile south of the SR 73 interchange (PM 12.4) to 0.2 mile north of the El Toro Road Undercrossing (PM 18.9) The I-5 Widening Project would reestablish existing auxiliary lanes and construct new auxiliary lanes, and improve several existing on- and off-ramps. Additionally, the project proposes no HOV buffer, which would accommodate continuous access to the HOV lanes throughout the project limits (approximately 6 miles). This I-5 Widening Project is anticipated to relieve some of the on-ramp congestion throughout the project limits during peak periods by adding capacity to the mainline. However, it will also increase traffic demands to the interchange off-ramps, by improving mainline traffic flow and reducing travel times to the interchange.

The No Build Alternative would not address the issues and deficiencies within the project limits. Therefore, this alternative would not meet the proposed project's Purpose and Need.

1.4.4 Comparison of Alternatives

Table 1.13 compares and contrasts the attributes of the two Build Alternatives (including Design Option B) against each other, as well as to the No Build Alternative. After the public circulation period, all comments will be considered, and Caltrans will decide whether or not to implement one of the Build Alternatives and make the final determination of the project's effect on the environment. Under CEQA,

if no unmitigable significant adverse impacts are identified, Caltrans will prepare a Mitigated Negative Declaration. Similarly, if Caltrans, as assigned by the FHWA, determines the NEPA action does not significantly impact the environment, Caltrans will issue a Finding of No Significant Impact.

1.4.5 Alternatives Considered but Eliminated from Further Discussion

Several build alternatives were considered during the project development phase, but were eliminated from detailed environmental review. Two were carried further into the Project Approval Environmental Document (PA&ED (Environmental) Phase and were evaluated as part of the technical studies but were later eliminated and are discussed below. The following discussion describes all the alternatives that were considered, but eliminated.

1.4.5.1 Alternatives Considered but Eliminated During Project Approval & Environmental Documentation (Environmental Phase)

Alternatives 1 and 3 were eliminated during the environmental phase subsequent to the preparation of the technical studies for the reasons as discussed below.

Alternative 1: Intersection Modification (including Design Option A)

Alternative 1 proposed a new “L” type intersection where the existing southbound I-5 hook off-ramps meet Avenida De La Carlota and Paseo de Valencia, and a new northbound I-5 on-ramp from Bridger Road. The existing I-5 southbound hook ramp to Avenida De La Carlota would have been realigned to a loop ramp that would have intersected El Toro Road. The existing northbound I-5 on-ramp from westbound El Toro Road would have been removed and replaced with a proposed on-ramp from Bridger Road; therefore, a new alignment of the northbound I-5 on-ramp from Bridger Road would have been required. Bridger Road would have been reconstructed to accommodate the proposed northbound I-5 on-ramp, and a continuous-median left-turn lane was proposed to provide access to local businesses from Bridger Road. A portion of Avenida De La Carlota would also have been reconstructed. Design Option A proposed improvements on the northbound I-5 on-ramp from El Toro Road. The existing northbound I-5 on-ramp from westbound El Toro Road would have been modified to extend further before connecting to I-5. A portion of Bridger Road would have been reconstructed to accommodate modifications to this on-ramp.

Table 1.13 Summary of Impacts

Resource Impacts	No Build Alternative	Build Alternative 2	Build Alternative 4	Build Alternative 4 with Design Option B
Land Use	**Land Use Conversion** No impacts **Land Use Consistency** No impacts **Coastal Zone** No impacts **Parks and Recreational Effects and Section 4(f) Use** No impacts	**Land Use Conversion** No Temporary Impacts *Permanent Impacts* Permanent conversion of existing and planned land uses to transportation uses to accommodate the proposed improvements. Build Alternative 2 would result in permanent impacts to the use of 0.04 ac of an existing education facility, 0.03 ac of existing general office uses, 1.48 ac of existing local parks and recreational uses, and 0.07 ac of existing commercial services. In addition, as shown in Table 2.1.4, Alternative 2 would result in the conversion of 4.10 ac of land planned for commercial uses, 2.25 ac of land planned for recreational/open space uses, and 0.01 ac of land planned for residential uses into transportation uses, as identified in local General Plans. The areas subject to be fully or partially acquired under Build Alternative 2 are generally for construction of the new northbound I-5 on-ramp, the new southbound I-5 off-ramp and a local sidewalk. **Land Use Consistency** *Temporary Impacts*	**Land Use Conversion** No Temporary Impacts *Permanent Impacts* Permanent conversion of existing and planned land uses to transportation uses to accommodate the proposed improvements. Build Alternative 4 would result in permanent impacts to the use of 0.06 ac of an existing education facility, 0.02 ac of existing general office uses, 0.71 ac of existing local parks and recreational uses, 0.09 ac of existing mixed urban use, 5.33 ac of existing regional shopping center, and 1.28 ac of existing retail stores and commercial services. In addition, Alternative 4 would result in the conversion of 13.22 ac of land planned for commercial uses and 1.34 ac of land planned for recreational/open space uses, as identified in local General Plans. The areas subject to be fully or partially acquired for the Build Alternative 4 are generally for construction of the new northbound and southbound I-5 on- and off-ramp improvements and a local sidewalk. **Land Use Consistency** *Temporary Impacts*	**Land Use Conversion** No Temporary Impacts *Permanent Impacts* Permanent conversion of existing and planned land uses to transportation uses to accommodate the proposed improvements. Design Option B would result in permanent impacts to the use of 0.06 ac of an existing education facility, 0.02 ac of existing general office uses, 1.47 ac of existing local parks and recreational uses, 0.09 ac of existing mixed urban use, 5.33 ac of an existing regional shopping center, 1.20 ac of existing retail stores and commercial services, and 0.01 ac of existing transportation uses. In addition, this design option would result in the conversion of 13.99 ac of land planned for commercial uses, 2.11 ac of land planned for recreational/open space uses, and 0.01 ac of land planned for residential uses as identified in local General Plans. The areas subject to be fully or partially acquired for Design Option B are generally for construction of the new northbound I-5 on-ramp. **Land Use Consistency** *Temporary Impacts*

Table 1.13 Summary of Impacts

Resource Impacts	No Build Alternative	Build Alternative 2	Build Alternative 4	Build Alternative 4 with Design Option B
		The construction of Build Alternative 2 would not result in any temporary inconsistencies with State, regional, or local plans and policies. *Permanent Impacts* General Plan Amendments would be required as a result of the incorporation of non-transportation General Plan-designated land into the I-5 facility to ensure consistency with land uses as designated in the local General Plans. However, Build Alternative 2 is consistent with the purpose and need of the proposed project and there are minor inconsistencies with the goals, policies, and objectives identified in the General Plan of the City of Lake Forest. **Coastal Zone** No impacts **Wild and Scenic Rivers** No Impacts **Farmland/Timberland** No Impacts **Parks and Recreational Effects and Section 4(f) Use** *Temporary Impacts*	The construction of Build Alternative 4 would not result in any temporary inconsistencies with State, regional, or local plans and policies. *Permanent Impacts* Minor General Plan Amendments would be required as a result of the incorporation of non-transportation General Plan-designated land into the I-5 facility to ensure consistency with land uses as designated in the local General Plans. However, Build Alternative 2 is consistent with the purpose and need of the proposed project and there are minor inconsistencies with the goals, policies, and objectives identified in the General Plans of the City of Lake Forest. **Coastal Zone** No impacts **Wild and Scenic Rivers** No Impacts **Farmland/Timberland** No Impacts **Parks and Recreational Effects and Section 4(f) Use** *Temporary Impacts*	The construction of Build Alternative 4 with Design Option B would not result in any temporary inconsistencies with State, regional, or local plans and policies. *Permanent Impacts* Minor General Plan Amendments would be required as a result of the incorporation of non-transportation General Plan-designated land into the I-5 facility to ensure consistency with land uses as designated in the local General Plans. However, Build Alternative 2 is consistent with the purpose and need of the proposed project and there are minor inconsistencies with the goals, policies, and objectives identified in the General Plans of the City of Lake Forest. **Coastal Zone** No impacts **Wild and Scenic Rivers** No Impacts **Farmland/Timberland** No Impacts **Parks and Recreational Effects and Section 4(f) Use** *Temporary Impacts*

Table 1.13 Summary of Impacts

Resource Impacts	No Build Alternative	Build Alternative 2	Build Alternative 4	Build Alternative 4 with Design Option B
		Build Alternative 2 would not require any TCE from Cavanaugh Mini Park, but would require 1.79 ac of the adjoining open space; *Permanent Impacts* Build Alternative 2 would acquire 0.32 ac from Cavanaugh Mini Park and 1.03 ac from the adjoining open space.	Build Alternative 4 would require 0.04 ac of Cavanaugh Mini Park, which is identified as APNs 617-185-07 and 617-185-08. In addition, Build Alternative 4 will require 1.80 ac of the adjoining open space. *Permanent Impacts* Build Alternative 4 would acquire 0.16 ac and 1.38 ac from the adjoining open space.	Design Option B would not require any TCE from Cavanaugh Mini Park, but will require 1.79 ac of the adjoining open space. *Permanent Impacts* Design Option B would acquire 0.32 ac from Cavanaugh Mini Park and 1.03 ac from the adjoining open space.

Table 1.13 Summary of Impacts

Resource Impacts	No Build Alternative	Build Alternative 2	Build Alternative 4	Build Alternative 4 with Design Option B
Community Impacts	**Growth** No Impacts **Community Character and Cohesion** No Impacts. No permanent impacts **Relocations and Real Property Acquisition** No Impacts **Environmental Justice** No Impacts	**Growth** No Impacts **Community Character and Cohesion** *Temporary Impacts* • Temporary construction-related impacts • Temporary construction-related impacts to local streets, including pedestrian and bicycle facilities associated with those same local streets. *Permanent Impacts* • Permanent 32 ft high flyover structure • Parkland acquisition **Relocations** 14 business parcels and 9 utilities relocated **Environmental Justice** No disproportionate Impacts	**Growth** No Impacts **Community Character and Cohesion** *Temporary Impacts* • Temporary construction-related impacts • Temporary construction-related impacts to local streets, including pedestrian and bicycle facilities associated with those same local streets. *Permanent Impacts* • Parkland acquisition **Relocations** 22 business parcels and 32 utilities relocated, including 66kV SCE power line. **Environmental Justice** No disproportionate Impacts	**Growth** No Impacts **Community Character and Cohesion** *Temporary Impacts* • Temporary construction-related impacts • Temporary construction-related impacts to local streets, including pedestrian and bicycle facilities associated with those same local streets. *Permanent Impacts* • Parkland acquisition **Relocations** 15 business parcels and 32 utilities relocated, including 66kV SCE power line. **Environmental Justice** No disproportionate Impacts

Table 1.13 Summary of Impacts

Resource Impacts	No Build Alternative	Build Alternative 2	Build Alternative 4	Build Alternative 4 with Design Option B
Utilities and Emergency Services	**Utilities** No impacts **Emergency Services** No impacts	**Utilities** *Temporary Impacts* Temporary service disruptions could occur. *Permanent Impacts* No impacts. **Emergency Services** *Temporary Impacts* Delay in response time for emergency services. *Permanent Impacts* Build Alternative 2 would not result in permanent adverse effects on utility facilities and providers and may actually benefit emergency service providers by reducing congestion at the interchange.	**Utilities** *Temporary Impacts* Temporary service disruptions could occur. *Permanent Impacts* No impacts. **Emergency Services** *Temporary Impacts* Delay in response time for emergency services. *Permanent Impacts* Build Alternative 4 would not result in permanent adverse effects on utility facilities and providers and may actually benefit emergency service providers by reducing congestion at the interchange.	**Utilities** *Temporary Impacts* Temporary service disruptions could occur. *Permanent Impacts* No impacts. **Emergency Services** *Temporary Impacts* Delay in response time for emergency services. *Permanent Impacts* Design Option B would not result in permanent adverse effects on utility facilities and providers and may actually benefit emergency service providers by reducing congestion at the interchange.
Traffic and Transportation	*Temporary Impacts* No impacts *Permanent Impacts* Long-term negative congestion impact	*Temporary Impacts* Detours and short-term full and partial closures are expected to result in some delays to the traveling public. *Permanent Impacts* Build Alternative 2 would improve traffic operations and reduced congestion in the long term.	*Temporary Impacts* Detours and short-term full and partial closures are expected to result in some delays to the traveling public. *Permanent Impacts* Build Alternative 4 would improve traffic operations and reduced congestion in the long term.	*Temporary Impacts* Detours and short-term full and partial closures are expected to result in some delays to the traveling public. *Permanent Impacts* Design Option B would improve traffic operations and reduced congestion in the long term.

Visual and Aesthetics	No impacts	*Temporary Impacts* • Sensitive viewers, including view of construction-related vehicle access and staging of construction materials within Caltrans and City ROW and disturbed or developed areas. • Temporary exposure to construction debris, equipment, and truck traffic. • Construction vehicle access and staging of construction materials would be visible from motorists traveling along the project limits as well as surrounding areas. • Nighttime construction lighting could potentially result in impacts to nearby residents and motorists traveling along the project limits. *Permanent Impacts* Increase in hardscape in the project limits visible to surrounding commercial and civic uses, residential uses, recreational uses (i.e., Cavanaugh Mini Park and the existing open space area along Gowdy Avenue), I-5 motorists, and local roadway travelers.	*Temporary Impacts* • Sensitive viewers, including view of construction-related vehicle access and staging of construction materials within Caltrans and City ROW and disturbed or developed areas. • Temporary exposure to construction debris, equipment, and truck traffic. • Construction vehicle access and staging of construction materials would be visible from motorists traveling along the project limits as well as surrounding areas. • Nighttime construction lighting could potentially result in impacts to nearby residents and motorists traveling along the project limits. *Permanent Impacts* Increase in hardscape in the project limits visible to surrounding commercial and civic uses, residential uses, recreational uses (i.e., Cavanaugh Mini Park and the existing open space area along Gowdy Avenue), I-5 motorists, and local roadway travelers.	*Temporary Impacts* • Sensitive viewers, including view of construction-related vehicle access and staging of construction materials within Caltrans and City ROW and disturbed or developed areas. • Temporary exposure to construction debris, equipment, and truck traffic. • Construction vehicle access and staging of construction materials would be visible from motorists traveling along the project limits as well as surrounding areas. • Nighttime construction lighting could potentially result in impacts to nearby residents and motorists traveling along the project limits. *Permanent Impacts* Increase in hardscape in the project limits visible to surrounding commercial and civic uses, residential uses, recreational uses (i.e., Cavanaugh Mini Park and the existing open space area along Gowdy Avenue), I-5 motorists, and local roadway travelers.

Table 1.13 Summary of Impacts

Resource Impacts	No Build Alternative	Build Alternative 2	Build Alternative 4	Build Alternative 4 with Design Option B
Cultural Resources	No impacts	*Temporary Impacts* Not applicable Permanent Impacts • No impacts to known archaeological or historic resources • Potential for impacts to previously unknown buried cultural materials or human remains	*Temporary Impacts* Not applicable Permanent Impacts • No impacts to known archaeological or historic resources • Potential for impacts to previously unknown buried cultural materials or human remains	*Temporary Impacts* Not applicable Permanent Impacts • No impacts to known archaeological or historic resources • Potential for impacts to previously unknown buried cultural materials or human remains
Water Quality and Stormwater Runoff	No impacts	*Temporary Impacts* • Temporary impacts to water quality anticipated during construction include soil-disturbing activities. Disturbed soil area (DSA) for this alternative is 9.79 ac. • Temporary impacts generated from materials and wastes associated with construction of Build Alternative 2. • It is not anticipated that the project would encounter groundwater during the construction, but if groundwater is encountered/ extracted for the construction of structures, the discharge must comply with General	*Temporary Impacts* • Temporary impacts to water quality anticipated during construction include soil-disturbing activities. DSA for this alternative is approximately 17.48 ac. • Temporary impacts generated from materials and wastes associated with construction of Alternative 4. • It is not anticipated that the project would encounter groundwater during the construction, but if groundwater is encountered/ extracted for the construction of structures, the discharge must comply with General	*Temporary Impacts* • Temporary impacts to water quality anticipated during construction include soil-disturbing activities. DSA for this option is the same for alternative 4. • Temporary impacts generated from materials and wastes associated with construction of Build Alternative 4 with Design Option B. • It is not anticipated that the project would encounter groundwater during the construction, but if groundwater is encountered/ extracted for the construction of structures, the discharge must comply with General WDRs from the San Diego RWQCB.

Table 1.13 Summary of Impacts

Resource Impacts	No Build Alternative	Build Alternative 2	Build Alternative 4	Build Alternative 4 with Design Option B
		WDRs from the San Diego RWQCB. *Permanent Impacts* • The increase in impervious surface will also result in long-term impacts that involve alteration in drainage patterns on the roadways as well as long-term discharges of pollutants typically generated by the operation of a transportation facility. Pollutants typically generated during the operation of a transportation facility include sediment/ turbidity, nutrients, trash and debris, bacteria and viruses, oxygen-demanding substances, organic compounds, oil and grease, pesticides and metals. • Potential impacts from potential pollutant sources, such as erosion from the improvements under Build Alternative 2.	WDRs from the San Diego RWQCB. *Permanent Impacts* • The increase in impervious surface will also result in long-term impacts that involve alteration in drainage patterns on the roadways as well as long-term discharges of pollutants typically generated by the operation of a transportation facility. Pollutants typically generated during the operation of a transportation facility include sediment/ turbidity, nutrients, trash and debris, bacteria and viruses, oxygen-demanding substances, organic compounds, oil and grease, pesticides and metals. • Potential impacts from potential pollutant sources, such as erosion from the improvements under Build Alternative 4.	*Permanent Impacts* • The increase in impervious surface will also result in long-term impacts that involve alteration in drainage patterns on the roadways as well as long-term discharges of pollutants typically generated by the operation of a transportation facility. Pollutants typically generated during the operation of a transportation facility include sediment/ turbidity, nutrients, trash and debris, bacteria and viruses, oxygen-demanding substances, organic compounds, oil and grease, pesticides and metals. • Potential impacts from potential pollutant sources, such as erosion from the improvements under Build Alternative 4 with Design Option B.

Table 1.13 Summary of Impacts

Resource Impacts	No Build Alternative	Build Alternative 2	Build Alternative 4	Build Alternative 4 with Design Option B
Geology/Soils/Seismic /Topography	No impacts	*Temporary Impacts* Soil erosion and siltation result from earth work activities *Permanent Impacts* Unsubstantial potential impacts of liquefaction and seismically induced settlement.	*Temporary Impacts* Soil erosion and siltation result from earth work activities *Permanent Impacts* Unsubstantial potential impacts of liquefaction and seismically induced settlement.	*Temporary Impacts* Soil erosion and siltation result from earth work activities *Permanent Impacts* Unsubstantial potential impacts of liquefaction and seismically induced settlement.
Paleontology	No impacts	*Temporary Impacts* Not applicable. *Permanent Impacts* Potential to impact sensitive paleontological resources.[1]	*Temporary Impacts* Not applicable. *Permanent Impacts* Potential to impact sensitive paleontological resources.[1]	*Temporary Impacts* Not applicable. *Permanent Impacts* Potential to impact sensitive paleontological resources.[1]
Hazardous Wastes and Materials	No impacts	*Temporary Impacts* • Build Alternative 2 would involve the disturbance of potentially contaminated soil and/or groundwater at APN 616-032-02 (Chevron Gasoline Station), 23891 Bridger Rd, Lake Forest, full acquisition. • Potential to encounter aerially deposited lead (ADL) at unpaved areas. • Potential to disturb the existing bridges and structures that contain asbestos-containing materials (ACMs) and Lead Based Paint (LBP).	*Temporary Impacts* • Build Alternative 4 would involve the disturbance of potentially contaminated soil and/or groundwater at APN 621-052-02 (Former Arco Gasoline Station), 24012 Avenida De La Carlota, Laguna Hills, full acquisition; and APN 621-051-35 (Firestone Complete Auto Care), 24196 Laguna Hills Mall, Laguna Hills, partial acquisition. • Potential to encounter ADL at unpaved areas. • Potential to disturb the existing bridges and	*Temporary Impacts* • Design Option B would involve the disturbance of potentially contaminated soil and/or groundwater at APN 621-052-02 (Former Arco Gasoline Station), 24012 Avenida De La Carlota, Laguna Hills, full acquisition; and APN 621-051-35 (Firestone Complete Auto Care), 24196 Laguna Hills Mall, Laguna Hills, partial acquisition. • Potential to encounter ADL at unpaved areas.

[1] This impact is less than significant with mitigation under CEQA.

Table 1.13 Summary of Impacts

Resource Impacts	No Build Alternative	Build Alternative 2	Build Alternative 4	Build Alternative 4 with Design Option B
		• Potential to remove yellow traffic striping and pavement-marking materials (paint, thermoplastic, permanent tape, and temporary tape) that may contain an elevated concentration of metals such as lead. • Dewatering may be required as part of the excavating the footing for the pile driving for the proposed bridge structure and/or of excavation at the potential property acquisitions with hazardous waste concern at APN 616-032-02 and offsite of this property. • Potential polychlorinated biphenyl (PCB) hazard from any leaking transformers and/or electrical equipment within the Study Area. • Potential to encounter unknown hazardous waste during construction. *Permanent Impacts* No impacts other than routine use of hazardous materials associated with maintenance of a transportation facility.	structures that contain ACMs and LBP. • Potential to remove yellow traffic striping and pavement-marking materials (paint, thermoplastic, permanent tape, and temporary tape) that may contain an elevated concentration of metals such as lead. • Dewatering may be required as part of the excavating the footing for the pile driving for the proposed bridge structure and/or of excavation at the potential property acquisitions with hazardous waste concern at APNs 621-052-02 and 621-051-35 and offsite of this property. • Potential PCB hazard from any leaking transformers and/or electrical equipment within the Study Area. • Potential to encounter unknown hazardous waste during construction. *Permanent Impacts* No impacts other than routine use of hazardous materials associated with maintenance of a transportation facility.	• Potential to disturb the existing bridges and structures that contain ACMs and LBP. • Potential to remove yellow traffic striping and pavement-marking materials (paint, thermoplastic, permanent tape, and temporary tape) that may contain an elevated concentration of metals such as lead. • Dewatering may be required as part of the excavating the footing for the pile driving for the proposed bridge structure and/or of excavation at the potential property acquisitions with hazardous waste concern at APNs 621-052-02 and 621-051-35 and offsite of this property. • Potential PCB hazard from any leaking transformers and/or electrical equipment within the Study Area. • Potential to encounter unknown hazardous waste during construction. *Permanent Impacts* No impacts other than routine use of hazardous materials associated with maintenance of a transportation facility.

Table 1.13 Summary of Impacts

Resource Impacts	No Build Alternative	Build Alternative 2	Build Alternative 4	Build Alternative 4 with Design Option B
Air Quality	No impacts	*Temporary Impacts* Short-term degradation of air quality may occur due to the release of particulate emissions generated by excavation, grading, hauling, and other construction activities. *Permanent Impacts* No new regional vehicular emission impacts.	*Temporary Impacts* Short-term degradation of air quality may occur due to the release of particulate emissions generated by excavation, grading, hauling, and other construction activities. *Permanent Impacts* No new regional vehicular emission impacts.	*Temporary Impacts* Short-term degradation of air quality may occur due to the release of particulate emissions generated by excavation, grading, hauling, and other construction activities. *Permanent Impacts* No new regional vehicular emission impacts.
Noise	No impacts	*Temporary Impacts* Noise from construction activities may intermittently dominate the noise environment in the immediate area of construction. However, construction noise would be short term, intermittent, and overshadowed by local traffic noise. *Permanent Impacts* Long-term noise associated with operation of Build Alternative 2 would be solely from traffic noise.	*Temporary Impacts* Noise from construction activities may intermittently dominate the noise environment in the immediate area of construction. However, construction noise would be short term, intermittent, and overshadowed by local traffic noise. *Permanent Impacts* Long-term noise associated with operation of Build Alternative 4 would be solely from traffic noise.	*Temporary Impacts* Noise from construction activities may intermittently dominate the noise environment in the immediate area of construction. However, construction noise would be short-term, intermittent, and overshadowed by local traffic noise. *Permanent Impacts* Long-term noise associated with operation of Design Option B would be solely from traffic noise.
Animal Species	No impacts	*Temporary Impacts* Build Alternative 2 would require tree and/or vegetation removal within the project limits, which could impact nesting and foraging habitat for Cooper's hawk and white-tailed kite. Construction activities that generate louder-than-normal noises or vibrations may disrupt breeding and/or foraging behaviors.	*Temporary Impacts* Build Alternative 4 would require tree and/or vegetation removal within the project limits, which could impact nesting and foraging habitat for Cooper's hawk and white-tailed kite. Construction activities that generate louder-than-normal noises or vibrations may disrupt breeding and/or foraging behaviors.	*Temporary Impacts* Build Alternative 4 with Design Option B will require tree and/or vegetation removal within the project limits, which could impact nesting and foraging habitat for Cooper's hawk and white-tailed kite. Construction activities that generate louder-than-normal noises or vibrations may disrupt breeding and/or foraging behaviors.

Table 1.13 Summary of Impacts

Resource Impacts	No Build Alternative	Build Alternative 2	Build Alternative 4	Build Alternative 4 with Design Option B
		Permanent Impacts No Impacts	*Permanent Impacts* No Impacts	*Permanent Impacts* No Impacts
Invasive Species	No impacts	*Temporary Impacts* During construction activities, grubbing and clearing of vegetation and soil may contain invasive plants or seeds. Equipment that comes in from other sites may also carry invasive plant material, which could spread into the construction site and be spread into adjacent areas through wind, water, or animal dispersal. *Permanent Impacts* There is the potential for Build Alternative 2 to inadvertently introduce additional invasive species into the corridor by seeds being transported by vehicles or through the use of invasive during landscaping.	*Temporary Impacts* During construction activities, grubbing and clearing of vegetation and soil may contain invasive plants or seeds. Equipment that comes in from other sites may also carry invasive plant material, which could spread into the construction site and be spread into adjacent areas through wind, water, or animal dispersal. *Permanent Impacts* There is the potential for Build Alternative 4 to inadvertently introduce additional invasive species into the corridor by seeds being transported by vehicles or through the use of invasive during landscaping.	*Temporary Impacts* During construction activities, grubbing and clearing of vegetation and soil may contain invasive plants or seeds. Equipment that comes in from other sites may also carry invasive plant material, which could spread into the construction site and be spread into adjacent areas through wind, water, or animal dispersal. *Permanent Impacts* There is the potential for this design option to inadvertently introduce additional invasive species into the corridor by seeds being transported by vehicles or through the use of invasive during landscaping.

ac = acre(s)
APN = Assessor's Parcel Number
County = County of Orange
ft = foot, feet
kV = kilovolt
ROW = right-of-way
RWQCB = Regional Water Quality Control Board
SCE = Southern California Edison
sq ft = square feet
TCE = temporary construction easement
WDR = Water Discharge Requirement

The results of the analysis from design and traffic have shown that Alternative 1 and Design Option A do not meet the project's Purpose and Need, and provides only marginal benefit over the No Build Alternative. Due to the large amount of property impacts, cost, minimal traffic performance and benefit increase, Alternative 1 is not a viable Build Alternative.

Alternative 3: Diverge Diamond Interchange

Alternative 3 proposed to reconfigure the I-5/El Toro Road Interchange to a diverging diamond interchange. By shifting cross-street traffic to the left side of the street between the signalized crossover intersections, vehicles on the cross street making left turns either onto or off ramps would not conflict with vehicles approaching from other directions; therefore, a diverging diamond interchange was assessed to improve the operation of the ramp terminal intersections. Construction would have included reconfiguring all four quadrants of the interchange, as well as a proposed bridge tunnel at the new southbound off-ramp to eastbound El Toro Road. A new northbound I-5 on-ramp from Bridger Road would also have been proposed. Bridger Road would have been reconstructed to accommodate the proposed northbound I-5 on-ramp, and a continuous-median left-turn lane would have been proposed to provide access to local businesses from Bridger Road. Modifications to Avenida De La Carlota would also have been required.

The results of the analysis from design and traffic have shown that Alternative 3 is not a viable Build Alternative. Alternative 3's configuration would not be able to meet the traffic demand or meet the project's Purpose and Need.

1.4.5.2 Alternatives Considered but Eliminated Early During the PA&ED (Environmental Phase):

The approved 2014 Project Study Report-Project Development Support (PSR-PDS) provides a description of alternatives originally considered, but then dropped from further consideration as part of the Preliminary Alternative Identification and Screening. The following transportation concepts discussed below were evaluated and eliminated from further consideration based either on feasibility or ability to meet the purpose and need, and/or cost. Some of the design features and options were used in the development of the proposed project alternatives; however, none of the following alternatives in their entirety moved forward for further discussion.

Alternative 3

Instead of a direct connection to El Toro Road, the structure would have extended further south before circling back over I-5 to land and merge with the I-5 northbound off-ramp at Bridger Road. This alternative was later modified during PA&ED and is now Alternative 2.

Alternative 4

Alternative 4 proposed a new southbound Collector-Distributor system beginning at the existing off-ramp for El Toro Road and ending at the Los Alisos Boulevard Overcrossing. The entire system would have been 5,640 feet long and would have taken the exiting southbound I-5 traffic all the way past the El Toro Road Interchange to the Los Alisos Overcrossing. This alternative was later rejected, as preliminary analysis showed that traffic patterns heading to northbound I-5 would not change in

comparison to the No Build Alternative. However, upon minor modifications and additional analysis, it was brought into the PA&ED phase for further analysis, as described above.

Alternative 8

Alternative 8 proposed a flyover structure that would have functioned as a direct connector from southbound I-5 to eastbound El Toro Road. Similar to Alternative 3 above, it would have removed the southbound to eastbound traffic from the Avenida De La Carlota/El Toro Road intersection. This alternative was brought into the PA&ED phase for further analysis, but due to the large amount of property impacts, cost, minimal traffic performance and benefit increase, it was eliminated by the Project Development Team as not a viable alternative.

Alternative 12

Alternative 12 proposed a new “knuckle” type intersection where the southbound I-5 hook ramps met at Avenida De La Carlota and Paseo de Valencia. This option would have provided a free-moving, unsignalized intersection, allowing two free right turns (northbound Avenida De La Carlota onto a new southbound I-5 loop ramp and southbound Avenida De La Carlota onto westbound Paseo de Valencia) as well as two free left turns (eastbound Paseo de Valencia to northbound Avenida De La Carlota and southbound existing I-5 hook off-ramp onto southbound Avenida De La Carlota). The existing I-5 southbound hook ramp would have been realigned to a loop ramp. This alternative was brought into the PA&ED phase for further analysis, but due to the large amount of property impacts, cost, minimal traffic performance and benefit increase, it was eliminated by the Project Development Team as not a viable alternative.

1.4.5.3 Other Alternatives Considered in the Project Initiation and Development Phase

This section provides a summary of alternatives studied as part of the Project Initiation and Development phase but were not considered as potential build alternatives within the PSR-PDS for the reasons as discussed below. Many of the alternatives discussed above or the Build Alternatives (including Design Option B) under evaluation in this document evolved from the Alternatives below with minor modifications to make them feasible and buildable.

Alternative 2

This alternative proposed a type L-1 half diamond interchange with a new direct southbound off-ramp and northbound on-ramp to and from Los Alisos Boulevard. This alternative modified the ramps to accommodate for the future I-5 Widening Project; however, the area is constrained by a building with adjacent parking to the west and the Moulton Water District Substation in the northeast. Right-of-way would have needed to be acquired and standard Caltrans freeway entrance geometrics would not be feasible. In addition to non-standard ramp shoulders, implementation of Alternative 2 would introduce a new interchange spaced less than the Caltrans standard minimum interchange spacing of 1 mile in urban areas. Also, it would require FHWA and California Transportation Commission approval for new ramps on the interstate system. Due to the above considerations, Alternative 2 was not recommended for further consideration.

Alternative 3B

Alternative 3B is an iteration of Alternative 3, described above. In this case, the southbound I-5 off-ramp would have been elevated on structure over the southbound on-ramps and El Toro Road, similar to Alternative 3. Rather than flying over the freeway to the east side of the interchange, the structure would have landed back down on the west side (outside) of Avenida De La Carlota near Five Lagunas.

This flyover would effectively move the I-5 southbound exiting vehicles past the El Toro Road intersection. However, the placement of the ramp would have required right-of-way acquisition from the mall and would have prohibited Caltrans access control of the ramp. Operationally it would not provide the same benefits as the full flyover ramp and would not provide direct access to Los Alisos Boulevard. For these reasons, Alternative 3B was not carried forward.

Alternative 4C

Alternative 4C proposed a new southbound Collector-Distributor system beginning at the existing off-ramp for El Toro Road and ending at the Los Alisos Boulevard Overcrossing. Much of the Collector-Distributor road would have needed to be elevated above the existing Avenida De La Carlota, and the entire system would have been 5,640 feet long. It introduced a new loop ramp intersection, which would have connected to Avenida De La Carlota via the parking lot of the Five Lagunas (previously known as Laguna Hills Mall). The loop ramp was proposed to be a raised, 150-foot radius, two-way on-/off-ramp structure that would have connected the elevated Collector-Distributor road back down to an at-grade intersection with Avenida De La Carlota, south of El Toro Road. To minimize impacts to existing mall parking, additional stalls would have to have been provided in the center of the loop ramp and under the ramp itself. The existing southbound slip ramp from El Toro Road to I-5 would have been eliminated to accommodate adequate the weaving distance along the Collector-Distributor road between the El Toro Road hook on-ramp and the proposed mall loop ramp.

Although Alternative 4C meets the Purpose and Need for the project, the capital construction costs exceeded the budget identified in the M2 Freeway Plan. In addition, some members of the Project Development Team expressed concern with this alternative due to the unconventional design approach and the required design exceptions. Due to these concerns and the project costs, this alternative was removed from further consideration.

Alternative 5

Alternative 5 proposed a flyover structure that directly connected the exiting southbound I-5 traffic to eastbound El Toro Road by traversing Cavanaugh Mini Park and joining with the existing cul-de-sac at the northern terminus of Bridger Road. Vehicles would then have proceeded south along Bridger Road to the intersection at El Toro Road. To ensure that northbound Bridger Road traffic would not enter the southbound off-ramp, traffic management measures would have been needed. These could have included signage and stops controlling the ramp, as well as other traffic calming devices.

Although this alternative would help address the existing deficiency of the southbound I-5 to eastbound El Toro Road movement, excessive environmental

impacts led to this alternative initially being not recommended for further consideration. These included potential right-of-way impacts, 4(f) impacts associated with the park, the elimination of on-street parking, and the need for vehicles using the new ramp to use a left-turn only on El Toro Road due to the insufficient merge length. In addition, the traffic operations at the intersection of the I-5 northbound off-ramp at Bridger Road and El Toro Road could increase in LOS due to the addition of vehicles accessing the intersection from the new flyover. Several variations of this alternative were considered.

Alternative 7

Alternative 7 was a modification of a concept studied by Caltrans in 2001 (Caltrans 2001). The alternative proposed a new type L-6 hook-style interchange with ramps to Avenida De La Carlota that use the Five Lagunas (previously Laguna Hills Mall) parking area along with a new signalized intersection. That alternative also proposed to eliminate the existing I-5 southbound onramp at El Toro Road and provide a southbound auxiliary lane between this new interchange and the existing southbound hook on-ramp just north of El Toro Road. It was re-evaluated as part of the 2014 PSR-PDS along with the concept of a collector-distributor road that would allow the southbound on-ramp to remain in place in conjunction with the proposed hook ramps.

Alternative 7 was removed from further consideration due to the loss of parking to the Five Lagunas, impacts to Avenida De La Carlota, the potential additional costs for a parking structure, and high right-of-way acquisition. In addition to the right-of-way impacts, the local agencies within the vicinity of the project were unsupportive of this alternative. Finally, Caltrans does not typically support the construction of new hook ramps on its facilities.

Alternative 9

This alternative was the predecessor to Alternative 5, described above. Alternative 9 proposed the same flyover geometry as Alternative 5, but initiated the southbound ramp takeoff farther south. As such, the ramp touchdown would have landed directly on Bridger Road rather than using Cavanaugh Mini Park to descend to Bridger Road at grade. Although this alternative would help address the existing deficiency of the southbound I-5 to eastbound El Toro Road movement, a number of factors led to this alternative being removed from further consideration. These included potential disruption to the businesses on Bridger Road, the elimination of on-street parking, and the need for vehicles using the new ramp to use a left-turn only on El Toro Road due to the insufficient merge length. In addition, the traffic operations at the intersection of I-5 northbound off-ramp-Bridger Road/El Toro Road could increase in LOS due to the additional vehicles accessing the intersection from the southbound flyover.

Alternative 10

Alternative 10 proposed a new overcrossing of I-5 at Ridge Route Drive. This would have provided an additional access point between the cities of Lake Forest and Laguna Hills and would have provided an option for vehicles travelling between the cities to bypass the El Toro Road Interchange area. The City of Lake Forest has already constructed abutment fill on the east side of the freeway in anticipation of this overcrossing, but the west side of the freeway contains substantial obstacles. The

elevation of Avenida De La Carlota at this location would need to be raised approximately 30 feet to match the elevation of the proposed overcrossing. Elevating the roadway would create significant right-of-way impacts to the adjacent commercial developments, including the elimination of driveways. Another option would be to have the bridge neck down to one lane in each direction and land in the median of Ridge Route Drive on the Laguna Hills side of the freeway (similar to a HOV Direct Access Ramp). However, this would not allow access to or from Avenida De La Carlota. Furthermore, a historical railroad undercrossing on Ridge Route Drive approximately 1 mile east of I-5 does not provide standard vertical clearance and would not accommodate the increased traffic volumes that the new overcrossing would create. Due to the negative traffic impacts on Ridge Route Drive and the environmental concerns with the historic railroad crossing, the alternative was removed from further consideration.

Alternative 11

This alternative proposed the construction of HOV drop ramps from the I-5 median to the Los Alisos Boulevard overcrossing on the northerly side of the bridge. Although this alternative would alleviate some traffic from the El Toro Road interchange, it was eliminated from further discussion. Additionally, this design was in the original 2001 PSR; it did not take into consideration the I-5 (SR 73 to El Toro Road) Widening Project, which includes the extension of dual HOV lanes through the Los Alisos Boulevard overcrossing.

Alternative 12A

Alternative 12A proposed to upgrade the I-5/El Toro Road Interchange to a Single Point Urban Interchange. This alternative was developed as a result of conversations with Caltrans Headquarters Design staff that requested the study of a full interchange replacement. Due to the high volume of traffic at this interchange, the conventional interchange types are inefficient. Further, the roadway circulation would be impacted, as well as access to local businesses. A grade separation would have been required at Avenida De La Carlota, thus redistributing traffic to adjacent intersections.

Implementation of Alternative 12A would have also required the complete reconstruction of the I-5/El Toro Road Interchange. Specifically, construction would have included reconfiguring all four quadrants of the interchange, replacing the I-5/El Toro undercrossing, lowering El Toro Road, the closure of Bridger Road, and grade-separating the El Toro Road and Avenida De La Carlota intersection. The total estimated project cost for Alternative 12A would have exceeded $100 million, which exceeds the $50 million M2 Freeway Plan budget. For these reasons, this alternative was eliminated from further consideration.

Alternative 12B

Alternative 12B is a progression of Alternative 12A and proposed the implementation of a tight diamond-type interchange. Similar to Alternative 12A, the construction of Alternative 12B would have required the complete reconstruction of the I-5/El Toro Road Interchange and would have included reconfiguring the western quadrants of the interchange, replacing the I-5/El Toro Road undercrossing, and grade-separating the El Toro and Avenida De La Carlota intersection. Alternative 12B proposed to leave the eastern side of the interchange as-is after the implementation of the I-5

Widening project. Overall operations, right-of-way impacts, and circulation impacts to the west side of the interchange would have been the same as Alternative 12A.

An initial traffic analysis was performed on Alternative 12B and determined that the I-5 southbound off-ramp and El Toro Road intersection would operate at LOS F in the design year of 2045 without the implementation of free right turns, which are not typically accepted on State facilities. Although the total estimated project cost for Alternative 12B would have been less than that of 12A, it would have exceeded of the $50 million M2 Freeway Plan budget.

1.4.5.4 Reversible Lanes

Assembly Bill 2542 amended the California Streets and Highways Code, effective January 1, 2017, and requires that Caltrans or a regional transportation planning agency demonstrate that reversible lanes were considered when submitting a capacity-increasing project or a major street or highway lane realignment project to the California Transportation Commission for approval (California Streets and Highways Code, Section 100.015). For projects that do not meet the criteria (capacity increasing or a major street or highway lane realignment), this determination can be documented in the Project Initiation Document. Projects that do meet these criteria must be evaluated by District Traffic Operations to determine the feasibility of including reversible lanes in the project scope. This requirement applies to projects newly approved for programming after January 1, 2017.

This project is an interchange improvement project and does not fit the criteria for capacity increasing or a major street or highway lane realignment; hence, no further analysis is needed.

1.4.5.5 Transportation System Management and Transportation Demand Management Alternatives

TSM provides cost-effective improvements that increase transportation system performance without the major expense of capital expansion projects. These programs include minor geometric improvements, bicycle and pedestrian improvements, and other measures, such as signal synchronization, motorist information, bus signal priority, and freeway ramp metering. TDM provides cost-effective improvements that reduce system demand by eliminating trips or shifting trips out of the peak periods to other, less-congested time periods during the day and thus increase transportation system performance without implementing travel restrictions. TDM programs include rideshare programs, employer flex-time, parking pricing, and intermodal improvements that support TDM programs and transfers between modes at key locations. TDM programs are devised to change the behavior of travelers. Some TDM approaches are voluntary, and they motivate participants with incentives. Other TDM approaches apply disincentives to drive single-occupancy vehicles, such as fees and constraints.

A TSM/TDM alternative is not considered a viable stand-alone option for this project, because it does not fulfill the project purpose or address the identified need. A TSM/TDM alternative on its own would:

- Provide minimal congestion reduction.

- Provide minimal enhancement of operations and improvement in trip reliability.
- Not increase mobility substantially, because it would have limited effect on congestion.
- Not maximize throughput because no additional through lanes are provided.

TSM and TDM are similar in a number of ways, because they may have the potential to lessen the number of trips, lessen peak hour travel, conserve energy, reduce emissions, and provide more travel alternatives. Although TSM and TDM measures alone do not satisfy the project's Purpose and Need, the following TSM and TDM measures are beneficial and are incorporated into Section 1.4.1.1–Common Design Features of the Build Alternatives (including Design Option B):

- Improved ramp metering hardware and software
- Upgraded traffic signals interconnected and coordinated with adjacent signals and ramp meters
- Intelligent Traffic System elements, including fiber-optic and other communication systems for improved connectivity and remote management; closed-circuit television coverage of the entire freeway mainline, ramps, and adjacent arterials; video detection systems; and vehicle detection systems for volume, speed, and vehicle classification
- On- and off-ramps designed to limit impacts to non-motorized travel
- An extension of an existing auxiliary lane in the northbound I-5 direction
- Traveler information management system improvements to enhance dissemination of real time information for roadway conditions
- Camera surveillance

1.5 Permits and Approvals Needed

The following permits, licenses, agreements, and/or certifications are required for construction of the Build Alternatives (including Design Option B) and are described below in Table 1.14.

Table 1.14: Permits and Approvals

Agency	Permit/Approval	Status
United States Fish and Wildlife Service (USFWS)	Section 7 Consultation for Threatened and Endangered Species,	Consultation with the USFWS and a resulting "streamlined" Biological Opinion (BO) would be required prior to FED. A Consistency Determination Memo would be jointly prepared with CDFW prior to FED as part of OCTA Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP)
United State Army Corps of Engineers (USACE)	Section 404 Permit for filling or dredging waters of the United States	OCTA has worked with the USACE to define a Programmatic Individual Permit for the M2 Freeway Projects that establishes Letter of Permission (LOP) procedures. The programmatic individual permit is anticipated after approval of FED and prior to construction.
Federal Highway Administration (FHWA)	Air Quality Conformity Determination	The Air Quality Conformity report will be submitted to FHWA after receipt of public comments on the IS/EA and selection of the preferred alternative (PA). The FHWA will make a conformity determination prior to approval of the FED and conclude that the Preferred Alternative is consistent with the requirements of the Clean Air Act
FHWA	Modified Access Report (MAR)	The MAR will be obtained after approval of PA&ED.
State Historic Preservation Office (SHPO)	Section 106 Concurrence	Concurrence letter received March 7, 2019
California Transportation Commission (CTC)	CTC will vote to approve funds	Approval will be obtained after FED.
California Department of Fish and Wildlife (CDFW)	1602 Lake and Streambed Alteration Agreement. Section 2080.1 Agreement for Threatened and Endangered Species	Application of Section 1602 Permit may be required after approval of FED and prior to construction A Consistency Determination. The memorandum would be jointly prepared with USFWS prior to FED as part of OCTA Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP).
California Public Utilities Commission (CPUC/PUC)	Compliance with PUC General Code 131D	During the design phase, early identification/coordination of utility conflicts with power lines or substations over 50kV is essential.
State Water Resources Control Board (SWRCB)	Section 402 NPDES/ NPDES General Permit for Stormwater Discharges of Stormwater Runoff Associated with Construction Activities (Order No. 2009-0009-DWQ, as amended by 2012-0006-DWQ)	Caltrans District 12, as the applicant for the NOI, to obtain permit prior to construction

Agency	Permit/Approval	Status
State Water Resources Control Board (SWRCB)	Caltrans NPDES Statewide Stormwater Permit (Order No. 2012-0011-DWQ, as amended by Order WQ 2014-0006-EXEC, Order WQ 2014- 0077-DWQ, and Order WQ 2015-0036-EXEC, NPDES No. CAS000003)	Amended permit issued to Caltrans on May 20, 2014, for discharges from state right-of-way.
Regional Water Quality Control Board (RWQCB)	Order No. *R9-2015-0013, NPDES No. CAG919003, General Waste Discharge Requirements for Groundwater Extraction Discharges to Surface Waters within the San Diego Region*	Caltrans District 12, as the applicant will obtain permit prior to start of construction
State Water Resources Control Board (SWRCB)	Section 401 Water Quality Certification	OCTA has worked with the USACE to define a Programmatic Individual Permit for the Measure 2 freeway projects that establishes Letter of Permission procedures. The programmatic individual permit (401 Certification) is anticipated after approval of FED and prior to start of construction.
City of Lake Forest – Cavanagh Park	Concurrence with Section 4(f) *de minimis* determination	Concurrence to be obtained prior to approval of FED.
Cities of Lake Forest, Laguna Woods, and Laguna Hills	Freeway Agreement	Freeway agreement will be completed during Design Phase, if needed

Caltrans = California Department of Transportation
NPDES = National Pollutant Discharge Elimination System
FED = Final Environmental Document
FHWA = Federal Highway Administration
OCTA = Orange County Transportation Authority
SHPO = State Historic Preservation Officer

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