

2.5 Traffic and Transportation/Pedestrian and Bicycle Facilities

2.5.1 Regulatory Setting

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

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

2.5.2 Affected Environment

This section is based on the *Draft Traffic Operations Analysis Report* (April 2023) prepared for the proposed Project. The proposed Project limits extend from Red Hill Avenue (12-ORA-5 Post Mile [PM] 28.9) to just north of the Orange County/Los Angeles (OC/LA) County Line (12-ORA-5 PM 44.4).

The traffic operations analysis was conducted to evaluate the operations on Interstate (I) 5 and connecting arterial roadways within the Project limits with and without implementation of the proposed Project. The freeway evaluation includes the I-5 mainline segments between interchanges, existing and proposed managed lanes (MLs) (high-occupancy vehicle [HOV] lanes and Express Lanes [ELs]), ramp segments, and merge, diverge, and weaving segments along the freeway mainline, freeway-to-freeway connectors (SR-55, SR-22, SR-57, and SR-91), Direct Managed Lanes Connectors (SR-55, SR-57 and SR-91), and Direct Managed Lanes Access

Ramps (Grand Ave, Gene Autry, Disney Way, and Disneyland Drive). A total of 39 ramp terminal intersections (on-ramps and off-ramps) and 32 arterial intersections within the Study Area were evaluated. The traffic operations analysis considered the following scenarios:

- Existing Baseline (2022)
- No Build Alternative – Opening Year (2035)
- Build Alternatives 2, 3, and 4 – Opening Year (2035)
- No Build Alternative – Horizon Year (2055)
- Build Alternatives 2, 3, and 4 – Horizon Year (2055)

2.5.2.1 Existing Facility

As previously stated in Section 1.1.1 – Existing Facility from Chapter 1, Proposed Project, I-5 is a major north-south interstate freeway that traverses the western United States from Mexico to Canada. In Orange County, I-5 (also known as the Santa Ana Freeway), serves as the linkage connecting Orange County to Los Angeles County. Within the Project Study Area, I-5 serves the cities of Irvine, Tustin, Santa Ana, Orange, Anaheim, Fullerton, Buena Park, La Mirada, and Santa Fe Springs. There are several State Routes (SRs) that connect to I-5, including SR-39, SR-55, SR-22, SR-57, and SR-91. In addition, there are several major arterials and local roadways paralleling I-5 that provide alternative routes to commuters. The Project segment of I-5, between Red Hill Avenue and the OC/LA County line, is shown on Figure 1-1 in Chapter 1.

Within the project limits, I-5 has 8 to 10 general-purpose (GP) lanes, with auxiliary lanes along many sections of the corridor. There is one HOV lane in each direction along I-5 and a second HOV lane between SR-55 and SR-57 in each direction. During peak commute times, congestion exists within the corridor and is expected to worsen in the future.

2.5.2.2 Existing Traffic Operations

Existing Levels of Service

HOV, Mainline and Ramps

As discussed in Section 1.2.2.1, Capacity, Transportation Demand, and Safety, and also shown in Table 1.2, the I-5 corridor in the Study Area currently operates at unacceptable levels of service (LOS) (E or F) in a substantial number of mainline segments and some ramps. Existing traffic conditions described in this section and in Section 1.2.2.1 are based on traffic counts and Existing Conditions in 2022. An LOS

analysis was conducted for the Existing Conditions on Project mainline segments, weaving segments, and ramp merge and diverge areas within the Study Area. Table 1.1, provided earlier in Section 1.2.2.1, provides information on existing traffic volumes during the a.m. and p.m. peak hours on I-5. As shown in Table 2.5.3, many of the freeway segments operate at an unacceptable LOS (classified as LOS E or F) under Existing Conditions, creating chokepoints and causing congestion on adjacent merge and diverge areas. Overall, the freeway operates at an unsatisfactory LOS during the morning peak hour in the northbound (NB) direction, and during both morning and evening peak hours in the southbound (SB) direction. Of the 46 GP mainline segments analyzed in the NB direction, 25 segments (approximately 54 percent), and of the 45 ramp facilities in the northbound direction, 30 ramp facilities (approximately 67-percent) operate at unacceptable LOS in the a.m. and/or p.m. peak hours. In the SB direction, of the 44 mainline segments analyzed, 20 segments (approximately 45 percent), and of the 43 ramp facilities in the southbound direction 18 facilities (approximately 42-percent) operate at unacceptable LOS during the a.m. and/or p.m. peak hour.

The existing HOV lanes also experience congestion during the peak hours. Of the 46 HOV segments analyzed in the NB direction, 24 segments (approximately 52 percent) operate at unacceptable LOS in the a.m. and/or p.m. peak hours. In the SB direction, 44 HOV segments were analyzed, with 19 segments (approximately 43 percent) operating at unacceptable LOS during the a.m. and/or p.m. peak hour.

Intersections

A total of 71 Study Area intersections (39 freeway ramp terminal intersections and 32 local arterial intersections) were evaluated. As shown in Table 2.5.1 (all tables are provided at the end of this section) two ramp terminal intersections (approximately 5 percent) currently operate at an unacceptable LOS (LOS E or F). Table 2.5.2 shows the analysis for local arterial intersections, with four local arterial intersections (approximately 13 percent) operating at an unacceptable LOS. Some of these intersections are operating at an unacceptable LOS during both peak periods, while others are operating at an unacceptable LOS during at least one peak period.

Ramp Capacity

On-ramp and off-ramp queuing for Existing Conditions was evaluated. It was determined that existing storage lengths are adequate for Existing Conditions during both a.m. and p.m. peak periods.

HOV Degradation Determination

The 2021 California HOV Lane Facilities Degradation Report (Caltrans 2022) and subsequent California HOV Lane Degradation Determination Reports (Caltrans 2019, 2020, 2021, 2022), developed to report the performance of the HOV lane network, listed this section of HOV facility as degraded, with portions of the proposed Project listed as extremely degraded. Following the completion of the *HOV Lane Degradation Determination Report*, the 2017 California HOV Lane Degradation Action Plan was developed to identify strategies for addressing the reported degraded HOV lanes. Analysis of I-5 suggests that factors contributing to degradation include:

- Demand exceeding capacity;
- Recurrent congestion on the freeway and high-speed differential between GP and HOV lanes with no buffer separation;
- Vehicle weaving conflict at ingress/egress locations;
- Multiple HOV lane bottlenecks along the corridor; and
- Bottlenecks at the I-5/SR-55 HOV Direct Connector and I-5/SR 57 Direct Connector

According to the *HOV Lane Degradation Determination Report*, remediation for this facility includes: increasing the minimum occupancy of vehicles; enhancing the available capacity of the HOV lane facility; and/or improving traffic demand management through a conversion of HOV lanes to ELs.

In 2016, Caltrans District 12 developed the *Orange County Managed Lanes Network Study*. The I-5 portion between south of SR-55 at Red Hill Avenue and SR-91 was designated as a Priority 1 Facility. Districts have prioritized their ML projects using different combinations of factors, including performance, cost, constructability, and revenues. A Priority 1 Facility shows the greatest benefit by converting HOV lanes to ELs.

In order to address some of the HOV degradation, the Orange County Transportation Authority (OCTA) has sponsored the addition of an HOV lane on I-5 between SR-55 and SR-57 through local Measure M2 funding. While the performance of I-5 between SR 55 and SR 57 would be improved, the future operational issues in that segment would not be resolved. The SR 55 SB and SR 57 NB system interchanges would continue to be the main bottlenecks. Through the implementation of ELs, the system operators can better control demand and manage congestion.

2.5.2.3 Pedestrian and Bicycle Facilities

Pedestrian travel across the Project Area where arterial streets cross I-5 is provided via sidewalks at the following locations:

- Red Hill Avenue undercrossing
- Newport Avenue undercrossing
- Main Street undercrossing
- 1st Street overcrossing
- 4th Street overcrossing
- Grand Avenue undercrossing
- Lincoln Avenue overcrossing (Santa Ana)
- 17th Street undercrossing
- Main Street overcrossing
- North Broadway overcrossing
- West Broadway overcrossing
- Chapman Avenue undercrossing
- The City Drive undercrossing
- East Orangewood Avenue undercrossing
- East Gene Autry Way overcrossing
- East Katella Avenue undercrossing
- South Anaheim Boulevard undercrossing
- South Harbor Boulevard overcrossing
- West Ball Road overcrossing
- West Santa Ana Street overcrossing
- West Broadway overcrossing
- Lincoln Avenue overcrossing (Anaheim)
- Euclid Street overcrossing
- North Brookhurst Street overcrossing
- West La Palma Avenue overcrossing
- Magnolia Street overcrossing
- Orangethorpe Avenue overcrossing
- Stanton Avenue overcrossing
- Beach Boulevard overcrossing
- Western Avenue overcrossing
- Artesia Boulevard undercrossing

These arterials generally include sidewalks on at least one side, and usually both sides, of the road as they cross I-5.

Class I (off-road, paved) bicycle lanes located within 0.5 mile of the Project limits include:

- **Bikeway Peters Canyon Regional Trail and Bikeway:** Crosses under the Project footprint and is a regional Class I (off-street) trail that connects the cities of Tustin, Orange, Irvine, and Newport Beach.
- **Santa Ana River Regional Trail:** Crosses under the Project Area and has paved multi-use trail features Class I and II bikeways that follow the existing Santa Ana River alignment and span 30 miles from Huntington Beach to Corona.
- **Coyote Creek Bikeway:** Crosses under the Project Area in the city of La Mirada. The Coyote Creek Bikeway is a 5.8-mile Class I (off-road) multi-use asphalt trail.

There are also Class II (on-road, striped lanes) bicycle lanes located along the following local arterial intersections along the Project corridor:

- Tustin Ranch Road
- Red Hill Avenue
- Euclid Street

2.5.2.4 Public Transit

Details regarding the different public transit routes operated by OCTA, LA Metro, and Anaheim Regional Transportation (ART) within the Study Area are described in detail under Section 1.2.2.5 – Modal Interrelationships and System Linkages within Chapter 1.

2.5.3 Environmental Consequences

The methodologies for forecasting and assessing future year with and without Project traffic effects are described in detail in Chapters 4 and 5 of the *Draft Traffic Operations Analysis Report* (April 2023). The findings of those analyses are summarized below.

The analysis evaluation criteria used to determine acceptable traffic operation conditions are based on the LOS policies identified by Caltrans. Caltrans strives for freeway facilities to operate at either LOS C or D. Freeway LOS were shown on Figure 1-2 in Chapter 1. Any future freeway facilities projected to operate at an unacceptable LOS (LOS E or F) need to be mitigated. Per Caltrans, an impact to freeway facilities would be considered substantial if the Project would:

- Degrade the LOS on the freeway facility from LOS D to LOS E or F; or
- Impact (worsen) a facility that is already operating at an unacceptable LOS (E or F)

The 71 Study Area intersections noted previously were taken into account in the traffic impact analysis as they may be potentially impacted due to HOV improvements. Intersections would be considered substantially impacted if they are projected to operate at an unacceptable LOS (E or F) under the potential Build Alternatives (and are not projected to operate at unsatisfactory LOS under the No Build Alternative scenario).

The improvements included in the Build Alternatives are shown in Chapter 1, Proposed Project, on Figures 1-3 through 1-4 for Alternative 2, 3, and 4, respectively.

Improvements for the Build Alternatives, as well as a description of the No Build Alternative are described in more detail in Section 1.3.1 – Project Alternatives within Chapter 1 of this environmental document and in Chapter 1 of the *Draft Traffic Operations Analysis Report* (April 2023).

2.5.3.1 Temporary Impacts

Build Alternatives (Alternatives 2, 3, and 4)

Alternative 2

Alternative 2 would maintain the existing lane configurations for I-5 with a modification of the minimum HOV-lane occupancy requirement from two-plus (2+) to three-plus (3+) passengers within the current HOV system in each direction between Red Hill Avenue and the OC/LA County line. Under this alternative, no additional roadway improvements would occur. However, Alternative 2 would require temporary closures of segments of the HOV lanes in order to replace signage and restripe pavement. To minimize this impact, Project Feature PF-TR-1 (Transportation Management Plan [TMP]) would be prepared to provide details on construction strategies and any other relevant details.

Alternatives 3 and 4

Generally, on-ramp and connector closures for Alternatives 3 and 4 would occur during off-peak and overnight hours to minimize delays to the traveling public. However, 55-hour weekend closures of the NB I-5 to NB SR-57 HOV connector and SB SR 57 to SB I-5 HOV connector will be required for construction of the proposed median concrete barrier. Extended long-term closures of the NB I-5 to NB SR-57 HOV connector and SB SR-57 to SB I-5 HOV connector will also be required for construction and demolition portions of the retaining wall located beneath the La Veta Avenue overcrossing.

Alternatives 3 and 4 are also not expected to include any modifications to arterials at their intersections with I-5 that would temporarily affect bicycle and pedestrian facilities. In addition, Alternatives 3 and 4 are not expected to require any temporary modifications to structures that may affect bicycle and pedestrian facilities that cross under the freeway.

Full and partial closures will be coordinated with local jurisdictions as outlined in PF-TR-1 (TMP). More detail regarding the preliminary detours associated with construction work is outlined as follows.

Southbound Main Street On-ramp and Southbound 17th Street Off-ramp

Short-term full closure of the segments listed above is anticipated for existing soundwall on retaining wall demolition activities, construction of a proposed soundwall on retaining wall activities, and rapid set concrete paving operations. No other full facility closures are anticipated for the Build Alternatives.

Northbound I-5 to Northbound SR-57 HOV Connector & Southbound SR-57 to Southbound I-5 HOV Connector

55-hour weekend closures of segments listed above will be required for the construction of the proposed median concrete barrier. Extended long-term closures of the NB I-5 to NB SR-57 HOV Connector and SB SR-57 to SB I-5 HOV Connector will also be required for construction and demolition of portions of retaining wall located beneath the La Veta Ave Overcrossing.

Project Feature PF-TR-1 addresses the potential for short-term impacts related to traffic and transportation during construction of the Build Alternatives.

PF-TR-1 Transportation Management Plan. Under this measure prior to approval of the final design, a final Transportation Management Plan (TMP) report will be prepared to outline strategies for reducing potential construction-related traffic conflicts, detours, and delays. A Major TMP classification is anticipated due to the complexity of the proposed Project. A qualified traffic engineer will prepare the TMP, which will include, but not be limited to, the elements described below to reduce traveler delays and enhance traveler safety during proposed Project construction. The TMP, during final design and would be incorporated into the plans, specifications, and estimates for implementation by the construction contractor. Specifically, the purpose of the TMP is to address the short-term traffic and transportation impacts during construction of the Project. The objectives of the TMP are to:

- Maintain traffic safety during construction;
- Effectively maintain an acceptable level of traffic flow throughout the transportation system during construction;
- Minimize traffic delays and facilitate reduction of the overall duration of construction activities;
- Minimize detours and impacts to pedestrians and bicyclists;

- Foster public awareness of the project and related transportation and traffic impacts; and
- Achieve public acceptance of construction of the project and the TMP measures.

The TMP will contain, but not be limited to, the following strategies recommended for implementation during construction activities of the proposed Project. The elements of these strategies will be refined during final design and incorporated in the TMP for implementation during Project construction.

- **Public Information Campaign.** The purpose of the public information campaign is to disseminate information to the public about Project construction activities and associated transportation impacts. This campaign is considered an important tool for reaching target audiences with important construction Project information and is anticipated to include, but not be limited to:
 - Brochures and mailers
 - Press releases/Media alerts
 - Paid advertising
 - Lane Closure Systems (LCS)
 - Public meetings/hearings
 - Communications with selected stakeholders
- **Motorist Information.** The effective implementation of a traveler information system during construction is crucial for enabling motorists to make informed decisions about their travel plans and options with real-time traffic information. That real-time traffic information will include information on mainline, ramp, lane, and arterial closures and detours; travel delays; access to adjacent land uses; “businesses are open” signing; and other signing and information to assist travelers in navigating through, around, and in construction areas.
- **Incident Management.** Effective incident management will ensure that incidents in and near construction areas are cleared quickly and do not result in substantial delays for the traveling

public in the vicinity of work zones. Incident management includes, but is not limited to:

- Caltrans Construction Zone Enhanced Enforcement Program (COZEEP)
 - Traffic Management Team
 - Caltrans Transportation Management Center
- **Construction Strategies.** The TMP will include procedures to lessen the transportation effects of Project-related construction activities and will include, but not be limited to, consideration of the following:
 - Lane requirement charts
 - Construction staging
 - Traffic handling plans
 - Full facility closures
 - Connector closures
 - Nighttime work
 - Extended weekend work
 - Speed limit reduction
 - Coordination with adjacent construction sites and special events
 - **Demand Management.** Temporarily reducing the overall traffic volumes on the Project segment of I-5 could reduce the short-term adverse effects of construction on traffic operations. The TMP will include, but not be limited to, rideshare strategies that could reduce vehicular demand in the Study Area during Project construction.
 - **Alternate Route Strategies.** The TMP will provide strategies for notifying motorists, pedestrians, and bicyclists of planned construction activities. This notification will allow travelers to make informed decisions about their travel plans, including the consideration of possible alternate routes. The TMP will finalize the detour and alternate routes for motorists, specifically addressing the following:

- Mainline lane closures
- Ramp/connector closures
- Local road closures
- Temporary highway or shoulder use
- Local street improvements
- Temporary detours and closures of bicycle and pedestrian facilities
- Traffic signal coordination

The construction contractor will implement the measures in the TMP during construction.

No Build Alternative (Alternative 1)

None of the improvements proposed under any of the Build Alternatives would be constructed under the No Build Alternative. As a result, the No Build Alternative would not result in temporary impacts related to traffic and circulation or to pedestrian and bicycle facilities.

2.5.3.2 Permanent Impacts

The following tables provide detailed information on traffic operations under the Build and No Build Alternatives in the Opening Year (2035):

- Table 2.5.3 summarizes the NB freeway mainline and ramp LOS during the a.m. and p.m. peak periods under the Existing Condition, as well as with the 2035 No Build Alternative (Alternative 1) and Build Alternatives (Alternatives 2, 3, and 4).
- Table 2.5.4 summarizes the SB freeway mainline and ramp LOS during the a.m. and p.m. peak periods under the Existing Condition, as well as with the 2035 No Build Alternative (Alternative 1) and Build Alternatives (Alternatives 2, 3, and 4).
- Table 2.5.5 summarizes the ramp terminal intersections LOS under the Existing Condition, as well as with the 2035 No Build Alternative (Alternative 1) and Build Alternatives (Alternatives 2, 3, and 4).
- Table 2.5.6 summarizes the local arterial intersections LOS under the Existing Condition, as well as with the 2035 No Build Alternative (Alternative 1) and Build Alternatives (Alternatives 2, 3, and 4).

- Table 2.5.7 summarizes the on-ramp peak-hour assessment under the Existing Condition, as well as with the 2035 No Build Alternative (Alternative 1) and Build Alternatives (Alternatives 2, 3, and 4).
- Table 2.5.8 summarizes the off-ramp queue length summary under the Existing Condition, as well as with the 2035 No Build Alternative (Alternative 1) and Build Alternatives (Alternatives 2, 3, and 4).

The following tables provide detailed information on traffic operations under the Build and No Build Alternatives in the Horizon Year (2055):

- Table 2.5.9 summarizes the NB freeway mainline and ramp LOS during the a.m. and p.m. peak periods under the Existing Condition, as well as with the 2055 No Build Alternative (Alternative 1) and Build Alternatives (Alternatives 2, 3, and 4).
- Table 2.5.10 summarizes the summarizes SB freeway mainline and ramp LOS during the a.m. and p.m. peak periods under the Existing Condition, as well as with the 2055 No Build Alternative (Alternative 1) and Build Alternatives (Alternatives 2, 3, and 4).
- Table 2.5.11 summarizes the ramp terminal intersections LOS under the Existing Condition, as well as with the 2055 No Build Alternative (Alternative 1) and Build Alternatives (Alternatives 2, 3, and 4).
- Table 2.5.12 summarizes the local arterial intersections LOS under the Existing Condition, as well as with the 2055 No Build Alternative (Alternative 1) and Build Alternatives (Alternatives 2, 3, and 4).
- Table 2.5.13 summarizes the on-ramp peak-hour assessment under the Existing Condition, as well as with the 2055 No Build Alternative (Alternative 1) and Build Alternatives (Alternatives 2, 3, and 4).
- Table 2.5.14 summarizes the off-ramp queue length summary under the Existing Condition, as well as with the 2055 No Build Alternative (Alternative 1) and Build Alternatives (Alternatives 2, 3, and 4).

As indicated previously, 2035 has been identified as the Opening Year for the proposed Project, and 2055 has been identified as the Horizon Year. The traffic impacts and operations under the Build Alternatives (Alternatives 2, 3, and 4) and No Build Alternative Alternative in 2035 and 2055 are discussed by alternative below.

Build Alternative (Alternative 2)

HOV, Mainline, and Ramps

Opening Year 2035

As identified in Tables 2.5.3 and 2.5.4, many of the freeway mainline segments are projected to operate at unacceptable LOS under Alternative 2 in 2035, creating chokepoints and causing congestion on adjacent merge/diverge areas compared to Existing Conditions. Of the 46 GP mainline segments analyzed in the NB direction for Alternative 2, 30 segments (approximately 65 percent) would be expected to operate at unacceptable LOS in the a.m. and/or p.m. peak hours, and of the 45 ramp facilities in the northbound direction, 33 facilities (approximately 73 percent) would be expected to operate at LOS E or F in 2035. In the southbound direction, 44 GP mainline segments were analyzed, with 39 segments (approximately 89 percent) expected to operate at unacceptable LOS during the a.m. and/or p.m. peak hour and of the 43 ramp facilities in the southbound direction 39 facilities (approximately 91 percent) would be expected to operate at LOS E or F in 2035.

Of the 46 HOV segments analyzed in the NB direction for Alternative 2, all segments are expected to improve LOS compared to the 2035 No Build Alternative and are expected to operate at an LOS of D or higher during the a.m. and/or p.m. peak hours in 2035. In the SB direction, 44 HOV segments were analyzed, with all but 4 segments (approximately 91 percent) expected to improve LOS compared to the 2035 No Build Alternative and to operate at an LOS of D or higher during the a.m. and/or p.m. peak hours in 2035.

Alternative 2 would maintain the existing lane configurations for I-5 with a modification of the minimum HOV-lane occupancy requirement from two-plus (2+) to three-plus (3+) passengers within the current HOV system in each direction between Red Hill Avenue and the OC/LA County line. Under this alternative, no additional roadway improvements would occur. As such, traffic operations within the Study Area are expected to improve at several HOV segments compared to the 2035 No Build Alternative for both the a.m. and p.m. peak hours as a result of the improvements to the HOV lanes under Alternative 2.

Horizon Year 2055

Additionally, as shown in Tables 2.5.9 and 2.5.10, under Alternative 2 in 2055, much like in 2035, many of the freeway mainline segments are projected to operate at unacceptable LOS, creating chokepoints and causing congestion on

adjacent merge and diverge areas compared to Existing Conditions. Of the 46 GP mainline segments analyzed in the NB direction for Alternative 2 in 2055, 32 segments (approximately 70 percent) would be expected to operate at unacceptable LOS in the a.m. and/or p.m. peak hours and of the 45 ramp facilities in the northbound direction, 36 facilities (approximately 80 percent) would be expected to operate at LOS E or F in 2055. In the SB direction, 44 GP mainline segments were analyzed, with 40 segments (approximately 91 percent) expected to operate at unacceptable LOS during the a.m. and/or p.m. peak hour and of the 43 ramp facilities in the southbound direction, 41 facilities (approximately 95 percent) would be expected to operate at LOS E or F in 2055. Overall, Alternative 2 would result in slightly worse operating conditions in both directions of the general purpose lanes as compared with the 2055 No Build Alternative.

Of the 46 HOV segments analyzed in the NB direction for Alternative 2, all segments are expected to improve LOS compared to the 2055 No Build Alternative and operate at an LOS of D or higher within the a.m. and/or p.m. peak hours in 2055. In the SB direction, 44 HOV segments were analyzed, with all segments expected to improve LOS compared to the 2035 No Build Alternative and operate at an LOS of D or higher during the a.m. and/or p.m. peak hours in 2055.

Similar to 2035 conditions, proposed improvements for the HOV segments under Alternative 2 in 2055 are expected to improve traffic operations at several freeway segments over the 2055 No Build Alternative for both the a.m. and p.m. peak hours.

Intersections

Opening Year 2035

As shown in Tables 2.5.5 and 2.5.6, under Alternative 2 in 2035, a total of 14 Study Area intersections (approximately 19 percent) are projected to operate at LOS E or F in one or both peak periods. Since Alternative 2 only proposes to modify existing HOV lane requirements with no additional roadway improvements, impacts to the study area intersections would be similar to the 2035 No Build Alternative. There are seven total intersections which operate at an LOS of D or higher under the 2035 No Build Alternative which would be degraded to an LOS E or F under Alternative 2 in 2035. These include

intersections: R-11, R-32, A-6, A-25, A-29, A-31, and A-32 as noted in tables 2.5.5 and 2.5.6, below.

Horizon Year 2055

Tables 2.5.11 and 2.5.12 outline the intersection operations under Alternative 2 in 2055. In 2055, a total of 23 Study Area intersections (approximately 32 percent) are projected to operate at LOS E or F in one or both peak periods. Since Alternative 2 only proposes to modify existing HOV lane requirements with no additional roadway improvements, impacts to the Study Area intersections would be similar to the 2055 No Build Alternative. There are six total intersections which operate at an LOS of D or higher under the 2055 No Build Alternative which would be degraded to an LOS E or F under Alternative 2 in 2055. These include intersections: R-36, A-6, A-21, A-25, A-28, and A-31 as noted in tables 2.5.11 and 2.5.12, below.

Ramp Capacity

Alternative 2 would not involve the alteration or reconfiguration of any existing ramps. Therefore, ramp metering rates for the Study Area on-ramps are expected to stay within an acceptable range of 1800 vehicles per hour (vph), similar to the No Build Alternative and as shown in Tables 2.5.7 and 2.5.13. Tables 2.5.8 and 2.5.14 contain a summary of off-ramp queue lengths in 2035 and 2055, respectively. It is anticipated that queue lengths provided on all on-ramps with minimum ramp metering rates would be adequate under 2035 Alternative 2 conditions, similar to the No Build Alternative. Since ramp improvements are not planned under Alternative 2, off- and on-ramp conditions in 2035 and 2055 would be similar to the 2035 and 2055 No Build Alternative. Therefore, Alternative 2 would not result in adverse impacts related to ramp queuing.

Bicycle and Pedestrian Facilities

Refer to Section 2.5.2.3 – Pedestrian and Bicycle Facilities above for a list of Class I and Class II bike facilities that intersect with the Project Area. Alternative 2 would not include any modifications to the freeway mainline, ramps, or arterials and only includes a modification to the minimum requirements for the HOV lanes and construction of two park-and-ride facilities within the existing freeway right-of-way (ROW). Based on the locations of these two park-and-ride facilities, as shown in Figure 1-3 in Chapter 1, potential temporary construction closures could occur at the South Anaheim Boulevard undercrossing and Grand Avenue undercrossing in order to accommodate the construction of these two park-and-ride facilities. However, any

potential closures would be temporary in nature to accommodate the construction of the park-and-ride facilities, and are not expected to result in permanent impacts to local bicycle and pedestrian facilities.

Public Transit

Alternative 2 would potentially result in temporary detours and increased travel times for local bus services that intersect with the Project Area. Implementation of the TMP (PF-TR-1) will ensure coordination with OCTA, LA Metro, and ART to alert transit patrons of any changes prior to temporary bus stop relocations, temporary detours, increased travel times, and changes in service schedule. Intermittent roadway lane closures and detours would not prevent the use of pedestrian and bicycle facilities and would allow unimpeded access to public transit facilities during construction activities.

Build Alternative (Alternative 3)

ELs, Mainline, and Ramps

Opening Year 2035

As identified in Tables 2.5.3 and 2.5.4, many of the freeway mainline segments are projected to operate at unacceptable LOS under Alternative 3 in 2035, creating chokepoints and causing congestion on adjacent merge/diverge areas compared to Existing Conditions. Of the 46 GP mainline segments analyzed in the NB direction for Alternative 3, 31 segments (approximately 67 percent) would be expected to operate at unacceptable LOS in the a.m. and/or p.m. peak hours and of the 45 ramp facilities in the northbound direction, 33 facilities (approximately 73 percent) would be expected to operate at LOS E or F in 2035. In the SB direction, 44 GP mainline segments were analyzed, with 24 segments (approximately 54 percent) expected to operate at unacceptable LOS during the a.m. and/or p.m. peak hours and of the 43 ramp facilities in the southbound direction, 24 facilities (approximately 56 percent) would be expected to operate at LOS E or F in 2035.

Of the 43 EL segments analyzed in the NB direction for Alternative 3, all segments are expected to improve LOS compared to the 2035 No Build Alternative and are expected to operate at an LOS of D or higher within the a.m. and/or p.m. peak hours in 2035. In the SB direction, 40 EL segments were analyzed, with only one segment from the Lincoln Avenue off-ramp to Euclid Street expected to operate at an LOS E or F compared to the 2035 No Build Alternative during the a.m. and/or p.m. peak hours.

Alternative 3 would convert the existing HOV lane to an EL (one in each direction) between Red Hill Avenue and SR-55; convert two existing HOV lanes to ELs in each direction between SR-55 and SR-57; and convert an existing HOV lane to an EL in each direction from SR-57 to the OC/LA County line. As such, traffic operations within the Study Area are expected to improve at several EL segments compared to the 2035 No Build Alternative for both the a.m. and p.m. peak hours as a result of the conversion of HOV lanes to ELs under Alternative 3.

Horizon Year 2055

Additionally, as shown in Tables 2.5.9 and 2.5.10, under Alternative 3 in 2055, much like in 2035, many freeway mainline segments are projected to operate at unacceptable LOS, creating chokepoints and causing congestion on adjacent merge and diverge areas compared to Existing Conditions. Of the 46 GP mainline segments analyzed in the NB direction for Alternative 3, in 2055, 32 segments (approximately 70 percent) would be expected to operate at unacceptable LOS in the a.m. and/or p.m. peak hours and of the 45 ramp facilities in the northbound direction, 35 facilities (approximately 78 percent) would be expected to operate at LOS E or F in 2055. In the southbound direction, 44 GP mainline segments were analyzed, with 36 segments (approximately 81 percent) expected to operate at unacceptable LOS during the a.m. and/or p.m. peak hour and of the 43 ramp facilities in the southbound direction, 36 facilities (approximately 84 percent) would be expected to operate at LOS E or F in 2055.

Of the 43 EL segments analyzed in the NB direction for Alternative 3, all segments are expected to improve LOS compared to the 2055 No Build Alternative and operate at an LOS of D or higher within the a.m. and/or p.m. peak hours in 2055. In the SB direction, 40 EL segments were analyzed, with only one segment from the Lincoln Ave. off-ramp to the Euclid St. off-ramp expected to operate at an LOS F during the a.m. and/or p.m. peak hours compared to the 2055 No Build Alternative. The 39 other EL segments analyzed are projected to operate at an LOS of D or higher during the a.m. and/or p.m. peak hours compared to the 2055 No Build Alternative.

Similar to 2035 conditions, improvements for the EL segments under Alternative 3 in 2055 are expected to improve traffic operations at several EL segments over the 2055 No Build Alternative for both the a.m. and p.m. peak hours.

Intersections

Opening Year 2035

As shown in Tables 2.5.5 and 2.5.6, under Alternative 3 in 2035, a total of 13 Study Area intersections (approximately 19 percent) are projected to operate at LOS E or F in one or both peak periods. Per the *Traffic Operations Analysis Report* (April 2023), the intersection analysis for Alternative 3 assumes the same lane configuration as the No Build Alternative. There are five total intersections which operate at an LOS of D or higher under the 2035 No Build Alternative which would be degraded to an LOS E or F under Alternative 3 in 2035. These include intersections: R-11, R-32, A-29, A-31, and A-32 as noted in tables 2.5.5 and 2.5.6, below.

Horizon Year 2055

Tables 2.5.11 and 2.5.12 outline the intersection operations under Alternative 3 in 2055. In 2055, a total of 21 Study Area intersections (approximately 30 percent) are projected to operate at LOS E or F in one or both peak periods. Per the *Traffic Operations Analysis Report* (April 2023), the intersection analysis for Alternative 3 assumes the same lane configuration as the No Build Alternative. There are four total intersections which operate at an LOS of D or higher under the 2055 No Build Alternative which would be degraded to an LOS E or F under Alternative 3 in 2055. These include intersections: R-4, A-21, A-25, and A-31 as noted in tables 2.5.11 and 2.5.12, below.

Ramp Capacity

As shown in Tables 2.5.7 and 2.5.13, under Alternative 3, the peak-hour ramp volume for all of the on-ramps except one (I-5 NB Main Street) is within the acceptable maximum metering rate of 900 vehicles per hour per lane (vphpl). In the *Traffic Operations Analysis Report* (April 2023), on-ramp assessments for all Build Alternatives were assumed to have the same number of lanes at the ramp meter and locations with ramp meters as the No Build Alternative. Therefore, under all analysis scenarios, the p.m. peak hour volume for the I-5 NB Main Street on-ramp is forecasted to have a volume greater than 900 vphpl (1,800 vph). Tables 2.5.8 and 2.5.14 contain a summary of off-ramp queue lengths for Alternative 3 in 2035 and 2055, respectively. It is anticipated that queue lengths provided on all on-ramps with minimum ramp metering rates would be adequate under 2035 Alternative 3 conditions, similar to the 2035 and 2055 No Build Alternative. Therefore, Alternative 3 would not result in adverse impacts related to ramp queuing.

Bicycle and Pedestrian Facilities

Refer to Section 2.5.2.3 – Pedestrian and Bicycle Facilities above for a list of Class I and Class II bike facilities that intersect with the Project Area. Alternative 3 would not include any modifications to arterials at their intersections with I-5 that would permanently affect bicycle and pedestrian facilities and would also include the construction of two park-and-ride facilities within the existing freeway right-of-way (ROW). Based on the locations of these two park-and-ride facilities as shown on Figure 1-3 in Chapter 1, potential temporary construction closures could occur at the South Anaheim Boulevard undercrossing and Grand Avenue undercrossing in order to accommodate the construction of these two park-and-ride facilities. However, any potential closures would be temporary in nature to accommodate the construction of the park-and-ride facilities, and is not expected to result in permanent to local bicycle and pedestrian facilities. Therefore, Alternative 3 would not result in permanent adverse impacts related to bicycle and pedestrian facilities.

Public Transit

Alternative 3 would potentially result in temporary detours and increased travel times for local bus services that intersect with the Project Area. Implementation of the TMP (PF-TR-1) will ensure coordination with OCTA, LA Metro, and ART to alert transit patrons of any changes prior to temporary bus stop relocations, temporary detours, increased travel times, and changes in service schedule. Intermittent roadway lane closures and detours would not prevent the use of pedestrian and bicycle facilities and would allow unimpeded access to public transit facilities during construction activities. Therefore, Alternative 3 would not result in adverse impacts related to public transit access.

Build Alternative (Alternative 4)

ELs, Mainline and Ramps

Opening Year 2035

As identified in Tables 2.5.3 and 2.5.4, many of the freeway mainline segments are projected to operate at unacceptable LOS under Alternative 4 in 2035, creating chokepoints and causing congestion on adjacent merge/diverge areas compared to Existing Conditions. Of the 46 GP mainline segments analyzed in the NB direction for Alternative 4, 30 segments (approximately 65 percent) would be expected to operate at unacceptable LOS in the a.m. and/or p.m. peak hours and of the 45 ramp facilities in the northbound direction, 33 facilities (approximately 73 percent) would be expected to operate at LOS E or F in 2035. In the SB direction, 44 GP mainline segments were analyzed, with 25 segments

approximately 57 percent) expected to operate at unacceptable LOS during the a.m. and/or p.m. peak hours and of the 43 ramp facilities in the southbound direction, 24 facilities (approximately 56 percent) would be expected to operate at LOS E or F in 2035.

Of the 43 EL segments analyzed in the NB direction for Alternative 4, all segments are expected to improve LOS compared to 2035 No Build Alternative and are expected to operate at an LOS of D or higher within the a.m. and/or p.m. peak hours in 2035. In the SB direction, 40 EL segments were analyzed, with only one segment from the Lincoln Avenue off-ramp to Euclid Street expected to operate at an LOS E or F compared to the 2035 No Build Alternative during the a.m. and/or p.m. peak hours.

Alternative 4 would convert the existing HOV lane to an EL in each direction between Red Hill Avenue and SR-55; convert two existing HOV lanes to ELs in each direction between SR-55 and SR-57; convert the existing HOV lane to an EL in each direction from SR-57 to the OC/LA County line; and construct an additional EL in each direction between SR-57 and SR-91. As such, traffic operations within the Study Area are expected to improve at several EL segments compared to the 2035 No Build Alternative for both the a.m. and p.m. peak hours as a result of the conversion of HOV lanes to ELs and the addition of an EL under Alternative 4.

Horizon Year 2055

Additionally, as shown in Tables 2.5.9 and 2.5.10, under Alternative 4 in 2055, much like in 2035, many freeway mainline segments are projected to operate at unacceptable LOS, creating chokepoints and causing congestion on adjacent merge and diverge areas compared to Existing Conditions. Of the 46 GP mainline segments analyzed in the NB direction for Alternative 4 in 2055, 30 GP mainline segments (approximately 65 percent) would be expected to operate at unacceptable LOS in the a.m. and/or p.m. peak hours in 2055, and of the 45 ramp facilities in the northbound direction 33 facilities (approximately 73 percent) would be expected to operate at LOS E or F in 2055. In the SB direction, 44 GP mainline segments were analyzed, with 33 segments (approximately 75 percent) expected to operate at unacceptable LOS during the a.m. and/or p.m. peak hour and of the 43 ramp facilities in the southbound direction 34 facilities (approximately 79 percent) would be expected to operate at LOS E or F in 2055.

Of the 43 EL segments analyzed in the NB direction for Alternative 4, all segments are expected to improve LOS compared to the 2055 No Build Alternative and operate at an LOS of D or higher within the a.m. and/or p.m. peak hours in 2055. In the SB direction, 40 EL segments were analyzed, with all but 2 segments (approximately 95 percent) expected to improve LOS compared to the 2055 No Build Alternative. These 2 segments would continue to operate at an LOS E or F during the a.m. and/or p.m. peak hours in 2055. As such, traffic operations within the Study Area are expected to improve at several EL segments compared to the 2055 No Build Alternative for both the a.m. and/or p.m. peak hours as a result of the conversion of HOV lanes to ELs and the addition of an EL under Alternative 4.

Similar to 2035 conditions, improvements for the EL segments under Alternative 4 in 2055 are expected to improve traffic operations at several EL segments over the 2055 No Build Alternative for both a.m. and p.m. peak hours.

Intersections

Opening Year 2035

As shown in Tables 2.5.5 and 2.5.6, under Alternative 4 in 2035, a total of 13 Study Area intersections (approximately 19 percent) are projected to operate at LOS E or F in one or both peak periods. Per the *Traffic Operations Analysis Report* (April 2023), the intersection analysis for Alternative 4 assumes the same lane configuration as the No Build Alternative. There are five total intersections which operate at an LOS of D or higher under the 2035 No Build Alternative which would be degraded to an LOS E or F under Alternative 4 in 2035. These include intersections: R-32, A-13, A-29, and A-32 as noted in tables 2.5.5 and 2.5.6, below.

Horizon Year 2055

Tables 2.5.11 and 2.5.12 outline the intersection operations under Alternative 4 in 2055. In 2055, a total of 22 Study Area intersections (approximately 31 percent) are projected to operate at LOS E or F in one or both peak periods. Per the *Traffic Operations Analysis Report* (April 2023), the intersection analysis for Alternative 4 assumes the same lane configuration as the No Build Alternative. There are three total intersections which operate at an LOS of D or higher under the 2055 No Build Alternative which would be degraded to an LOS E or F under Alternative 4 in 2055. These include intersections: A-21, A-25, and A-31 as noted in tables 2.5.11 and 2.5.12, below.

Ramp Capacity

As shown in Tables 2.5.7 and 2.5.13, under Alternative 4, the peak-hour ramp volume for all of the on-ramps except one (I-5 NB Main Street) is within the acceptable maximum metering rate of 900 vphpl. In the *Traffic Operations Analysis Report* (April 2023), on-ramp assessments for all Build Alternatives were assumed to have the same number of lanes at the ramp meter and locations with ramp meters as the No Build Alternative. Therefore, under all analysis scenarios, the p.m. peak hour volume for the I-5 NB Main Street on-ramp is forecasted to have a volume greater than 900 vphpl (1,800 vehicles vph). Tables 2.5.8 and 2.5.14 contain a summary of off-ramp queue lengths in 2035 and 2055, respectively. It is anticipated that queue lengths provided on all on-ramps with minimum ramp metering rates would be adequate under 2035 Alternative 4 conditions. Therefore, Alternative 4 would not result in adverse impacts related to ramp queuing.

Bicycle and Pedestrian Facilities

Refer to Section 2.5.2.3 – Pedestrian and Bicycle Facilities above for a list of Class I and Class II bike facilities that intersect with the Project Area. Alternative 4 would not include any modifications to arterials at their intersections with I-5 that would affect bicycle and pedestrian facilities and would also include the construction of two park-and-ride facilities within the existing freeway right-of-way (ROW). Based on the locations of these two park-and-ride facilities as shown on Figure 1-3 in Chapter 1, potential temporary construction closures could occur at the South Anaheim Boulevard undercrossing and Grand Avenue undercrossing in order to accommodate the construction of these two park-and-ride facilities. However, any potential closures would be temporary in nature to accommodate the construction of the park-and-ride facilities, and is not expected to result in permanent to local bicycle and pedestrian facilities. Therefore, Alternative 4 would not result in permanent adverse impacts related to bicycle and pedestrian facilities.

Public Transit

Alternative 4 would potentially result in temporary detours and increased travel times for local bus services that intersect with the Project Area. Implementation of the TMP (PF-TR-1) will ensure coordination with OCTA, LA Metro, and ART to alert transit patrons of any changes prior to temporary bus stop relocations, temporary detours, increased travel times, and changes in service schedule. Intermittent roadway lane closures and detours would not prevent the use of pedestrian and bicycle facilities and would allow unimpeded access to public transit facilities during construction

activities. Therefore, Alternative 4 would not result in permanent adverse impacts related to public transit access.

No Build Alternative (Alternative 1)

HOV, Mainline, and Ramps

Opening Year 2035

As shown in Tables 2.5.3 and 2.5.4, many of the freeway segments are projected to operate at unacceptable LOS under the No Build Alternative in 2035, creating chokepoints and causing congestion on adjacent merge/diverge areas compared to Existing Conditions. Of the 46 GP mainline segments analyzed in the NB direction for the No Build Alternative, 28 segments (approximately 61 percent) would be expected to operate at unacceptable LOS in the a.m. and/or p.m. peak hours and of the 45 ramp facilities in the northbound direction, 32 facilities (approximately 71 percent) would be expected to operate at LOS E or F in 2035. In the SB direction, 44 GP mainline segments were analyzed, with 25 segments (approximately 57 percent) expected to operate at unacceptable LOS during the a.m. and/or p.m. peak hour and of the 43 ramp facilities in the southbound direction, 27 facilities (approximately 63 percent) would be expected to operate at LOS E or F in 2035.

Of the 46 HOV segments analyzed in the NB direction for the No Build Alternative, all but 1 segment (approximately 99 percent) is expected to improve LOS and is expected to operate at an LOS of D or higher during the a.m. and/or p.m. peak hours in 2035. In the SB direction, 44 HOV segments were analyzed, with only 7 segments (approximately 16 percent) expected to improve LOS compared to Existing Conditions and to operate at an LOS of D or higher during the a.m. and/or p.m. peak hours in 2035.

The No Build Alternative would maintain the existing lane configurations for I-5, and the proposed improvements under the Build Alternatives would not occur. However, improvements associated with other projects planned by OCTA, Caltrans and local agencies are assumed to be completed, which could improve freeway conditions from their respective proposed improvements. The following are the planned freeway improvement projects on I-5 that are assumed to be completed by year 2035 and are included in No Build Alternative (Alternative 1):

- *I-5 Improvement Project (South Los Angeles County) from the Orange/Los Angeles County line to I-605 (FTIP# LA0D73)*

Project improvements include an addition of HOV lanes, mixed flow lanes, interchange modifications at select locations, pedestrian overcrossings, frontage road modification and re-establishing a major surface street connection between communities.

- *I-5 Improvement Project from I-405 to SR-55 (FTIP# ORA130302, EA0K670)*

Project improvements include an addition of one GP lane in each direction, auxiliary lanes selected locations, convert existing buffer separated HOV lanes to continuous access HOV lanes, and modify ramp configuration on select interchanges.

Therefore, the analysis below shows that traffic operations within the Study Area are expected to improve in the NB direction during the a.m. and p.m. peak hours in 2035 at several HOV segments compared to Existing Conditions but would worsen in the SB direction during the a.m. and p.m. peak hours compared to Existing Conditions.

Horizon Year 2055

Additionally, as shown in Tables 2.5.9 and 2.5.10 many of the freeway segments are projected to operate at unacceptable LOS under the No Build Alternative in 2035, creating chokepoints and causing congestion on adjacent merge/diverge areas compared to the Existing Condition. Of the 46 GP mainline segments analyzed in the NB direction for the No Build Alternative, 31 GP mainline segments (approximately 57 percent) would be expected to operate at unacceptable LOS in the a.m. and/or p.m. peak hours and of the 45 ramp facilities in the northbound direction 32 facilities (approximately 76 percent) would be expected to operate at LOS E or F in 2055. In the SB direction, 44 GP mainline segments were analyzed, with 27 segments (approximately 61 percent) expected to operate at unacceptable LOS during the a.m. and/or p.m. peak hours and of the 43 ramp facilities in the southbound direction 32 facilities (approximately 74 percent) would be expected to operate at LOS E or F in 2055. See above for how improved conditions under the 2055 No Build Alternative include the

consideration of two other major freeway improvement projects within the Study Area.

Of the 43 HOV segments analyzed in the NB direction for the No Build Alternative, all segments are expected to improve LOS compared to Existing Conditions and operate at an LOS of D or higher within the a.m. and/or p.m. peak hours in 2055. In the southbound direction, 40 HOV segments were analyzed, with all but two segments (approximately 95 percent) expected to improve LOS compared to Existing Conditions and operate at an LOS of D or higher during the a.m. and/or p.m. peak hours in 2055.

Similar to 2035 conditions, the No Build Alternative in 2055 is expected to improve in the NB direction during the a.m. and p.m. peak hours at several HOV segments compared to Existing Conditions but would worsen in the SB direction during the a.m. and p.m. peak hours compared to Existing Conditions.

Intersections

Opening Year 2035

As shown in Tables 2.5.5 and 2.5.6, under the No Build Alternative in 2035, a total of nine Study Area intersections (approximately 12 percent) are projected to operate at LOS E or F in one or both peak periods. This total represents three more Study Area intersections than the six Study Area intersections that operate at LOS E or F under 2022 Existing Conditions.

Horizon Year 2055

Tables 2.5.11 and 2.5.12 outline the intersection operations under the No Build Alternative in 2055. In 2055, a total of 19 Study Area intersections (approximately 27 percent) are projected to operate at LOS E or F in one or both peak periods. This total represents 13 more Study Area intersections than the six Study Area intersections that operate at LOS E or F under 2022 Existing Conditions.

Ramp Capacity

As indicated in Tables 2.5.7 and 2.5.13, queue lengths provided on all on-ramps with minimum ramp metering rates are projected to be adequate under both the 2035 and 2055 No Build Alternative scenarios. Similarly, all off-ramps within the Project Area are projected to have adequate queue lengths under both 2035 and 2055 No Build Alternative conditions.

Bicycle and Pedestrian Facilities

None of the improvements proposed under the Build Alternatives would be constructed under the No Build Alternative; therefore, no permanent impacts related to pedestrian or bicycle facilities would occur.

Public Transit

None of the improvements proposed under the Build Alternatives would be constructed under the No Build Alternative; therefore, no permanent impacts related to public transit would occur.

2.5.4 Avoidance, Minimization, and/or Mitigation Measures

The Build Alternatives will incorporate PF-TR-1 listed above to help avoid and/or minimize potential impacts. No additional avoidance, minimization, and/or mitigation measures other than measure PF-TR-1 are required.

Table 2.5.1: Existing (2022) Intersection Peak-Hour LOS—Ramp Terminal Intersections

No.	From	2022 AM Peak Hour		2022 PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
R-1	I-5 SB on/off-ramp and Red Hill Avenue	17.1	B	30.7	C
R-2	I-5 NB on/off-ramp and Red Hill Avenue	19.3	B	15.8	B
R-3	I-5 NB on-ramp and Newport Avenue*	N/A	N/A	N/A	N/A
R-4	I-5 SB off-ramp and Newport Avenue	25.2	C	30.8	C
R-5	I-5 SB on-ramp and E. First Street	8.3	A	5.9	A
R-6	I-5 NB on/off-ramp and E. 4th Street	17.2	B	7.3	A
R-7	I-5 SB off-ramp and E. 4th Street	23.3	C	18.7	B
R-8	I-5 NB on/off-ramp and Grand Avenue	12.0	B	11.2	B
R-9	I-5 SB on/off-ramp and E. Santa Ana Boulevard	27.8	C	30.8	C
R-10	I-5 SB HOV on-ramp / NB HOV Off-ramp and Grand Avenue	51.9	D	50.1	D
R-11	I-5 NB off-ramp and 17th Street	38.4	D	39.6	D
R-12	I-5 SB on/off-ramp and Penn Way	34.7	C	33.4	C
R-13	I-5 NB off-ramp and Main Street	30.7	C	31.0	C
R-14	I-5 NB on-ramp/I-5 SB off-ramp/Santa Clara and Main Street	45.6	D	65.6	E
R-15	I-5 SB on-ramp/Buffalo Avenue and Main Street	16.8	B	18.9	B
R-16	I-5 NB off-ramp and Broadway	18.4	B	14.9	B
R-17	I-5 NB off-ramp/SB on-ramp and Chapman Avenue	52.6	D	43.8	D
R-18	I-5 NB on-ramp and W. Chapman Avenue	32.9	C	33.9	C
R-19	I-5 NB on/off-ramp and The City Drive/State College Boulevard	15.7	B	30.5	C
R-20	I-5 SB off/on-ramp and The City Drive/State College Boulevard	17.0	B	17.2	B
R-21	I-5 NB/SB HOV ramps/E. Gene Autry Way	23.3	C	25.0	C
R-22	I-5 SB off-ramp and E. Katella Avenue	20.7	C	20.9	C
R-23	I-5 NB on-ramp and S. Anaheim Way	19.2	B	26.2	C
R-24	I-5 SB off-ramp and Disney Way	18.0	B	19.1	B
R-25	I-5 NB on/off-ramp and S. Harbor Boulevard	11.3	B	13.2	B
R-26	I-5 SB on/off-ramp and S. Harbor Boulevard	8.3	A	5.8	A
R-27	I-5 SB/NB on/off-ramp and Disneyland Drive	40.7	D	43.2	D
R-28	I-5 NB on/off-ramp and Lincoln Avenue	27.6	C	37.3	D
R-29	I-5 SB on/off-ramp and Lincoln Avenue	27.9	C	23.1	C
R-30	I-5 SB/NB on/off-ramp and Euclid Street	46.7	D	68.9	E
R-31	I-5 NB off-ramp and W La Palma Avenue*	0.7	A	0.7	A
R-32	I-5 NB off-ramp/SB on/off-ramp and Brookhurst Street	48.4	D	50.5	D
R-33	I-5 NB off-ramp and Magnolia Street	21.0	C	24.7	C
R-34	I-5 SB on/off-ramp and Magnolia Street	30.2	C	27.7	C
R-35	I-5 NB off-ramp and Auto Center Drive	23.8	C	20.3	C

Table 2.5.1: Existing (2022) Intersection Peak-Hour LOS—Ramp Terminal Intersections

No.	From	2022 AM Peak Hour		2022 PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
R-36	I-5 NB on/off-ramp and Auto Center Drive	34.4	C	38.0	D
R-37	I-5 SB on/off-ramp and Beach Boulevard	16.6	B	35.1	D
R-38	I-5 NB on/off-ramp and Artesia Boulevard	43.4	D	30.7	C
R-39	I-5 SB off-ramp and Artesia Boulevard	29.1	C	28.9	C

HOV = high-occupancy vehicle
 I = Interstate
 LOS = level of service
 N/A = not applicable
 NB = northbound
 SB = southbound

Table 2.5.2: Existing (2022) Intersection Peak-Hour LOS—Local Arterial Intersections

No.	From	2022 AM Peak Hour		2022 PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
A-1	El Camino Real and Red Hill Avenue	33.1	C	21.7	C
A-2	Nisson Road and Red Hill Avenue	33.2	C	37.7	D
A-3	El Camino Real and Newport Avenue	35.1	D	42.0	D
A-4	Mitchell Avenue and Newport Avenue	19.7	B	24.5	C
A-5	Elk Lane and E. First Street	24.8	C	19.2	B
A-6	Cabrillo Park Drive and E. 4 th Street	39.0	D	52.5	D
A-7	17 th Street and Penn Way	13.8	B	15.2	B
A-8	17 th Street and Lincoln Avenue	25.6	C	27.6	C
A-9	Main Street and W 20 th Street	16.1	B	18.5	B
A-10	Broadway and Santa Clara Avenue and I-5 SB off-ramp	24.8	C	56.2	E
A-11	The City Drive N. and Chapman Avenue	43.6	D	39.5	D
A-12	E. Katella Avenue and S. Anaheim Way	21.4	C	25.7	C
A-13	W. Katella Avenue and S. Anaheim Boulevard/S. Haster Street	32.3	C	39.3	D
A-14	S. Clementine Street and Disney Way	24.9	C	28.1	C
A-15	S. Anaheim Boulevard and Disney Way/Manchester Avenue	60.7	E	45.7	D
A-16	S. Anaheim Boulevard and E. Cerritos Avenue	18.9	B	32.2	C
A-17	Harbor Boulevard and W. Manchester Avenue	18.7	B	19.5	B
A-18	Harbor Boulevard and W. Ball Road	54.9	D	50.8	D
A-19	Disneyland Drive and W. Ball Road	63.2	E	73.5	E
A-20	Lincoln Avenue and N. Manchester Avenue	26.1	C	17.2	B
A-21	Lincoln Avenue and N. Loara Street	35.1	D	48.5	D
A-22	Lincoln Avenue and S. West Street	35.9	D	37.0	D
A-23	S. Euclid Street and Lincoln Avenue	37.7	D	42.2	D
A-24	Euclid Street and Crescent Avenue	29.4	C	50.5	D
A-25	La Palma Avenue and Brookhurst Street	38.9	D	41.9	D
A-26	Brookhurst Street and Sequoia Avenue	16.1	B	17.5	B
A-27	Orangethorpe Avenue and Magnolia Avenue	38.4	D	42.0	D
A-28	Auto Center Drive and Orangethorpe Avenue	12.3	B	11.2	B
A-29	Auto Center Drive and Stanton Avenue	27.6	C	36.2	D
A-30	Beach Boulevard and 9 th Street	12.7	B	9.5	A
A-31	Beach Boulevard and Auto Center Drive	39.8	D	56.2	E
A-32	Auto Center Drive and Commonwealth Avenue	17.6	B	27.6	C

I = Interstate
LOS = level of service
NB = northbound
SB = southbound

Table 2.5.3: Existing (2002), 2035 No Build Alternative (Alternative 1), and 2035 Build Alternatives (Alternatives 2, 3, and 4) Peak-Hour LOS Summary for I-5 Northbound Mainline and Ramps

Segment from	Segment to	Facility	GP										HOV/EL*									
			2022 Existing		2035 No Build Alternative (Alternative 1)		2035 Alternative 2		2035 Alternative 3		2035 Alternative 4		2022 Existing		2035 No Build Alternative (Alternative 1)		2035 Alternative 2		2035 Alternative 3		2035 Alternative 4	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
South of Red Hill Avenue off-ramp	Red Hill Avenue off-ramp	Mainline	E	F	E	F	F	F	E	F	E	E	F	F	F	F	A	B	-	-	-	-
JRed Hill Avenue off-ramp		Ramp	E	E	E	E	E	F	E	E	E	E	-	-	-	-	-	-	-	-	-	-
Red Hill Avenue off-ramp	Red Hill Avenue on-ramp	Mainline	D	D	D	C	C	F	F	F	D	C	E	F	D	F	C	B	-	-	-	-
Red Hill Avenue on-ramp		Ramp	E	F	E	F	E	F	F	F	E	F	-	-	-	-	-	-	-	-	-	-
Red Hill Avenue on-ramp	Newport Avenue on-ramp	Mainline	E	F	D	F	D	F	F	F	D	F	D	F	D	F	D	B	-	-	-	-
Newport Avenue on-ramp		Ramp	E	E	F	E	F	E	F	E	F	E	-	-	-	-	-	-	-	-	-	-
Newport Avenue on-ramp	SR-55 NB off-ramp	Mainline	E	E	F	E	F	E	F	E	F	E	D	F	D	F	A	B	C	B	C	D
SR-55 NB off-ramp		Ramp	E	E	F	E	F	E	F	E	F	E	-	-	-	-	-	-	-	-	-	-
SR-55 NB off-ramp	SR-55 SB off-ramp	Mainline	E	C	E	C	E	C	F	F	E	C	D	F	D	F	A	B	C	B	C	D
SR-55 SB off-ramp		Ramp	E	C	E	C	E	C	F	F	E	C	-	-	-	-	-	-	-	-	-	-
SR-55 SB off-ramp	SR-55 NB on-ramp	Mainline	E	D	E	D	D	D	F	E	E	C	D	F	E	F	D	B	C	B	C	D
SR-55 NB on-ramp		Ramp	F	F	F	F	F	F	E	F	F	E	-	-	-	-	-	-	-	-	-	-
SR-55 NB on-ramp	1st/4th Street off-ramp	Mainline	F	F	F	F	F	F	E	F	F	E	D	F	D	F	A	B	C	B	C	D
1st/4th Street off-ramp		Ramp	F	F	F	F	F	F	E	F	F	E	-	-	-	-	-	-	-	-	-	-
1st/4th Street off-ramp	4th Street on-ramp/SR-55 NB on-ramp (HOV/EL)*	Mainline	E	D	E	D	F	F	F	F	E	D	D	F	D	F	A	B	C	B	C	D
4th Street on-ramp		Ramp	D	E	E	E	D	E	F	F	E	E	-	-	-	-	-	-	-	-	-	-
NB SR-55 on-ramp (HOV/EL)*		Ramp	-	-	-	-	-	-	-	-	-	-	B	C	B	C	A	C	B	B	B	C
4th Street on-ramp/SR-55 NB on-ramp (HOV/EL)*	Grand Avenue off-ramp/Grand Avenue off-ramp (HOV/EL)*	Mainline	D	E	E	E	D	E	F	F	E	E	B	C	B	C	A	C	B	B	B	C
Grand Avenue off-ramp (HOV/EL)*		Ramp	-	-	-	-	-	-	-	-	-	-	B	C	B	C	A	C	B	B	B	C
Grand Avenue off-ramp		Ramp	D	E	E	E	D	E	F	F	E	E	-	-	-	-	-	-	-	-	-	-
Grand Avenue off-ramp/Grand Avenue off-ramp (HOV/EL)*	Grand Avenue on-ramp	Mainline	D	D	D	D	C	F	E	F	D	F	D	D	D	D	C	C	B	B	B	C
Grand Avenue on-ramp		Ramp	E	E	E	E	E	F	F	F	E	F	-	-	-	-	-	-	-	-	-	-
Grand Avenue on-ramp	17th Street off-ramp	Mainline	E	E	E	E	E	F	F	F	E	F	B	B	B	C	A	A	B	B	B	C
17th Street off-ramp		Ramp	E	E	E	E	E	F	F	F	E	F	-	-	-	-	-	-	-	-	-	-
17th Street off-ramp	EB 17th Street on-ramp	Mainline	D	D	D	D	D	F	F	F	E	F	B	F	B	F	A	A	A	B	A	B
EB 17th Street on-ramp		Ramp	D	C	F	C	D	F	F	F	E	F	-	-	-	-	-	-	-	-	-	-
EB 17th Street on-ramp	WB 17th Street on-ramp	Mainline	D	C	F	C	D	F	F	F	E	F	B	F	B	F	A	A	A	B	A	B
WB 17th Street on-ramp		Ramp	F	E	F	E	F	F	F	F	F	F	-	-	-	-	-	-	-	-	-	-
WB 17th Street on-ramp	Main Street/Broadway off-ramp	Mainline	F	E	F	E	F	F	F	F	F	F	B	F	B	F	A	A	A	B	A	B
Main Street/Broadway off-ramp		Ramp	F	E	F	E	F	F	F	F	F	F	-	-	-	-	-	-	-	-	-	-
Main Street/Broadway off-ramp	Main Street on-ramp	Mainline	D	E	F	E	D	F	F	F	F	F	B	F	B	F	A	A	A	B	A	B
Main Street on-ramp		Ramp	E	D	E	D	F	D	F	F	F	F	-	-	-	-	-	-	-	-	-	-
Main Street on-ramp	SR-22 WB off-ramp	Mainline	E	D	E	D	F	D	F	F	F	F	B	F	B	F	A	A	A	B	A	B
SR-22 WB off-ramp		Ramp	E	D	E	D	F	D	F	F	F	F	-	-	-	-	-	-	-	-	-	-
SR-22 WB off-ramp	SR-57 NB off-ramp/SR-57 NB off-ramp (HOV/EL)*	Mainline	E	E	D	E	E	E	E	E	E	E	B	F	B	F	A	A	A	B	A	B
SR-57 NB off-ramp (HOV/EL)*		Ramp	-	-	-	-	-	-	-	-	-	-	B	F	B	F	A	B	A	B	A	B
SR-57 NB off-ramp		Ramp	E	E	E	E	E	E	E	E	E	D	-	-	-	-	-	-	-	-	-	-
SR-57 NB off-ramp/SR-57 NB off-ramp (HOV/EL)*	SR-22 WB on-ramp	Mainline	C	C	C	C	C	C	C	D	C	D	B	F	B	F	A	B	A	B	A	B
SR-22 WB on-ramp		Ramp	C	D	C	E	C	F	C	F	C	F	-	-	-	-	-	-	-	-	-	-
SR-22 WB on-ramp	Chapman Avenue off-ramp	Mainline	C	D	C	E	C	F	C	F	C	F	B	F	B	F	A	B	A	B	A	B
Chapman Avenue off-ramp		Ramp	C	D	C	E	C	F	C	F	C	F	-	-	-	-	-	-	-	-	-	-
Chapman Avenue off-ramp	The City Drive off-ramp	Mainline	C	F	C	F	C	F	C	F	C	F	B	F	B	F	A	B	A	B	A	B
The City Drive off-ramp		Ramp	C	F	C	F	C	F	C	F	C	F	-	-	-	-	-	-	-	-	-	-
The City Drive off-ramp	The City Drive on-ramp	Mainline	C	D	C	D	D	F	C	F	C	F	B	F	B	F	A	B	A	B	A	B
The City Drive on-ramp		Ramp	C	F	C	F	D	F	C	F	C	F	-	-	-	-	-	-	-	-	-	-

Table 2.5.3: Existing (2002), 2035 No Build Alternative (Alternative 1), and 2035 Build Alternatives (Alternatives 2, 3, and 4) Peak-Hour LOS Summary for I-5 Northbound Mainline and Ramps

Segment from	Segment to	Facility	GP										HOV/EL*									
			2022 Existing		2035 No Build Alternative (Alternative 1)		2035 Alternative 2		2035 Alternative 3		2035 Alternative 4		2022 Existing		2035 No Build Alternative (Alternative 1)		2035 Alternative 2		2035 Alternative 3		2035 Alternative 4	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Gene Autry Way/Disney Way off-ramp (HOV/EL)*		Ramp	-	-	-	-	-	-	-	-	-	-	B	D	B	C	A	A	A	A	A	A
The City Drive on-ramp	Katella Avenue off-ramp	Mainline	C	F	C	F	D	F	C	F	C	F	B	F	B	F	A	A	B	C	A	B
Katella Avenue off-ramp		Ramp	C	F	C	F	D	F	C	F	C	F	-	-	-	-	-	-	-	-	-	-
Katella Avenue off-ramp	Anaheim Way/Orangewood Avenue on-ramp	Mainline	C	F	C	F	C	F	C	F	C	F	C	F	C	F	C	B	B	C	A	B
Anaheim Way/Orangewood Avenue on-ramp		Ramp	D	F	D	F	D	F	C	F	C	F	-	-	-	-	-	-	-	-	-	-
Anaheim Way/Orangewood Avenue on-ramp	Katella Avenue on-ramp	Mainline	D	F	D	F	D	F	C	F	C	F	B	F	B	F	A	B	B	C	A	B
Katella Avenue on-ramp		Ramp	C	F	C	F	D	F	C	F	C	F	-	-	-	-	-	-	-	-	-	-
Katella Avenue on-ramp	S. Anaheim Boulevard on-ramp	Mainline	C	F	C	F	D	F	C	F	C	F	B	F	B	F	A	B	B	C	A	B
Anaheim Boulevard on-ramp		Ramp	D	F	D	F	D	F	D	F	D	F	-	-	-	-	-	-	-	-	-	-
S. Anaheim Boulevard on-ramp	Harbor Boulevard off-ramp	Mainline	D	F	D	F	D	F	D	F	D	F	B	F	B	F	C	B	B	C	A	B
Harbor Boulevard off-ramp		Ramp	D	F	D	F	D	F	D	F	D	F	-	-	-	-	-	-	-	-	-	-
Gene Autry Way on-ramp (HOV/EL)*		Ramp	-	-	-	-	-	-	-	-	-	-	B	F	B	F	A	B	A	B	A	B
Harbor Boulevard off-ramp	Harbor Boulevard on-ramp	Mainline	C	F	C	F	C	F	C	F	C	F	C	F	C	F	C	B	A	C	A	B
Harbor Boulevard on-ramp		Ramp	C	D	C	D	C	D	C	D	C	D	-	-	-	-	-	-	-	-	-	-
Harbor Boulevard on-ramp	Ball Road on-ramp	Mainline	C	D	C	D	C	D	C	D	C	D	B	D	B	D	A	B	A	C	A	B
Ball Road on-ramp		Ramp	D	D	D	D	D	D	D	D	D	D	-	-	-	-	-	-	-	-	-	-
Ball Road on-ramp	Disneyland Drive on-ramp	Mainline	D	E	D	E	D	E	D	E	D	E	B	D	B	D	A	B	A	C	A	B
Disneyland Drive on-ramp		Ramp	C	D	C	D	C	D	C	D	C	D	-	-	-	-	-	-	-	-	-	-
Disneyland Drive on-ramp	Lincoln Avenue off-ramp	Mainline	C	D	C	D	C	D	C	D	C	D	B	D	B	D	A	B	A	C	A	B
Lincoln Avenue off-ramp		Ramp	D	E	D	E	D	E	D	E	D	E	-	-	-	-	-	-	-	-	-	-
Lincoln Avenue off-ramp	Lincoln Avenue on-ramp	Mainline	C	D	C	E	C	D	C	D	C	D	C	D	C	E	C	B	B	C	A	B
Lincoln Avenue on-ramp		Ramp	D	F	D	F	D	F	D	F	D	E	-	-	-	-	-	-	-	-	-	-
Lincoln Avenue on-ramp	Euclid Street off-ramp	Mainline	D	F	D	F	D	F	D	F	D	E	C	D	C	E	C	B	B	C	A	B
Euclid Street off-ramp		Ramp	D	F	D	F	D	F	D	F	D	E	-	-	-	-	-	-	-	-	-	-
Euclid Street off-ramp	Euclid Street on-ramp	Mainline	D	D	C	F	D	D	C	D	C	D	B	D	C	E	A	B	B	D	A	D
Euclid Street on-ramp		Ramp	D	F	D	F	D	F	D	F	D	E	-	-	-	-	-	-	-	-	-	-
Euclid Street on-ramp	Brookhurst Street off-ramp	Mainline	D	F	D	F	D	F	D	F	D	E	B	D	B	D	A	B	B	D	A	D
Brookhurst Street off-ramp		Ramp	D	F	D	F	D	F	D	F	D	E	-	-	-	-	-	-	-	-	-	-
Brookhurst Street off-ramp	La Palma Avenue off-ramp	Mainline	D	E	D	D	D	E	D	E	D	D	B	D	B	D	A	B	B	D	A	D
La Palma Avenue off-ramp		Ramp	D	E	D	D	D	E	D	E	D	D	-	-	-	-	-	-	-	-	-	-
La Palma Avenue off-ramp	Brookhurst Street on-ramp	Mainline	C	D	C	D	C	D	C	D	C	C	C	D	B	D	A	B	B	D	A	D
Brookhurst Street on-ramp		Ramp	C	C	C	C	C	D	C	C	C	C	-	-	-	-	-	-	-	-	-	-
Brookhurst Street on-ramp	La Palma Avenue on-ramp	Mainline	C	C	C	C	C	D	C	C	C	C	B	D	B	D	A	B	B	D	A	D
La Palma Avenue on-ramp		Ramp	C	D	C	D	D	D	C	D	C	D	-	-	-	-	-	-	-	-	-	-
La Palma Avenue on-ramp	SR-91 WB off-ramp	Mainline	C	D	C	D	D	D	C	D	C	D	B	C	B	D	A	B	A	B	-	-
SR-91 WB off-ramp		Ramp	C	D	C	D	D	D	C	D	C	D	-	-	-	-	-	-	-	-	-	-
SR-91 WB off-ramp	SR-91 EB off-ramp/SR-91 WB off-ramp (HOV/EL)*	Mainline	D	E	D	E	E	E	D	E	D	E	A	B	B	D	A	A	A	A	A	C
SR-91 WB off-ramp (HOV/EL)			-	-	-	-	-	-	-	-	-	-	A	A	B	D	A	B	B	D	A	D
SR-91 EB off-ramp		Ramp	D	E	D	E	E	E	D	E	D	E	-	-	-	-	-	-	-	-	-	-
SR-91 EB off-ramp/SR-91 WB off-ramp (HOV/EL)*	SR-91 WB on-ramp/SR-91 WB on-ramp (HOV/EL)*	Mainline	B	B	B	B	B	B	B	C	B	B	C	D	C	D	C	B	B	D	A	D
SR-91 WB on-ramp		Ramp	B	B	B	B	B	C	B	C	B	F	-	-	-	-	-	-	-	-	-	-
SR-91 WB on-ramp (HOV/EL)*			-	-	-	-	-	-	-	-	-	-	B	B	B	C	A	B	B	D	A	D
SR-91 WB on-ramp/SR-91 WB on-ramp (HOV/EL)*	Orangethorpe Avenue on-ramp	Mainline	B	B	B	B	B	C	B	C	B	F	B	C	B	C	A	B	A	B	A	B

Table 2.5.3: Existing (2002), 2035 No Build Alternative (Alternative 1), and 2035 Build Alternatives (Alternatives 2, 3, and 4) Peak-Hour LOS Summary for I-5 Northbound Mainline and Ramps

Segment from	Segment to	Facility	GP										HOV/EL*									
			2022 Existing		2035 No Build Alternative (Alternative 1)		2035 Alternative 2		2035 Alternative 3		2035 Alternative 4		2022 Existing		2035 No Build Alternative (Alternative 1)		2035 Alternative 2		2035 Alternative 3		2035 Alternative 4	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Orangethorpe Avenue on-ramp		Ramp	B	C	B	C	B	C	B	C	B	C	-	-	-	-	-	-	-	-	-	-
Orangethorpe Avenue on-ramp	Auto Center Drive off-ramp	Mainline	B	C	B	C	B	C	B	C	B	C	A	A	A	A	A	A	A	A	A	B
Auto Center Drive off-ramp		Ramp	B	C	B	C	B	C	B	C	B	C	-	-	-	-	-	-	-	-	-	-
Auto Center Drive off-ramp	Beach Boulevard off-ramp	Mainline	B	B	B	B	B	B	B	C	B	B	B	B	A	B	A	A	B	B	B	C
Beach Boulevard off-ramp		Ramp	B	B	B	B	B	B	B	C	B	B	-	-	-	-	-	-	-	-	-	-
Beach Boulevard off-ramp	Beach Boulevard on-ramp	Mainline	C	C	C	C	C	C	B	B	B	B	A	B	A	B	A	A	A	A	A	C
Beach Boulevard on-ramp		Ramp	C	C	C	C	C	C	B	B	B	B	-	-	-	-	-	-	-	-	-	-
Beach Boulevard on-ramp	Artesia Boulevard off-ramp	Mainline	C	C	C	C	C	C	B	B	B	B	B	B	B	B	A	A	B	A	B	C
Artesia Boulevard off-ramp		Ramp	C	C	C	C	C	C	B	B	B	B	-	-	-	-	-	-	-	-	-	-
Artesia Boulevard off-ramp	North of Artesia Boulevard off-ramp	Mainline	C	C	C	C	C	C	C	C	C	C	B	B	B	B	A	A	B	A	B	C

* = The No Build Alternative (Alternative 1) and Alternative 2 will maintain HOV lane configurations, and Alternatives 3 and 4 will convert them into ELs. In the event either Alternative 3 or 4 is chosen as the Build Alternative, these marked segments will transition from HOV lanes to ELs.

EB = eastbound
 EL = Express Lane
 HOV = high-occupancy vehicle
 I = Interstate
 LOS = level of service

N/A = not applicable
 NB = northbound
 SB = southbound
 SR = State Route
 WB = westbound

Table 2.5.4: Existing (2022), 2035 No Build Alternative (Alternative 1), and 2035 Build Alternatives (Alternatives 2, 3, and 4) Peak-Hour LOS Summary for I-5 Southbound Mainline and Ramps

Segment from	Segment to	Facility	GP										HOV/EL*									
			2022 Existing		2035 No Build Alternative (Alternative 1)		2035 Alternative 2		2035 Alternative 3		2035 Alternative 4		2022 Existing		2035 No Build Alternative (Alternative 1)		2035 Alternative 2		2035 Alternative 3		2035 Alternative 4	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Artesia Boulevard off-ramp	Artesia Boulevard on-ramp	Mainline	C	B	C	B	F	B	C	B	C	B	B	A	F	A	A	A	A	A	B	A
Artesia Boulevard on-ramp		Ramp	C	B	C	C	F	C	C	C	C	C	-	-	-	-	-	-	-	-	-	-
Artesia Boulevard on-ramp	Beach Boulevard off-ramp	Mainline	C	B	C	C	F	C	C	C	C	C	B	A	F	A	A	A	A	A	B	A
Beach Boulevard off-ramp		Ramp	C	B	C	C	F	C	C	C	C	C	-	-	-	-	-	-	-	-	-	-
Beach Boulevard off-ramp	Beach Boulevard on-ramp	Mainline	C	B	C	B	F	B	C	B	C	B	C	B	F	B	A	A	A	A	B	A
Beach Boulevard on-ramp		Ramp	C	B	C	B	F	C	C	C	C	B	-	-	-	-	-	-	-	-	-	-
Beach Boulevard on-ramp	SR-91 EB off-ramp/SR-91 EB off-ramp (HOV/EL)*	Mainline	C	B	C	B	F	C	C	C	C	B	B	A	F	A	A	A	A	A	B	A
SR-91 EB off-ramp (HOV/EL)*		Ramp	-	-	-	-	-	-	-	-	-	-	B	A	F	A	A	A	A	A	B	A
SR-91 EB off-ramp		Ramp	C	B	C	B	F	C	C	C	C	B	-	-	-	-	-	-	-	-	-	-
SR-91 EB off-ramp/SR-91 EB off-ramp (HOV/EL)*	Magnolia Street off-ramp	Mainline	C	B	C	B	F	B	C	B	C	B	C	A	F	A	A	A	A	A	B	A
Magnolia Street off-ramp		Ramp	C	C	C	C	F	C	C	B	C	B	-	-	-	-	-	-	-	-	-	-
Magnolia Street off-ramp	SR-91 EB on-ramp/SR-91 EB on-ramp (HOV/EL)*	Mainline	B	B	D	B	F	B	E	B	E	B	C	A	F	A	A	A	A	A	B	A
SR-91 EB on-ramp (HOV/EL)*		Ramp	-	-	-	-	-	-	-	-	-	-	E	B	F	B	A	A	B	A	B	A
SR-91 EB on-ramp		Ramp	C	C	F	C	F	C	F	B	F	B	-	-	-	-	-	-	-	-	-	-
SR-91 EB on-ramp/SR-91 EB on-ramp (HOV/EL)*	Magnolia Street on-ramp	Mainline	C	C	F	C	F	C	F	B	F	B	F	C	F	C	A	A	B	A	B	A
Magnolia Street on-ramp		Ramp	D	B	E	B	F	B	F	B	F	B	-	-	-	-	-	-	-	-	-	-
Magnolia Street on-ramp	Brookhurst Street off-ramp	Mainline	D	B	E	B	F	B	F	B	F	B	F	C	F	C	A	A	B	A	B	A
Brookhurst Street off-ramp		Ramp	D	B	E	B	F	B	F	B	F	B	-	-	-	-	-	-	-	-	-	-
Brookhurst Street off-ramp	Brookhurst Street on-ramp	Mainline	F	C	F	C	F	C	F	C	F	C	F	C	F	C	A	E	C	B	B	B
Brookhurst Street on-ramp		Ramp	F	F	F	F	F	F	F	C	F	C	-	-	-	-	-	-	-	-	-	-
Brookhurst Street on-ramp	Euclid Street off-ramp	Mainline	F	F	F	F	F	F	F	C	F	C	F	F	F	F	A	F	C	B	B	A
Euclid Street off-ramp		Ramp	F	F	F	F	F	F	F	C	F	C	-	-	-	-	-	-	-	-	-	-
Euclid Street off-ramp	Lincoln Avenue off-ramp	Mainline	F	B	F	C	F	C	F	C	F	C	F	F	F	F	A	F	C	B	B	A
Lincoln Avenue off-ramp		Ramp	F	C	F	C	F	C	F	C	F	C	-	-	-	-	-	-	-	-	-	-
Lincoln Avenue off-ramp	Euclid Street on-ramp	Mainline	F	B	F	B	F	B	F	C	F	C	F	B	F	B	A	F	F	F	F	F
Euclid Street on-ramp		Ramp	F	C	F	C	F	C	F	C	F	C	-	-	-	-	-	-	-	-	-	-
Euclid Street on-ramp	Lincoln Avenue on-ramp	Mainline	F	C	F	C	F	C	F	C	F	C	D	B	F	B	A	A	B	A	B	A
Lincoln Avenue on-ramp		Ramp	F	B	F	B	F	C	F	C	F	C	-	-	-	-	-	-	-	-	-	-
Lincoln Avenue on-ramp	Disneyland Drive off-ramp/Disneyland Drive off-ramp (HOV/EL)*	Mainline	F	B	F	B	F	C	F	C	F	C	D	B	F	B	A	A	B	A	B	A
Disneyland Drive off-ramp (HOV/EL)*		Ramp	-	-	-	-	-	-	-	-	-	-	C	A	F	B	A	A	B	A	B	A
Disneyland Drive off-ramp		Ramp	F	B	F	B	F	C	F	C	F	C	-	-	-	-	-	-	-	-	-	-
Disneyland Drive off-ramp/Disneyland Drive off-ramp (HOV/EL)*	Disneyland Drive on-ramp	Mainline	E	B	E	C	F	C	F	C	F	C	C	B	F	B	C	A	C	C	C	C

Table 2.5.4: Existing (2022), 2035 No Build Alternative (Alternative 1), and 2035 Build Alternatives (Alternatives 2, 3, and 4) Peak-Hour LOS Summary for I-5 Southbound Mainline and Ramps

Segment from	Segment to	Facility	GP										HOV/EL*									
			2022 Existing		2035 No Build Alternative (Alternative 1)		2035 Alternative 2		2035 Alternative 3		2035 Alternative 4		2022 Existing		2035 No Build Alternative (Alternative 1)		2035 Alternative 2		2035 Alternative 3		2035 Alternative 4	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Disneyland Drive on-ramp		Ramp	D	B	E	B	F	C	F	C	F	C	-	-	-	-	-	-	-	-	-	-
Disneyland Drive on-ramp	Harbor Boulevard off-ramp	Mainline	D	B	E	B	F	C	F	C	F	C	C	B	F	B	C	A	C	C	C	C
Harbor Boulevard off-ramp		Ramp	D	B	E	B	F	C	F	C	F	C	-	-	-	-	-	-	-	-	-	
Harbor Boulevard off-ramp	Harbor Boulevard on-ramp	Mainline	E	B	F	B	F	B	E	B	E	B	E	B	F	B	A	A	C	C	C	C
Harbor Boulevard on-ramp		Ramp	D	B	E	B	F	B	D	B	D	B	-	-	-	-	-	-	-	-	-	
Harbor Boulevard on-ramp	Anaheim Boulevard off-ramp	Mainline	D	B	E	B	F	B	D	B	D	B	C	B	F	B	A	A	C	C	C	C
Anaheim Boulevard off-ramp		Ramp	D	B	E	B	F	B	D	B	D	B	-	-	-	-	-	-	-	-	-	
Anaheim Boulevard off-ramp	Katella Avenue off-ramp	Mainline	D	B	D	B	F	C	C	C	C	B	C	B	F	B	A	A	C	C	C	C
Katella Avenue off-ramp		Ramp	D	B	D	B	F	C	C	C	C	B	-	-	-	-	-	-	-	-	-	
Katella Avenue off-ramp	Disney Way on-ramp/Gene Autry Way off-ramp (HOV/EL)*	Mainline	D	B	D	B	F	B	D	C	D	C	C	B	F	B	A	A	B	B	B	A
Gene Autry Way off-ramp (HOV/EL)*		Ramp	-	-	-	-	-	-	--	-	-	-	C	B	F	B	A	A	B	B	A	A
Disney Way on-ramp		Ramp	D	B	D	B	F	C	D	C	D	C	-	-	-	-	-	-	-	-	-	
Disney Way on-ramp/Gene Autry Way off-ramp (HOV/EL)*	Katella Avenue on-ramp	Mainline	D	B	D	B	F	C	D	C	D	C	D	B	F	B	A	A	A	A	A	A
Katella Avenue on-ramp		Ramp	E	B	E	B	F	B	E	B	E	B	-	-	-	-	-	-	-	-	-	
Katella Avenue on-ramp	The City Drive off-ramp	Mainline	E	B	E	B	F	B	E	B	E	B	D	B	F	B	A	A	A	A	A	A
The City Drive off-ramp		Ramp	E	B	E	B	F	B	E	B	E	B	-	-	-	-	-	-	-	-	-	
The City Drive off-ramp	Orangewood Avenue on-ramp/Gene Autry Way on-ramp (HOV/EL)*	Mainline	E	B	E	B	F	B	D	B	D	B	E	B	F	B	B	B	A	A	A	A
Gene Autry Way on-ramp (HOV/EL)*		Ramp	-	-	-	-	-	-	-	-	-	-	C	B	F	B	B	B	B	A	B	A
Orangewood Avenue on-ramp		Ramp	D	B	D	B	F	B	D	B	D	B	-	-	-	-	-	-	-	-	-	
Orangewood Avenue on-ramp/Gene Autry Way on-ramp (HOV/EL)*	The City Drive on-ramp	Mainline	D	B	D	B	F	B	D	B	D	B	F	B	F	B	B	B	A	A	A	A
The City Drive on-ramp		Ramp	D	B	D	B	F	B	C	B	C	B	-	-	-	-	-	-	-	-	-	
The City Drive on-ramp	Chapman Avenue on-ramp	Mainline	D	B	D	B	F	B	C	B	C	B	F	B	F	B	B	B	A	A	A	A
Chapman Avenue on-ramp		Ramp	D	B	D	B	F	B	D	B	D	B	-	-	-	-	-	-	-	-	-	
Chapman Avenue on-ramp	SR-22 WB off-ramp	Mainline	D	B	D	B	F	B	D	B	D	B	F	B	F	B	B	B	A	A	A	A
SR-22 WB off-ramp		Ramp	D	B	D	B	F	B	D	B	D	B	-	-	-	-	-	-	-	-	-	
SR-22 WB off-ramp	SR-22 EB / La Veta Avenue off-ramp	Mainline	D	C	D	C	F	C	D	C	D	C	F	B	F	B	B	B	A	A	A	A
SR-22 EB / La Veta Avenue off-ramp		Ramp	D	C	D	C	F	C	D	C	D	C	-	-	-	-	-	-	-	-	-	
SR-22 EB / La Veta Avenue off-ramp	Broadway/Main Street off-ramp/SB SR-57 on-ramp (HOV/EL)*	Mainline	E	C	E	C	F	C	E	C	E	C	F	B	F	B	B	B	A	A	A	A
Broadway/Main Street off-ramp		Ramp	E	C	E	C	F	C	E	C	E	C	-	-	-	-	-	-	-	-	-	
SB SR-57 on-ramp (HOV/EL)*		Ramp	-	-	-	-	-	-	-	-	-	-	B	B	E	B	A	A	A	A	B	A
Broadway/Main Street off-ramp/SB SR-57 on-ramp (HOV/EL)*	SR-22 EB on-ramp	Mainline	C	A	D	A	F	B	E	B	F	B	C	B	F	B	A	A	A	A	B	A
SR-22 EB on-ramp		Ramp	D	B	E	C	F	C	F	C	F	C	-	-	-	-	-	-	-	-	-	

Table 2.5.4: Existing (2022), 2035 No Build Alternative (Alternative 1), and 2035 Build Alternatives (Alternatives 2, 3, and 4) Peak-Hour LOS Summary for I-5 Southbound Mainline and Ramps

Segment from	Segment to	Facility	GP										HOV/EL*									
			2022 Existing		2035 No Build Alternative (Alternative 1)		2035 Alternative 2		2035 Alternative 3		2035 Alternative 4		2022 Existing		2035 No Build Alternative (Alternative 1)		2035 Alternative 2		2035 Alternative 3		2035 Alternative 4	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
SR-22 EB on-ramp	SR-57 SB/CD Road on-ramp	Mainline	F	B	F	B	F	B	F	B	F	B	C	B	E	B	A	A	A	A	B	A
SR-57 SB/CD Road on-ramp		Ramp	F	B	F	B	F	B	D	B	D	B	-	-	-	-	-	-	-	-	-	-
SR-57 SB/CD Road on-ramp	Main Street on-ramp	Mainline	F	B	F	B	F	B	E	B	E	B	F	B	F	B	A	A	B	B	C	B
Main Street on-ramp		Ramp	F	B	F	B	E	C	D	B	E	B	-	-	-	-	-	-	-	-	-	-
Main Street on-ramp	17th Street off-ramp	Mainline	F	B	F	B	E	C	D	B	E	B	F	B	F	B	A	A	B	A	C	A
17th Street off-ramp		Ramp	F	B	F	B	E	C	D	B	E	B	-	-	-	-	-	-	-	-	-	-
17th Street off-ramp	17th Street on-ramp	Mainline	F	B	F	B	F	B	F	B	F	B	F	B	F	B	A	A	B	A	C	A
17th Street on-ramp		Ramp	E	B	E	B	F	B	F	B	F	B	-	-	-	-	-	-	-	-	-	-
17th Street on-ramp	Grand Avenue off-ramp	Mainline	E	B	E	B	F	B	F	B	F	B	F	B	F	B	A	A	B	A	C	A
Grand Avenue off-ramp		Ramp	E	B	E	B	F	B	F	B	F	B	-	-	-	-	-	-	-	-	-	-
Grand Avenue off-ramp	Grand Avenue on-ramp	Mainline	C	B	C	B	F	B	F	B	F	B	F	B	F	B	A	A	B	A	C	A
Grand Avenue on-ramp		Ramp	C	B	E	B	F	B	F	B	F	B	-	-	-	-	-	-	-	-	-	-
Grand Avenue on-ramp (HOV/EL)*		Ramp	-	-	-	-	-	-	-	-	-	-	B	B	B	B	A	A	B	A	B	A
Grand Avenue on-ramp/Grand Avenue on-ramp (HOV/EL)*	4th Street off-ramp/SR-55 SB off-ramp (HOV/EL)*	Mainline	C	B	E	B	F	B	F	B	F	B	B	B	B	B	A	A	B	A	B	A
SR-55 SB off-ramp (HOV/EL)*		Ramp	-	-	-	-	-	-	-	-	-	-	B	B	B	B	A	A	B	A	B	A
4th Street off-ramp		Ramp	C	B	E	B	F	B	F	B	F	B	-	-	-	-	-	-	-	-	-	-
4th Street off-ramp	1st Street on-ramp	Mainline	F	B	F	F	F	F	F	B	F	B	F	C	F	F	A	A	B	B	C	B
1st Street on-ramp		Ramp	D	B	D	B	E	B	E	B	D	B	-	-	-	-	-	-	-	-	-	-
1st Street on-ramp	SR-55 SB off-ramp	Mainline	D	B	D	B	E	B	E	B	D	B	C	C	-	C	A	A	C	B	C	B
SR-55 SB off-ramp		Ramp	D	B	D	B	E	B	E	B	D	B	-	-	-	-	-	-	-	-	-	-
SR-55 SB off-ramp	Newport Avenue off-ramp	Mainline	C	A	C	A	C	A	C	A	C	A	C	C	C	C	A	A	C	B	C	B
Newport Avenue off-ramp		Ramp	C	A	C	A	C	A	C	A	C	A	-	-	-	-	-	-	-	-	-	-
Newport Avenue off-ramp	SR-55 NB on-ramp	Mainline	C	B	C	B	C	B	C	B	C	B	C	C	C	B	A	A	C	B	C	B
SR-55 NB on-ramp		Ramp	E	B	E	B	F	B	D	B	D	B	-	-	-	-	-	-	-	-	-	-
SR-55 NB on-ramp	SR-55 SB on-ramp	Mainline	E	B	E	B	F	B	D	B	D	B	C	C	C	C	A	A	-	-	-	-
SR-55 SB on-ramp		Ramp	F	C	F	C	D	C	F	C	F	C	-	-	-	-	-	-	-	-	-	-
SR-55 SB on-ramp	Red Hill Avenue off-ramp	Mainline	F	C	F	C	D	C	F	C	F	C	C	B	C	B	A	A	-	-	-	-
Red Hill Avenue off-ramp		Ramp	F	C	F	C	D	C	F	C	F	C	-	-	-	-	-	-	-	-	-	-
Red Hill Avenue off-ramp	Red Hill Avenue on-ramp	Mainline	F	B	F	B	C	B	D	B	D	B	C	C	C	C	A	A	-	-	-	-
Red Hill Avenue on-ramp		Ramp	E	B	D	C	D	C	E	B	E	B	-	-	-	-	-	-	-	-	-	-
Red Hill Avenue on-ramp	South of Red Hill Avenue on-ramp	Mainline	D	B	D	B	D	C	D	B	E	B	B	B	B	B	A	A	-	-	-	-

* = The No Build Alternative (Alternative 1) and Alternative 2 will maintain HOV lane configurations, and Alternatives 3 and 4 will convert them into ELs. In the event either Alternative 3 or 4 is chosen as the Build Alternative, these marked segments will transition from HOV lanes to ELs.

CD = collector-distributor
 EB = eastbound
 EL = Express Lane
 HOV = high-occupancy vehicle

I = Interstate
 LOS = level of service
 N/A = not applicable
 NB = northbound

SB = southbound
 SR = State Route
 WB = westbound

**Table 2.5.5: Existing (2022), 2035 No Build Alternative (Alternative 1), and 2035 Build Alternatives (Alternatives 2, 3, and 4) Intersection Peak Hour LOS—
Ramp Terminal Intersections**

No.	Intersection	2022 AM		2022 PM		2035 AM (No Build Alt [Alt 1])		2035 PM (No Build Alt [Alt 1])		2035 AM (Alt 2)		2035 PM (Alt 2)		2035 AM (Alt 3)		2035 PM (Alt 3)		2035 AM (Alt 4)		2035 PM (Alt 4)	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
R-1	I-5 SB on/off-ramp and Red Hill Avenue	17.1	B	30.7	C	29.4	C	34.9	C	40.8	D	39.6	D	30.4	C	36.2	D	33.6	C	38.4	D
R-2	I-5 NB on/off-ramp and Red Hill Avenue	19.3	B	15.8	B	25.9	C	20.9	C	17.4	B	25.9	C	16.2	B	24.7	C	16.8	B	25.1	C
R-3	I-5 NB on-ramp and Newport Avenue	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
R-4	I-5 SB off-ramp and Newport Avenue	25.2	C	30.8	C	26.4	C	36.3	D	30.3	C	37.5	D	29.5	C	39.4	D	29.6	C	40.1	D
R-5	I-5 SB on-ramp and E. First Street	8.3	A	5.9	A	5.7	A	5.9	A	6.3	A	5.6	A	5.9	A	5.5	A	6.0	A	5.5	A
R-6	I-5 NB on/off-ramp and E. 4th Street	17.2	B	7.3	A	8.9	A	24.9	C	5.3	A	31.3	C	9.3	A	35.0	C	9.0	A	27.8	C
R-7	I-5 SB off-ramp and E. 4th Street	23.3	C	18.7	B	33.2	C	20.4	C	35.2	D	21.3	C	33.2	C	21.1	C	33.8	C	21.0	C
R-8	I-5 NB on/off-ramp and Grand Avenue	12.0	B	11.2	B	11.7	B	12.2	B	11.1	B	12.6	B	11.9	B	12.5	B	12.1	B	11.9	B
R-9	I-5 SB on/off-ramp and E. Santa Ana Boulevard	27.8	C	30.8	C	30.5	C	29.3	C	31.7	C	32.0	C	29.8	C	28.9	C	29.5	C	27.9	C
R-10	I-5 SB HOV on-ramp / NB HOV off-ramp and Grand Avenue	51.9	D	50.1	D	30.5	C	38.2	D	50.8	D	32.3	C	52.3	D	36.2	D	52.6	D	35.7	D
R-11	I-5 NB off-ramp and 17th Street	38.4	D	39.6	D	51.6	D	53.3	D	45.1	D	55.5	E	57.8	E	38.8	D	45.1	D	39.0	D
R-12	I-5 SB on/off-ramp and Penn Way	34.7	C	33.4	C	35.1	D	33.4	C	34.7	C	34.4	C	34.0	C	34.4	C	34.3	C	34.0	C
R-13	I-5 NB off-ramp and Main Street	30.7	C	31.0	C	41.0	D	29.8	C	36.9	D	25.0	C	38.4	D	24.4	C	38.5	D	24.3	C
R-14	I-5 NB on-ramp/I-5 SB off-ramp/Santa Clara and Main Street	45.6	D	65.6	E	39.2	D	94.0	F	46.2	D	86.7	F	46.6	D	88.3	F	45.5	D	88.4	F
R-15	I-5 SB on-ramp/Bufalo Avenue and Main Street	16.8	B	18.9	B	20.3	C	28.5	C	19.9	B	28.3	C	20.0	C	26.7	C	19.8	B	26.0	C
R-16	I-5 NB off-ramp and Broadway	18.4	B	14.9	B	16.5	B	18.6	B	25.5	C	15.6	B	26.2	C	15.4	B	15.9	B	15.4	B
R-17	I-5 NB off-ramp/SB on-ramp and Chapman Avenue	52.6	D	43.8	D	49.8	D	40.8	D	49.6	D	45.1	D	48.4	D	42.9	D	48.2	D	42.8	D
R-18	I-5 NB on-ramp and W. Chapman Avenue	32.9	C	33.9	C	38.9	D	36.4	D	37.4	D	38.3	D	38.3	D	36.9	D	38.3	D	37.2	D
R-19	I-5 NB on/off-ramp and The City Drive/State College Boulevard	15.7	B	30.5	C	19.0	B	34.2	C	19.7	B	32.0	C	18.3	B	30.2	C	17.7	B	30.1	C
R-20	I-5 SB off/on-ramp and The City Drive/State College Boulevard	17.0	B	17.2	B	17.6	B	11.4	B	17.0	B	17.8	B	17.8	B	16.9	D	18.3	B	17.0	B
R-21	I-5 NB/SB HOV ramps/E. Gene Autry Way	23.3	C	25.0	C	26.3	C	21.6	C	14.5	B	16.0	B	28.0	C	14.2	B	33.6	C	16.5	B
R-22	I-5 SB off-ramp and E. Katella Avenue	20.7	C	20.9	C	22.6	C	25.9	C	23.1	C	21.4	C	25.0	C	24.1	C	30.3	C	26.6	C
R-23	I-5 NB on-ramp and S. Anaheim Way	19.2	B	26.2	C	13.9	B	22.0	C	15.0	B	27.4	C	13.7	B	27.8	C	13.1	B	26.3	C
R-24	I-5 SB off-ramp and Disney Way	18.0	B	19.1	B	21.8	C	20.9	C	22.5	C	24.2	C	20.2	C	23.9	C	21.1	C	22.5	C
R-25	I-5 NB on/off-ramp and S. Harbor Boulevard	11.3	B	13.2	B	14.8	B	15.6	B	14.7	B	15.0	B	14.3	B	15.1	B	13.2	B	14.9	B
R-26	I-5 SB on/off-ramp and S. Harbor Boulevard	8.3	A	5.8	A	5.0	A	14.3	B	4.8	A	15.2	B	4.8	A	15.0	B	5.2	A	14.7	B
R-27	I-5 SB/NB on/off-ramp and Disneyland Drive	40.7	D	43.2	D	40.2	D	42.1	D	38.2	D	40.4	D	39.0	D	40.7	D	42.0	D	44.7	D
R-28	I-5 NB on/off-ramp and Lincoln Avenue	27.6	C	37.3	D	27.8	C	32.3	C	26.3	C	33.5	C	29.5	C	40.1	D	30.8	C	40.1	D
R-29	I-5 SB on/off-ramp and Lincoln Avenue	27.9	C	23.1	C	29.1	C	32.2	C	29.0	C	30.6	C	32.4	C	30.7	C	31.4	C	30.6	C
R-30	I-5 SB/NB on/off-ramp and Euclid Street	46.7	D	68.9	E	42.8	D	64.7	E	50.6	D	63.9	E	51.1	D	62.5	E	50.8	D	62.9	E
R-31	I-5 NB off-ramp and W. La Palma Avenue	0.7	A	0.7	A	0.7	A	0.7	A	0.6	A	0.7	A	0.6	A	0.7	A	0.6	A	0.8	A
R-32	I-5 NB off/SB on/off-ramp and Brookhurst Street	48.4	D	50.5	D	49.5	D	48.1	D	50.5	D	62.5	E	57.8	E	61.3	E	55.7	E	66.1	E
R-33	I-5 NB off-ramp and Magnolia Street	21.0	C	24.7	C	26.1	C	60.5	E	45.1	D	93.5	F	45.1	D	62.8	E	47.1	D	63.0	E

**Table 2.5.5: Existing (2022), 2035 No Build Alternative (Alternative 1), and 2035 Build Alternatives (Alternatives 2, 3, and 4) Intersection Peak Hour LOS—
Ramp Terminal Intersections**

No.	Intersection	2022 AM		2022 PM		2035 AM (No Build Alt [Alt 1])		2035 PM (No Build Alt [Alt 1])		2035 AM (Alt 2)		2035 PM (Alt 2)		2035 AM (Alt 3)		2035 PM (Alt 3)		2035 AM (Alt 4)		2035 PM (Alt 4)	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
R-34	I-5 SB on/off-ramp and Magnolia Street	30.2	C	27.7	C	28.4	C	27.6	C	35.7	D	29.8	C	37.1	D	29.6	C	36.4	D	29.3	C
R-35	I-5 NB off-ramp and Auto Center Drive	23.8	C	20.3	C	23.8	C	17.4	B	24.2	C	18.2	B	24.1	C	17.8	B	24.1	C	17.7	B
R-36	I-5 NB on/off-ramp and Auto Center Drive	34.4	C	38.0	D	36.3	D	44.6	D	34.1	C	44.9	D	37.5	D	44.5	D	35.8	D	45.3	D
R-37	I-5 SB on/off-ramp and Beach Boulevard	16.6	B	35.1	D	22.3	C	29.4	C	21.2	C	21.5	C	21.5	C	21.0	C	22.9	C	22.7	C
R-38	I-5 NB on/off-ramp and Artesia Boulevard	43.4	D	30.7	C	42.3	D	28.7	C	41.8	D	30.9	C	37.5	D	31.3	C	37.7	D	31.8	C
R-39	I-5 SB off-ramp and Artesia Boulevard	29.1	C	28.9	C	27.9	C	28.6	C	30.6	C	29.5	C	29.3	C	29.6	C	29.0	C	29.9	C

HOV = high-occupancy vehicle
I = Interstate
LOS = level of service
N/A = not applicable
NB = northbound
SB = southbound
sec = seconds

**Table 2.5.6: Existing (2022), 2035 No Build Alternative (Alternative 1), and 2035 Build Alternatives (Alternatives 2, 3, and 4) Intersection Peak-Hour LOS—
Local Arterial Intersections**

No.	Intersection	2022 AM		2022 PM		2035 AM (No Build Alt [Alt 1])		2035 PM (No Build Alt [Alt 1])		2035 AM (Alt 2)		2035 PM (Alt 2)		2035 AM (Alt 3)		2035 PM (Alt 3)		2035 AM (Alt 4)		2035 PM (Alt 4)	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
A-1	El Camino Real and Red Hill Avenue	33.1	C	21.7	C	34.4	C	37.9	D	42.2	D	36.5	D	32.7	C	35.6	D	33.3	C	35.7	D
A-2	Nisson Road and Red Hill Avenue	33.2	C	37.7	D	26.7	C	31.2	C	26.6	C	29.7	C	23.5	C	30.0	C	23.6	C	29.3	C
A-3	El Camino Real and Newport Avenue	35.1	D	42.0	D	48.8	D	63.9	E	46.1	D	55.5	E	48.0	D	59.7	E	47.7	D	60.0	E
A-4	Mitchell Avenue and Newport Avenue	19.7	B	24.5	C	25.2	C	33.0	C	30.7	C	39.4	D	30.3	C	38.5	D	30.8	C	38.4	D
A-5	Elk Lane and E. First Street	24.8	C	19.2	B	26.5	C	19.8	B	30.5	C	19.6	B	27.8	C	19.7	B	27.6	C	19.6	B
A-6	Cabrillo Park Drive and E. 4 th Street	39.0	D	52.5	D	39.4	D	51.8	D	45.5	D	55.5	E	39.1	D	53.4	D	39.4	D	53.7	D
A-7	17 th Street and Penn Way	13.8	B	15.2	B	15.0	B	17.9	B	15.5	B	18.6	B	16.1	B	19.9	B	18.3	B	20.0	B
A-8	17 th Street and Lincoln Avenue	25.6	C	27.6	C	27.3	C	41.3	D	27.6	C	41.8	D	27.7	C	42.5	D	28.1	C	42.5	D
A-9	Main Street and W. 20 th Street	16.1	B	18.5	B	15.3	B	18.8	B	15.9	B	19.3	B	15.6	B	19.5	B	15.6	B	19.5	B
A-10	Broadway and Santa Clara Avenue and I-5 SB off-ramp	24.8	C	56.2	E	29.7	C	62.5	E	31.2	C	95.3	F	31.0	C	98.6	F	32.0	C	85.8	F
A-11	The City Drive N. and Chapman Avenue	43.6	D	39.5	D	62.0	E	54.3	D	60.8	E	61.0	E	61.0	E	55.2	D	61.3	E	55.0	D
A-12	E. Katella Avenue and S. Anaheim Way	21.4	C	25.7	C	21.9	C	35.1	D	21.9	C	38.2	D	20.7	C	36.9	C	20.1	C	38.9	D
A-13	W. Katella Avenue and S. Anaheim Boulevard/S. Haster Street	32.3	C	39.3	D	41.2	D	44.6	D	39.5	D	54.3	D	39.7	D	49.3	D	40.0	D	55.4	E
A-14	S. Clementine Street and Disney Way	24.9	C	28.1	C	37.9	D	34.8	C	37.1	D	36.3	D	36.0	D	37.8	D	32.6	C	37.1	D
A-15	S. Anaheim Boulevard and Disney Way/Manchester Avenue	60.7	E	45.7	D	31.6	C	45.4	D	23.2	C	38.1	D	35.7	D	44.5	D	31.6	C	41.3	D
A-16	S. Anaheim Boulevard and E. Cerritos Avenue	18.9	B	32.2	C	25.6	C	28.9	C	29.1	C	32.7	C	24.8	C	31.1	C	25.7	C	32.9	C
A-17	Harbor Boulevard and W. Manchester Avenue	18.7	B	19.5	B	26.7	C	25.0	C	26.8	C	24.3	C	25.4	C	26.5	C	22.1	C	25.1	C
A-18	Harbor Boulevard and W. Ball Road	54.9	D	50.8	D	48.5	D	49.2	D	48.9	D	50.3	D	49.2	D	51.6	D	48.1	D	52.7	D
A-19	Disneyland Drive and W. Ball Road	63.2	E	73.5	E	60.2	E	75.2	E	59.9	E	75.9	E	60.4	E	75.7	E	62.3	E	74.3	E
A-20	Lincoln Avenue and N. Manchester Avenue	26.1	C	17.2	B	8.9	A	15.7	B	21.7	C	15.8	B	22.5	C	15.7	B	22.1	C	15.4	B
A-21	Lincoln Avenue and N. Loara Street	35.1	D	48.5	D	38.4	D	28.5	C	39.2	D	38.8	D	39.7	D	28.4	C	39.8	D	28.4	C
A-22	Lincoln Avenue and S. West Street	35.9	D	37.0	D	29.4	C	42.9	D	29.9	C	42.7	D	29.8	C	42.5	D	29.6	C	43.3	D
A-23	S. Euclid Street and Lincoln Avenue	37.7	D	42.2	D	40.9	D	56.6	E	41.5	D	50.6	D	41.1	D	49.2	D	40.6	D	48.3	D
A-24	Euclid Street and Crescent Avenue	29.4	C	50.5	D	32.5	C	53.8	D	35.3	D	47.2	D	39.0	D	42.8	D	52.1	D	45.7	D
A-25	La Palma Avenue and Brookhurst Street	38.9	D	41.9	D	42.9	D	53.9	D	44.3	D	55.0	E	43.9	D	54.8	D	44.3	D	54.5	D
A-26	Brookhurst Street and Sequoia Avenue	16.1	B	17.5	B	34.6	C	25.7	C	35.3	D	27.2	C	35.2	D	28.8	C	35.2	D	25.4	C
A-27	Orangethorpe Avenue and Magnolia Avenue	38.4	D	42.0	D	43.4	D	70.1	E	45.8	E	77.0	E	46.1	D	75.0	E	46.8	D	76.0	E
A-28	Auto Center Drive and Orangethorpe Avenue	12.3	B	11.2	B	15.9	B	18.1	B	16.5	B	29.3	C	16.6	B	33.5	C	16.5	B	20.6	C
A-29	Auto Center Drive and Stanton Avenue	27.6	C	36.2	D	53.8	D	40.3	D	66.3	E	37.3	D	57.0	E	37.1	D	59.8	E	37.5	D
A-30	Beach Boulevard and 9 th Street	12.7	B	9.5	A	19.1	B	14.4	B	20.5	C	14.4	B	20.0	B	13.9	B	20.4	C	13.8	B

**Table 2.5.6: Existing (2022), 2035 No Build Alternative (Alternative 1), and 2035 Build Alternatives (Alternatives 2, 3, and 4) Intersection Peak-Hour LOS—
Local Arterial Intersections**

No.	Intersection	2022 AM		2022 PM		2035 AM (No Build Alt [Alt 1])		2035 PM (No Build Alt [Alt 1])		2035 AM (Alt 2)		2035 PM (Alt 2)		2035 AM (Alt 3)		2035 PM (Alt 3)		2035 AM (Alt 4)		2035 PM (Alt 4)	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
A-31	Beach Boulevard and Auto Center Drive	39.8	D	56.2	E	43.8	D	53.9	D	44.2	D	62.1	E	45.7	D	71.3	E	45.9	D	58.7	E
A-32	Auto Center Drive and Commonwealth Avenue	17.6	B	27.6	C	28.5	C	47.7	D	30.6	C	69.3	E	31.1	C	61.8	E	30.1	C	58.9	E

HOV = high-occupancy vehicle
I = Interstate
LOS = level of service
N/A = not applicable
NB = northbound
SB = southbound
sec = seconds

Table 2.5.7: Existing (2022), 2035 No Build Alternative (Alternative 1), and 2035 Build Alternatives (Alternatives 2, 3, and 4) On-Ramp Peak-Hour Assessment

Ramp Location	Facility	Existing Lane Configuration		Meter Rate, vph (240–900 vphpl)	Existing Year 2022 - vph		Opening Year 2035 (No Build Alt [Alt 1]) - vph		Opening Year 2035 (Alt 2) - vph		Opening Year 2035 (Alt 3) - vph		Opening Year 2035 (Alt 4) - vph		
		Meter?	# of Lanes		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
I-5 SB GP	Artesia Boulevard on-ramp	On-Ramp	Yes	2	1800	771	825	837	897	810	879	793	897	820	911
	Beach Boulevard on-ramp	On-Ramp	Yes	2	1800	802	761	871	816	906	780	808	776	830	785
	SR-91 EB on-ramp	Connector	No	--	--	--	--	2,926	1,988	2,879	1,992	2,766	2,116	2,678	2,036
	Magnolia Street on-ramp	On-Ramp	Yes	2	1800	967	619	1,051	658	1,039	653	1,166	645	1,192	645
	Brookhurst Street on-ramp	On-Ramp	Yes	2	1800	1,205	722	1,306	767	1,289	762	1,418	780	1,457	793
	Euclid Street on-ramp	On-Ramp	Yes	2	1800	991	578	1,038	618	1,022	609	1,060	609	1,133	622
	Lincoln Avenue on-ramp	On-Ramp	Yes	2	1800	1,339	611	1,451	645	1,412	631	1,524	649	1,540	649
	Disneyland Drive on-ramp	On-Ramp	Yes	2	1800	633	440	687	464	631	438	754	429	776	438
	Harbor Boulevard on-ramp	On-Ramp	Yes	2	1800	889	526	876	541	854	528	921	505	926	497
	Disney Way on-ramp	On-Ramp	Yes	2	1800	606	528	564	541	570	550	525	519	541	514
	Katella Avenue on-ramp	On-Ramp	Yes	2	1800	657	544	647	559	647	563	541	505	558	528
	Orangewood Avenue on-ramp	On-Ramp	Yes	2	1800	690	354	681	365	720	385	430	361	402	373
	The City Drive on-ramp	On-Ramp	Yes	2	1800	324	391	341	409	374	469	312	348	302	389
	Chapman Avenue on-ramp	On-Ramp	Yes	2	1800	873	834	870	882	882	874	743	866	737	866
	SR-22 EB on-ramp	Connector	No	--	--	--	--	1,518	1,138	1,412	1,062	1,401	1,026	1,384	1,022
	SR-57 SB/CD Road on-ramp	CD Road On-Ramp	No	--	--	--	--	647	365	675	597	687	557	681	561
	Main Street on-ramp	On-Ramp	Yes	2	1800	701	639	726	665	614	637	714	601	714	609
	17th Street on-ramp	On-Ramp	Yes	2	1800	885	660	921	682	943	629	971	665	977	665
	Grand Avenue on-ramp	On-Ramp	Yes	2	1800	422	372	435	385	514	453	464	361	475	348
	1st Street on-ramp	On-Ramp	Yes	2	1800	1,202	806	1,245	825	1,278	805	1,256	793	1,266	786
SR-55 NB on-ramp	Connector	No	--	--	--	--	1,043	662	1,345	787	843	662	848	646	
SR-55 SB on-ramp	Connector	No	--	--	--	--	3,499	3,377	3,387	3,467	3,504	3,377	3,560	3,377	
Red Hill Avenue on-ramp	On-Ramp	Yes	2	1800	920	813	954	836	1,004	857	960	801	966	792	
I-5 NB GP	Red Hill Avenue on-ramp	On-Ramp	Yes	2	1800	652	682	732	725	726	718	715	725	732	725
	Newport Avenue on-ramp	On-Ramp	Yes	2	1800	817	1,006	913	1,051	897	1,077	869	959	880	979
	SR-55 NB on-ramp	Connector	No	--	--	--	--	4,102	3,223	4,012	3,263	4,024	2,900	4,296	3,282
	4th Street on-ramp	On-Ramp	Yes	2	1800	530	1,160	594	1,214	605	1,155	600	1,227	622	1,227
	Grand Avenue on-ramp	On-Ramp	Yes	2	1800	624	1,222	699	1,266	715	1,247	666	1,266	704	1,266
	EB 17th Street on-ramp	On-Ramp	Yes	2	1800	368	113	413	118	440	106	418	705	418	725
	WB 17th Street on-ramp	On-Ramp	Yes	2	1800	264	486	297	509	303	509	297	516	303	516
	Main Street on-ramp	On-Ramp	Yes	2	1800	888	1,711	996	1,808	1,007	1,814	1,007	1,840	974	1,847
	SR-22 WB on-ramp	Connector	No	--	--	--	--	2,497	3,693	2,635	3,954	2,547	3,896	2,519	3,889
	The City Drive on-ramp	On-Ramp	Yes	2	1800	399	1,079	446	1,129	446	1,129	407	1,018	424	947
	Anaheim Way/Orangewood Avenue on-ramp	On-Ramp	Yes	2	1800	380	1,043	424	1,090	396	1,116	424	1,096	446	1,064
Katella Avenue on-ramp	On-Ramp	No	--	--	--	--	297	783	292	751	226	744	242	770	

Table 2.5.7: Existing (2022), 2035 No Build Alternative (Alternative 1), and 2035 Build Alternatives (Alternatives 2, 3, and 4) On-Ramp Peak-Hour Assessment

Ramp Location	Facility	Existing Lane Configuration		Meter Rate, vph (240–900 vphpl)	Existing Year 2022 - vph		Opening Year 2035 (No Build Alt [Alt 1]) - vph		Opening Year 2035 (Alt 2) - vph		Opening Year 2035 (Alt 3) - vph		Opening Year 2035 (Alt 4) - vph	
		Meter?	# of Lanes		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Anaheim Boulevard on-ramp	On-Ramp	No	--	--	--	--	369	1,240	363	1,227	369	1,221	380	1,325
Harbor Boulevard on-ramp	On-Ramp	Yes	2	1800	219	588	242	613	259	600	396	620	429	953
Ball Road on-ramp	On-Ramp	Yes	2	1800	420	680	468	712	468	691	440	705	435	738
Disneyland Drive on-ramp	On-Ramp	Yes	2	1800	334	710	374	705	374	699	358	699	341	685
Lincoln Avenue on-ramp	On-Ramp	Yes	2	1800	458	555	512	587	479	555	462	587	446	600
Euclid Street on-ramp	On-Ramp	Yes	2	1800	534	739	600	836	589	842	583	809	583	751
Brookhurst Street on-ramp	On-Ramp	Yes	2	1800	580	836	649	874	644	868	638	829	649	907
La Palma Avenue on-ramp	On-Ramp	Yes	2	1800	247	270	275	281	281	287	281	287	270	281
SR-91 WB on-ramp	Connector	No	--	--	--	--	1,353	2,192	1,342	2,375	1,414	2,388	1,408	2,395
Orangethorpe Avenue on-ramp	On-Ramp	Yes	2	1800	295	351	330	365	325	333	325	326	325	352
Beach Boulevard on-ramp	On-Ramp	Yes	2	1800	485	725	545	757	561	764	556	770	567	777
I-5 SB HOV/EL*	SR-91 EB off-ramp (HOV/EL)*	Connector	--	--	--	--	509	395	335	324	531	254	813	360
	SR-91 EB on-ramp (HOV/EL)*	Connector	--	--	--	--	94	23	18	4	120	39	143	35
	Gene Autry Way on-ramp (HOV/EL)*	Ramp	--	--	--	--	971	1,024	971	1,024	778	821	739	813
	SR-57 SB on-ramp (HOV/EL)*	Connector	--	--	--	--	180	156	180	156	180	156	180	156
	Santa Ana Boulevard/Grand Avenue on-ramp (HOV/EL)*	Ramp	--	--	--	--	583	1,206	583	1,206	583	1,206	583	1,206
I-5 NB HOV/EL*	SR-55 NB on-ramp (HOV/EL)*	Connector	--	--	--	--	55	51	55	51	55	51	55	51
	Gene Autry Way on-ramp (HOV/EL)*	Ramp	--	--	--	--	440	211	440	211	440	211	440	211
	WB SR-91 on-ramp (HOV/EL)*	Connector	--	--	--	--	440	211	440	211	440	211	440	211

* = The No Build Alternative (Alternative 1) and Alternative 2 will maintain HOV lane configurations, and Alternatives 3 and 4 will convert them into ELs. In the event either Alternative 3 or 4 is chosen as the Build Alternative, these marked segments will transition from HOV lanes to ELs.

CD = collector-distributor
 EB = eastbound
 EL = Express Lane
 GP = general-purpose
 HOV = high-occupancy vehicle
 I = Interstate
 LOS = level of service

N/A = not applicable
 NB = northbound
 SB = southbound
 SR = State Route
 vph = vehicles per hour
 vphpl = vehicles per hour per lane
 WB = westbound

Table 2.5.8: Existing (2022), 2035 No Build Alternative (Alternative 1), and 2035 Build Alternatives (Alternatives 2, 3, and 4) Off-Ramp Queue Length Summary

Ramp No.	Intersection Location	Off-Ramp Direction	Ramp Length (ft)	2022 AM Peak Queue (ft)	2022 PM Peak Queue (ft)	2035 (No Build Alt [Alt 1]) AM Peak Queue (ft)	2035 (No Build Alt [Alt 1]) PM Peak Queue (ft)	2035 (Alt 2) AM Peak Queue (ft)	2035 (Alt 2) PM Peak Queue (ft)	2035 (Alt 3) AM Peak Queue (ft)	2035 (Alt 3) PM Peak Queue (ft)	2035 (Alt 4) AM Peak Queue (ft)	2035 (Alt 4) PM Peak Queue (ft)
R-2	I-5 NB off-ramp to Red Hill Avenue	WB	890	140 (Right)	293 (Right)	148 (Right)	362 (Right)	233 (Right)	393 (Right)	167 (Right)	362 (Right)	216 (Right)	398 (Right)
R-6	I-5 NB off-ramp to E. 4th Street	NB	1,080	147 (Left)	189 (Left)	223 (Left)	287 (Left)	113 (Left)	271 (Left)	228 (Left)	338 (Left)	292 (Left)	428 (Left)
R-8	I-5 NB off-ramp to Grand Avenue	WB	1,390	165 (Left)	174 (Right)	179 (Left)	304 (Right)	193 (Left)	284 (Right)	209 (Left)	264 (Right)	203 (Left)	264 (Right)
R-10	I-5 NB HOV off-ramp and Grand Avenue	WB	1,210	120 (Through)	96 (Through)	#227 (Through)	#250 (Through)	#85 (Through)	#157 (Through)	#235 (Through)	#185 (Through)	#172 (Through)	#314 (Through)
R-11	I-5 NB off-ramp to 17th Street	NB	850	474 (Through)	#384 (Left)	#586 (Through)	453 (Left)	#576 (Left)	#481 (Through)	#507 (Through)	324 (Through)	522 (Through)	335 (Through)
R-13	I-5 NB off-ramp to Main Street/Edgewood Road	NWB	890	#297 (Right)	155 (Right)	#381 (Right)	#335 (Right)	#370 (Right)	201 (Right)	#370 (Right)	192 (Right)	#370 (Right)	202 (Right)
R-16	I-5 NB off-ramp to Broadway	NWB	1,990	177 (Right)	212 (Right)	340 (Right)	313 (Right)	#394 (Right)	#249 (Right)	336 (Right)	240 (Right)	336 (Right)	240 (Right)
R-17	I-5 NB off-Ramp to Chapman Avenue	NB	1,480	217 (Left)	219 (Left)	259 (Left)	265 (Left)	257 (Left)	251 (Left)	256 (Left)	284 (Left)	273 (Left)	300 (Left)
R-19	I-5 NB off-ramp to The City Drive/State College Boulevard	WB	1,600	93 (Left)	307 (Through)	90 (Left)	272 (Through)	87 (Through)	91 (Through)	88 (Through)	276 (Through)	156 (Through)	238 (Left)
R-21	I-5 NB HOV off-ramp to E. Gene Autry Way	NB	2,010	52 (Left)	164 (Through)	176 (Left)	200 (Left)	120 (Left)	181 (Left)	290 (Left)	166 (Left)	259 (Left)	200 (Left)
R-25	I-5 NB off-ramp to S. Harbor Boulevard	WB	1,290	#138 (Right)	#304 (Right)	165 (Right)	271 (Right)	159 (Right)	264 (Right)	87 (Right)	262 (Right)	224 (Right)	591 (Right)
R-28	I-5 NB off-ramp to Lincoln Avenue	NB	1,140	135 (Through)	#411 (Through)	180 (Through)	#412 (Through)	185 (Through)	#385 (Through)	210 (Through)	#422 (Through)	214 (Through)	#559 (Right)
R-30	I-5 NB off-ramp to Euclid Street	WB	1,410	264 (Left)	#590 (Left)	#412 (Left)	#636 (Left)	#423 (Left)	#643 (Left)	#420 (Left)	#703 (Left)	#455 (Left)	#722 (Left)
R-32	I-5 NB off-ramp to Brookhurst Street	WB	2,010	#276 (Left)	#377 (Left)	#253 (Left)	#413 (Left)	#262 (Left)	#491 (Left)	#287 (Left)	#537 (Left)	#359 (Left)	#556 (Left)
R-33	I-5 NB off-ramp to Magnolia Street	EB	1,270	204 (Through)	296 (Through)	238 (Through)	#576 (Through)	238 (Through)	#613 (Through)	235 (Through)	#600 (Through)	245 (Through)	#658 (Through)
R-35	I-5 NB off-ramp to Auto Center Drive	NB	820	220 (Left)	476 (Left)	226 (Left)	526 (Left)	225 (Left)	510 (Left)	231 (Left)	533 (Left)	231 (Left)	#735 (Left)
R-36	I-5 NB off-ramp to Beach Boulevard/Auto Center Drive	NB	1,150	259 (Through)	459 (Through)	269 (Through)	516 (Through)	262 (Through)	576 (Through)	272 (Through)	584 (Through)	264 (Through)	631 (Through)
R-38	I-5 NB off-ramp to Artesia Boulevard	NB	1,110	293 (Through)	183 (Through)	247 (Through)	174 (Through)	311 (Through)	206 (Through)	237 (Through)	131 (Through)	219 (Through)	120 (Through)
R-1	I-5 SB off-ramp to Red Hill Avenue	EB	980	151 (Left)	#339 (Left)	182 (Left)	370 (Left)	191 (Left)	328 (Left)	163 (Left)	#449 (Through)	205 (Left)	#465 (Left)
R-4	I-5 SB off-ramp to Newport Avenue	EB	1,390	170 (Right)	381 (Right)	420 (Right)	#663 (Right)	453 (Right)	#683 (Right)	445 (Right)	#712 (Right)	#581 (Right)	#819 (Right)
R-7	I-5 SB off-ramp to E 4th Street	SB	970	186 (Through)	142 (Through)	202 (Left)	204 (Left)	226 (Left)	229 (Left)	232 (Left)	226 (Left)	260 (Left)	251 (Left)
R-9	I-5 SB off-ramp to E. Santa Ana Boulevard	SB	990	271 (Left)	214 (Left)	297 (Left)	216 (Left)	287 (Left)	225 (Left)	293 (Left)	214 (Left)	288 (Left)	222 (Left)
R-12	I-5 SB off-ramp to Penn Way	WB	1,060	200 (Left)	206 (Left)	283 (Left)	322 (Left)	289 (Left)	358 (Left)	275 (Left)	342 (Left)	314 (Left)	415 (Left)
R-14	I-5 SB off-ramp to Main Street/Santa Clara Avenue	SEB	1,010	#332 (Right)	#305 (Right)	#332 (Right)	#461 (Right)	356 (Right)	#317 (Right)	#315 (Right)	#332 (Right)	#319 (Right)	#353 (Right)
R-20	I-5 SB off-ramp to The City Drive N.	EB	2,980	176 (Through)	169 (Through)	235 (Through)	191 (Through)	240 (Through)	284 (Through)	274 (Through)	236 (Through)	312 (Through)	258 (Through)
R-21	I-5 NB HOV off-ramp to E. Gene Autry Way	SB	2,050	32 (Left)	23 (Left)	39 (Left)	26 (Left)	18 (Left)	8 (Left)	61 (Left)	18 (Left)	61 (Left)	18 (Left)
R-22	I-5 SB off-ramp to E. Katella Avenue	NB	2,460	71 (Through)	78 (Through)	86 (Through)	#95 (Through)	84 (Through)	128 (Through)	87 (Through)	121 (Through)	236 (Through)	#202 (Through)
R-24	I-5 SB off-ramp to Disney Way	SB	900	106 (Through)	142 (Left)	112 (Through)	185 (Left)	127 (Through)	184 (Left)	138 (Through)	186 (Left)	145 (Through)	187 (Left)
R-26	I-5 SB off-ramp to S. Harbor Boulevard	EB	1,300	72 (Left)	123 (Right)	70 (Left)	204 (Right)	67 (Left)	170 (Right)	111 (Right)	170 (Right)	117 (Right)	169 (Right)
R-27	I-5 SB off-ramp/HOV off-ramp to Disneyland Drive	WB	1,850	259 (Left)	306 (Left)	267 (Left)	316 (Left)	251 (Left)	326 (Left)	287 (Left)	325 (Left)	305 (Left)	339 (Left)
R-29	I-5 SB off-ramp to Lincoln Avenue	SB	2,225	#106 (Left)	#227 (Left)	110 (Left)	257 (Left)	115 (Left)	233 (Left)	123 (Left)	228 (Left)	127 (Left)	252 (Left)
R-30	I-5 SB off-ramp to Euclid Street	EB	2,220	#224 (Left)	#398 (Left)	#221 (Left)	#426 (Left)	#221 (Left)	#430 (Left)	#284 (Left)	#397 (Left)	#270 (Left)	#367 (left)
R-32	I-5 SB off-ramp to Brookhurst Street	EB	1,470	287 (Through)	293 (Through)	#423 (Through)	#454 (Through)	#431 (Through)	#522 (Through)	#436 (Through)	#530 (Through)	#533 (Through)	#544 (Through)
R-34	I-5 SB off-ramp to Magnolia Street	EB	1,660	343 (Left)	287 (Left)	396 (Left)	347 (Left)	390 (Left)	371 (Left)	400 (Left)	362 (Left)	424 (Left)	368 (Left)
R-37	I-5 SB off-ramp to Beach Boulevard	EB	1,330	241 (Right)	#423 (Right)	#185 (Left)	#342 (Right)	#210 (Left)	#360 (Left)	#175 (Left)	#325 (Left)	#200 (Left)	#320 (Left)
R-39	I-5 SB off-ramp to Artesia Boulevard	SB	2,070	101 (Through)	130 (Left)	122 (Through)	123 (Left)	127 (Through)	138 (Through)	133 (Through)	138 (Through)	152 (Through)	153 (Through)

EB = eastbound
Ft = foot/feet
HOV = high-occupancy vehicle

I = Interstate
LOS = level of service
NB = northbound

SB = southbound
WB = westbound

Table 2.5.9: Existing (2022), 2055 No Build Alternative (Alternative 1), and 2055 Build Alternatives (Alternatives 2, 3, and 4) Peak-Hour LOS Summary for I-5 Northbound Mainline and Ramps

Segment from	Segment to	Facility	GP										HOV/EL*										
			2022 Existing		2055 No Build Alternative (Alternative 1)		2055 Alternative 2		2055 Alternative 3		2055 Alternative 4		2022 Existing		2055 No Build Alternative (Alternative 1)		2055 Alternative 2		2055 Alternative 3		2055 Alternative 4		
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
South of Red Hill Avenue off-ramp	Red Hill Avenue off-ramp	Mainline	E	F	F	F	F	F	F	F	F	F	F	F	F	F	F	B	B	-	-	-	-
Red Hill Avenue off-ramp		Ramp	E	E	E	E	E	F	E	E	E	E	-	-	-	-	-	-	-	-	-	-	-
Red Hill Avenue off-ramp		Ramp			D	C			D	F	D	C			E	F			-	-	-	-	
Red Hill Avenue off-ramp	Red Hill Avenue on-ramp	Mainline	D	D	E	F	C	F	E	F	F	F	E	F	-	-	C	B	-	-	-	-	
Red Hill Avenue on-ramp		Ramp	E	F	D	F	E	F	D	F	F	F	-	-	D	E	-	-	-	-	-	-	
Red Hill Avenue on-ramp	Newport Avenue on-ramp	Mainline	E	F	F	F	D	F	F	F	F	E	D	F	-	-	D	B	-	-	-	-	
Newport Avenue on-ramp		Ramp	E	E	F	F	F	F	F	F	F	E	-	-	D	F	-	-	D	B	D	D	
Newport Avenue on-ramp	SR-55 NB off-ramp	Mainline	E	E	F	F	F	F	F	F	F	E	D	F	-	-	A	B	-	-	-	-	
SR-55 NB off-ramp		Ramp	E	E	E	C	F	F	F	F	F	C	-	-	D	F	-	-	D	B	D	D	
SR-55 NB off-ramp	SR-55 SB off-ramp	Mainline	E	C	E	C	E	C	F	F	F	C	D	F	-	-	A	B	-	-	-	-	
SR-55 SB off-ramp		Ramp	E	C	E	D	E	C	E	F	E	D	-	-	E	F	-	-	D	B	D	D	
SR-55 SB off-ramp	SR-55 NB on-ramp	Mainline	E	D	F	F	D	D	F	F	E	E	D	F	-	-	D	B	-	-	-	-	
SR-55 NB on-ramp		Ramp	F	F	F	F	F	F	F	F	E	E	-	-	D	F	-	-	D	B	D	D	
SR-55 NB on-ramp	1st/4th Street off-ramp	Mainline	F	F	F	F	F	F	F	F	E	E	D	F	-	-	A	B	-	-	-	-	
1st/4th Street off-ramp		Ramp	F	F	E	D	F	F	E	F	E	F	-	-	D	F	-	-	D	B	D	D	
1st/4th Street off-ramp	4th Street on-ramp/SR-55 NB on-ramp (HOV/EL)*	Mainline	E	D	E	E	F	F	E	F	F	F	D	F	-	-	A	B	-	-	-	-	
4th Street on-ramp		Ramp	D	E	-	-	E	E	-	-	-	-	-	-	B	C	-	-	B	B	B	C	
NB SR-55 on-ramp (HOV/EL)*		Ramp	-	-	E	E	-	-	E	F	F	F	B	C	B	C	A	C	B	B	B	C	
4th Street on-ramp/SR-55 NB on-ramp (HOV/EL)*	Grand Avenue off-ramp/Grand Avenue off-ramp (HOV/EL)*	Mainline	D	E	-	-	E	E	-	-	-	-	B	C	B	C	A	C	B	B	B	C	
Grand Avenue off-ramp (HOV/EL)*		Ramp	-	-	E	E	-	-	E	F	F	F	B	C	-	-	A	C	-	-	-	-	
Grand Avenue off-ramp		Ramp	D	E	D	D	E	E	E	F	E	F	-	-	D	E	-	-	B	B	B	C	
Grand Avenue off-ramp/Grand Avenue off-ramp (HOV/EL)*	Grand Avenue on-ramp	Mainline	D	D	E	F	C	F	E	F	F	F	D	D	-	-	C	C	-	-	-	-	
Grand Avenue on-ramp		Ramp	E	E	E	F	E	F	E	F	F	F	-	-	B	F	-	-	B	B	B	C	
Grand Avenue on-ramp	17th Street off-ramp	Mainline	E	E	E	F	E	F	E	F	F	F	B	B	-	-	A	B	-	-	-	-	
17th Street off-ramp		Ramp	E	E	D	D	E	F	D	F	F	F	-	-	B	F	-	-	A	B	A	C	
17th Street off-ramp	EB 17th Street on-ramp	Mainline	D	D	F	C	D	F	D	F	F	F	B	F	-	-	A	A	-	-	-	-	
EB 17th Street on-ramp		Ramp	D	C	F	C	D	F	D	F	F	F	-	-	B	F	-	-	A	B	A	C	
EB 17th Street on-ramp	WB 17th Street on-ramp	Mainline	D	C	F	F	D	F	F	F	F	F	B	F	-	-	A	A	-	-	-	-	
WB 17th Street on-ramp		Ramp	F	E	F	F	F	F	F	F	F	F	-	-	B	F	-	-	A	B	A	C	
WB 17th Street on-ramp	Main Street/Broadway off-ramp	Mainline	F	E	F	F	F	F	F	F	F	F	B	F	-	-	A	A	-	-	-	-	
Main Street/Broadway off-ramp		Ramp	F	E	F	F	F	F	F	F	F	F	-	-	B	F	-	-	A	B	A	C	

Table 2.5.9: Existing (2022), 2055 No Build Alternative (Alternative 1), and 2055 Build Alternatives (Alternatives 2, 3, and 4) Peak-Hour LOS Summary for I-5 Northbound Mainline and Ramps

Segment from	Segment to	Facility	GP										HOV/EL*										
			2022 Existing		2055 No Build Alternative (Alternative 1)		2055 Alternative 2		2055 Alternative 3		2055 Alternative 4		2022 Existing		2055 No Build Alternative (Alternative 1)		2055 Alternative 2		2055 Alternative 3		2055 Alternative 4		
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
Main Street/Broadway off-ramp	Main Street on-ramp	Mainline	D	E	E	D	D	F	F	F	F	F	F	B	F	-	-	A	A	-	-	-	-
Main Street on-ramp		Ramp	E	D	E	D	F	D	F	F	F	F	-	-	B	F	-	-	A	B	A	C	
Main Street on-ramp	SR-22 WB off-ramp	Mainline	E	D	E	D	F	D	F	F	F	F	B	F	-	-	A	A	-	-	-	-	
SR-22 WB off-ramp		Ramp	E	D	D	E	F	D	E	E	E	E	-	-	B	F	-	-	A	B	A	C	
SR-22 WB off-ramp	SR-57 NB off-ramp/SR-57 NB off-ramp (HOV/EL)*	Mainline	E	E	-	-	E	E	-	-	-	-	B	F	B	F	A	A	A	B	B	C	
SR-57 NB off-ramp (HOV/EL)*			-	-	E	E	-	-	E	D	E	E	B	F	-	-	A	B	-	-	-	-	
SR-57 NB off-ramp		Ramp	E	E	C	C	E	E	C	D	C	C	-	-	B	F	-	-	A	B	A	A	
SR-57 NB off-ramp/SR-57 NB off-ramp (HOV/EL)*	SR-22 WB on-ramp	Mainline	C	C	C	E	C	C	C	F	C	E	B	F	-	-	A	B	-	-	-	-	
SR-22 WB on-ramp		Ramp	C	D	C	E	C	F	C	F	C	E	-	-	B	F	-	-	A	B	A	A	
SR-22 WB on-ramp	Chapman Avenue off-ramp	Mainline	C	D	C	E	C	F	C	F	C	E	B	F	-	-	A	B	-	-	--	-	
Chapman Avenue off-ramp		Ramp	C	D	C	F	C	F	C	F	C	F	-	-	B	F	-	-	A	B	A	A	
Chapman Avenue off-ramp	The City Drive off-ramp	Mainline	C	F	C	F	C	F	C	F	C	F	B	F	-	-	A	B	-	-	-	-	
The City Drive off-ramp		Ramp	C	F	C	F	C	F	D	F	D	F	-	-	B	F	-	-	A	B	A	A	
The City Drive off-ramp	The City Drive on-ramp	Mainline	C	D	C	F	D	F	C	F	C	F	B	F	-	-	A	B	-	-	-	-	
The City Drive on-ramp		Ramp	C	F	-	-	D	F	-	-	-	-	-	-	B	E	-	-	A	A	A	A	
Gene Autry Way/Disney Way off-ramp (HOV/EL)*		Ramp	-	-	C	F	-	-	C	F	C	F	B	D	B	F	A	A	B	C	A	B	
The City Drive on-ramp	Katella Avenue off-ramp	Mainline	C	F	C	F	D	F	C	F	C	F	B	F	-	-	A	A	-	-	-	-	
Katella Avenue off-ramp		Ramp	C	F	C	F	D	F	C	F	C	F	-	-	C	F	-	-	B	C	A	B	
Katella Avenue off-ramp	Anaheim Way/Orangewood Avenue on-ramp	Mainline	C	F	D	F	C	F	C	F	C	F	C	F	-	-	C	B	-	-	-	-	
Anaheim Way/Orangewood Avenue on-ramp		Ramp	D	F	D	F	D	F	C	F	C	F	-	-	B	F	-	-	B	C	A	B	
Anaheim Way/Orangewood Avenue on-ramp	Katella Avenue on-ramp	Mainline	D	F	C	F	D	F	C	F	C	F	B	F	-	-	A	B	-	-	-	-	
Katella Avenue on-ramp		Ramp	C	F	C	F	D	F	C	F	C	F	-	-	B	F	-	-	B	C	A	B	
Katella Avenue on-ramp	S. Anaheim Boulevard on-ramp	Mainline	C	F	D	F	D	F	D	F	D	F	B	F	-	-	A	B	-	-	-	-	
Anaheim Boulevard on-ramp		Ramp	D	F	D	F	D	F	D	F	D	F	-	-	B	F	-	-	B	C	A	B	
S. Anaheim Boulevard on-ramp	Harbor Boulevard off-ramp	Mainline	D	F	D	F	D	F	D	F	D	F	B	F	-	-	C	B	-	-	-	-	
Harbor Boulevard off-ramp		Ramp	D	F	-	-	D	F	-	-	-	-	-	-	B	F	-	-	A	B	A	B	
Gene Autry Way on-ramp (HOV/EL)*		Ramp	-	-	C	F	-	-	D	F	C	F	B	F	C	F	A	B	A	C	A	B	
Harbor Boulevard off-ramp	Harbor Boulevard on-ramp	Mainline	C	F	D	D	C	F	C	D	C	D	C	F	-	-	C	B	-	-	-	-	
Harbor Boulevard on-ramp		Ramp	C	D	D	D	D	D	C	D	C	D	-	-	B	F	-	-	A	C	A	B	
Harbor Boulevard on-ramp	Ball Road on-ramp	Mainline	C	D	D	D	D	D	D	D	D	D	B	D	-	-	A	B	-	-	-	-	

Table 2.5.9: Existing (2022), 2055 No Build Alternative (Alternative 1), and 2055 Build Alternatives (Alternatives 2, 3, and 4) Peak-Hour LOS Summary for I-5 Northbound Mainline and Ramps

Segment from	Segment to	Facility	GP										HOV/EL*									
			2022 Existing		2055 No Build Alternative (Alternative 1)		2055 Alternative 2		2055 Alternative 3		2055 Alternative 4		2022 Existing		2055 No Build Alternative (Alternative 1)		2055 Alternative 2		2055 Alternative 3		2055 Alternative 4	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Ball Road on-ramp		Ramp	D	D	D	E	D	D	D	E	D	E	-	-	B	F	-	-	A	C	A	B
Ball Road on-ramp	Disneyland Drive on-ramp	Mainline	D	E	C	D	D	E	C	D	C	D	B	D	-	-	A	B	-	-	-	-
Disneyland Drive on-ramp		Ramp	C	D	C	D	C	D	C	D	C	D	-	-	B	F	-	-	A	C	A	B
Disneyland Drive on-ramp	Lincoln Avenue off-ramp	Mainline	C	D	D	E	C	D	D	E	D	E	B	D	-	-	A	B	-	-	-	-
Lincoln Avenue off-ramp		Ramp	D	E	C	F	D	E	C	D	C	D	-	-	C	F	-	-	B	C	A	B
Lincoln Avenue off-ramp	Lincoln Avenue on-ramp	Mainline	C	D	D	F	C	D	D	F	D	E	C	D	-	-	C	B	-	-	-	-
Lincoln Avenue on-ramp		Ramp	D	F	D	F	D	F	D	F	D	E	-	-	C	F	-	-	B	C	A	B
Lincoln Avenue on-ramp	Euclid Street off-ramp	Mainline	D	F	D	F	D	F	D	F	D	E	C	D	-	-	C	B	-	-	-	-
Euclid Street off-ramp		Ramp	D	F	D	F	D	F	D	D	D	D	-	-	C	F	-	-	B	D	A	D
Euclid Street off-ramp	Euclid Street on-ramp	Mainline	D	D	D	F	D	D	D	F	D	E	B	D	-	-	A	B	-	-	-	-
Euclid Street on-ramp		Ramp	D	F	D	F	D	F	D	F	D	E	-	-	B	F	-	-	B	D	A	D
Euclid Street on-ramp	Brookhurst Street off-ramp	Mainline	D	F	D	F	D	F	D	F	D	E	B	D	-	-	A	B	-	-	-	-
Brookhurst Street off-ramp		Ramp	D	F	D	E	D	F	D	E	D	D	-	-	B	F	-	-	B	D	A	D
Brookhurst Street off-ramp	La Palma Avenue off-ramp	Mainline	D	E	D	E	D	E	D	E	D	D	B	D	-	-	A	B	-	-	-	-
La Palma Avenue off-ramp		Ramp	D	E	C	D	D	E	C	D	C	C	-	-	B	F	-	-	B	D	A	D
La Palma Avenue off-ramp	Brookhurst Street on-ramp	Mainline	C	D	C	C	C	D	C	C	C	C	C	D	-	-	A	B	-	-	-	-
Brookhurst Street on-ramp		Ramp	C	C	C	C	C	D	C	C	C	C	-	-	B	F	-	-	B	D	A	D
Brookhurst Street on-ramp	La Palma Avenue on-ramp	Mainline	C	C	D	D	C	D	D	E	D	D	B	D	-	-	A	B	-	-	-	-
La Palma Avenue on-ramp		Ramp	C	D	D	D	D	E	D	E	D	D	-	-	B	F	-	-	A	B	-	-
La Palma Avenue on-ramp	SR-91 WB off-ramp	Mainline	C	D	D	D	D	E	D	E	D	D	B	C	-	-	A	B	-	-	-	-
SR-91 WB off-ramp		Ramp	C	D	E	E	D	E	E	E	E	E	-	-	B	F	-	-	A	A	A	C
SR-91 WB off-ramp	SR-91 EB off-ramp/SR-91 WB off-ramp (HOV/EL)*	Mainline	D	E	-	-	E	E	-	-	-	-	A	B	B	F	A	A	B	D	A	D
SR-91 WB off-ramp (HOV/EL)*			-	-	E	E	-	-	E	E	E	E	A	A	-	-	A	B	-	-	-	-
SR-91 EB off-ramp		Ramp	D	E	B	D	E	E	B	C	B	C	-	-	C	D	-	-	B	D	A	D
SR-91 EB off-ramp/SR-91 WB off-ramp (HOV/EL)*	SR-91 WB on-ramp/SR-91 WB on-ramp (HOV/EL)*	Mainline	B	B	B	F	B	D	B	C	B	F	C	D	-	-	C	B	-	-	-	-
SR-91 WB on-ramp		Ramp	B	B	-	-	B	F	-	-	-	-	-	-	B	C	-	-	B	D	A	D
SR-91 WB on-ramp (HOV/EL)*			-	-	B	F	-	-	B	C	B	F	B	B	B	C	A	B	A	B	A	B
SR-91 WB on-ramp/SR-91 WB on-ramp (HOV/EL)*	Orangethorpe Avenue on-ramp	Mainline	B	B	B	C	B	F	B	C	B	B	B	C	-	-	A	B	-	-	-	-
Orangethorpe Avenue on-ramp		Ramp	B	C	B	C	B	C	B	C	B	B	-	-	A	A	-	-	A	A	A	B
Orangethorpe Avenue on-ramp	Auto Center Drive off-ramp	Mainline	B	C	B	C	B	C	B	C	B	B	A	A	-	-	A	A	-	-	-	-
Auto Center Drive off-ramp		Ramp	B	C	B	B	B	C	B	C	B	B	-	-	A	B	-	-	B	B	B	C

Table 2.5.9: Existing (2022), 2055 No Build Alternative (Alternative 1), and 2055 Build Alternatives (Alternatives 2, 3, and 4) Peak-Hour LOS Summary for I-5 Northbound Mainline and Ramps

Segment from	Segment to	Facility	GP										HOV/EL*										
			2022 Existing		2055 No Build Alternative (Alternative 1)		2055 Alternative 2		2055 Alternative 3		2055 Alternative 4		2022 Existing		2055 No Build Alternative (Alternative 1)		2055 Alternative 2		2055 Alternative 3		2055 Alternative 4		
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
Auto Center Drive off-ramp	Beach Boulevard off-ramp	Mainline	B	B	B	B	B	B	B	C	B	B	B	B	-	-	B	A	-	-	-	-	
Beach Boulevard off-ramp		Ramp	B	B	C	C	B	B	B	B	B	B	B	-	-	A	B	-	-	A	A	A	C
Beach Boulevard off-ramp	Beach Boulevard on-ramp	Mainline	C	C	C	C	C	C	B	B	B	B	A	B	-	-	A	A	-	-	-	-	
Beach Boulevard on-ramp		Ramp	C	C	C	C	C	C	B	B	B	B	-	-	B	B	-	-	B	A	B	C	
Beach Boulevard on-ramp	Artesia Boulevard off-ramp	Mainline	C	C	C	C	C	C	B	B	B	B	B	B	-	-	B	A	-	-	-	-	
Artesia Boulevard off-ramp		Ramp	C	C	C	C	C	C	C	C	C	C	-	-	B	B	-	-	B	A	B	C	
Artesia Boulevard off-ramp	North of Artesia Boulevard off-ramp	Mainline	C	C			C	C					B	B			B	A					

* = The No Build Alternative (Alternative 1) and Alternative 2 will maintain HOV lane configurations, and Alternatives 3 and 4 will convert them into ELs. In the event either Alternative 3 or 4 is chosen as the Build Alternative, these marked segments will transition from HOV lanes to ELs.

EB = eastbound
 EL = Express Lane
 GP = general-purpose
 HOV = high-occupancy vehicle
 I = Interstate
 LOS = level of service
 NB = northbound
 SB = southbound
 SR = State Route
 WB = westbound

Table 2.5.10: Existing (2022), 2055 No Build Alternative (Alternative 1), and 2055 Build Alternatives (Alternatives 2, 3, and 4) Peak-Hour LOS Summary for I-5 Southbound Mainline and Ramps

Segment from	Segment to	Facility	GP										HOV/EL*									
			2022 Existing		2055 No Build Alternative (Alternative 1)		2055 Alternative 2		2055 Alternative 3		2055 Alternative 4		2022 Existing		2055 No Build Alternative (Alternative 1)		2055 Alternative 2		2055 Alternative 3		2055 Alternative 4	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Artesia Boulevard off-ramp	Artesia Boulevard on-ramp	Mainline	C	B	C	B	F	C	D	B	C	B	B	A	F	A	A	A	A	A	C	A
Artesia Boulevard on-ramp		Ramp	C	B	D	C	F	C	F	C	C	C	-	-	-	-	-	-	-	-	-	-
Artesia Boulevard on-ramp	Beach Boulevard off-ramp	Mainline	C	B	D	C	F	C	F	C	C	C	B	A	F	A	A	A	A	A	C	A
Beach Boulevard off-ramp		Ramp	C	B	D	C	F	C	F	C	C	C	-	-	-	-	-	-	-	-	-	-
Beach Boulevard off-ramp	Beach Boulevard on-ramp	Mainline	C	B	C	B	F	B	F	B	C	B	C	B	F	B	A	A	A	A	C	A
Beach Boulevard on-ramp		Ramp	C	B	D	B	F	C	D	C	C	C	-	-	-	-	-	-	-	-	-	-
Beach Boulevard on-ramp	SR-91 EB off-ramp/SR-91 EB off-ramp (HOV/EL)*	Mainline	C	B	D	B	F	C	D	C	C	C	B	A	F	B	A	A	A	A	C	A
SR-91 EB off-ramp (HOV/EL)*		Ramp	-	-	-	-	-	-	-	-	-	-	B	A	F	B	A	A	A	A	B	A
SR-91 EB off-ramp		Ramp	C	B	D	B	F	C	D	C	C	C	-	-	-	-	-	-	-	-	-	-
SR-91 EB off-ramp/SR-91 EB off-ramp (HOV/EL)*	Magnolia Street off-ramp	Mainline	C	B	C	B	F	B	C	B	D	B	C	A	F	A	A	A	A	A	B	A
Magnolia Street off-ramp		Ramp	C	C	C	C	F	C	C	B	D	B	-	-	-	-	-	-	-	-	-	-
Magnolia Street off-ramp	SR-91 EB on-ramp/SR-91 EB on-ramp (HOV/EL)*	Mainline	B	B	D	B	F	B	D	B	F	B	C	A	F	A	A	A	A	A	B	A
SR-91 EB on-ramp (HOV/EL)*		Ramp	-	-	-	-	-	-	-	-	-	-	E	B	F	B	A	A	B	A	B	A
SR-91 EB on-ramp		Ramp	C	C	F	C	F	C	F	B	F	B	-	-	-	-	-	-	-	-	-	-
SR-91 EB on-ramp/SR-91 EB on-ramp (HOV/EL)*	Magnolia Street on-ramp	Mainline	C	C	F	C	F	C	F	B	F	B	F	C	F	C	A	A	C	A	B	A
Magnolia Street on-ramp		Ramp	D	B	E	B	F	B	F	B	F	B	-	-	-	-	-	-	-	-	-	-
Magnolia Street on-ramp	Brookhurst Street off-ramp	Mainline	D	B	E	B	F	B	F	B	F	B	F	C	F	C	A	A	C	A	B	A
Brookhurst Street off-ramp		Ramp	D	B	E	B	F	B	F	B	F	B	-	-	-	-	-	-	-	-	-	-
Brookhurst Street off-ramp	Brookhurst Street on-ramp	Mainline	F	C	F	C	F	C	F	C	F	C	F	C	F	C	A	E	D	B	B	B
Brookhurst Street on-ramp		Ramp	F	F	F	F	F	F	F	C	F	C	-	-	-	-	-	-	-	-	-	-
Brookhurst Street on-ramp	Euclid Street off-ramp	Mainline	F	F	F	F	F	F	F	C	F	C	F	F	F	F	A	F	D	B	B	A
Euclid Street off-ramp		Ramp	F	F	F	F	F	F	F	C	F	C	-	-	-	-	-	-	-	-	-	-
Euclid Street off-ramp	Lincoln Avenue off-ramp	Mainline	F	B	F	C	F	C	F	C	F	C	F	F	F	F	A	F	D	B	B	A
Lincoln Avenue off-ramp		Ramp	F	C	F	C	F	C	F	C	F	C	-	-	-	-	-	-	-	-	-	-
Lincoln Avenue off-ramp	Euclid Street on-ramp	Mainline	F	B	F	B	F	B	F	C	F	C	F	B	F	B	A	F	F	F	B	F
Euclid Street on-ramp		Ramp	F	C	F	C	F	C	F	C	F	C	-	-	-	-	-	-	-	-	-	-
Euclid Street on-ramp	Lincoln Avenue on-ramp	Mainline	F	C	F	C	F	C	F	C	F	C	D	B	F	B	A	A	B	A	B	A
Lincoln Avenue on-ramp		Ramp	F	B	F	C	F	C	F	C	F	C	-	-	-	-	-	-	-	-	-	-
Lincoln Avenue on-ramp	Disneyland Drive off-ramp/Disneyland Drive off-ramp (HOV/EL)*	Mainline	F	B	F	C	F	C	F	C	F	C	D	B	F	B	A	A	B	A	B	A
Disneyland Drive off-ramp (HOV/EL)*		Ramp	-	-	-	-	-	-	-	-	-	-	C	A	F	B	A	A	B	A	B	A

Table 2.5.10: Existing (2022), 2055 No Build Alternative (Alternative 1), and 2055 Build Alternatives (Alternatives 2, 3, and 4) Peak-Hour LOS Summary for I-5 Southbound Mainline and Ramps

Segment from	Segment to	Facility	GP										HOV/EL*										
			2022 Existing		2055 No Build Alternative (Alternative 1)		2055 Alternative 2		2055 Alternative 3		2055 Alternative 4		2022 Existing		2055 No Build Alternative (Alternative 1)		2055 Alternative 2		2055 Alternative 3		2055 Alternative 4		
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM
Disneyland Drive off-ramp		Ramp	F	B	F	C	F	C	F	C	F	C	-	-	-	-	-	-	-	-	-	-	-
Disneyland Drive off-ramp/Disneyland Drive off-ramp (HOV)	Disneyland Drive on-ramp	Mainline	E	B	E	C	F	C	F	C	F	C	C	B	F	B	C	A	C	C	C	C	C
Disneyland Drive on-ramp		Ramp	D	B	E	C	F	C	F	C	F	C	-	-	-	-	-	-	-	-	-	-	-
Disneyland Drive on-ramp	Harbor Boulevard off-ramp	Mainline	D	B	E	C	F	C	F	C	F	C	C	B	F	B	C	A	C	C	C	C	C
Harbor Boulevard off-ramp		Ramp	D	B	E	C	F	C	F	C	F	C	-	-	-	-	-	-	-	-	-	-	-
Harbor Boulevard off-ramp	Harbor Boulevard on-ramp	Mainline	E	B	F	C	F	B	E	C	E	C	E	B	F	B	A	A	C	C	C	C	C
Harbor Boulevard on-ramp		Ramp	D	B	E	B	F	B	F	B	F	B	-	-	-	-	-	-	-	-	-	-	-
Harbor Boulevard on-ramp	Anaheim Boulevard off-ramp	Mainline	D	B	E	B	F	B	F	B	F	B	C	B	F	B	A	A	C	C	C	C	C
Anaheim Boulevard off-ramp		Ramp	D	B	E	B	F	B	F	B	F	B	-	-	-	-	-	-	-	-	-	-	-
Anaheim Boulevard off-ramp	Katella Avenue off-ramp	Mainline	D	B	D	C	F	C	E	C	D	C	C	B	F	B	A	A	C	C	C	C	C
Katella Avenue off-ramp		Ramp	D	B	D	C	F	C	E	C	D	C	-	-	-	-	-	-	-	-	-	-	-
Katella Avenue off-ramp	Disney Way on-ramp/Gene Autry Way off-ramp (HOV/EL)*	Mainline	D	B	D	B	F	B	F	C	F	C	C	B	F	B	A	A	C	B	B	A	A
Gene Autry Way off-ramp (HOV/EL)*		Ramp	-	-	-	-	-	-	-	-	-	-	C	B	F	B	A	A	C	-	A	A	A
Disney Way on-ramp		Ramp	D	B	D	C	F	C	E	C	E	C	-	-	-	-	-	-	-	-	-	-	-
Disney Way on-ramp/Gene Autry Way off-ramp (HOV/EL)*	Katella Avenue on-ramp	Mainline	D	B	D	C	F	C	E	C	E	C	D	B	F	B	A	A	A	A	A	A	A
Katella Avenue on-ramp		Ramp	E	B	E	B	F	B	F	C	F	B	-	-	-	-	-	-	-	-	-	-	-
Katella Avenue on-ramp	The City Drive off-ramp	Mainline	E	B	E	B	F	B	F	C	F	B	D	B	F	B	A	A	A	A	A	A	A
The City Drive off-ramp		Ramp	E	B	E	B	F	B	F	C	F	B	-	-	-	-	-	-	-	-	-	-	-
The City Drive off-ramp	Orangewood Avenue on-ramp/Gene Autry Way on-ramp (HOV/EL)*	Mainline	E	B	F	B	F	B	F	C	E	C	E	B	F	B	B	B	A	A	A	A	A
Gene Autry Way on-ramp (HOV/EL)*		Ramp	-	-	-	-	-	-	-	-	-	-	C	B	F	B	B	B	B	A	B	A	A
Orangewood Avenue on-ramp		Ramp	D	B	E	B	F	B	E	B	E	B	-	-	-	-	-	-	-	-	-	-	-
Orangewood Avenue on-ramp/Gene Autry Way on-ramp (HOV/EL)*	The City Drive on-ramp	Mainline	D	B	E	B	F	B	E	B	E	B	F	B	F	B	B	B	A	A	A	A	A
The City Drive on-ramp		Ramp	D	B	D	B	F	B	D	B	C	B	-	-	-	-	-	-	-	-	-	-	-
The City Drive on-ramp	Chapman Avenue on-ramp	Mainline	D	B	D	B	F	B	E	B	D	B	F	B	F	B	B	B	A	A	A	A	A
Chapman Avenue on-ramp		Ramp	D	B	E	B	F	B	F	B	E	B	-	-	-	-	-	-	-	-	-	-	-
Chapman Avenue on-ramp	SR-22 WB off-ramp	Mainline	D	B	E	B	F	B	F	B	E	B	F	B	F	B	B	B	A	A	A	A	A
SR-22 WB off-ramp		Ramp	D	B	E	B	F	B	F	B	E	B	-	-	-	-	-	-	-	-	-	-	-
SR-22 WB off-ramp	SR-22 EB/La Veta Avenue off-ramp	Mainline	D	C	D	C	F	C	F	C	E	C	F	B	F	B	B	B	A	A	A	A	A
SR-22 EB/La Veta Avenue off-ramp		Ramp	D	C	D	C	F	C	F	C	E	C	-	-	-	-	-	-	-	-	-	-	-

Table 2.5.10: Existing (2022), 2055 No Build Alternative (Alternative 1), and 2055 Build Alternatives (Alternatives 2, 3, and 4) Peak-Hour LOS Summary for I-5 Southbound Mainline and Ramps

Segment from	Segment to	Facility	GP										HOV/EL*									
			2022 Existing		2055 No Build Alternative (Alternative 1)		2055 Alternative 2		2055 Alternative 3		2055 Alternative 4		2022 Existing		2055 No Build Alternative (Alternative 1)		2055 Alternative 2		2055 Alternative 3		2055 Alternative 4	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
SR-22 EB/La Veta Avenue off-ramp	Broadway/Main Street off-ramp/SB SR-57 on-ramp (HOV/EL)*	Mainline	E	C	E	C	F	C	F	C	E	C	F	B	F	B	B	B	A	A	A	A
Broadway/Main Street off-ramp		Ramp	E	C	E	C	F	C	F	C	E	C	-	-	-	-	-	-	-	-	-	-
SB SR-57 on-ramp (HOV/EL)*		Ramp	-	-	-	-	-	-	-	-	-	-	B	B	F	B	A	A	B	A	B	B
Broadway/Main Street off-ramp/SB SR-57 on-ramp (HOV/EL)*	SR-22 EB on-ramp	Mainline	C	A	D	B	F	B	F	B	F	B	C	B	F	B	A	A	B	A	B	A
SR-22 EB on-ramp		Ramp	D	B	E	C	F	C	F	C	F	C	-	-	-	-	-	-	-	-	-	-
SR-22 EB on-ramp	SR-57 SB/CD Road on-ramp	Mainline	F	B	F	B	F	B	F	B	F	B	C	B	E	B	A	A	B	A	B	A
SR-57 SB/CD Road on-ramp		Ramp	F	B	F	B	F	B	D	B	F	B	-	-	-	-	-	-	-	-	-	-
SR-57 SB/CD Road on-ramp	Main Street on-ramp	Mainline	F	B	F	B	F	B	E	B	F	B	F	B	F	F	A	A	C	B	C	B
Main Street on-ramp		Ramp	F	B	F	C	F	C	E	C	F	D	-	-	-	-	-	-	-	-	-	-
Main Street on-ramp	17th Street off-ramp	Mainline	F	B	F	C	F	C	E	C	F	D	F	B	F	F	A	A	C	A	C	B
17th Street off-ramp		Ramp	F	B	F	C	F	C	E	C	F	D	-	-	-	-	-	-	-	-	-	-
17th Street off-ramp	17th Street on-ramp	Mainline	F	B	F	B	F	B	F	C	F	F	F	B	F	F	A	A	C	A	C	B
17th Street on-ramp		Ramp	E	B	E	B	F	B	F	F	F	F	-	-	-	-	-	-	-	-	-	-
17th Street on-ramp	Grand Avenue off-ramp	Mainline	E	B	E	B	F	B	F	F	F	F	F	B	F	F	A	A	C	A	C	B
Grand Avenue off-ramp		Ramp	E	B	E	B	F	B	F	F	F	F	-	-	-	-	-	-	-	-	-	-
Grand Avenue off-ramp	Grand Avenue on-ramp	Mainline	C	B	C	B	F	F	F	F	F	F	F	B	F	F	A	A	C	A	C	B
Grand Avenue on-ramp		Ramp	C	B	E	B	F	F	F	F	F	F	-	-	-	-	-	-	-	-	-	-
Grand Avenue on-ramp (HOV/EL)*		Ramp	-	-	-	-	-	-	-	-	-	-	B	B	B	F	A	A	B	A	D	B
Grand Avenue on-ramp/Grand Avenue on-ramp (HOV/EL)*	4th Street off-ramp/SR-55 SB off-ramp (HOV/EL)*	Mainline	C	B	E	B	F	F	F	F	F	F	B	B	B	F	A	A	B	A	F	B
SR-55 SB off-ramp (HOV/EL)*		Ramp	-	-	-	-	-	-	-	-	-	-	B	B	B	F	A	A	B	A	D	B
4th Street off-ramp		Ramp	C	B	E	B	F	F	F	F	F	F	-	-	-	-	-	-	-	-	-	-
4th Street off-ramp	1st Street on-ramp	Mainline	F	B	F	F	F	F	F	F	F	F	F	C	F	F	A	A	C	B	F	C
1st Street on-ramp		Ramp	D	B	E	B	E	B	E	B	E	B	-	-	-	-	-	-	-	-	-	-
1st Street on-ramp	SR-55 SB off-ramp	Mainline	D	B	E	B	E	B	E	B	E	B	C	C	-	F	A	A	C	B	C	B
SR-55 SB off-ramp		Ramp	D	B	E	B	E	B	E	B	E	B	-	-	-	-	-	-	-	-	-	-
SR-55 SB off-ramp	Newport Avenue off-ramp	Mainline	C	A	C	A	C	A	C	A	C	A	C	C	C	F	A	A	C	B	C	B
Newport Avenue off-ramp		Ramp	C	A	C	A	C	A	C	A	C	A	-	-	-	-	-	-	-	-	-	-
Newport Avenue off-ramp	SR-55 NB on-ramp	Mainline	C	B	C	B	C	B	C	A	C	A	C	C	C	B	A	A	C	B	C	B
SR-55 NB on-ramp		Ramp	E	B	E	B	E	B	D	B	D	B	-	-	-	-	-	-	-	-	-	-

Table 2.5.10: Existing (2022), 2055 No Build Alternative (Alternative 1), and 2055 Build Alternatives (Alternatives 2, 3, and 4) Peak-Hour LOS Summary for I-5 Southbound Mainline and Ramps

Segment from	Segment to	Facility	GP										HOV/EL*									
			2022 Existing		2055 No Build Alternative (Alternative 1)		2055 Alternative 2		2055 Alternative 3		2055 Alternative 4		2022 Existing		2055 No Build Alternative (Alternative 1)		2055 Alternative 2		2055 Alternative 3		2055 Alternative 4	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
SR-55 NB on-ramp	SR-55 SB on-ramp	Mainline	E	B	E	B	E	B	D	B	D	B	C	C	C	F	A	A	-	-	-	-
SR-55 SB on-ramp		Ramp	F	C	F	C	E	C	F	C	F	C	-	-	-	-	-	-	-	-	-	-
SR-55 SB on-ramp	Red Hill Avenue off-ramp	Mainline	F	C	F	C	E	C	F	C	F	C	C	B	C	B	A	A	-	-	-	-
Red Hill Avenue off-ramp		Ramp	F	C	F	C	E	C	F	C	F	C	-	-	-	-	-	-	-	-	-	-
Red Hill Avenue off-ramp	Red Hill Avenue on-ramp	Mainline	F	B	F	B	C	B	F	B	D	B	C	C	C	C	A	A	-	-	-	-
Red Hill Avenue on-ramp		Ramp	E	B	D	C	D	C	E	B	E	B	-	-	-	-	-	-	-	-	-	-
Red Hill Avenue on-ramp	South of Red Hill Avenue on-ramp	Mainline	D	B	D	B	D	C	D	B	E	B	B	B	B	B	A	A	-	-	-	-

* = The No Build Alternative (Alternative 1) and Alternative 2 will maintain HOV lane configurations, and Alternatives 3 and 4 will convert them into ELs. In the event either Alternative 3 or 4 is chosen as the Build Alternative, these marked segments will transition from HOV lanes to ELs.
 CD = collector-distributor GP = general-purpose LOS = level of service SR = State Route
 EB = eastbound HOV = high-occupancy vehicle NB = northbound WB = westbound
 EL = Express Lane I = Interstate SB = southbound

**Table 2.5.11: Existing (2022), 2055 No Build Alternative (Alternative 1), and 2055 Build Alternatives (Alternatives 2, 3, and 4) Intersection Peak-Hour LOS—
Ramp Terminal Intersections**

No.	Intersection	2022 AM		2022 PM		2055 AM (No Build Alt [Alt 1])		2055 PM (No Build Alt [Alt 1])		2055 AM (Alt 2)		2055 PM (Alt 2)		2055 AM (Alt 3)		2055 PM (Alt 3)		2055 AM (Alt 4)		2055 PM (Alt 4)	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
R-1	I-5 SB on/off-ramp and Red Hill Avenue	17.1	B	30.7	C	40.5	D	40.7	D	40.6	D	45.3	D	30.8	C	38.1	D	31.8	C	40.0	D
R-2	I-5 NB on/off-ramp and Red Hill Avenue	19.3	B	15.8	B	17.4	B	23.2	C	22.2	C	27.0	C	27.1	C	24.6	C	27.5	C	24.8	C
R-3	I-5 NB on-ramp and Newport Avenue*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
R-4	I-5 SB off-ramp and Newport Avenue	25.2	C	30.8	C	28.5	C	51.5	D	31.6	C	51.7	D	30.9	C	55.9	E	31.3	C	57.0	E
R-5	I-5 SB on-ramp and E. First Street	8.3	A	5.9	A	6.4	A	7.9	A	7.0	A	7.4	A	6.6	A	7.3	A	6.6	A	7.3	A
R-6	I-5 NB on/off-ramp and E. 4th Street	17.2	B	7.3	A	18.3	B	42.1	D	8.5	A	37.4	D	14.9	B	50.8	D	14.7	B	49.3	D
R-7	I-5 SB off-ramp and E. 4th Street	23.3	C	18.7	B	24.4	C	18.5	B	24.0	C	19.0	B	24.7	C	18.8	B	25.0	C	19.4	B
R-8	I-5 NB on/off-ramp and Grand Avenue	12.0	B	11.2	B	16.1	B	51.2	D	11.7	B	47.2	D	13.7	B	22.5	C	16.3	B	22.5	C
R-9	I-5 SB on/off-ramp and E. Santa Ana Boulevard	27.8	C	30.8	C	36.6	D	31.1	C	38.5	D	33.3	C	37.4	D	31.3	C	37.0	D	31.3	C
R-10	I-5 SB HOV on-ramp/NB HOV off-ramp and Grand Avenue	51.9	D	50.1	D	47.6	D	73.6	E	33.6	C	46.4	D	48.8	D	51.4	D	42.2	D	51.4	D
R-11	I-5 NB off-ramp and 17th Street	38.4	D	39.6	D	39.6	D	36.6	D	39.8	D	39.9	D	39.5	D	38.3	D	40.3	D	35.5	D
R-12	I-5 SB on/off-ramp and Penn Way	34.7	C	33.4	C	29.3	C	30.5	C	29.4	C	31.1	C	28.8	C	31.4	C	28.5	C	31.4	C
R-13	I-5 NB off-ramp and Main Street	30.7	C	31.0	C	50.3	D	31.1	C	36.9	D	24.2	C	38.2	D	24.1	C	38.0	D	23.3	C
R-14	I-5 NB on-ramp/I-5 SB off-ramp/Santa Clara and Main Street	45.6	D	65.6	E	45.9	D	134.5	F	43.4	D	117.7	F	41.5	D	118.9	F	43.6	D	121.2	F
R-15	I-5 SB on-ramp/Buffalo Avenue and Main Street	16.8	B	18.9	B	21.2	C	32.2	C	19.9	B	36.7	D	20.8	C	29.8	C	20.6	C	31.7	C
R-16	I-5 NB off-ramp and Broadway	18.4	B	14.9	B	16.8	B	19.4	B	25.2	C	16.7	B	25.9	C	15.8	B	16.3	B	15.8	B
R-17	I-5 NB off-ramp/SB on-ramp and Chapman Avenue	52.6	D	43.8	D	46.0	D	22.5	C	46.9	D	24.0	C	45.6	D	25.8	C	44.9	D	26.3	C
R-18	I-5 NB on-ramp and W. Chapman Avenue	32.9	C	33.9	C	36.6	D	38.3	D	35.2	D	35.3	D	37.5	D	34.8	C	36.3	D	34.9	C
R-19	I-5 NB on/off-ramp and The City Drive/State College Boulevard	15.7	B	30.5	C	17.9	B	32.0	C	18.5	B	30.3	C	16.8	B	30.4	C	16.7	B	29.5	C
R-20	I-5 SB off/on-ramp and The City Drive/State College Boulevard	17.0	B	17.2	B	14.8	B	17.8	B	14.1	B	9.4	A	14.8	B	12.9	B	15.2	B	13.0	B
R-21	I-5 NB/SB HOV Ramps/E. Gene Autry Way	23.3	C	25.0	C	20.9	C	19.1	B	12.8	B	14.3	B	22.1	C	17.1	B	27.5	C	17.6	B
R-22	I-5 SB off-ramp and E. Katella Avenue	20.7	C	20.9	C	36.2	D	33.3	C	33.5	C	44.4	D	38.0	D	42.6	D	32.2	C	46.5	D
R-23	I-5 NB on-ramp and S. Anaheim Way	19.2	B	26.2	C	13.9	B	27.4	C	16.1	B	46.4	D	14.8	B	47.6	D	15.0	B	41.7	D
R-24	I-5 SB off-ramp and Disney Way	18.0	B	19.1	B	16.7	B	17.7	B	17.1	B	18.2	B	14.9	B	18.9	B	14.8	B	19.3	B
R-25	I-5 NB on/off-ramp and S. Harbor Boulevard	11.3	B	13.2	B	27.0	C	30.3	C	27.5	C	28.1	C	26.5	C	28.5	C	26.3	C	31.2	C
R-26	I-5 SB on/off-ramp and S. Harbor Boulevard	8.3	A	5.8	A	15.3	B	13.1	B	15.5	B	14.1	B	14.5	B	14.2	B	17.9	B	13.5	B
R-27	I-5 SB/NB on/off-ramp and Disneyland Drive	40.7	D	43.2	D	40.3	D	41.4	D	38.0	D	39.6	D	36.9	D	40.2	D	41.8	D	42.3	D
R-28	I-5 NB on/off-ramp and Lincoln Avenue	27.6	C	37.3	D	33.7	C	58.5	E	34.5	C	72.6	E	34.8	C	80.8	F	34.7	C	69.0	E
R-29	I-5 SB on/off-ramp and Lincoln Avenue	27.9	C	23.1	C	13.7	B	14.1	B	13.2	B	13.8	B	15.8	B	13.5	B	15.1	B	23.5	C
R-30	I-5 SB/NB on/off-ramp and Euclid Street	46.7	D	68.9	E	55.8	E	64.1	E	55.4	E	67.8	E	55.4	E	69.4	E	61.2	E	66.9	E
R-31	I-5 NB off-ramp and W La Palma Avenue*	0.7	A	0.7	A	0.7	A	0.7	A	0.6	A	0.7	A	0.6	A	0.7	A	0.7	A	0.8	A
R-32	I-5 NB off/SB on/off-ramp and Brookhurst Street	48.4	D	50.5	D	58.2	E	61.2	E	55.0	D	77.3	E	63.3	E	72.5	E	59.0	E	78.8	E
R-33	I-5 NB off-ramp and Magnolia Street	21.0	C	24.7	C	33.2	C	63.9	E	34.5	C	160.2	F	32.6	C	60.1	E	36.9	D	66.0	E

**Table 2.5.11: Existing (2022), 2055 No Build Alternative (Alternative 1), and 2055 Build Alternatives (Alternatives 2, 3, and 4) Intersection Peak-Hour LOS—
Ramp Terminal Intersections**

No.	Intersection	2022 AM		2022 PM		2055 AM (No Build Alt [Alt 1])		2055 PM (No Build Alt [Alt 1])		2055 AM (Alt 2)		2055 PM (Alt 2)		2055 AM (Alt 3)		2055 PM (Alt 3)		2055 AM (Alt 4)		2055 PM (Alt 4)	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
R-34	I-5 SB on/off-ramp and Magnolia Street	30.2	C	27.7	C	32.6	C	28.1	C	32.4	C	29.6	C	34.4	C	34.5	C	33.1	C	29.4	C
R-35	I-5 NB off-ramp and Auto Center Drive	23.8	C	20.3	C	23.6	C	19.3	B	23.6	C	19.1	B	23.6	C	19.4	B	23.5	C	20.9	C
R-36	I-5 NB on/off-ramp and Auto Center Drive	34.4	C	38.0	D	29.7	C	45.2	D	31.8	C	44.9	D	30.3	C	45.1	D	32.6	C	44.5	D
R-37	I-5 SB on/off-ramp and Beach Boulevard	16.6	B	35.1	D	22.2	C	32.4	C	20.1	C	21.0	C	24.0	C	20.6	C	24.1	C	21.4	C
R-38	I-5 NB on/off-ramp and Artesia Boulevard	43.4	D	30.7	C	46.6	D	37.5	D	64.8	E	56.1	E	38.2	D	43.5	D	40.2	D	53.1	D
R-39	I-5 SB off-ramp and Artesia Boulevard	29.1	C	28.9	C	32.2	C	29.9	C	37.0	C	31.8	C	33.1	C	31.6	C	32.6	C	32.3	C

HOV = high-occupancy vehicle
I = Interstate
LOS = level of service
NB = northbound
SB = southbound
sec = seconds

**Table 2.5.12: Existing (2022), 2055 No Build Alternative (Alternative 1), and 2055 Build Alternatives (Alternatives 2, 3, and 4) Intersection Peak-Hour LOS—
Local Arterial Intersections**

No.	Intersection	2022 AM		2022 PM		2055 AM (No Build Alt [Alt 1])		2035 PM (No Build Alt [Alt 1])		2055 AM (Alt 2)		2055 PM (Alt 2)		2055 AM (Alt 3)		2055 PM (Alt 3)		2055 AM (Alt 4)		2055 PM (Alt 4)	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
A-1	El Camino Real and Red Hill Avenue	33.1	C	21.7	C	32.8	C	37.1	D	54.2	D	39.1	D	38.3	D	39.3	D	38.3	D	38.9	D
A-2	Nisson Road and Red Hill Avenue	33.2	C	37.7	D	33.0	C	30.8	C	28.4	C	30.4	C	29.4	C	30.5	C	29.4	C	29.6	C
A-3	El Camino Real and Newport Avenue	35.1	D	42.0	D	68.3	E	64.1	E	64.3	E	73.2	E	66.7	E	65.9	E	66.4	E	67.9	E
A-4	Mitchell Avenue and Newport Avenue	19.7	B	24.5	C	48.1	D	61.1	E	49.9	D	66.1	E	51.0	D	64.9	E	50.3	D	66.6	E
A-5	Elk Lane and E. First Street	24.8	C	19.2	B	26.3	C	18.9	B	31.4	C	18.6	B	27.6	C	18.8	B	27.6	C	18.5	B
A-6	Cabrillo Park Drive and E 4 th Street	39.0	D	52.5	D	50.0	D	53.0	D	54.9	D	58.1	E	52.1	D	49.6	D	53.0	D	49.1	D
A-7	17 th Street and Penn Way	13.8	B	15.2	B	17.3	B	22.4	C	18.2	B	23.4	C	19.0	B	23.2	C	20.0	C	23.2	C
A-8	17 th Street and Lincoln Avenue	25.6	C	27.6	C	43.7	D	30.0	C	42.8	D	30.5	C	43.9	D	30.7	C	44.0	D	30.8	C
A-9	Main Street and W 20 th Street	16.1	B	18.5	B	15.3	B	20.8	C	31.1	C	24.0	C	16.0	B	23.0	C	16.3	B	23.8	C
A-10	Broadway and Santa Clara Avenue and I-5 SB off-ramp	24.8	C	56.2	E	29.6	C	78.4	E	16.9	B	109.8	F	30.2	C	110.5	F	31.2	C	111.2	F
A-11	The City Drive N. and Chapman Avenue	43.6	D	39.5	D	65.3	E	61.2	E	31.1	C	64.4	E	65.7	E	68.4	E	65.1	E	65.8	E
A-12	E Katella Avenue and S. Anaheim Way	21.4	C	25.7	C	23.1	C	69.9	E	24.2	C	84.6	F	22.9	C	79.3	E	22.1	C	79.2	E
A-13	W Katella Avenue and S. Anaheim Boulevard/S. Haster Street	32.3	C	39.3	D	51.6	E	86.1	F	45.3	D	99.1	F	49.1	D	83.5	F	44.0	D	102.7	F
A-14	S. Clementine Street and Disney Way	24.9	C	28.1	C	42.1	D	39.4	D	42.4	D	39.6	D	40.6	D	40.2	D	41.0	D	41.2	D
A-15	S. Anaheim Boulevard and Disney Way/Manchester Avenue	60.7	E	45.7	D	30.8	C	43.9	D	26.2	C	40.3	D	32.5	C	41.7	D	33.9	C	42.5	D
A-16	S. Anaheim Boulevard and E Cerritos Avenue	18.9	B	32.2	C	21.0	C	40.7	D	23.0	C	43.3	D	21.9	C	45.0	D	21.5	C	53.4	D
A-17	Harbor Boulevard and W. Manchester Avenue	18.7	B	19.5	B	37.3	D	42.0	D	37.2	D	43.2	D	35.8	D	46.3	D	35.1	D	47.0	D
A-18	Harbor Boulevard and W. Ball Road	54.9	D	50.8	D	59.1	E	69.4	E	60.1	E	65.2	E	63.1	E	66.2	E	59.1	E	71.9	E
A-19	Disneyland Drive and W. Ball Road	63.2	E	73.5	E	73.9	E	85.2	F	73.5	E	85.7	F	76.1	E	87.2	F	76.0	E	91.2	F
A-20	Lincoln Avenue and N. Manchester Avenue	26.1	C	17.2	B	19.6	B	13.4	B	24.6	C	14.4	B	29.9	C	14.7	B	49.7	D	25.5	C
A-21	Lincoln Avenue and N. Loara Street	35.1	D	48.5	D	50.4	D	45.9	D	60.9	E	46.4	D	98.1	F	44.1	D	61.1	E	44.9	D
A-22	Lincoln Avenue and S. West Street	35.9	D	37.0	D	39.8	D	38.1	D	36.5	D	36.3	D	40.0	D	30.0	C	39.7	D	34.6	C
A-23	S. Euclid Street and Lincoln Avenue	37.7	D	42.2	D	54.1	D	110.0	F	56.3	E	106.0	F	60.2	E	94.6	F	2.8	D	86.2	F
A-24	Euclid Street and Crescent Avenue	29.4	C	50.5	D	39.4	D	58.8	E	43.8	D	53.5	D	48.0	D	53.0	D	68.7	E	46.4	D
A-25	La Palma Avenue and Brookhurst Street	38.9	D	41.9	D	46.8	D	50.6	D	48.6	D	56.4	E	49.6	D	55.1	E	49.3	D	55.0	E
A-26	Brookhurst Street and Sequoia Avenue	16.1	B	17.5	B	26.2	C	14.5	B	19.0	B	15.2	B	18.7	B	15.7	B	18.9	B	15.0	B
A-27	Orangethorpe Avenue and Magnolia Avenue	38.4	D	42.0	D	56.7	E	77.3	E	62.9	E	98.3	F	63.4	E	89.4	F	63.4	E	92.4	F
A-28	Auto Center Drive and Orangethorpe Avenue	12.3	B	11.2	B	20.6	C	23.3	C	28.4	C	69.5	E	29.3	C	45.8	D	29.2	C	35.7	D
A-29	Auto Center Drive and Stanton Avenue	27.6	C	36.2	D	62.7	E	41.0	D	73.6	E	38.4	D	71.3	E	38.4	D	73.8	E	39.1	D
A-30	Beach Boulevard and 9 th Street	12.7	B	9.5	A	20.2	C	19.6	C	21.4	C	19.6	B	21.9	C	19.8	B	21.8	C	19.4	C

**Table 2.5.12: Existing (2022), 2055 No Build Alternative (Alternative 1), and 2055 Build Alternatives (Alternatives 2, 3, and 4) Intersection Peak-Hour LOS—
Local Arterial Intersections**

No.	Intersection	2022 AM		2022 PM		2055 AM (No Build Alt [Alt 1])		2035 PM (No Build Alt [Alt 1])		2055 AM (Alt 2)		2055 PM (Alt 2)		2055 AM (Alt 3)		2055 PM (Alt 3)		2055 AM (Alt 4)		2055 PM (Alt 4)	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
A-31	Beach Boulevard and Auto Center Drive	39.8	D	56.2	E	41.7	D	54.4	D	42.8	D	78.8	E	44.1	D	64.2	E	45.8	D	83.3	F
A-32	Auto Center Drive and Commonwealth Avenue	17.6	B	27.6	C	52.6	D	76.9	E	63.8	E	68.1	E	61.1	E	58.1	E	62.2	E	72.3	E

I = Interstate
LOS = level of service
NB = northbound
SB = southbound
sec = seconds

Table 2.5.13: Existing (2022), 2055 No Build Alternative (Alternative 1), and 2055 Build Alternatives (Alternatives 2, 3, and 4) On-Ramp Peak-Hour Assessment

	Ramp Location	Facility	Existing Lane Configuration		Meter Rate, vph (240–900 vphpl)	Existing Year 2022 - vph		Horizon Year 2055 (No Build Alt [Alt 1]) - vph		Horizon Year 2055 (Alt 2) - vph		Horizon Year 2055 (Alt 3) - vph		Horizon Year 2055 (Alt 4) - vph	
			Meter?	# of Lanes		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
I-5 SB GP	Artesia Boulevard on-ramp	On-Ramp	Yes	2	1800	771	825	893	902	876	888	848	902	866	915
	Beach Boulevard on-ramp	On-Ramp	Yes	2	1800	802	761	933	834	929	798	866	793	884	798
	SR-91 EB on-ramp	Connector	No	--	--	--	--	3,134	2,068	3,080	2,072	2,974	2,192	2,846	2,108
	Magnolia Street on-ramp	On-Ramp	Yes	2	1800	967	619	1,125	677	1,111	671	1,252	662	1,266	662
	Brookhurst Street on-ramp	On-Ramp	Yes	2	1800	1,205	722	1,401	789	1,384	785	1,530	803	1,545	816
	Euclid Street on-ramp	On-Ramp	Yes	2	1800	991	578	1,116	618	1,093	609	1,139	613	1,228	622
	Lincoln Avenue on-ramp	On-Ramp	Yes	2	1800	1,339	611	1,557	667	1,518	653	1,641	671	1,657	671
	Disneyland Drive on-ramp	On-Ramp	Yes	2	1800	633	440	737	482	681	451	810	447	832	455
	Harbor Boulevard on-ramp	On-Ramp	Yes	2	1800	889	526	938	563	916	550	987	528	993	519
	Disney Way on-ramp	On-Ramp	Yes	2	1800	606	528	642	563	647	572	597	537	614	532
	Katella Avenue on-ramp	On-Ramp	Yes	2	1800	657	544	692	581	692	587	581	528	597	546
	Orangewood Avenue on-ramp	On-Ramp	Yes	2	1800	690	354	731	377	770	401	458	377	430	381
	The City Drive on-ramp	On-Ramp	Yes	2	1800	324	391	363	417	396	477	335	361	312	393
	Chapman Avenue on-ramp	On-Ramp	Yes	2	1800	873	834	921	898	938	890	787	882	770	882
	SR-22 EB on-ramp	Connector	No	--	--	--	--	1,618	1,179	1,507	1,098	1,495	1,058	1,474	1,054
	SR-57 SB/CD Road on-ramp	CD Road On-Ramp	No	--	--	--	--	692	381	726	625	731	585	726	585
	Main Street on-ramp	On-Ramp	Yes	2	1800	701	639	814	677	687	649	804	609	793	617
	17th Street on-ramp	On-Ramp	Yes	2	1800	885	660	971	698	993	641	1,028	677	1,022	677
	Grand Avenue on-ramp	On-Ramp	Yes	2	1800	422	372	441	393	520	461	475	369	475	356
	1st Street on-ramp	On-Ramp	Yes	2	1800	1,202	806	1,334	850	1,368	829	1,345	813	1,350	805
SR-55 NB on-ramp	Connector	No	--	--	--	--	1,133	682	1,530	811	916	677	921	667	
SR-55 SB on-ramp	Connector	No	--	--	--	--	3,750	3,497	3,694	3,597	3,767	3,497	3,817	3,497	
Red Hill Avenue on-ramp	On-Ramp	Yes	2	1800	920	813	1,022	857	1,077	877	1,028	821	1,033	806	
I-5 NB GP	Red Hill Avenue on-ramp	On-Ramp	Yes	2	1800	652	682	754	764	748	751	739	764	748	757
	Newport Avenue on-ramp	On-Ramp	Yes	2	1800	817	1,006	946	1,122	935	1,148	899	1,025	908	1,044
	SR-55 NB on-ramp	Connector	No	--	--	--	--	4,235	3,439	4,138	3,484	4,167	3,116	4,435	3,083
	4th Street on-ramp	On-Ramp	Yes	2	1800	530	1,160	611	1,299	622	1,240	618	1,312	627	1,312
	Grand Avenue on-ramp	On-Ramp	Yes	2	1800	624	1,222	721	1,364	743	1,338	684	1,364	721	1,364
	EB 17th Street on-ramp	On-Ramp	Yes	2	1800	368	113	418	126	446	113	426	744	418	764
	WB 17th Street on-ramp	On-Ramp	Yes	2	1800	264	486	308	542	314	542	309	548	314	548
	Main Street on-ramp	On-Ramp	Yes	2	1800	888	1,711	1,034	1,912	1,045	1,925	1,048	1,944	1,040	1,944
	SR-22 WB on-ramp	Connector	No	--	--	--	--	2,585	3,941	2,728	4,222	2,642	4,150	2,618	4,131
	The City Drive on-ramp	On-Ramp	Yes	2	1800	399	1,079	462	1,208	462	1,208	426	1,083	440	1,005
	Anaheim Way/Orangewood Avenue on-ramp	On-Ramp	Yes	2	1800	380	1,043	440	1,169	413	1,195	441	1,169	468	1,136
Katella Avenue on-ramp	On-Ramp	No	--	--	--	--	308	836	303	803	238	790	253	816	

Table 2.5.13: Existing (2022), 2055 No Build Alternative (Alternative 1), and 2055 Build Alternatives (Alternatives 2, 3, and 4) On-Ramp Peak-Hour Assessment

Ramp Location	Facility	Existing Lane Configuration		Meter Rate, vph (240–900 vphpl)	Existing Year 2022 - vph		Horizon Year 2055 (No Build Alt [Alt 1]) - vph		Horizon Year 2055 (Alt 2) - vph		Horizon Year 2055 (Alt 3) - vph		Horizon Year 2055 (Alt 4) - vph	
		Meter?	# of Lanes		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Anaheim Boulevard on-ramp	On-Ramp	No	--	--	--	--	380	1,325	374	1,312	381	1,305	391	1,403
Harbor Boulevard on-ramp	On-Ramp	Yes	2	1800	219	588	253	659	275	640	414	673	451	665
Ball Road on-ramp	On-Ramp	Yes	2	1800	420	680	484	757	484	738	452	751	446	783
Disneyland Drive on-ramp	On-Ramp	Yes	2	1800	334	710	385	790	385	777	370	783	341	770
Lincoln Avenue on-ramp	On-Ramp	Yes	2	1800	458	555	528	620	495	587	474	626	457	613
Euclid Street on-ramp	On-Ramp	Yes	2	1800	534	739	616	822	605	829	602	816	600	751
Brookhurst Street on-ramp	On-Ramp	Yes	2	1800	580	836	671	940	666	940	661	914	671	933
La Palma Avenue on-ramp	On-Ramp	Yes	2	1800	247	270	286	300	292	307	293	307	281	300
SR-91 WB on-ramp	Connector	No	--	--	--	--	1,397	2,343	1,392	2,539	1,462	2,552	1,452	2,558
Orangethorpe Avenue on-ramp	On-Ramp	Yes	2	1800	295	351	341	392	336	365	337	352	336	379
Beach Boulevard on-ramp	On-Ramp	Yes	2	1800	485	725	561	809	578	816	574	822	572	829
I-5 SB HOV/EL*	SR-91 EB off-ramp (HOV/EL)*	Connector	No	--	--	--	545	410	335	324	567	265	875	375
	SR-91 EB on-ramp (HOV/EL)*	Connector	No	--	--	--	94	35	18	4	120	55	143	55
	Gene Autry Way on-ramp (HOV/EL)*	Ramp	No	--	--	--	1,040	1,063	1,040	1,063	834	848	799	844
	SR-57 SB on-ramp (HOV/EL)*	Connector	No	--	--	--	200	145	200	145	200	145	200	145
	Santa Ana Boulevard/Grand Avenue on-ramp (HOV/EL)*	Ramp	No	--	--	--	605	1,283	605	1,283	605	1,283	605	1,283
I-5 NB HOV/EL*	SR-55 NB on-ramp (HOV/EL)*	Connector	No	--	--	--	61	51	61	51	61	51	61	51
	Gene Autry Way on-ramp (HOV/EL)*	Ramp	No	--	--	--	457	221	457	221	457	221	457	221
	WB SR-91 on-ramp (HOV/EL)*	Connector	No	--	--	--	457	1,146	457	1,146	457	1,146	457	1,146

* = The No Build Alternative (Alternative 1) and Alternative 2 will maintain HOV lane configurations and Build Alternatives 3 and 4 will convert them into ELs. In the event either Alternative 3 or 4 is chosen as the Build Alternative, these marked segments will transition from HOV lanes to ELs.

CD = collector-distributor
 EB = eastbound
 EL = Express Lane
 GP = general-purpose
 HOV = high-occupancy vehicle
 I = Interstate
 LOS = level of service
 N/A = not applicable
 NB = northbound
 SB = southbound
 SR = State Route
 vph = vehicles per hour
 vphpl = vehicles per hour per lane
 WB = westbound

Table 2.5.14: Existing (2022), 2055 No Build Alternative (Alternative 1), and 2055 Build Alternatives (Alternatives 2, 3, and 4) Off-Ramp Queue Length Summary

Ramp No.	Intersection Location	Off Ramp Direction	Ramp Length (ft)	2022 AM Peak Queue (ft)	2022 PM Peak Queue (ft)	2055 (No Build Alt [Alt 1]) AM Peak Queue (ft)	2055 (Alt 1 No Build) PM Peak Queue (ft)	2055 (Alt 2) AM Peak Queue (ft)	2055 (Alt 2) PM Peak Queue (ft)	2055 (Alt 3) AM Peak Queue (ft)	2055 (Alt 3) PM Peak Queue (ft)	2055 (Alt 4) AM Peak Queue (ft)	2055 (Alt 4) PM Peak Queue (ft)
R-2	I-5 NB off-ramp to Red Hill Avenue	WB	890	140 (Right)	293 (Right)	167 (Right)	391 (Right)	168 (Right)	#467 (Right)	216 (Right)	398 (Right)	216 (Right)	398 (Right)
R-6	I-5 NB off-ramp to E. 4th Street	NB	1,080	147 (Left)	189 (Left)	286 (Left)	392 (Left)	204 (Left)	387 (Left)	292 (Left)	428 (Left)	292 (Left)	428 (Left)
R-8	I-5 NB off-ramp to Grand Avenue	WB	1,390	165 (Left)	174 (Right)	173 (Left)	#406 (Right)	191 (Left)	318 (Left)	203 (Left)	264 (Right)	203 (Left)	264 (Right)
R-10	I-5 NB HOV off-ramp and Grand Avenue	WB	1,210	120 (Through)	96 (Through)	#288 (Through)	#485 (Through)	#117 (Through)	#290 (Through)	#172 (Through)	#314 (Through)	#172 (Through)	#314 (Through)
R-11	I-5 NB off-ramp to 17th Street	NB	850	474 (Through)	#384 (Left)	502 (Left)	337 (Left)	510 (Through)	349 (Through)	522 (Through)	335 (Through)	522 (Through)	335 (Through)
R-13	I-5 NB off-ramp to Main Street/Edgewood Road	NWB	890	#297 (Right)	155 (Right)	#422 (Right)	#415 (Right)	#370 (Right)	#205 (Right)	#370 (Right)	202 (Right)	#370 (Right)	202 (Right)
R-16	I-5 NB off-ramp to Broadway	NWB	1,990	177 (Right)	212 (Right)	340 (Right)	323 (Right)	#394 (Right)	#291 (Right)	336 (Right)	240 (Right)	336 (Right)	240 (Right)
R-17	I-5 NB off-Ramp to Chapman Avenue	NB	1,480	217(Left)	219 (Left)	270 (Left)	281 (Left)	268 (Left)	304 (Left)	273 (Left)	300 (Left)	273 (Left)	300 (Left)
R-19	I-5 NB off-ramp to The City Drive/State College	WB	1,600	93 (Left)	307 (Through)	136 (Through)	389 (Through)	139 (Through)	301 (Through)	156 (Through)	238 (Left)	156 (Through)	238 (Left)
R-21	I-5 NB HOV off-ramp to E. Gene Autry Way	NB	2,010	52 (Left)	164 (Through)	185 (Left)	209 (Left)	120 (Left)	196 (Left)	259 (Left)	200 (Left)	259 (Left)	200 (Left)
R-25	I-5 NB off-ramp to S. Harbor Boulevard	WB	1,290	#138 (Right)	#304 (Right)	395 (Right)	596 (Right)	368 (Right)	592 (Right)	224 (Right)	591 (Right)	224 (Right)	591 (Right)
R-28	I-5 NB off-ramp to Lincoln Avenue	NB	1,140	135 (Through)	#411 (Through)	177 (Through)	#678 (Through)	183 (Through)	#495 (Through)	214 (Through)	#559 (Right)	214 (Through)	#559 (Right)
R-30	I-5 NB off-ramp to Euclid Street	WB	1,410	264 (Left)	#590 (Left)	#427 (Left)	#686 (Left)	#423 (Left)	#686 (Left)	#455 (Left)	#722 (Left)	#455 (Left)	#722 (Left)
R-32	I-5 NB off-ramp to Brookhurst Street	WB	2,010	#276 (Left)	#377 (Left)	#279 (Left)	#425 (Left)	#328 (Left)	#498 (Left)	#359 (Left)	#556 (Left)	#359 (Left)	#556 (Left)
R-33	I-5 NB off-ramp to Magnolia Street	EB	1,270	204 (Through)	296 (Through)	248 (Through)	#637 (Through)	256 (Through)	#662 (Through)	245 (Through)	#658 (Through)	245 (Through)	#658 (Through)
R-35	I-5 NB off-ramp to Auto Center Drive	NB	820	220 (Left)	476 (Left)	231 (Left)	698 (Left)	229 (Left)	#701 (Left)	231 (Left)	#735 (Left)	231 (Left)	#735 (Left)
R-36	I-5 NB off-ramp to Beach Boulevard/Auto Center Drive	NB	1,150	259 (Through)	459 (Through)	274 (Through)	553 (Through)	267 (Through)	624 (Through)	264 (Through)	631 (Through)	264 (Through)	631 (Through)
R-38	I-5 NB off-ramp to Artesia Boulevard	NB	1,110	293 (Through)	183 (Through)	285 (Through)	141 (Through)	221 (Through)	151 (Through)	219 (Through)	120 (Through)	219 (Through)	120 (Through)
R-1	I-5 SB off-ramp to Red Hill Avenue	EB	980	151 (Left)	#339 (Left)	178 (Left)	#403 (Left)	#275 (Right)	337 (Right)	205 (Left)	#465 (Left)	205 (Left)	#465 (Left)
R-4	I-5 SB off-ramp to Newport Avenue	EB	1,390	170 (Right)	381 (Right)	#533 (Right)	#755 (Right)	#581 (Right)	#759 (Right)	#581 (Right)	#819 (Right)	#581 (Right)	#819 (Right)
R-7	I-5 SB off-ramp to E. 4th Street	SB	970	186 (Through)	142 (Through)	230 (Left)	226 (Left)	252 (Left)	246 (Left)	260 (Left)	251 (Left)	260 (Left)	251 (Left)
R-9	I-5 SB off-ramp to E. Santa Ana Boulevard	SB	990	271 (Left)	214 (Left)	296 (Left)	222 (Left)	293 (Left)	233 (Left)	288 (Left)	222 (Left)	288 (Left)	222 (Left)
R-12	I-5 SB off-ramp to Penn Way	WB	1,060	200 (Left)	206 (Left)	325 (Left)	394 (Left)	331 (Left)	429 (Left)	314 (Left)	415 (Left)	314 (Left)	415 (Left)
R-14	I-5 SB off-ramp to Main Street/Santa Clara Avenue	SEB	1,010	#332 (Right)	#305 (Right)	#340 (Right)	#543 (Right)	#326 (Right)	#353 (Right)	#319 (Right)	#353 (Right)	#319 (Right)	#353 (Right)
R-20	I-5 SB off-ramp to The City Drive N.	EB	2,980	176 (Through)	169 (Through)	279 (Through)	211 (Right)	286 (Through)	213 (Through)	312 (Through)	258 (Through)	312 (Through)	258 (Through)
R-21	I-5 NB HOV off-ramp to E. Gene Autry Way	SB	2,050	32 (Left)	23 (Left)	41 (Left)	29 (Left)	18 (Left)	8 (Left)	61 (Left)	18 (Left)	61 (Left)	18 (Left)
R-22	I-5 SB off-ramp to E. Katella Avenue	NB	2,460	71 (Through)	78 (Through)	225 (Through)	#187 (Through)	206 (Through)	#247 (Through)	236 (Through)	#202 (Through)	236 (Through)	#202 (Through)
R-24	I-5 SB off-ramp to Disney Way	SB	900	106 (Through)	142 (Left)	149 (Through)	189 (Left)	139 (Through)	187 (Left)	145 (Through)	187 (Left)	145 (Through)	187 (Left)
R-26	I-5 SB off-ramp to S. Harbor Boulevard	EB	1,300	72 (Left)	123 (Right)	102 (Right)	187 (Right)	102 (Right)	175 (Right)	117 (Right)	169 (Right)	117 (Right)	169 (Right)
R-27	I-5 SB off-ramp/HOV off-ramp to Disneyland Drive	WB	1,850	259 (Left)	306 (Left)	280 (Left)	316 (Left)	267 (Left)	326 (Left)	305 (Left)	339 (Left)	305 (Left)	339 (Left)
R-29	I-5 SB off-ramp to Lincoln Avenue	SB	2,225	#106 (Left)	#227 (Left)	116 (Left)	#292 (Left)	123 (Left)	#274 (Left)	127 (Left)	252 (Left)	127 (Left)	252 (Left)
R-30	I-5 SB off-ramp to Euclid Street	EB	2,220	#224 (Left)	#398 (Left)	#232 (Through)	#430 (Left)	#220 (Left)	#391 (Left)	#270 (Left)	#367 (left)	#270 (Left)	#367 (left)
R-32	I-5 SB off-ramp to Brookhurst Street	EB	1,470	287 (Through)	293 (Through)	#461 (Through)	#476 (Through)	#541 (Through)	#522 (Through)	#533 (Through)	#544 (Through)	#533 (Through)	#544 (Through)

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Ramp No.	Intersection Location	Off Ramp Direction	Ramp Length (ft)	2022 AM Peak Queue (ft)	2022 PM Peak Queue (ft)	2055 (No Build Alt [Alt 1]) AM Peak Queue (ft)	2055 (Alt 1 No Build) PM Peak Queue (ft)	2055 (Alt 2) AM Peak Queue (ft)	2055 (Alt 2) PM Peak Queue (ft)	2055 (Alt 3) AM Peak Queue (ft)	2055 (Alt 3) PM Peak Queue (ft)	2055 (Alt 4) AM Peak Queue (ft)	2055 (Alt 4) PM Peak Queue (ft)
R-34	I-5 SB off-ramp to Magnolia Street	EB	1,660	343 (Left)	287 (Left)	423 (Left)	347 (Left)	393 (Left)	367 (Left)	424 (Left)	368 (Left)	424 (Left)	368 (Left)
R-37	I-5 SB off-ramp to Beach Boulevard	EB	1,330	241 (Right)	#423 (Right)	#200 (Left)	#395 (Right)	#206 (Left)	#328 (Left)	#200 (Left)	#320 (Left)	#200 (Left)	#320 (Left)
R-39	I-5 SB off-ramp to Artesia Boulevard	SB	2,070	101 (Through)	130 (Left)	147 (Through)	124 (Through)	154 (Through)	155 (Through)	152 (Through)	153 (Through)	152 (Through)	153 (Through)

EB = eastbound
ft = foot/feet
HOV = high-occupancy vehicle
I = Interstate
LOS = level of service
NB = northbound
SB = southbound
WB = westbound