RTIP ID# LA0G1119

TCWG Consideration Date ~~September~~ October 2~~5~~3, 2018

Project Description *(clearly describe project)*

Proposed improvements include: (1) additional freeway mainline capacity leading to the westbound SR-91 connector ramp to the northbound and southbound I-605, (2) improvements to freeway entrance and exit ramps in the westbound direction on SR-91, and (3) operational improvements for the northbound I-605 at the Alondra Boulevard off-ramp. Associated improvements are also anticipated on the arterial streets in the vicinity of the freeway ramp intersections.

ALTERNATIVES

The proposed alternatives include the No Build Alternative, a Build Alternative and a Design Option at the SR-91/Pioneer Boulevard and SR-91/Norwalk Boulevard interchanges for the Build Alternative. These alternatives are each discussed below.

No Build Alternative

The No Build Alternative does not include any planned improvements to the Study Area. Under this alternative, there would be no reconstruction or improvements to the Study Area. Within the project limits, westbound SR-91 would continue to have four mixed-flow lanes that are 11 ft wide, a 1.5 ft wide median shoulder, one 12 ft wide HOV lane, and one 12 ft wide auxiliary lane between certain successive on- and off-ramps.

~~The No Build Alternative does not include any planned improvements to the westbound SR-91 corridor. Under this alternative, there would be no reconstruction or improvements to the SR-91 corridor. Within the Project limits, SR-91 would continue to have four mixed flow lanes that are 11 feet wide, with a 2-foot-wide median shoulder, plus one 11-foot-wide HOV lane and a 1-foot-wide HOV buffer.~~

Build Alternative

The Build Alternative would add one new mixed-flow lane in the westbound direction on SR-91 from approximately Shoemaker Avenue to I-605, joining at the point where the westbound SR-91 to northbound I-605 connector ramp flares from one to two lanes. In addition, the new mixed-flow lane would create a three-lane exit movement on westbound SR-91 to both the northbound and southbound I-605 connector ramps where only a two-lane exit movement exists now.

The Build Alternative would keep the existing auxiliary lanes between Bloomfield Avenue and Norwalk Boulevard, Norwalk Boulevard and Pioneer Boulevard, and Pioneer Boulevard and westbound SR-91 to the northbound and southbound I-605 connector ramps.

Interchange modifications at Pioneer Boulevard and Norwalk Boulevard are also proposed under the Build Alternative. These modifications include reconstructing existing Type L-9 cloverleaf interchanges into Type L-7 cloverleaf interchanges. Typical Type L-7 and Type L-9 local street interchanges are shown on Figure 1.~~The Build Alternative would add one new mixed-flow lane in the westbound direction on SR-91 from approximately Shoemaker Avenue to I-605, joining at the point where the westbound SR-91 to northbound I-605 connector ramp flares from one to two lanes. In addition, the new mixed-flow lane would create a three-lane exit movement on westbound SR-91 to both the northbound and southbound I-605 connector ramps where only a two-lane exit movement exists now.~~

~~The Build Alternative would keep the existing auxiliary lanes between Bloomfield Avenue and Norwalk Boulevard, Norwalk Boulevard and Pioneer Boulevard, and Pioneer Boulevard and westbound SR-91 to the northbound and southbound I-605 connector ramps.~~

~~Interchange modifications at Pioneer Boulevard and Norwalk Boulevard are also proposed under the Build Alternative. These modifications include reconstructing existing Type L-9 cloverleaf interchanges into Type L-7 cloverleaf interchanges. Typical Type L-7 and Type L-9 local street interchanges are shown on Figure 1~~.

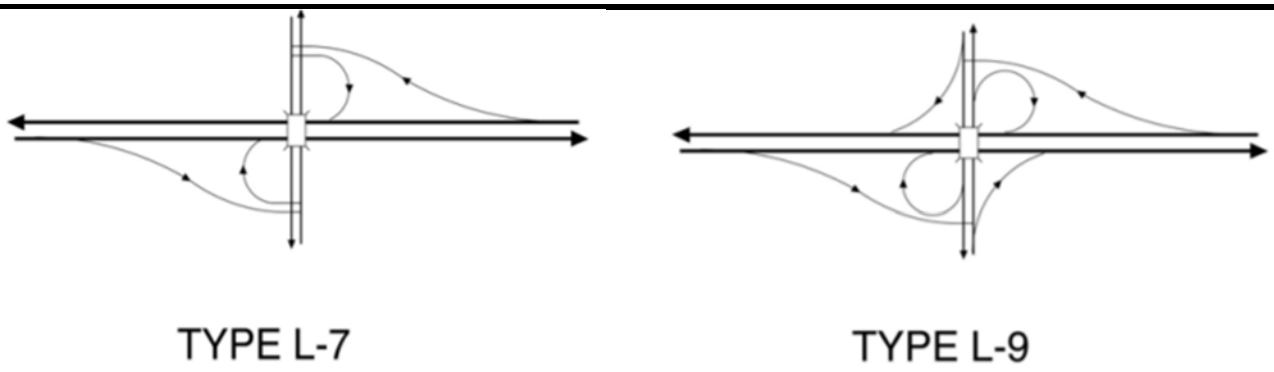
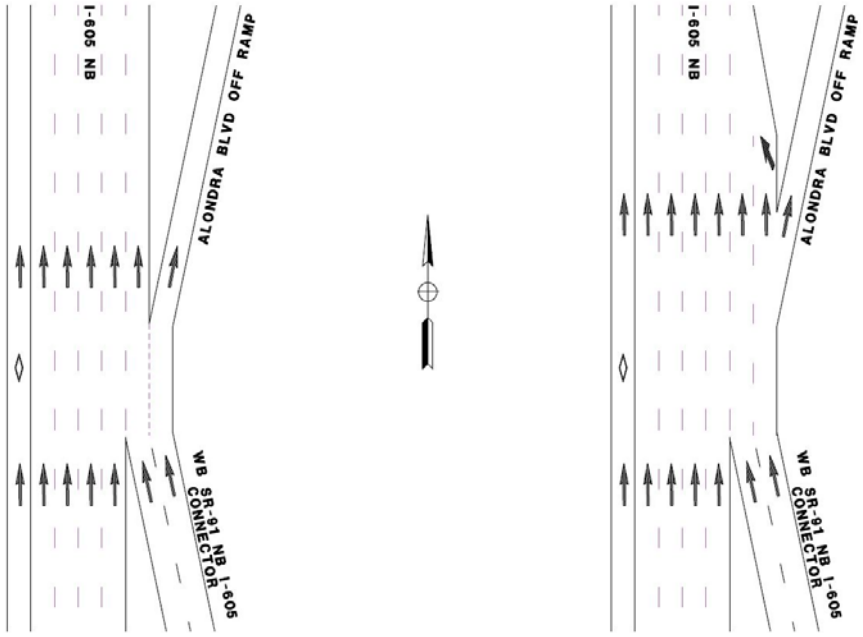


Figure 1. Typical Type L-7 and L-9 Local Street Interchanges

These new configurations will eliminate loop on-ramp free right-turn and direct on ramp movements, and will increase the vehicular weaving and merging distances on the westbound SR-91 mainline between these two interchanges, as well as on the I-605 northbound/southbound connector ramp. These modifications will alter the arterial street operations as a result of the changed interchange access point for the arterial street to westbound SR-91.

The existing outside lane of westbound SR-91 to the northbound I-605 two-lane connector ramp terminates at Alondra Boulevard, forcing the driver in the outside lane to exit at Alondra Boulevard. Modifications are proposed at the Alondra Boulevard exit point to provide a single-lane exit movement and to carry the outside lane past the exit point and merge it with the northbound I-605 mainline prior to the Alondra Boulevard undercrossing. No Build and Build Alternatives for the I-605 northbound Alondra Boulevard off-ramp are shown on Figure 2.



No Build Alternative **Build Alternative**

Figure 2. I-605 NB Alondra Blvd. Off-Ramp

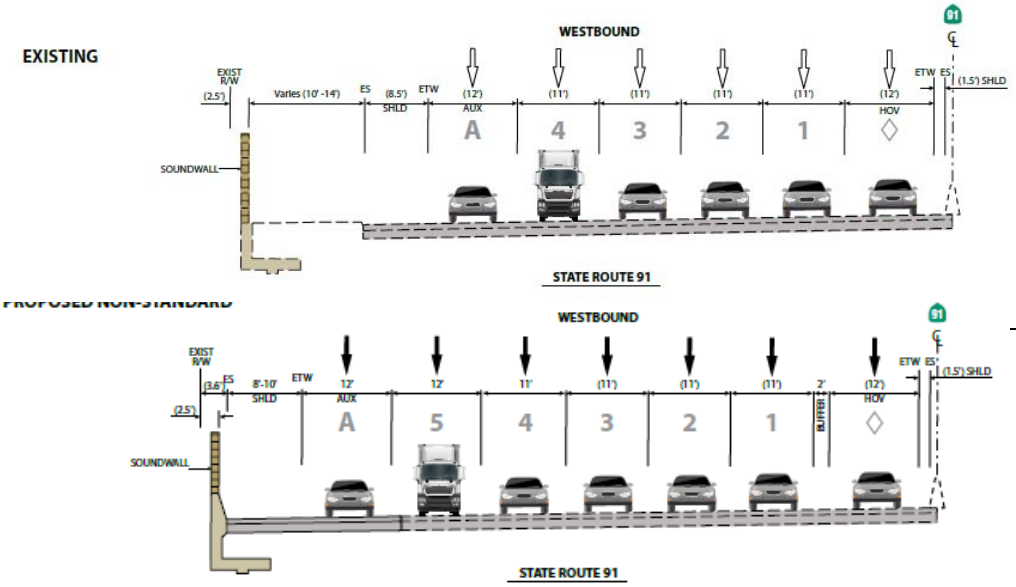
The Build Alternative would include standardized features (such as Best Management Practices [BMPs] for water quality) that are generally applied to Caltrans' highway improvement projects. These standardized features avoid and minimize environmental impacts.

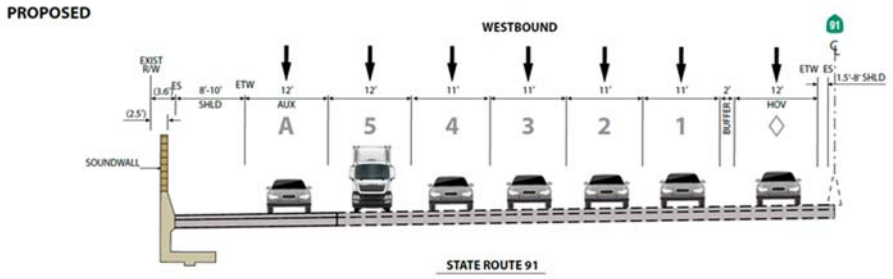
Build Alternative Design Options

To compare overall freeway, ramp, and arterial street operations, the following design options for the Build Alternative were evaluated:

- **Design Option: Full Build.** Using standard (12 ft) lane and shoulder widths. This standard option would acquire 18 residences and one business on the north side of the freeway along 170th Street between the Norwalk Boulevard and Pioneer Boulevard interchanges in Artesia, as well as the Arco Gas Station on Pioneer Boulevard. A typical section of this design option is shown below under the heading Typical Cross Sections as the Proposed Standard.
- **Design Option 1: Reduced Lane/Shoulder Width.** Using non-standard (narrower than standard) lane and shoulder widths. This non-standard option would eliminate the need for right-of-way acquisition (18 residences and one business) on the north side of the freeway along 170th Street between the Norwalk Boulevard and Pioneer Boulevard interchanges in Artesia. A typical section of this design option is shown under the heading Typical Cross Sections.
- **Design Option 2: Pioneer Boulevard L-9.** By keeping the Type L-9 interchange configuration at Pioneer Boulevard, both the loop and direct westbound on-ramps would remain. Both loop and direct westbound on-ramps would intersect Pioneer Boulevard at a 90-degree angle, which would slow vehicle speeds at the Pioneer Boulevard interchange and improve pedestrian and bicycle safety.
- **Design Option 3: Pioneer Boulevard Westbound Ramps/168th Alignment.** Aligning the SR-91 westbound ramps with 168th Street in Artesia at the Pioneer Boulevard interchange would create a four-legged intersection with Pioneer Boulevard as the north and south legs, the westbound ramps as the east leg, and 168th Street as the west leg. This option would require right-of-way acquisition of approximately eight parcels, which would include five residences, but would eliminate the need to acquire one gas station along Pioneer Boulevard.
- **Design Option 4: Diamond Ramps.** This design option utilizes diamond ramp configurations at Pioneer Boulevard and Norwalk Boulevard in lieu of the proposed Type L-7 cloverleaf interchange configurations. The diamond ramps were analyzed for comparison purposes to the partial cloverleaf ramp configuration options. The diamond ramps have a smaller footprint than the cloverleaf options but provide less weaving distance between successive on- and off-ramps, and therefore do not improve safety and traffic operations as much as the cloverleaf design options.
- **Design Option 5: Four-Lane Gridley Road Overcrossing.** The four-lane Gridley Road overcrossing structure is a design option that the City of Cerritos requested be studied. This would add approximately $4 million of construction cost, require no additional right-of-way acquisition, and is within the environmental footprint that is being studied with this project. However, since a four-lane Gridley Road overcrossing, when compared to the existing two-lane, is not required to fulfill the purpose and need of the project, the City of Cerritos would need to find and obtain the additional funds necessary for the improvement.

Typical Cross Sections





On September 27th, 2018, the Project Development Team identified the Preferred Alternative. The Preferred Alternative includes the Design Option 1: Reduced Lane/Shoulder Width and the Design option 3: Pioneer Boulevard Westbound Ramps168th Alignment.

Design Exceptions (Advisory and Mandatory)

The Build Alternative would require design exceptions. Design exceptions are necessary when the proposed design deviates from the standard design features presented in the Caltrans *Highway Design Manual* (2017). For example, the design standard for a freeway left-side shoulder is 10 ft; design exceptions would be requested for locations where the columns supporting overcrossing bridges encroach into the shoulder and narrow the shoulder to approximately 7 ft where it is beneath the bridge. The proposed Build Alternative would not be standard; therefore, mandatory and advisory design exceptions would be required for the Build Alternative. A standard alternative would not be cost effective, would require an extensive rebuild of the existing freeway, and would have extensive right-of-way impacts. There are 28 mandatory and 17 advisory design standards that would require design exceptions at one or more locations in the Study Area (see the Draft Project Report for a full list of design exceptions). Notably, Design Option 1 (Reduced Lane/Shoulder Width) includes reduced non-standard lane and shoulder widths.

Transportation Systems Management and Transportation Demand Management Alternatives

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

A TSM/TDM alternative is not considered a viable stand-alone option because it does not fulfill the project's purpose and need. A TSM/TDM alternative on its own would:

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

TSM and TDM are similar in a number of ways, because they may:

- Lessen the number of trips,
- Lessen peak-hour travel,

- Conserve energy,
- Reduce emissions, and
- Provide more travel alternatives.

Although TSM and TDM measures alone do not satisfy the purpose and need of the project, the following TSM and TDM measures are beneficial and may be incorporated into the Build Alternative for the proposed project:

- Improved ramp-metering hardware and software and closed-circuit television systems for viewing ramps and nearby arterials
- Upgraded traffic signals that are interconnected and coordinated with adjacent signals and ramp meters at locations of interchange improvements
- Additional way-finding signs on freeways and arterials
- On- and off-ramps designed to limit impacts to non-motorized travel and preserve access to bike lanes and trails
- Intelligent Transportation Systems (ITS) elements, including fiber-optic and other communication systems for improved connectivity and remote management; changeable message signs; closed-circuit television coverage of the entire freeway mainline, ramps, and adjacent arterials; video detection systems; and vehicle detection systems for volume, speed, and vehicle classification
- Advanced traffic management system improvements to the hardware and software systems at the Caltrans District 7 Traffic Management Center
- Traveler information management system improvements to enhance dissemination of real-time information on roadway conditions

Type of Project *(use Table 1 on instruction sheet)*
Change to existing state highway

County	**Narrative Location/Route & Postmiles:**	
Los Angeles		SR-91 PM 16.9-19.8 I-605 PM 5.0-5.8
	Caltrans Projects – EA# 07-29811	

Lead Agency: Caltrans District 7

Contact Person	**Phone#**	**Fax#**	**Email**
Andrew Yoon	213-897-6117	213-897-1634	andrew_yoon@dot.ca.gov

Hot Spot Pollutant of Concern *(check one or both)* **PM2.5 X** **PM10 X**

Federal Action for which Project-Level PM Conformity is Needed *(check appropriate box)*

Categorical Exclusion (NEPA)		**EA or Draft EIS**	**FONSI or Final EIS**	**PS&E or Construction**	**Other**
	X				

Scheduled Date of Federal Action: 2017

NEPA Assignment – Project Type *(check appropriate box)*

Exempt		**Section 326 – Categorical Exemption**		**Section 327 – Non-Categorical Exemption**
			X	

Current Programming Dates *(as appropriate)*

	PE/Environmental	**ENG**	**ROW**	**CON**
Start	2016	2016	June 2020	Jan 2021
End	2018	2017	Jan 2021	June 2024

Project Purpose and Need (Summary): *(attach additional sheets as necessary)*
Purpose:

The purpose of the project is to reduce congestion and improve freeway operations (both mainline and ramps), improve safety and improve local and system interchange operations.

Need:

The westbound SR-91 approaching the connector ramp for both the northbound and southbound I-605 currently experiences substantial congestion, which will continue in the future No Build condition. Congestion is a result of inadequate capacity of the existing two-lane connector for the westbound SR-91 to northbound and southbound I-605, as well as the closely spaced freeway entrance and exit ramps resulting in a high concentration of accidents.

Capacity and Transportation Demand

The need for the Project is based on an assessment of the existing and future transportation demand in the Study Area compared to the available capacity. Based on the examination of existing travel conditions and projected future traffic (2044), the SR91 currently experiences, and will continue to experience, capacity and operational problems due to a number of interrelated factors. The existing westbound SR-91 mainline and connector ramp to the northbound and southbound I-605 has insufficient capacity for the existing traffic volumes, resulting in deficient levels of service. No major improvements have been undertaken on SR-91 in the Study Area since it was built in 1968, except for pavement rehabilitation and re-striping in 1994 to provide for an HOV lane in each direction. Extensive population growth occurred both before and after SR-91 was built. The increase in regional traffic during that time has contributed to traffic volumes that exceed the existing design capacity of the SR-91, particularly at the I-605 interchange. Table A below shows the average daily weekday automobile and heavy-duty truck volumes on SR-91. The SR-91 westbound traffic volumes range from lower volumes on the eastern end near Shoemaker Avenue and higher volumes on the western end near I-605.

Table A. SR-91 Corridor Average Daily (24-hour) Weekday Traffic Volumes.

	General Purpose Lanes		HOV Lanes
Route	**Automobiles**	**Trucks**	**Automobiles**
SR-91 Westbound (east of connector ramp)	90,630 – 118,050	7,000 – 7,500	15,800 – 19,600
I-605 Northbound	140,700	8,700	6,200

Sources: SR-91 Automobile counts were based on PeMS data from spring and fall 2016; SR-91 truck counts were based on WILTEC video counts conducted in 2016; I-605 automobile counts were based on PeMS data from spring and fall 2013; and I-605 truck counts were calculated based on the 2013 Caltrans reported truck percentages.

Social Demand and Economic Development

Regional population is forecast to grow by 18 percent, and the Study Area population is forecast to grow by 12 percent from 2016 to 2044. Employment is anticipated to follow a different pattern, with regional growth of 23 percent and Study Area employment growth of 27 percent. Population growth is projected to be lower in the Study Area than in the Southern California Association of Governments (SCAG) region because the Study Area is almost completely developed. New growth will be limited to smaller, infill-type developments. For historical context, the regional population was approximately eight million in 1960. The 2016 population of nearly nineteen million for the region represents a 135 percent increase since 1960. The 2016 Regional Transportation Plan (RTP) growth forecast was the basis for the regional traffic modeling that was conducted for the SR-91 Project.

Surrounding Land Use/Traffic Generators *(especially effect on diesel traffic)*

Existing land uses in the project area include single- and multifamily residences, churches, schools, an institution, a community center, a day-care center, an after-school facility, a park, a golf course, recreational areas, hotels, restaurants, vacant land, retail, office, commercial, and light industrial uses. The majority of the sensitive receptors within or adjacent to the project area are residential uses.

Opening Year: Build and No Build LOS, AADT, % and # trucks, truck AADT of proposed facility

2024

See attached analysis

RTP Horizon Year / Design Year: Build and No Build LOS, AADT, % and # trucks, truck AADT of proposed facility

2044

See attached analysis

Opening Year: If facility is an interchange(s) or intersection(s), Build and No Build cross-street AADT, % and # trucks, truck AADT
N/A

RTP Horizon Year / Design Year: If facility is an interchange (s) or intersection(s), Build and No Build cross-street AADT, % and # trucks, truck AADT
N/A

Describe potential traffic redistribution effects of congestion relief *(impact on other facilities)*
See attached analysis

Comments/Explanation/Details *(attach additional sheets as necessary)*
See attached analysis

$PM_{2.5}$/PM_{10} Hot-Spot Analysis

The proposed project is located within a nonattainment area for federal PM2.5 and PM10 standards. Therefore, per 40 CFR Part 93 hot-spot analyses are required for conformity purposes. However, the EPA does not require hot-spot analyses, qualitative or quantitative, for projects that are not listed in section 93.123(b)(1) as an air quality concern. The project does not qualify as a project of air quality concern (POAQC) because of the following reasons:

i. The proposed project would improve SR-91 by changing the existing highway. As shown in Tables 1 and 2, while traffic volumes along SR-91 would exceed the 125,000 average daily trips criteria for a POAQC and the truck percentage exceeds 8 percent, the truck traffic volumes and percentages would not change significantly with the project. The two highlighted roadway segments in each table are between two existing on-ramps. The build alternative would combine the southbound on-ramp with the northbound on-ramp, thus putting the combined traffic volumes onto these segments. Thus, while the project will result is shifting some traffic (both truck and auto) from other routes to SR-91 westbound as a result of the increased capacity of the roadway and enhanced operating conditions, it will not result in a higher proportion of trucks overall. While some segments could experience a very small increase in truck percentage (one tenth of one percent), other segments will experience a decrease in truck percentage due to a proportionally larger increase in shifted auto volumes as compared to truck volumes. Finally, the trucks that will operate on the improved corridor under the build condition would experience much less congestion, higher speeds, less delay and lower travel times in the corridor.

ii. The proposed project does not affect intersections that are at LOS D, E, or F that have a significant number of diesel vehicles. Based on the Traffic Operations Analysis Report (Michael Baker International, March 7, 2018), the proposed project would reduce the delay and improve the LOS at intersections within the project vicinity. The LOS conditions in the project vicinity with and without the proposed project are shown in Tables 3 through 10. While some of the road segments shown show a worsening of LOS, all of the segments where the LOS worsens are located outside of the area where the project results in physical changes (improvements) to the roadway network. These locations are either to the east of west of the area of improvement. The improvements themselves, by adding capacity (due to the new freeway lane and other measures which improve operating conditions), attract traffic to the westbound corridor. The attraction of trips extends beyond the limits of the physical improvements themselves because these improvements alleviate a major bottleneck in the corridor. Each of the segments which show a degradation in service levels are forecast to experience an increase in travel demand of approximately 5 percent to 7.5 percent. In these segments, without a physical or operational improvement to go along with the increase in traffic flow, the Highway Capacity Manual (HCM) analysis will result in a degraded service level (higher traffic flow, but the same capacity). However, it is also important to note that HCM does not account for upstream or downstream improvements which will occur as a result of the project. The traffic microsimulation model that was developed to assess the project area showed significant improvements in traffic flow, increased speeds and decreased delay in the study area and outside of the study area, which is not captured by the HCM results. Thus, while the HCM shows a slight worsening of LOS for these segments, the microsimulation model demonstrates that they will likely improve in operation conditions in the future.

iii. The proposed project does not include the construction of a new bus or rail terminal that would have a significant number of diesel vehicles congregating at a single location.

iv. The proposed project does not expand an existing bus or rail terminal that would significantly increase the number of diesel vehicles congregating at a single location.

v. The proposed project is not in or affecting locations, areas, or categories of sites that are identified in the $PM_{2.5}$ and PM_{10} applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

Therefore, the proposed project meets the Clean Air Act requirements and 40 CFR 93.116 without any explicit hot-spot analysis. The proposed project would not create a new, or worsen an existing, PM_{10} or $PM_{2.5}$ violation.

Table 1: Opening Year (2024) Traffic Volumes

Roadway Segment	No Build (2024)			Build (2024) Both Without and With Design Option			Project Percent Increase	
	Total ADT	Truck ADT	Truck %	Total ADT	Truck ADT	Truck %	Total ADT	Truck ADT
WESTBOUND SR-91								
East of Studebaker Rd	106,700	11,240	10.5%	109,700	11,590	10.6%	2.8%	3.1%
West of Pioneer Blvd	136,400	13,570	9.9%	149,000	13,590	9.1%	9.2%	0.1%
East of Pioneer Blvd	132,400	13,120	9.9%	139,300	13,880	10.0%	5.2%	5.8%
West of Norwalk Blvd	131,100	12,980	9.9%	144,400	13,120	9.1%	10%	1.1%
East of Norwalk Blvd	128,500	12,820	10.0%	135,200	12,340	9.1%	5.2%	-3.7%
West of Bloomfield Ave	124,800	12,410	9.9%	130,200	13,020	10.0%	4.3%	4.9%
East of Artesia Blvd	116,800	11,530	9.9%	119,500	11,840	9.9%	2.3%	2.7%
West of 183rd St	126,400	12,580	10.0%	128,400	12,830	10.0%	1.6%	2.0%
NORTHBOUND I-605								
North of Westbound SR-91 On-Ramp	153,900	11,790	7.7%	155,200	11,880	7.7%	0.8%	0.8%

Source: Cambridge Systematics, Inc., June 2017.

Table 2: Future Year (2044) Traffic Volumes

Roadway Segment	No Build (2044)			Build (2044) Both Without and With Design Option			Project Percent Increase	
	Total ADT	Truck ADT	Truck %	Total ADT	Truck ADT	Truck %	Total ADT	Truck ADT
WESTBOUND SR-91								
East of Studebaker Rd	108,500	14,960	13.8%	111,200	15,250	13.7%	2.5%	1.9%
West of Pioneer Blvd	137,700	17,320	12.6%	150,600	17,960	11.9%	9.4%	3.7%
East of Pioneer Blvd	133,600	17,140	12.8%	140,300	17,570	12.5%	5.0%	2.5%
West of Norwalk Blvd	132,100	16,950	12.8%	145,300	17,780	12.2%	10%	4.9%
East of Norwalk Blvd	129,400	17,390	13.4%	135,900	18,390	13.5%	5.0%	5.8%
West of Bloomfield Ave	125,200	15,990	12.8%	130,400	16,330	12.5%	4.2%	2.1%
East of Artesia Blvd	116,400	15,580	13.4%	119,000	15,840	13.3%	2.2%	1.7%
West of 183rd St	126,700	16,040	12.7%	128,800	16,310	12.7%	1.7%	1.7%
NORTHBOUND I-605								
North of Westbound SR-91 On-Ramp	154,900	21,800	14.1%	155,100	21,800	14.1%	0.1%	0.0%

Source: Cambridge Systematics, Inc., June 2017.

Table 3 Freeway Mainline Level of Service Analysis – Year 2016 Existing Conditions vs. Year 2024 Opening Year

Segment Location	AM Peak-Hour LOS						PM Peak-Hour LOS					
	2016 Existing Conditions	2024 No Build	2024 Build	2024 Diamond Ramps Design Option	2024 Pioneer Blvd L-9 Design Option	2024 Pioneer Blvd WB Ramps/ 168th Alignment Design Option	2016 Existing Conditions	2024 No Build	2024 Build	2024 Diamond Ramps Design Option	2024 Pioneer Blvd L-9 Design Option	2024 Pioneer Blvd WB Ramps/ 168th Alignment Design Option
Westbound SR-91												
Carmenita Road Off-Ramp to 183rd Street On-Ramp	C	C	C	C	C	C	C	C	D	D	D	D
Artesia Boulevard Off-Ramp to Artesia Boulevard On-Ramp	C	C	C	C	C	C	C	C	D	D	D	D
Artesia Boulevard On-Ramp to Bloomfield Avenue On-Ramp	C	C	C	C	C	C	D	D	C	C	C	C
Norwalk Boulevard Off-Ramp to Norwalk Boulevard Loop On-Ramp	C	C	C	C	C	C	D	D	C	–	C	C
Norwalk Boulevard Loop On-Ramp to Norwalk Boulevard Direct On-Ramp	D	D	–	–	–	–	D	D	–	–	–	–
Norwalk Boulevard Off-Ramp to Norwalk Boulevard Direct On-Ramp	–	–	–	-	–	–	–	–	–	C	–	–
Pioneer Boulevard Off-Ramp to Pioneer Boulevard Loop On-Ramp	D	D	C	C	C	C	D	D	D	–	D	D
Pioneer Boulevard Loop On-Ramp to Pioneer Boulevard Direct On-Ramp	D	D	–	–	C	–	D	D	–	–	D	–
Pioneer Boulevard Off-Ramp to Pioneer Boulevard Direct On-Ramp	–	–	–	-	–	–	–	–	–	D	–	–
I-605 Off-Ramp (NB & SB) to Studebaker Road Off-Ramp	C	C	C	C	C	C	D	D	C	C	C	C
Studebaker Road Off-Ramp to Lane Drop	–	–	B	B	B	B	–	–	C	C	C	C
Studebaker Road Off-Ramp to I-605 NB/WB SR-91 Loop On-Ramp	C	C	–	–	–	–	C	C	–	–	–	–
Lane Drop to I-605 NB On-Ramp	–	–	C	C	C	C	–	–	D	D	D	D
I-605 NB/WB SR-91 Loop On-Ramp to I-605 SB/WB SR-91 On-Ramp	C	C	C	C	C	C	C	C	D	D	D	D

Source: Intueor Consulting, Inc. (2017).

I-605 = Interstate 605 LOS = level of service NB = northbound SB = southbound SR-91 = State Route 91 WB = westbound

Table 4 Freeway Weaving Analysis – Year 2016 Existing Conditions vs. Year 2024 Opening Year

Segment Location	AM Peak-Hour LOS						PM Peak-Hour LOS					
	2016 Existing Conditions	2024 No Build	2024 Build	2024 Diamond Ramps Design Option	2024 Pioneer Blvd L-9 Design Option	2024 Pioneer Blvd WB Ramps/ 168th Alignment Design Option	2016 Existing Conditions	2024 No Build	2024 Build	2024 Diamond Ramps Design Option	2024 Pioneer Blvd L-9 Design Option	2024 Pioneer Blvd WB Ramps/ 168th Alignment Design Option
Westbound SR-91												
183rd Street On-Ramp to Artesia Boulevard Off-Ramp	C	C	D	D	D	D	C	C	D	D	D	D
Bloomfield Avenue On-Ramp to Norwalk Boulevard Off-Ramp	D	D	C	C	C	C	D	D	D	D	D	D
Norwalk Boulevard Direct On-Ramp to Pioneer Boulevard Off-Ramp	D	D	D	D	D	D	D	D	D	D	D	D
Pioneer Boulevard Direct On-Ramp to I-605 Off-Ramp (NB & SB)	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**
Northbound I-605												
SR-91 WB On-Ramp to Alondra Boulevard Off-Ramp	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**

Source: Intueor Consulting, Inc. (2017).

Note: Shaded cells indicate unsatisfactory LOS levels (i.e., LOS E or F).

I-605 = Interstate 605 LOS = level of service NB = northbound SB = southbound SR-91 = State Route 91 WB = westbound

Table 5 Freeway Merge and Diverge Analysis – Year 2016 Existing Conditions vs. Year 2024 Opening Year

Junction	Merge/Diverge	AM Peak-Hour LOS						PM Peak-Hour LOS					
		2016 Existing Conditions	2024 No Build	2024 Build	2024 Diamond Ramps Design Option	2024 Pioneer Blvd L-9 Design Option	2024 Pioneer Blvd WB Ramps/ 168th Alignment Design Option	2016 Existing Conditions	2024 No Build	2024 Build	2024 Diamond Ramps Design Option	2024 Pioneer Blvd L-9 Design Option	2024 Pioneer Blvd WB Ramps/ 168th Alignment Design Option
Westbound SR-91													
Artesia Boulevard On-Ramp	Merge	C	C	C	C	C	C	C	C	D	D	D	D
Norwalk Boulevard Loop On-Ramp	Merge	C	C	–	–	–	–	C	C	–	–	–	–
Pioneer Boulevard Loop On-Ramp	Merge	C	C	–	–	C	–	C	C	–	–	C	–
Studebaker Road Off-Ramp	Diverge	C	C	C	C	C	C	D	D	C	C	C	C
I-605 NB On-Ramp	Merge	C	C	C	C	C	C	D	D	D	D	D	D

Source: Intueor Consulting, Inc. (2017).

I-605 = Interstate 605 LOS = level of service NB = northbound SR-91 = State Route 91

Table 6 Intersection Level of Service Analysis – Year 2016 Existing Conditions vs. Year 2024 Opening Year

Junction	AM Peak-Hour LOS						PM Peak-Hour LOS					
	2016 Existing Conditions	2024 No Build	2024 Build	2024 Diamond Ramps Design Option	2024 Pioneer Blvd L-9 Design Option	2024 Pioneer Blvd WB Ramps/ 168th Alignment Design Option	2016 Existing Conditions	2024 No Build	2024 Build	2024 Diamond Ramps Design Option	2024 Pioneer Blvd L-9 Design Option	2024 Pioneer Blvd WB Ramps/ 168th Alignment Design Option
Westbound SR-91												
WB SR-91 Off-Ramp/Artesia Boulevard	C	B	B	B	B	B	B	B	B	B	B	B
Bloomfield Avenue/WB SR-91 On-Ramp	B	B	B	B	B	B	B	B	B	B	B	B
Norwalk Boulevard/WB SR-91 Off-Ramp	A	A	–	–	–	–	A	A	–	–	–	–
Norwalk Boulevard/WB SR-91 On-Off Ramp	–	–	C	A	C	C	–	–	B	A	B	B
Pioneer Boulevard/WB SR-91 Off-Ramp	A	A	–	–	–	–	A	A	–	–	–	–
Pioneer Boulevard/WB SR-91 On-Off Ramp	–	–	C	B	B	C	–	–	C	A	B	C
Studebaker Road/WB SR-91 Off-Ramp	B	B	C	C	C	C	A	A	B	B	B	B
Northbound I-605												
NB I-605 Off-Ramp/Alondra Boulevard	C	C	C	C	C	C	D	C	C	C	C	C

Source: Intueor Consulting, Inc. (2017).

I-605 = Interstate 605

LOS = level of service

NB = northbound

SR-91 = State Route 91

WB = westbound

Table 7 Freeway Mainline Level of Service Analysis – Year 2016 Existing Conditions vs. Year 2044 Horizon Year

Segment Location	AM Peak-Hour LOS						PM Peak-Hour LOS					
	2016 Existing Conditions	2044 No Build	2044 Build	2044 Diamond Ramps Design Option	2024 Pioneer Blvd L-9 Design Option	2024 Pioneer Blvd WB Ramps/ 168th Alignment Design Option	2016 Existing Conditions	2044 No-Build	2044 Build	2044 Diamond Ramps Design Option	2024 Pioneer Blvd L-9 Design Option	2024 Pioneer Blvd WB Ramps/ 168th Alignment Design Option
Westbound SR-91												
Carmenita Road Off-Ramp to 183rd Street On-Ramp	C	C	C	C	C	C	C	C	D	D	D	D
Artesia Boulevard Off-Ramp to Artesia Boulevard On-Ramp	C	C	C	C	C	C	C	C	D	D	D	D
Artesia Boulevard On-Ramp to Bloomfield Avenue On-Ramp	C	C	C	C	C	C	D	D	C	C	C	C
Norwalk Boulevard Off-Ramp to Norwalk Boulevard Loop On-Ramp	C	D	C	–	C	C	D	D	D	–	D	D
Norwalk Boulevard Loop On-Ramp to Norwalk Boulevard Direct On-Ramp	D	D	–	–	–	–	D	D	–	–	–	–
Norwalk Boulevard Off-Ramp to Norwalk Boulevard Direct On-Ramp	–	–	–	C	–	–	–	–	–	D	–	–
Pioneer Boulevard Off-Ramp to Pioneer Boulevard Loop On-Ramp	D	D	C	–	C	C	D	D		–	D	D
Pioneer Boulevard Loop On-Ramp to Pioneer Boulevard Direct On-Ramp	D	D	–	–	D	–	D	D	–	–	D	–
Pioneer Boulevard Off-Ramp to Pioneer Boulevard Direct On-Ramp	–	–	–	C	–	–	–	–	–	D	–	–
I-605 Off-Ramp (NB & SB) to Studebaker Road Off-Ramp	C	C	C	C	C	C	D	D	C	C	C	C
Studebaker Road Off-Ramp to Lane Drop	–	–	C	C	C	C	–	–	C	C	C	C
Studebaker Road Off-Ramp to I-605 NB/WB SR-91 Loop On-Ramp	C	C	–	–	–	–	C	C	–	–	–	–
Lane Drop to I-605 NB On-Ramp	–	–	C	C	C	C	–	–	D	D	D	D
I-605 NB/WB SR-91 Loop On-Ramp to I-605 SB/WB SR-91 On-Ramp	C	C	C	C	C	C	C	C	D	D	D	D

Source: Intueor Consulting, Inc. (2017).

I-605 = Interstate 605

LOS = level of service

NB = northbound

SB = southbound

SR-91 = State Route 91

WB = westbound

Table 8 Freeway Weaving Analysis – Year 2016 Existing Conditions vs. Year 2044 Horizon Year

Segment Location	AM Peak-Hour LOS						PM Peak-Hour LOS					
	2016 Existing Conditions	2044 No Build	2044 Build	2044 Diamond Ramps Design Option	2024 Pioneer Blvd L-9 Design Option	2024 Pioneer Blvd WB Ramps/ 168th Alignment Design Option	2016 Existing Conditions	2044 No Build	2044 Build	2044 Diamond Ramps Design Option	2024 Pioneer Blvd L-9 Design Option	2024 Pioneer Blvd WB Ramps/ 168th Alignment Design Option
Westbound SR-91												
183rd Street On-Ramp to Artesia Boulevard Off-Ramp	C	C	D	D	D	D	C	D	D	D	D	D
Bloomfield Avenue On-Ramp to Norwalk Boulevard Off-Ramp	C	D	C	C	C	C	D	D	D	D	D	D
Norwalk Boulevard Direct On-Ramp to Pioneer Boulevard Off-Ramp	D	D	D	D	D	D	D	D	D	D	D	D
Pioneer Boulevard Direct On-Ramp to I-605 Off-Ramp (NB & SB)	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**
Northbound I-605												
SR-91 WB On-Ramp to Alondra Boulevard Off-Ramp	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**

Source: Intueor Consulting, Inc. (2017).

Note: Shaded cells indicate unsatisfactory LOS levels (i.e., LOS E or F).

I-605 = Interstate 605 SB = southbound

LOS = level of service SR-91 = State Route 91

NB = northbound WB = westbound

Table 9 Freeway Merge and Diverge Analysis – Year 2016 Existing Conditions vs. Year 2044 Horizon Year

Junction	Merge/Diverge	AM Peak-Hour LOS						PM Peak-Hour LOS					
		2016 Existing Conditions	2044 No Build	2044 Build	2044 Diamond Ramps Design Option	2024 Pioneer Blvd L-9 Design Option	2024 Pioneer Blvd WB Ramps/ 168th Alignment Design Option	2016 Existing Conditions	2044 No Build	2044 Build	2044 Diamond Ramps Design Option	2024 Pioneer Blvd L-9 Design Option	2024 Pioneer Blvd WB Ramps/ 168th Alignment Design Option
Westbound SR-91													
Artesia Boulevard On-Ramp	Merge	C	C	C	C	C	C	C	C	D	D	D	D
Norwalk Boulevard Loop On-Ramp	Merge	C	C	–	–	–	–	C	C	–	–	–	–
Pioneer Boulevard Loop On-Ramp	Merge	C	C	–	–	C	–	C	C	–	–	C	–
Studebaker Road Off-Ramp	Diverge	C	C	C	C	C	C	D	D	C	C	C	C
I-605 NB On-Ramp	Merge	C	C	C	C	C	C	D	D	D	D	D	D

Source: Intueor Consulting, Inc. (2017).

I-605 = Interstate 605 NB = northbound

LOS = level of service SR-91 = State Route 91

Table 10 Intersection Level of Service Analysis – Year 2016 Existing Conditions vs. Year 2044 Horizon Year

Junction	AM Peak-Hour LOS						PM Peak-Hour LOS					
	2016 Existing Conditions	2044 No Build	2044 Build	2044 Diamond Ramps Design Option	2024 Pioneer Blvd L-9 Design Option	2024 Pioneer Blvd WB Ramps/ 168th Alignment Design Option	2016 Existing Conditions	2044 No Build	2044 Build	2044 Diamond Ramps Design Option	2024 Pioneer Blvd L-9 Design Option	2024 Pioneer Blvd WB Ramps/ 168th Alignment Design Option
Westbound SR-91												
WB SR-91 Off-Ramp/Artesia Boulevard	C	B	B	B	B	B	B	B	B	B	B	B
Bloomfield Avenue/WB SR-91 On-Ramp	B	B	B	B	B	B	B	B	B	B	B	B
Norwalk Boulevard/WB SR-91 Off-Ramp	A	A	–	–	–	–	A	A	–	–	–	–
Norwalk Boulevard/WB SR-91 On-Off Ramp	–	–	C	B	C	C	–	–	B	A	B	B
Pioneer Boulevard/WB SR-91 Off-Ramp	A	A	–	–	–	–	A	A	–	–	–	–
Pioneer Boulevard/WB SR-91 On-Off Ramp	–	–	C	B	B	C	–	–	C	B	B	C
Studebaker Road/WB SR-91 Off-Ramp	B	B	C	C	C	C	A	A	B	B	B	B
Northbound I-605												
NB I-605 Off-Ramp/Alondra Boulevard	C	C	C	C	C	C	D	C	C	C	C	C

Source: Intueor Consulting, Inc. (2017).

I-605 = Interstate 605 SR-91 = State Route 91

LOS = level of service WB = westbound

NB = northbound