07-LA-405 PM 16.4/R21.2
EA 07-35310K
Project No. 0718000250
October 2018

Project Study Report-Project Development Support (PSR-PDS)

To

Request Approval of a Locally Funded Project to Proceed to the Project Approval and Environmental Document Phase

On Route Interstate 405

Between Artesia Boulevard PM 16.4

And I-405/I-105 Separation PM R21.2

APPROVAL RECOMMENDED:

Isidro Panuco, Project Manager
Los Angeles County Metropolitan Transportation Authority, Accepts risks identified in this PSR-PDS and attached risk register

APPROVAL RECOMMENDED:

Paul Marquez, Caltrans Deputy District Director, Planning, Goods Movement and Local Assistance

APPROVAL RECOMMENDED:

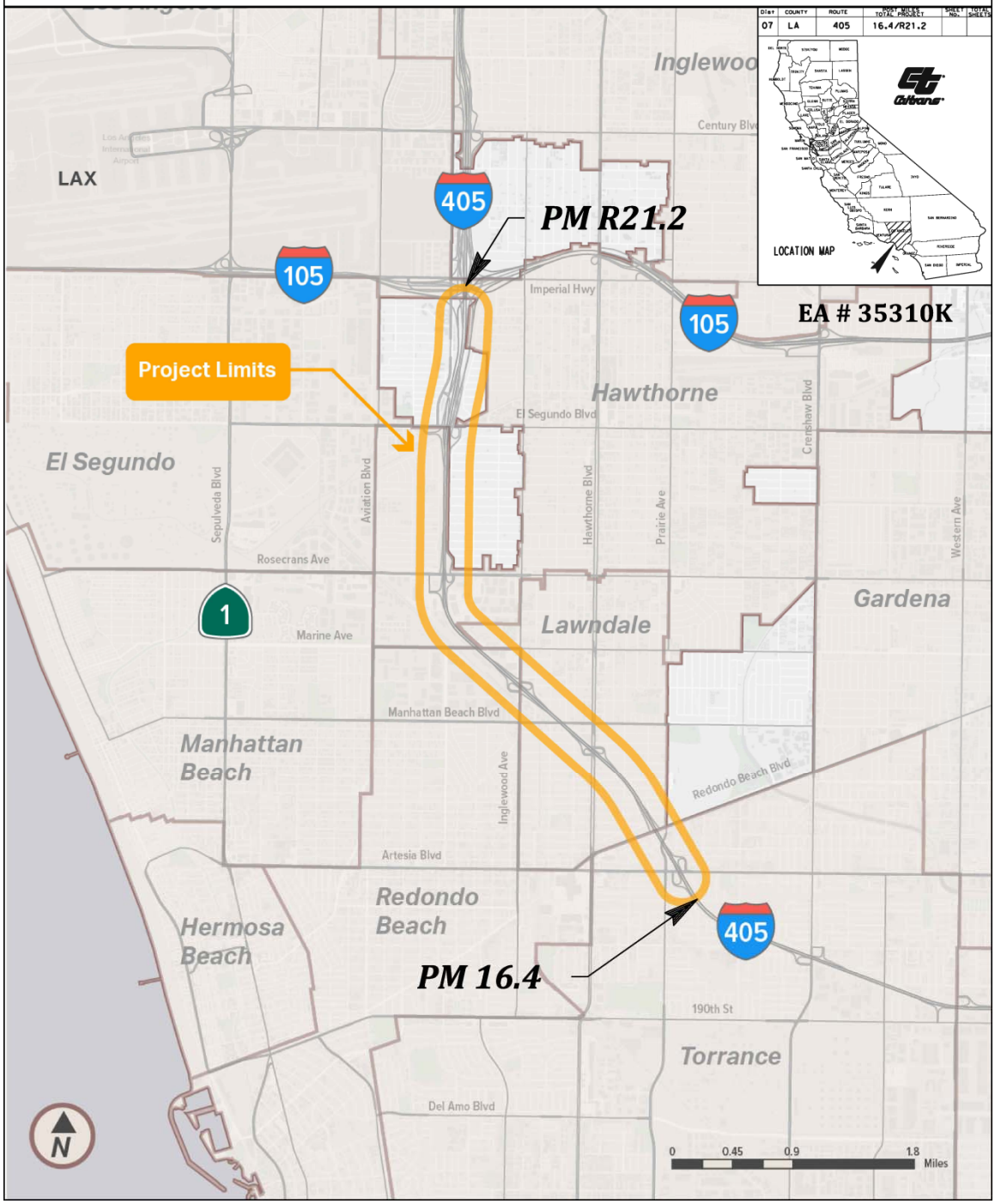
Mohammed Chowdhury, Caltrans Project Manager

APPROVED:

John Bulinski, District Director

11/1/18
Date

VICINITY MAP



This project study report-project development support has been prepared under the direction of the following registered civil engineer. The registered civil engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

REGISTERED CIVIL ENGINEER *DATE*

Table of Contents

1. INTRODUCTION

The Los Angeles County Metropolitan Transportation Authority (Metro), in cooperation with the California Department of Transportation (Caltrans) District 7 and the South Bay Cities Council of Governments (SBCCOG), is proposing to add auxiliary lanes from Artesia Boulevard to El Segundo Boulevard along the Interstate 405 (I-405) freeway corridor in Los Angeles County. The addition of auxiliary lanes at seven locations would alleviate congestion along both northbound and southbound directions of travel.

Below is a summary of the proposed project:

Project Limits	07-LA-405 PM 16.4/R21.2	
Number of Alternatives	2	
	No Build Alternative	Build Alternative
Current Capital Outlay Support Estimate for PA&ED	$0	$3M
Current Capital Outlay Construction Cost Range	$0	$100M - $120M
Current Capital Outlay Right-of-Way Cost Range	$0	$1M - $3M
Funding Source	N/A	Local funds, Measure R and/or Measure M
Type of Facility	Freeway	
Number of Structures	N/A	6 Total
Anticipated Environmental Determination or Document	N/A	CE/CE
Legal Description	In LA County, In Torrance, Redondo Beach, Lawndale and Hawthorne, Between Artesia Boulevard and El Segundo Boulevard	
Project Development Category	5 (project does not require substantial new right-of-way and does not increase traffic capacity; CEQA anticipated as a CE)	

The remaining capital outlay support, right-of-way, and construction components of the project are preliminary estimates. The Project Report (PR) will serve as the approval document for the preferred alternative to commence the environmental phase. Estimates for the preferred alternative will be refined in the Project Approval and Environmental Document phase.

Funding is expected to be a combination of local sales tax funds. Metro is anticipated to manage the following phases of project development; Project Approval and Environmental Document (PA&ED), the Plans, Specification, & Estimate (PS&E), and construction. Caltrans will be the lead agency for the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA) compliance. In addition, Caltrans is anticipated to provide oversight of the following phases of project development; PA&ED, PS&E, and construction.

Project environmental studies are anticipated to begin in 2019 with the PA&ED phase and to be completed by late 2020. Construction could begin as early as the Fall of 2023 with an anticipated completion of late 2025.

2. BACKGROUND

I-405 is generally a north-south freeway consisting of 24 miles within Orange County and 48 miles within Los Angeles County. The freeway begins at the "El Toro Y" in southeast Irvine and terminates near Mission Hills in the San Fernando Valley section of the City of Los Angeles. It serves as a major link between both counties and is considered a bypass route to I-5 Freeway. In addition, the freeway traverses through several Los Angeles basin cities and serves the Los Angeles International Airport, Long Beach Municipal Airport, the Port of Long Beach, and the Port of Los Angeles. I-405 is also part of the National Highway System which provides both intra-regional and inter-regional access between counties.

Construction of the I-405 freeway began in 1957 and was completed in 1969 in Orange County. Within the project limits, the freeway trends from the southeast to the northwest direction with a curve known as the "Southbay Curve" located just south of the Rosecrans Avenue Interchange. It consists of four general purpose lanes and one High-Occupancy Vehicle (HOV) lane in both directions. Moreover, there are six local street interchanges, I-105, I-405 freeway-to-freeway interchange, and five local street under crossings. The posted speed limit along the corridor is 65 mph.

Both existing general purpose and HOV lanes are 11-feet wide. The outside shoulder is 10-feet wide and varies to a wider width in some portions of the corridor. The inside shoulder is generally two-feet wide. The HOV lanes are separated from the general purpose lanes by a one-foot wide striped buffer. There are no dedicated transit facilities on I-405; however, the corridor accommodates a multimodal system which includes carpooling, express transit service, interregional and intra-regional travel and shipping route. There are no pedestrian or bicycle access on any section of the I-405.

The project is sponsored by Metro and supported by SBCCOG which is comprised of the cities of Torrance, Redondo Beach, Lawndale, and Hawthorne within the project limits.

3. PURPOSE AND NEED

Purpose

The purpose of the proposed project is to achieve the following objectives:

- Improve traffic time reliability by reducing existing and forecasted traffic congestion on the Interstate 405 mainline between Artesia Boulevard and El Segundo Boulevard.
- Improve safety, and minimize queuing and blocking through the enhancement of confluence areas and vehicular storage on the Interstate 405 mainline.

- Reduce peak period travel times by improving Level of Service (LOS) along the I-405 in the southbound direction between El Segundo Boulevard and Rosecrans Avenue.

Need

The need for the proposed project is derived from data that shows declining operational conditions and heavy congestion within project limits and during peak travel periods. These deficiencies are the result of insufficient vehicular storage at mainline exits and interchanges, and weaving from automobiles entering and exiting the roadway. TASAS data shows that rear-end collisions account for 61 and 66 percent of all types of collisions in the northbound and southbound directions, respectively, which is indicative of congestion-related conditions along the corridor.

4. TRAFFIC ENGINEERING PERFORMANCE ASSESSMENT

The purpose of the Traffic Engineering Performance Assessment (TEPA) prepared for this project (under separate cover) is to inform the project need and purpose, including major performance deficiencies within the project limits, and determine the scope and magnitude of the traffic study that will be performed during the PA&ED phase of the project. The TEPA serves as a reference document for this PSR-PDS.

As part of the TEPA analysis, the following scenarios were evaluated:

- Existing (2018), Opening Year (2025), and Design Year (2045) Traffic Volumes
- Freeway Mainline and Ramp Traffic Operations
- Assessment of Safety Performance/Needs
- Recommended Scope for Future Traffic Engineering Studies

Existing and Future Traffic Volumes

The TEPA utilized, to the extent feasible, available traffic data. Existing (2018) weekday AM (5-10 AM) and PM (3-8 PM) peak period traffic volumes at the study locations were obtained from Caltrans Performance Measurement System (PeMS) and Caltrans Traffic Census data. Ramp volumes were derived from either the Traffic Census data or PeMS data. Truck data on the freeway was obtained from Caltrans Traffic Census data. Existing data showed that there are approximately 4 percent trucks on I-405 throughout the corridor. Peak hour volumes (2018 AM and PM) within the study area are summarized in Tables 1 and 2, for I-405 Mainline and I-405 Ramps, respectively. Segments listed in the following tables are defined as the portion of the mainline freeway that is separated by on- and off-ramps.

Table 1: Existing (2018) Peak Hour I-405 Mainline Volumes

I-405 MAINLINE SEGMENTS			AM Peak Hour			PM Peak Hour		
			GP	HOV	Total	GP	HOV	Total
1	I-405 NB	South of Artesia Blvd	7,550	1,523	9,073	7,822	2,395	10,217
2	I-405 NB	Between Artesia Off-Ramp and Artesia On-Ramp	7,066	1,523	8,589	6,860	2,395	9,255
3	I-405 NB	Between Artesia On-Ramp and Redondo Beach On-Ramp	7,296	1,523	8,819	7,106	2,395	9,501
4	I-405 NB	Between Redondo Beach On-Ramp and Hawthorne Off-Ramp	7,995	1,523	9,518	7,851	2,395	10,246
5	I-405 NB	Between Hawthorne Off-Ramp and Hawthorne On-Ramp	7,591	1,612	9,203	8,214	1,113	9,327
6	I-405 NB	Between Hawthorne On-Ramp and Inglewood Off-Ramp	8,536	1,612	10,148	8,978	1,113	10,091
7	I-405 NB	Between Inglewood Off-Ramp and NB Inglewood On-Ramp	7,878	1,612	9,490	8,118	1,113	9,231
8	I-405 NB	Between NB Inglewood On-Ramp and SB Inglewood On-Ramp	8,865	1,612	10,477	8,980	1,113	10,093
9	I-405 NB	Between SB Inglewood On-Ramp and Rosecrans Off-Ramp	9,428	1,612	11,040	9,311	1,113	10,424
10	I-405 NB	Between Rosecrans Off-Ramp and EB Rosecrans On-Ramp	9,063	1,386	10,449	9,087	978	10,065
11	I-405 NB	Between EB Rosecrans On-Ramp and WB Rosecrans On-Ramp	9,843	1,386	11,229	9,877	978	10,855
12	I-405 NB	Between WB Rosecrans Ave On-Ramp and El Segundo Off-Ramp	10,328	1,386	11,714	10,394	978	11,372
13	I-405 NB	North of El Segundo Blvd Off-Ramp	9,866	1,386	11,252	10,156	978	11,134
14	I-405 SB	North of I-105 Ramp	8,791	836	9,627	7,001	1,430	8,431
15	I-405 SB	Between I-105 On-Ramp and EB El Segundo On-Ramp	10,355	836	11,191	8,433	1,430	9,863
16	I-405 SB	Between EB El Segundo On-Ramp and WB Rosecrans Off-Ramp	10,682	836	11,518	9,528	1,430	10,958
17	I-405 SB	Between WB Rosecrans Off-Ramp and Hindry Off-Ramp	9,743	836	10,579	8,528	1,430	9,958
18	I-405 SB	Between Hindry Off-Ramp and Rosecrans On-Ramp	8,470	1,230	9,700	8,044	1,529	9,573
19	I-405 SB	Between Rosecrans On-Ramp and Inglewood Off-Ramp	9,087	1,230	10,317	8,824	1,529	10,353
20	I-405 SB	Between Inglewood Off-Ramp and SB Inglewood On-Ramp	8,095	1,230	9,325	7,766	1,529	9,295
21	I-405 SB	Between SB Inglewood On-Ramp and NB Inglewood On-Ramp	8,511	1,230	9,741	8,332	1,529	9,861
22	I-405 SB	Between NB Inglewood On-Ramp and Hawthorne Off-Ramp	8,913	1,230	10,143	8,676	1,529	10,205
23	I-405 SB	Between Hawthorne Off-Ramp and Hawthorne On-Ramp	7,450	1,059	8,509	7,757	1,512	9,269
24	I-405 SB	Between Hawthorne On-Ramp and Redondo Beach Off-Ramp	8,187	1,059	9,246	8,268	1,512	9,780
25	I-405 SB	Between Redondo Beach Off-Ramp and Artesia Off-Ramp	7,092	1,059	8,151	7,641	1,512	9,153

I-405 MAINLINE SEGMENTS			AM Peak Hour			PM Peak Hour		
			GP	HOV	Total	GP	HOV	Total
26	I-405 SB	Between Artesia Off-Ramp and Artesia On-Ramp	6,716	1,059	7,775	7,075	1,512	8,587
27	I-405 SB	South of Artesia Blvd On-Ramp	7,961	1,059	9,020	7,673	1,512	9,185

GP=General Purpose Lane; HOV=High-Occupancy Vehicle Lane; traffic volumes are shown in vehicles per hour (vph).

Table 2: Existing (2018) Peak Hour I-405 Ramp Volumes

I-405 RAMP SEGMENTS			AM Peak Hour	PM Peak Hour
1	I-405 NB	Off-Ramp to Artesia Blvd	484	962
2	I-405 NB	On-Ramp from Artesia Blvd	230	246
3	I-405 NB	On-Ramp from Redondo Beach Blvd	699	745
4	I-405 NB	Off-Ramp to Hawthorne Blvd	404	919
5	I-405 NB	On-Ramp from Hawthorne Blvd	945	764
6	I-405 NB	Off-Ramp to Inglewood Ave	658	860
7	I-405 NB	On-Ramp from NB Inglewood Ave	987	862
8	I-405 NB	On-Ramp from SB Inglewood Ave	563	331
9	I-405 NB	Off-Ramp to Rosecrans Ave	365	359
10	I-405 NB	On-Ramp from EB Rosecrans Ave	780	790
11	I-405 NB	On-Ramp from WB Rosecrans Ave	485	517
12	I-405 NB	Off-Ramp to El Segundo Blvd	462	238
13	I-405 SB	On-Ramp from I-105	1,564	1,432
14	I-405 SB	On-Ramp from EB El Segundo Blvd	327	1,095
15	I-405 SB	Off-Ramp to WB Rosecrans Ave	939	1,000
16	I-405 SB	Off-Ramp to Hindry Ave	879	385
17	I-405 SB	On-Ramp from Rosecrans Ave/Hindry Ave	617	780
18	I-405 SB	Off-Ramp to Inglewood Ave	992	1,058
19	I-405 SB	On-Ramp from SB Inglewood Ave	416	566
20	I-405 SB	On-Ramp from NB Inglewood Ave	402	344
21	I-405 SB	Off-Ramp to Hawthorne Blvd	1,634	936
22	I-405 SB	On-Ramp from Hawthorne Blvd	737	511
23	I-405 SB	Off-Ramp to Redondo Beach Blvd	1,095	627
24	I-405 SB	Off-Ramp to Artesia Blvd	376	566
25	I-405 SB	On-Ramp from Artesia Blvd	1,245	598

Traffic volumes are shown in vehicles per hour (vph).

Traffic volume forecasts for Opening Year (2025) and Design Year (2045) conditions were developed by applying a growth factor developed from the Southern California Association of Governments (SCAG) Regional Transportation Plan (RTP) 2016 model. The growth factor is based on the growth of the Socio-Economic Data (SED) from the base year (2016) to the model horizon year (2040). The average growth in population, households, and employment within the six Regional Statistical Areas (RSA) that surround the study corridor was calculated to be 14%. An annual growth factor was then calculated by dividing the percentage growth by 24 years. The annual average growth factor (0.57%) was then applied to existing (2018) volumes to develop year 2025 and year 2045 forecasts.

The analysis assumed that the proposed auxiliary lanes between the on- and off-ramps would not create any additional capacity and would not attract any additional regional traffic to the corridor. Opening Year (2025) AM and PM peak hour volumes within the study area are summarized in Tables 3 and 4, for I-405 mainline segments and I-405 ramp segments, respectively. Design Year (2045) AM and PM peak hour volumes within the study area are summarized in Tables 5 and 6, for I-405 mainline segments and I-405 ramp segments, respectively.

Table 3: Opening Year (2025) Peak Hour I-405 Mainline Volumes

I-405 MAINLINE SEGMENTS			AM Peak Hour			PM Peak Hour		
			GP	HOV	Total	GP	HOV	Total
1	I-405 NB	South of Artesia Blvd	7,855	1,585	9,440	8,138	2,492	10,630
2	I-405 NB	Between Artesia Off-Ramp and Artesia On-Ramp	7,352	1,585	8,937	7,138	2,492	9,629
3	I-405 NB	Between Artesia On-Ramp and Redondo Beach On-Ramp	7,591	1,585	9,176	7,394	2,492	9,885
4	I-405 NB	Between Redondo Beach On-Ramp and Hawthorne Off-Ramp	8,318	1,585	9,903	8,169	2,492	10,661
5	I-405 NB	Between Hawthorne Off-Ramp and Hawthorne On-Ramp	7,806	1,677	9,483	8,546	1,158	9,704
6	I-405 NB	Between Hawthorne On-Ramp and Inglewood Off-Ramp	8,789	1,677	10,466	9,341	1,158	10,499
7	I-405 NB	Between Inglewood Off-Ramp and NB Inglewood On-Ramp	8,104	1,677	9,781	8,446	1,158	9,604
8	I-405 NB	Between NB Inglewood On-Ramp and SB Inglewood On-Ramp	9,131	1,677	10,808	9,343	1,158	10,501
9	I-405 NB	Between SB Inglewood On-Ramp and Rosecrans Off-Ramp	9,717	1,677	11,394	9,688	1,158	10,846
10	I-405 NB	Between Rosecrans Off-Ramp and EB Rosecrans On-Ramp	9,572	1,442	11,014	9,455	1,018	10,473
11	I-405 NB	Between EB Rosecrans On-Ramp and WB Rosecrans On-Ramp	10,384	1,442	11,826	10,277	1,018	11,295
12	I-405 NB	Between WB Rosecrans Ave On-Ramp and El Segundo Off-Ramp	10,888	1,442	12,330	10,815	1,018	11,833
13	I-405 NB	North of El Segundo Blvd Off-Ramp	10,408	1,442	11,850	10,567	1,018	11,585
14	I-405 SB	North of I-105 Ramp	9,147	870	10,017	7,284	1,488	8,772
15	I-405 SB	Between I-105 On-Ramp and EB El Segundo On-Ramp	10,774	870	11,644	8,774	1,488	10,262
16	I-405 SB	Between EB El Segundo On-Ramp and WB Rosecrans Off-Ramp	11,114	870	11,984	9,914	1,488	11,402
17	I-405 SB	Between WB Rosecrans Off-Ramp and Hindry Off-Ramp	10,137	870	11,007	8,873	1,488	10,361
18	I-405 SB	Between Hindry Off-Ramp and Rosecrans On-Ramp	8,813	1,280	10,093	8,369	1,591	9,960
19	I-405 SB	Between Rosecrans On-Ramp and Inglewood Off-Ramp	9,455	1,280	10,735	9,181	1,591	10,772
20	I-405 SB	Between Inglewood Off-Ramp and SB Inglewood On-Ramp	8,423	1,280	9,703	8,080	1,591	9,671
21	I-405 SB	Between SB Inglewood On-Ramp and NB Inglewood On-Ramp	8,855	1,280	10,135	8,669	1,591	10,260
22	I-405 SB	Between NB Inglewood On-Ramp and Hawthorne Off-Ramp	9,274	1,280	10,554	9,027	1,591	10,618
23	I-405 SB	Between Hawthorne Off-Ramp and Hawthorne On-Ramp	7,751	1,102	8,853	8,071	1,573	9,644
24	I-405 SB	Between Hawthorne On-Ramp and Redondo Beach Off-Ramp	8,518	1,102	9,620	8,603	1,573	10,176
25	I-405 SB	Between Redondo Beach Off-Ramp and Artesia Off-Ramp	7,379	1,102	8,481	7,950	1,573	9,523

I-405 MAINLINE SEGMENTS			AM Peak Hour			PM Peak Hour		
			GP	HOV	Total	GP	HOV	Total
26	I-405 SB	Between Artesia Off-Ramp and Artesia On-Ramp	6,988	1,102	8,090	7,361	1,573	8,934
27	I-405 SB	South of Artesia Blvd On-Ramp	8,283	1,102	9,385	7,983	1,573	9,556

GP=General Purpose Lane; HOV=High-Occupancy Vehicle Lane; traffic volumes are shown in vehicles per hour (vph).

Table 4: Opening Year (2025) Peak Hour I-405 Ramp Volumes

I-405 RAMP SEGMENTS			AM Peak Hour	PM Peak Hour
1	I-405 NB	Off-Ramp to Artesia Blvd	504	1,001
2	I-405 NB	On-Ramp from Artesia Blvd	239	256
3	I-405 NB	On-Ramp from Redondo Beach Blvd	727	775
4	I-405 NB	Off-Ramp to Hawthorne Blvd	420	956
5	I-405 NB	On-Ramp from Hawthorne Blvd	983	795
6	I-405 NB	Off-Ramp to Inglewood Ave	685	895
7	I-405 NB	On-Ramp from NB Inglewood Ave	1,027	897
8	I-405 NB	On-Ramp from SB Inglewood Ave	586	344
9	I-405 NB	Off-Ramp to Rosecrans Ave	380	374
10	I-405 NB	On-Ramp from EB Rosecrans Ave	812	822
12	I-405 NB	On-Ramp from WB Rosecrans Ave	505	538
13	I-405 NB	Off-Ramp to El Segundo Blvd	481	248
14	I-405 SB	On-Ramp from I-105	1,627	1,490
15	I-405 SB	On-Ramp from EB El Segundo Blvd	340	1,139
16	I-405 SB	Off-Ramp to WB Rosecrans Ave	977	1,040
17	I-405 SB	Off-Ramp to Hindry Ave	915	401
18	I-405 SB	On-Ramp from Rosecrans Ave/Hindry Ave	642	812
19	I-405 SB	Off-Ramp to Inglewood Ave	1,032	1,101
20	I-405 SB	On-Ramp from SB Inglewood Ave	433	589
21	I-405 SB	On-Ramp from NB Inglewood Ave	418	358
22	I-405 SB	Off-Ramp to Hawthorne Blvd	1,700	974
23	I-405 SB	On-Ramp from Hawthorne Blvd	767	532
24	I-405 SB	Off-Ramp to Redondo Beach Blvd	1,139	652
25	I-405 SB	Off-Ramp to Artesia Blvd	391	589
26	I-405 SB	On-Ramp from Artesia Blvd	1,295	622

Traffic volumes are shown in vehicles per hour (vph).

Table 5: Design Year (2045) Peak Hour I-405 Mainline Volumes

I-405 MAINLINE SEGMENTS			AM Peak Hour			PM Peak Hour		
			GP	HOV	Total	GP	HOV	Total
1	I-405 NB	South of Artesia Blvd	8,798	1,775	10,573	9,115	2,791	11,906
3	I-405 NB	Between Artesia Off-Ramp and Artesia On-Ramp	8,234	1,775	10,009	7,994	2,791	10,785
5	I-405 NB	Between Artesia On-Ramp and Redondo Beach On-Ramp	8,502	1,775	10,277	8,281	2,791	11,072
7	I-405 NB	Between Redondo Beach On-Ramp and Hawthorne Off-Ramp	9,317	1,775	11,092	9,149	2,791	11,940
9	I-405 NB	Between Hawthorne Off-Ramp and Hawthorne On-Ramp	8,742	1,878	10,620	9,572	1,297	10,869
11	I-405 NB	Between Hawthorne On-Ramp and Inglewood Off-Ramp	9,843	1,878	11,721	10,462	1,297	11,759
13	I-405 NB	Between Inglewood Off-Ramp and NB Inglewood On-Ramp	9,077	1,878	10,955	9,460	1,297	10,757
15	I-405 NB	Between NB Inglewood On-Ramp and SB Inglewood On-Ramp	10,227	1,878	12,105	10,465	1,297	11,762
17	I-405 NB	Between SB Inglewood On-Ramp and Rosecrans Off-Ramp	10,883	1,878	12,761	10,850	1,297	12,147
19	I-405 NB	Between Rosecrans Off-Ramp and EB Rosecrans On-Ramp	10,721	1,615	12,336	10,589	1,140	11,729
21	I-405 NB	Between EB Rosecrans On-Ramp and WB Rosecrans On-Ramp	11,630	1,615	13,245	11,510	1,140	12,650
23	I-405 NB	Between WB Rosecrans Ave On-Ramp and El Segundo Off-Ramp	12,195	1,615	13,810	12,112	1,140	13,252
25	I-405 NB	North of El Segundo Blvd Off-Ramp	11,657	1,615	13,272	11,835	1,140	12,975
1	I-405 SB	North of I-105 Ramp	10,244	974	11,218	8,158	1,666	9,824
3	I-405 SB	Between I-105 On-Ramp and EB El Segundo On-Ramp	12,067	974	13,041	9,827	1,666	11,493
5	I-405 SB	Between EB El Segundo On-Ramp and WB Rosecrans Off-Ramp	12,448	974	13,422	11,103	1,666	12,769
7	I-405 SB	Between WB Rosecrans Off-Ramp and Hindry Off-Ramp	11,354	974	12,328	9,938	1,666	11,604
9	I-405 SB	Between Hindry Off-Ramp and Rosecrans On-Ramp	9,870	1,433	11,303	9,374	1,782	11,156
11	I-405 SB	Between Rosecrans On-Ramp and Inglewood Off-Ramp	10,589	1,433	12,022	10,283	1,782	12,065
13	I-405 SB	Between Inglewood Off-Ramp and SB Inglewood On-Ramp	9,433	1,433	10,866	9,050	1,782	10,832
15	I-405 SB	Between SB Inglewood On-Ramp and NB Inglewood On-Ramp	9,918	1,433	11,351	9,709	1,782	11,491
17	I-405 SB	Between NB Inglewood On-Ramp and Hawthorne Off-Ramp	10,386	1,433	11,819	10,110	1,782	11,892
19	I-405 SB	Between Hawthorne Off-Ramp and Hawthorne On-Ramp	8,682	1,234	9,916	9,039	1,762	10,801
21	I-405 SB	Between Hawthorne On-Ramp and Redondo Beach Off-Ramp	9,540	1,234	10,774	9,635	1,762	11,397
23	I-405 SB	Between Redondo Beach Off-Ramp and Artesia Off-Ramp	8,264	1,234	9,498	8,904	1,762	10,666

I-405 MAINLINE SEGMENTS			AM Peak Hour			PM Peak Hour		
			GP	HOV	Total	GP	HOV	Total
25	I-405 SB	Between Artesia Off-Ramp and Artesia On-Ramp	7,826	1,234	9,060	8,245	1,762	10,007
27	I-405 SB	South of Artesia Blvd On-Ramp	9,277	1,234	10,511	8,942	1,762	10,704

GP=General Purpose Lane; HOV=High-Occupancy Vehicle Lane; traffic volumes are shown in vehicles per hour (vph).

Table 6: Design Year (2045) Peak Hour I-405 Ramp Volumes

I-405 RAMP SEGMENTS			AM Peak Hour	PM Peak Hour
2	I-405 NB	Off-Ramp to Artesia Blvd	564	1,121
4	I-405 NB	On-Ramp from Artesia Blvd	268	287
6	I-405 NB	On-Ramp from Redondo Beach Blvd	815	868
8	I-405 NB	Off-Ramp to Hawthorne Blvd	471	1,071
10	I-405 NB	On-Ramp from Hawthorne Blvd	1,101	890
12	I-405 NB	Off-Ramp to Inglewood Ave	767	1,002
14	I-405 NB	On-Ramp from NB Inglewood Ave	1,150	1,005
16	I-405 NB	On-Ramp from SB Inglewood Ave	656	386
18	I-405 NB	Off-Ramp to Rosecrans Ave	425	418
20	I-405 NB	On-Ramp from EB Rosecrans Ave	909	921
22	I-405 NB	On-Ramp from WB Rosecrans Ave	565	602
24	I-405 NB	Off-Ramp to El Segundo Blvd	538	277
2	I-405 SB	On-Ramp from I-105	1,823	1,669
4	I-405 SB	On-Ramp from EB El Segundo Blvd	381	1,276
6	I-405 SB	Off-Ramp to WB Rosecrans Ave	1,094	1,165
8	I-405 SB	Off-Ramp to Hindry Ave	1,024	449
10	I-405 SB	On-Ramp from Rosecrans Ave/Hindry Ave	719	909
12	I-405 SB	Off-Ramp to Inglewood Ave	1,156	1,233
14	I-405 SB	On-Ramp from SB Inglewood Ave	485	660
16	I-405 SB	On-Ramp from NB Inglewood Ave	468	401
18	I-405 SB	Off-Ramp to Hawthorne Blvd	1,904	1,091
20	I-405 SB	On-Ramp from Hawthorne Blvd	859	595
22	I-405 SB	Off-Ramp to Redondo Beach Blvd	1,276	731
24	I-405 SB	Off-Ramp to Artesia Blvd	438	660
26	I-405 SB	On-Ramp from Artesia Blvd	1,451	697

Traffic volumes are shown in vehicles per hour (vph).

Freeway Mainline and Ramp Traffic Operations

This TEPA evaluates existing (2018), opening year (2025), and design year (2045) conditions with and without the proposed project for the following operational conditions:

- Freeway Mainline Analysis
- Ramp Merge and Diverge Analysis

The results of the freeway mainline traffic operations analysis showed that most of the mainline segments are currently operating at LOS F and that the congestion is projected to get worse without any improvements. As described in the TEPA, the proposed addition of auxiliary lanes in northbound and southbound directions and the proposed lane extension in the southbound direction are projected to alleviate the congestion within the corridor. Under build conditions, the volume-to-capacity (V/C) ratio of the freeway segments would improve within the proposed project area, and level of service would improve from LOS F to LOS D at one segment in the northbound direction and one segment in the southbound direction.

The TEPA also evaluated ramp operations within the corridor. The results of the merge and diverge operations showed that most of the ramps are currently operating at LOS F and are projected to get worse during year 2025 and year 2045 conditions. Mainline congestion in the future will contribute to poor operating conditions at the on- and off-ramps. The proposed auxiliary lanes would provide for safer merging and diverging operations at the ramps by adding more space for vehicles entering or existing the high speed mainline traffic.

The proposed project would reduce congestion along northbound and southbound I-405 between I-105 and Artesia Boulevard by adding seven auxiliary lanes between the local interchanges for a total of approximately 2.85 lane miles. The new auxiliary lanes will improve the volume-to-capacity ratio by more than 10%. At each location the V/C ratio will improve in a range of 11% to 18% for this highly congested stretch of the I-405 freeway. Table 7 summarizes the percentage improvement in V/C ratio at the proposed auxiliary lane segments for year 2025 conditions and Table 8 summarizes for the improvements for year 2045 conditions. The auxiliary lane will also translate to safer merge and diverge operations within the project limits. See Figure 1 and Figure 2.

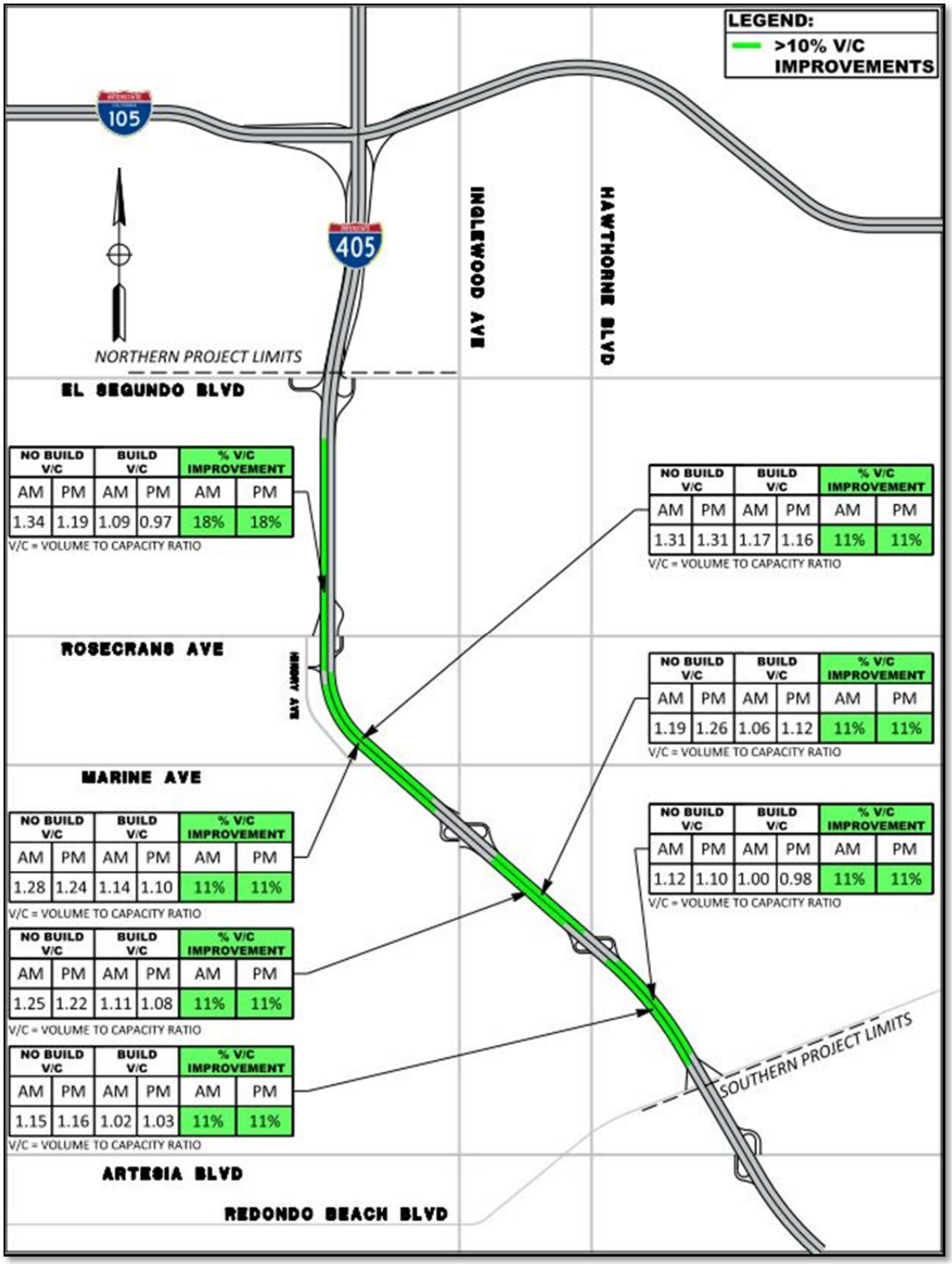
Table 7: Opening Year (2025) Project Improvements

I-405 NORTHBOUND SEGMENTS	2025 No-Build		2025 Build		% Improvement	
	AM V/C	PM V/C	AM V/C	PM V/C	AM	PM
Between Redondo Beach Blvd and Hawthorne Blvd	1.12	1.10	1.00	0.98	11%	11%
Between Hawthorne Blvd and Inglewood Ave	1.19	1.26	1.06	1.12	11%	11%
Between Inglewood Ave and Rosecrans Ave	1.31	1.31	1.17	1.16	11%	11%
I-405 SOUTHBOUND SEGMENTS	**2025 No-Build**		**2025 Build**		**% Improvement**	
	AM V/C	**PM V/C**	**AM V/C**	**PM V/C**	**AM**	**PM**
Between El Segundo Blvd and Rosecrans Ave	1.34	1.19	1.09	0.97	18%	18%
Between Rosecrans Ave and Inglewood Ave	1.28	1.24	1.14	1.10	11%	11%
Between Inglewood Ave and Hawthorne Blvd	1.25	1.22	1.11	1.08	11%	11%
Between Hawthorne Blvd and Redondo Beach Blvd	1.15	1.16	1.02	1.03	11%	11%
V/C = Volume-to-Capacity ratio						

Table 8: Design Year (2045) Project Improvements

I-405 NORTHBOUND SEGMENTS	2045 No-Build		2045 Build		% Improvement	
	AM V/C	PM V/C	AM V/C	PM V/C	AM	PM
Between Redondo Beach Blvd and Hawthorne Blvd	1.26	1.24	1.12	1.10	11%	11%
Between Hawthorne Blvd and Inglewood Ave	1.33	1.41	1.18	1.26	11%	11%
Between Inglewood Ave and Rosecrans Ave	1.47	1.47	1.31	1.30	11%	11%
I-405 SOUTHBOUND SEGMENTS	**2045 No-Build**		**2045 Build**		**% Improvement**	
	AM V/C	**PM V/C**	**AM V/C**	**PM V/C**	**AM**	**PM**
Between El Segundo Blvd and Rosecrans Ave	1.50	1.33	1.22	1.09	18%	18%
Between Rosecrans Ave and Inglewood Ave	1.43	1.39	1.27	1.24	11%	11%
Between Inglewood Ave and Hawthorne Blvd	1.40	1.37	1.25	1.21	11%	11%
Between Hawthorne Blvd and Redondo Beach Blvd	1.29	1.30	1.15	1.16	11%	11%
V/C = Volume-to-Capacity ratio						

Figure 1: 2025 Project Improvements



NO BUILD V/C		BUILD V/C		% V/C IMPROVEMENT	
AM	PM	AM	PM	AM	PM
1.34	1.19	1.09	0.97	18%	18%

NO BUILD V/C		BUILD V/C		% V/C IMPROVEMENT	
AM	PM	AM	PM	AM	PM
1.31	1.31	1.17	1.16	11%	11%

NO BUILD V/C		BUILD V/C		% V/C IMPROVEMENT	
AM	PM	AM	PM	AM	PM
1.19	1.26	1.06	1.12	11%	11%

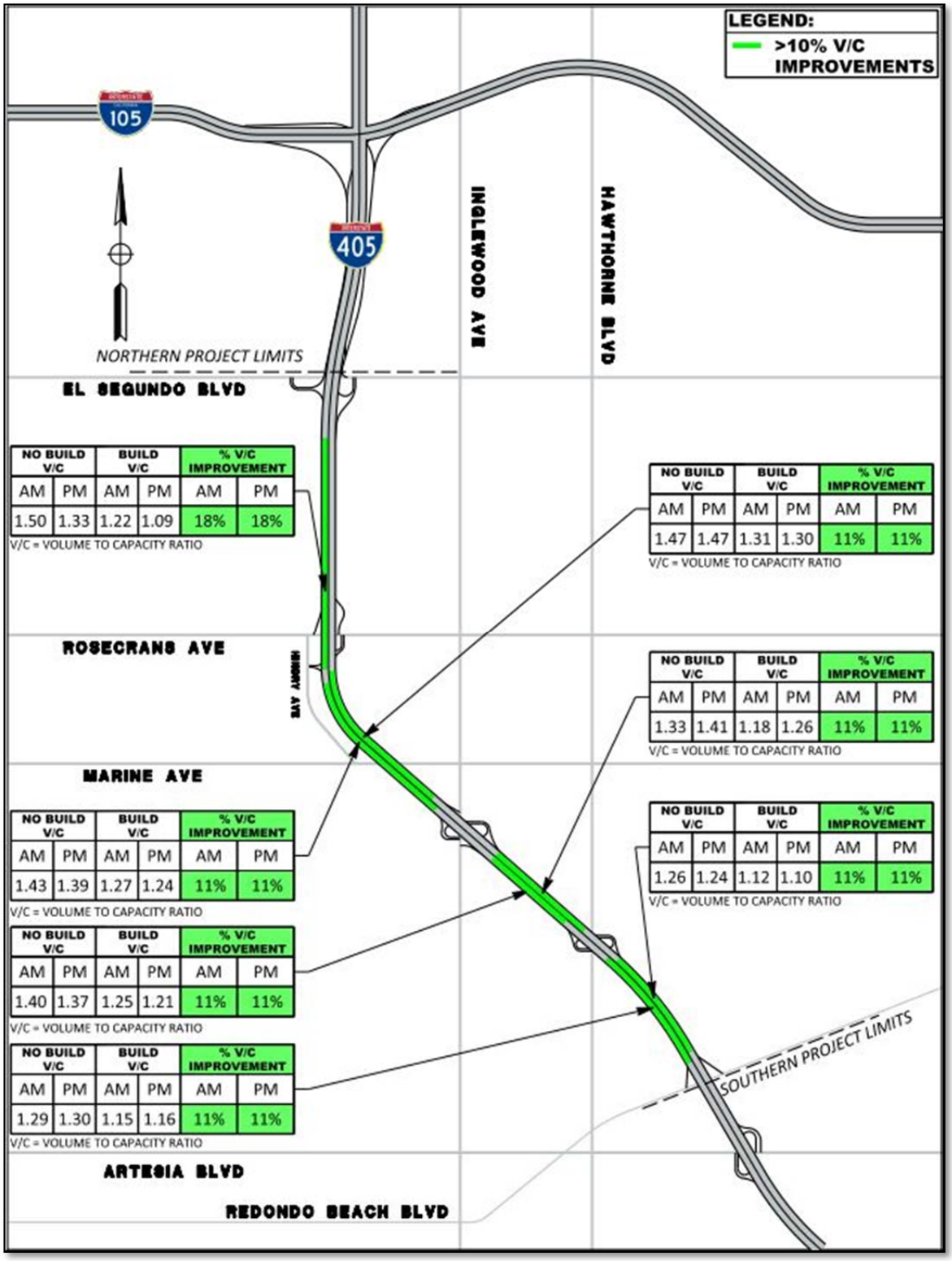
NO BUILD V/C		BUILD V/C		% V/C IMPROVEMENT	
AM	PM	AM	PM	AM	PM
1.28	1.24	1.14	1.10	11%	11%

NO BUILD V/C		BUILD V/C		% V/C IMPROVEMENT	
AM	PM	AM	PM	AM	PM
1.12	1.10	1.00	0.98	11%	11%

NO BUILD V/C		BUILD V/C		% V/C IMPROVEMENT	
AM	PM	AM	PM	AM	PM
1.25	1.22	1.11	1.08	11%	11%

NO BUILD V/C		BUILD V/C		% V/C IMPROVEMENT	
AM	PM	AM	PM	AM	PM
1.15	1.16	1.02	1.03	11%	11%

Figure 2: 2045 Project Improvements



NO BUILD V/C		BUILD V/C		% V/C IMPROVEMENT	
AM	PM	AM	PM	AM	PM
1.50	1.33	1.22	1.09	18%	18%

V/C = VOLUME TO CAPACITY RATIO

NO BUILD V/C		BUILD V/C		% V/C IMPROVEMENT	
AM	PM	AM	PM	AM	PM
1.47	1.47	1.31	1.30	11%	11%

V/C = VOLUME TO CAPACITY RATIO

NO BUILD V/C		BUILD V/C		% V/C IMPROVEMENT	
AM	PM	AM	PM	AM	PM
1.33	1.41	1.18	1.26	11%	11%

V/C = VOLUME TO CAPACITY RATIO

NO BUILD V/C		BUILD V/C		% V/C IMPROVEMENT	
AM	PM	AM	PM	AM	PM
1.43	1.39	1.27	1.24	11%	11%

V/C = VOLUME TO CAPACITY RATIO

NO BUILD V/C		BUILD V/C		% V/C IMPROVEMENT	
AM	PM	AM	PM	AM	PM
1.26	1.24	1.12	1.10	11%	11%

V/C = VOLUME TO CAPACITY RATIO

NO BUILD V/C		BUILD V/C		% V/C IMPROVEMENT	
AM	PM	AM	PM	AM	PM
1.40	1.37	1.25	1.21	11%	11%

V/C = VOLUME TO CAPACITY RATIO

NO BUILD V/C		BUILD V/C		% V/C IMPROVEMENT	
AM	PM	AM	PM	AM	PM
1.29	1.30	1.15	1.16	11%	11%

V/C = VOLUME TO CAPACITY RATIO

The following are the specific benefits resulting from the proposed project:

- The project would add approximately 5,620 feet of auxiliary lanes in the northbound direction and 9,835 feet in the southbound direction. The additional lane miles will provide additional off-ramp storage capacity, reducing existing turbulence caused by traffic entering and exiting the mainline. Improved mainline operations on the freeway should result from the added off-ramp storage.
- Existing bottlenecks in the northbound direction form between 7:00-9:00 AM between Rosecrans Avenue and Inglewood Avenue, and between Hawthorne Boulevard and Redondo Beach Boulevard. Figure 3 illustrates the congestion in the northbound direction based on available traffic data. The proposed auxiliary lanes between Redondo Beach Boulevard and Rosecrans Avenue in the northbound direction would reduce the congestion and improve mainline operations by improving merge and diverge operations at the interchanges for local users without impacting the mainline through traffic.
- An existing bottleneck is formed in the southbound direction of I-405 between El Segundo Boulevard and Rosecrans Avenue due to the high on-ramp volumes from I-105 and El Segundo Boulevard, and a lane drop at the El Segundo Boulevard on-ramp. Figure 4 illustrates traffic congestion in the southbound direction based on available traffic data. With the proposed project, the merge condition would be removed at the El Segundo Boulevard on-ramp, and the lane from the I-105 on-ramp would extend by approximately 4,120 feet providing more room for traffic entering the freeway to merge onto the mainline. This would alleviate congestion in the southbound direction between El Segundo Boulevard and Rosecrans Avenue, and improve the speed within the segment. Under Opening Year (2025) conditions, the level of service (LOS) at this segment would improve from LOS F to LOS D in the PM peak hour. Figure 5 illustrates the LOS improvement in the southbound direction.

Figure 3: I-405 Northbound Bottleneck Conditions

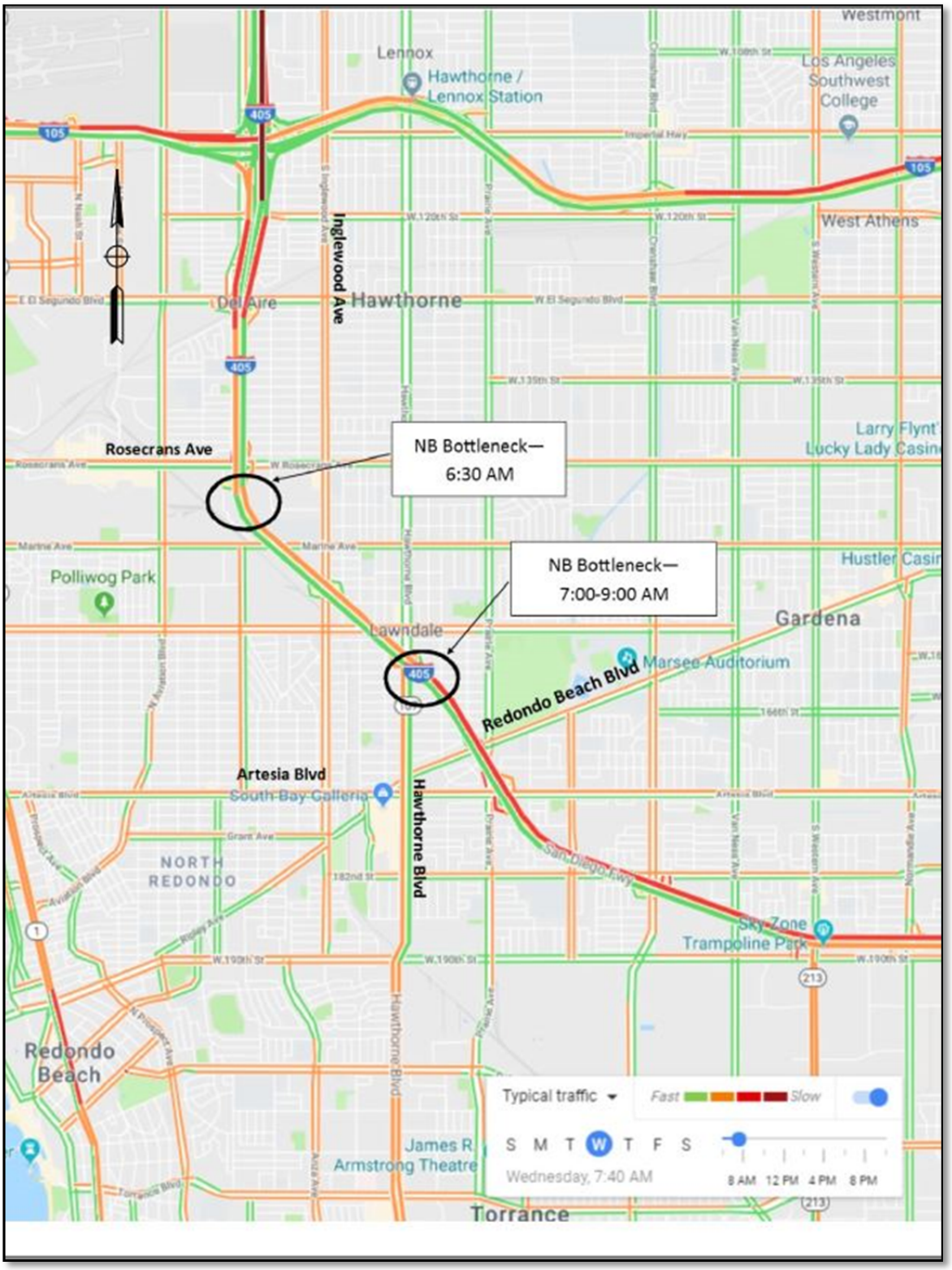


Figure 4: I-405 Southbound Bottleneck Conditions

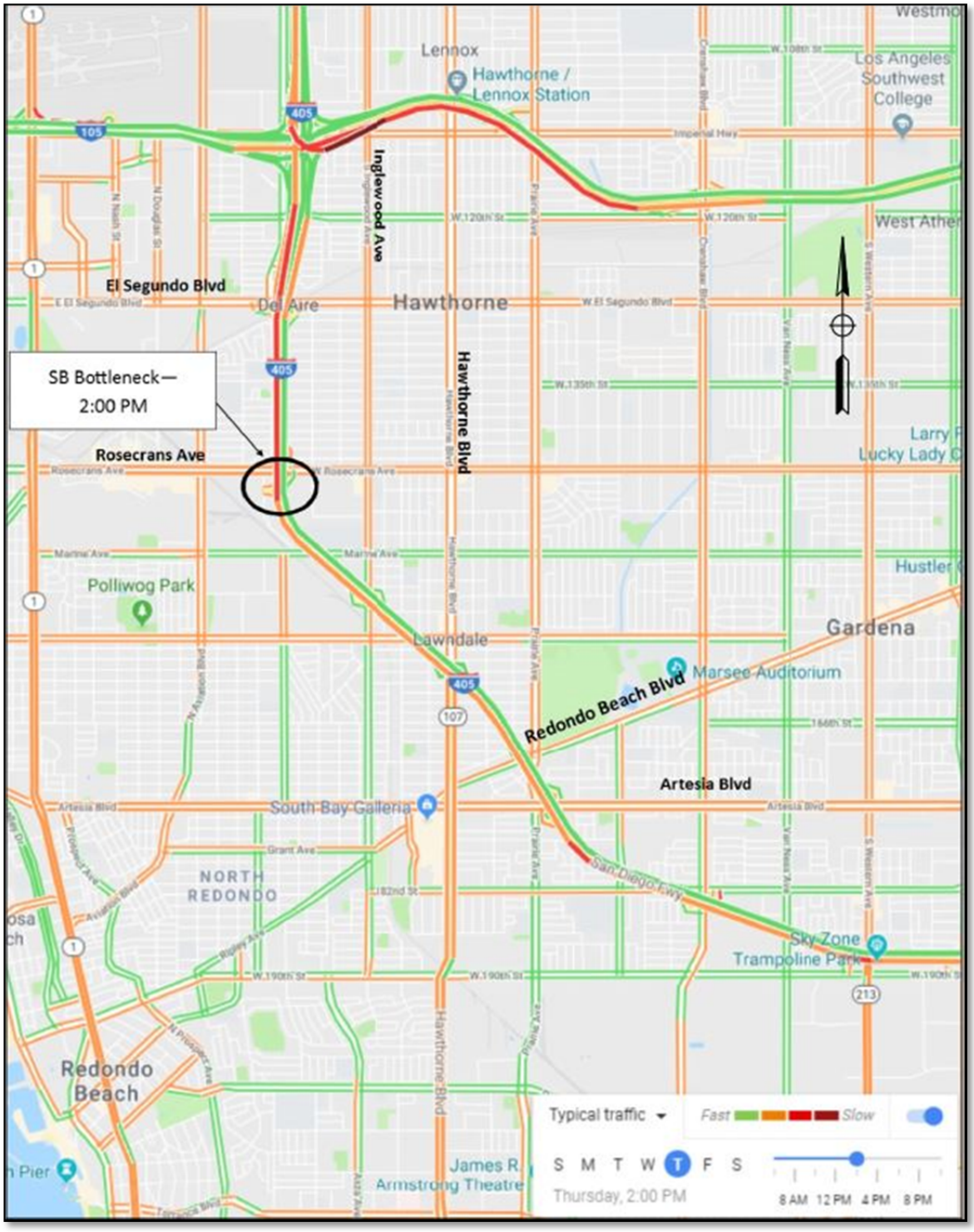
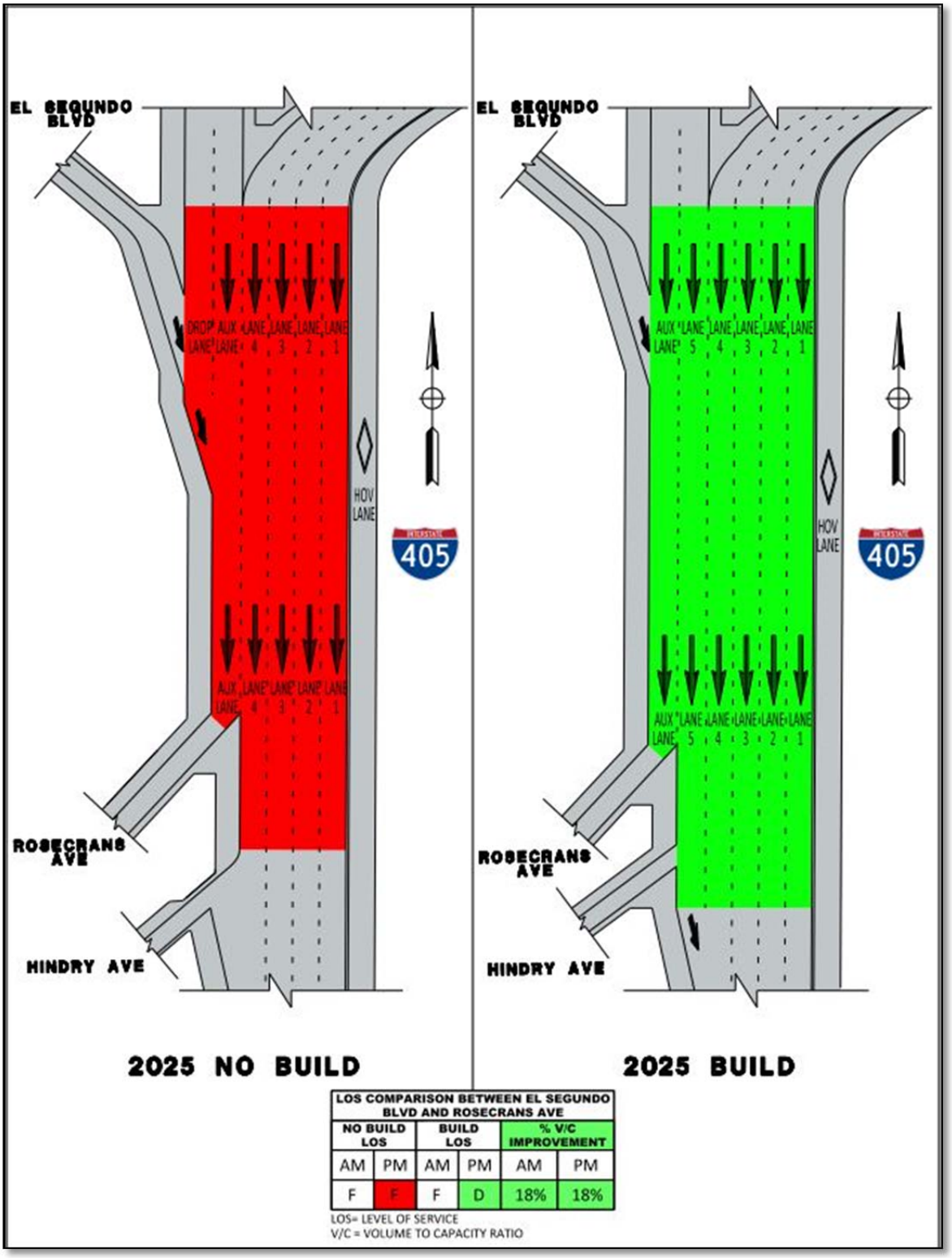


Figure 5: Level of Service Improvement



LOS COMPARISON BETWEEN EL SEGUNDO BLVD AND ROSECRANS AVE					
NO BUILD LOS		BUILD LOS		% V/C IMPROVEMENT	
AM	PM	AM	PM	AM	PM
F	F	F	D	18%	18%

LOS= LEVEL OF SERVICE
V/C = VOLUME TO CAPACITY RATIO

Assessment of Safety Performance/Needs

Traffic accident data were reviewed for both northbound and southbound I-405 mainline and ramp segments within the project limits. The safety assessment consisted of collecting and reviewing accident data contained in Table B of the Traffic Accident Surveillance and Analysis System (TASAS) summary provided by Caltrans. A three-year accident history window from January 2014 through December 2016 was used in this TEPA analysis.

The existing accident rates for all of the freeway mainline segments are summarized in Table 9 and are compared to the statewide average accident rates for similar facilities. As shown in Table 9 below, the accident rates at the freeway mainline and ramp segments are less than the statewide average rates for similar facilities.

Table 9: Accident Rates

Location	Number of Accidents			Accident Rate[1]					
				Actual			State-wide Average		
	F	I	Total	F	F+I	Total	F	F+I	Total
I-405 Northbound (PM 016.586–R021.001)	2	195	619	0.003	0.30	0.94	0.004	0.35	1.12
I-405 Southbound (PM 016.586–R021.001)	0	193	679	0.000	0.29	1.03	0.004	0.35	1.12

Notes:
[1] The accident rate is the number of accidents per million vehicle-miles.
F = Fatal; F+I = Fatal + Injury
Accident Data Reviewed: 01/01/2014 to 12/31/2016
Source: Caltrans TASAS, Table B

The number of accidents by accident type for the freeway mainline and the ramp segments are summarized in Table 10. Approximately 61 percent of the accidents on northbound I-405 and approximately 66 percent of accidents on southbound I-405 were rear-end collisions, which are typically related to traffic congestion on these freeway segments. Other relevant accident types were sideswipe and hit-object incidents, which are also attributable and related to traffic congestion.

Table 10: Accident Summary

Location	Sideswipe	Rear End	Broadside	Hit Object	Overturn	Other
I-405 Northbound	22%	61%	2%	10%	2%	3%
I-405 Southbound	23%	66%	2%	7%	1%	1%

Source: Caltrans District 8 TASAS; Accident Data Reviewed: 01/01/2014 to 12/31/2016

The proposed project would enhance safety at the ramp areas by reducing the conflict between high speed mainline through vehicles and slow speed ramp vehicles. This would likely reduce the number of rear-end collisions in the corridor.

Sideswipe and hit-object incidents typically occur when drivers attempt unsafe lane changes such as entering or exiting the freeway within a short distance between on- and off-ramps. With the proposed auxiliary lanes, drivers will have space for speed changes at the ramps away from high speed through traffic. This would likely reduce sideswipe and hit-object type of collisions and enhance safety in the corridor.

Recommended Scope of Future Traffic Engineering Studies, Activities, and Tasks

Based on the review of existing and forecast conditions in the TEPA document, the traffic operations analysis to be prepared during the PA&ED phase should include at the minimum the following key elements:

Traffic Forecasting

- Recommend that ramp intersections at all of the interchanges in the study area be included for the PA&ED phase.
- Recommend AM and PM peak period intersection turning movement volume counts be collected at the ramp intersections.

Mainline Operational/Capacity Analysis and Evaluation

- VISSIM analysis model for both no-build and build conditions.
- Freeway Mainline Basic Segment Analysis – HCM 2010.
- Freeway Weaving Analysis – HCM 2010.
- Freeway Ramp Junction Analyses (Merge and Diverge) – HCM 2010.
- Ramp Terminus Intersection Analysis – HCM 2010 Intersection Analysis.
- Arterial Queueing Analysis – 95th Percentile Queue from HCM 2010 Intersection Analysis.
- Off-Ramp Queuing Analysis – 95th Percentile Queue from HCM 2010 Intersection Analysis.
- On-Ramp Metering Analysis - Caltrans Ramp Metering Guidelines (most current edition).
- High Occupancy (HOV) lane Analysis – Volume-to-Capacity Ratio.
- Intersection Control Evaluation (ICE), if applicable – Caltrans Traffic Operations Policy Directive 13-02.
- Vehicle Miles Travelled (VMT) Analysis – per guidelines specified in California Senate Bill (SB) 743 and using the Travel Demand Model.
- Los Angeles County Congestion Management Program (CMP) Analysis – at the CMP monitored freeway mainline and intersection locations based on the CMP guidelines.
- Evaluate alternative Measures of Effectiveness (MOE) such as relative speed or travel time and peak hour throughput.

The traffic study should be expanded to include the AM and PM peak hour traffic operations analysis for the following scenarios:

- Existing Conditions
- Opening Year No-Build Conditions
- Opening Year Build Conditions
- Design Year No-Build Conditions
- Design Year Build Conditions

Safety Analysis and Evaluation

The safety analysis and evaluation during the PA&ED phase should utilize the most recent three years of collision data collected from Caltrans. Review of collision data and evaluation of existing and proposed infrastructure as well as operating conditions should be conducted to determine and ensure that the proposed project would not deteriorate existing conditions.

Other Analyses

The following are other analyses that are recommended for the PA&ED phase:

- HOV Degradation Evaluation
- Project Construction Staging/Traffic Management Planning
- Ramp Closure Study
- Freeway Signage

5. DEFICIENCIES

Traffic Operations

Based on the TEPA, as summarized Section 4, the mainline experiences operational deficiencies in the existing conditions. Similarly, the ramp analysis indicated that the merge and diverge operations are currently in poor operating conditions because of the congestion on the mainline.

One specific location that currently experiences deficiencies in operation is the southbound I-405 between El Segundo Boulevard and Rosecrans Avenue due to geometric constraints and significant traffic demand. The drop of two lanes along southbound I-405 from the I-105 branch connector in conjunction with the merge of high traffic volumes from the El Segundo Boulevard SB on-ramp generates a bottleneck condition at the northern project limits.

Existing Bottlenecks

The I-405 freeway corridor, within the project limits, currently experiences heavy congestion during peak hour periods due to bottlenecks resulting from heavy demand along the mainline and from vehicles entering and exiting the freeway. Existing traffic data shows that bottlenecks are formed between Rosecrans Avenue and Inglewood Avenue and Hawthorne Boulevard and Redondo Beach Boulevard in the northbound direction, and between El Segundo Boulevard and Rosecrans Avenue in the southbound direction. The

projected growth in traffic during the opening year (2025) and design year (2045) would result in increased traffic congestion.

Safety

Based on the latest 3-year collision data collected from Caltrans, rear end collisions account for approximately 61% and 66% of all types of collisions in the northbound and southbound directions, respectively. Rear end collisions are typically indicative of congestion-related conditions along the corridor.

6. CORRIDOR AND SYSTEM COORDINATION

I-405 is an interstate route that is part of the California Freeway and Expressway System and also the National Highway System (NHS). In addition, it is part of the Federal Surface Transportation Assistance Act (STAA) route network for oversized trucks, the Strategic Highway Network (STRAHNET), the Intermodal Corridors of Economic Significance (ICES), and the Subsystem of Highways for the Movement of Extralegal Permit Loads (SHELL).

The I-405 Transportation Concept Report (TCR) (Caltrans, June 2013) shows that four mixed-flow (general purpose) and one High Occupancy Vehicle (HOV) lanes in each direction are required on I-405 from I-105 to SR-91 to attain LOS F1 for the 2035 Baseline Regional Transportation Plan or 11 total lanes to attain LOS F0. LOS F0 was established by Caltrans District 7 as the minimum acceptable level of service on the freeway system (1996 District System Management Plan). To attain LOS D, 15 total lanes would be needed.

A Corridor System Management Plan (CSMP) (Caltrans, September 2010) was also developed for the I-405 freeway, a comprehensive plan for supporting the congestion reduction and productivity improvements designated as a Proposition 1B ballot measure for Corridor Mobility Improvement Account (CMIA) corridors. Within the project limits, bottleneck locations were observed indicating that traffic demand exceeds the capacity due to roadway geometry along northbound I-405 between the Inglewood Avenue and Rosecrans Avenue and along southbound I-405 between El Segundo Boulevard and Rosecrans Avenue interchanges. Another bottleneck location was identified at the Hawthorne Boulevard northbound on-ramp freeway-merge area which was observed to have concentrated number of incoming vehicles due to the geometric layout of the lane drop taper of the 3-lane on-ramp.

7. ALTERNATIVES

Project Alternatives

Two Alternatives, one no build and one build are considered for the project. The project study area begins at the I-405/Artesia Boulevard Interchange at the southern limits and ends at the I-405/El Segundo Boulevard Interchange at the northern limits. Consistent with the project purpose and need, the proposed improvements along the I-405 are within the

existing right-of way.

Alternative 1 – This alternative is the No Build Alternative and proposes no reconstruction or improvements to the existing I-405 Freeway between Artesia Boulevard and El Segundo Boulevard.

Alternative 2 – This alternative proposes to add auxiliary lanes in both directions of I-405 between the interchanges of Redondo Beach and Hawthorne Boulevard, Hawthorne Boulevard and Inglewood Avenue, and Inglewood Avenue and Rosecrans Avenue to improve traffic operations and enhance safety through the corridor.

At each of the six entrance ramps initiating the auxiliary lane, the existing condition consists of pavement beyond the ramp merge point that is consistent with the concept for entrance ramp geometry in the current HDM standards (HDM revision, July 2018). The length of existing short auxiliary lanes prior to the merge on the freeway varies at each location. The project proposes to utilize most of the existing pavement prior to the addition of auxiliary lanes (see lane schematic in Attachment C).

In addition, this alternative proposes to alleviate the existing bottleneck at the southbound I-405 segment between El Segundo Boulevard and Rosecrans Avenue. The bottleneck is currently caused by the abrupt reduction of freeway travel lanes from six lanes to four lanes within a short distance of 700 feet. The combination of heavy traffic volumes from the I-105 eastbound and westbound connector and the El Segundo Boulevard on-ramp merging into the 4-lane freeway mainline causes the heavy congestion that occurs during existing conditions. This alternative proposes to minimize the bottleneck and alleviate the congestion by extending the first lane drop past the Rosecrans Avenue Southbound Off-ramp and introduce the second lane drop within the Rosecrans Avenue interchange. This will extend and improve the spacing between lane drops downstream, resulting in improvements to traffic operations, and also addresses the bottleneck condition identified in the CSMP at this segment of the I-405.

A total of six structures will be impacted as part of the proposed improvements. Three out of the six will require widening in both directions of the freeway; 166th Street UC, Manhattan Beach Boulevard UC and Marine Avenue UC. Lawndale OH will be an extension of a box bridge on both sides of the freeway. Rosecrans Avenue UC and 135th Street UC will only require widening along the southbound direction of the freeway. At each location, bridge widening will be required to accommodate the proposed auxiliary lanes. It is anticipated that vertical clearance will not be affected at each of the structure widening locations.

To minimize future reconstruction costs and impacts, and to allow for future improvements, Alternative 2 will consider, as part of the proposed improvements, the width necessary to accommodate future lanes which may be undertaken after this project. To accomplish this, the proposed retaining walls will be placed at 100-foot offsets from the freeway centerline at the following locations:

- NB and SB I-405 between Hawthorne Boulevard and Manhattan Beach Boulevard Undercrossing
- SB I-405 between Manhattan Beach Boulevard Undercrossing and Inglewood Avenue
- NB and SB I-405 between Inglewood Avenue and Marine Avenue Undercrossing
- NB and SB I-405 between Marine Avenue Undercrossing and Lawndale Overhead
- NB and SB I-405 between Lawndale Overhead and Rosecrans Avenue

The placement of the proposed 100-foot offset from the I-405 centerline would provide for flexibility in accommodating various geometric cross-sectional configurations for future planned improvements within the project limits.

Total Capital Outlay Cost for the build alternative ranges from $100 to $120 million.

Nonstandard Design Features

There are nonstandard features that have been identified in the No Build and Build Alternatives based on the Caltrans Highway Design Manual (HDM) 6th Edition (July 2018) standards. It is anticipated that a Design Standard Decision Document (formerly Fact Sheet Exceptions to Mandatory and Advisory Design Standards) will be prepared during the PA&ED phase and approved as part of the Final Project Report. Attachment J entitled Design Standards Risk Assessment Matrix comprises of potential design exceptions to Boldface type and Underline type standards and the assigned probability of approval for the build alternative. Procedurally, as the project geometrics are further studied, developed, and refined during the PA&ED phase, the list of potential design exceptions may need to be updated or revised.

Proposed Features

The proposed engineering features for the Build Alternative 2 are summarized as follows:

<u>Northbound:</u>

- Add one auxiliary lane between Redondo Beach Boulevard and Hawthorne Boulevard
- Add one auxiliary lane between Hawthorne Boulevard and Inglewood Avenue
- Add one auxiliary lane between Inglewood Avenue and Rosecrans Avenue

<u>Southbound:</u>

- Lane extension of SB GP lane no. 5 and GP lane no. 6 from I-105/SBI-405 connector between El Segundo Boulevard and Rosecrans Avenue
- Add one auxiliary lane between Rosecrans Avenue and Inglewood Avenue
- Add one auxiliary lane between Inglewood Avenue and Hawthorne Boulevard
- Add one auxiliary lane between Hawthorne Boulevard and Redondo Beach Boulevard

Engineering Technical Studies

The following engineering technical studies are anticipated during the PA&ED to obtain approval of the Build Alternative for the project:

- Traffic Report
- Preliminary Materials and Geotechnical Reports
- Geometric Approval Drawings
- Advanced Planning Studies for all proposed bridge modifications and nonstandard retaining walls
- Design Standard Decision Document
- Preliminary Drainage Report
- Life-Cycle Cost Analysis
- Storm Water Data Report
- Noise Study Report and Noise Abatement Decision Report
- Right of Way engineering
- Utility Investigation

Stormwater BMPs

A Storm Water Data Report (SWDR) has been prepared (under a separate cover) for this PID phase of the project. The anticipated storm water project risk level is Level 2 for the build alternative. The SWDR recommends the implementation of treatment Best Management Practices (BMPs) to treat the project targeted design constituents or pollutants. The project proposes to implement six of the 16 BMPs strategies identified in the "I-405 and Route 90 Storm Water Quality Study" within the project limits. The six permanent proposed BMPs would comprise of biofiltration swales to be located at various locations along the project limits. The six added permanent BMPs will treat 22.70 acres of the pave areas generating 204% (22.70/11.12 acres of total added impervious areas) of the proposed new impervious surface. Temporary construction site BMPs including hydraulic mulch, fiber rolls, silt fencing, and drainage inlet protection are also anticipated to be implemented. The SWDR will be updated during the PA&ED and PS&E phases to confirm the risk levels assigned during the PID, disturbed soil area, change in the amount of impervious area, and proposed BMPs anticipated to be implemented for design pollution prevention, treatment, and construction. With the total Disturbed Soil Area (DSA) determined to be greater than one acre for the project, a Storm Water Pollution Prevention Plan (SWPPP) will be required during construction to address construction site BMPs. The SWDR cover page is included as Attachment I.

Traffic Handling and Construction Staging

It is anticipated all existing lanes, including the HOV lanes, will remain open during construction of the freeway widening. Restriping of the mainline may be required to accommodate placement of temporary railing along the freeway to construct improvements beyond the existing edge of traveled way. The new or reconstructed retaining walls and soundwalls are assumed to be constructible within the existing Caltrans right of way.

Complete Streets

Alternative 2 addresses the safe mobility of vehicles at proposed auxiliary lane locations by providing standard lane widths and outside shoulders. In addition, current approved safety shaped concrete barriers beyond the shoulders are to be implemented as part of the improvements. Procedurally, the project has considered Complete Streets, however due to the project not impacting local roads or ramp termini, considerations related to pedestrians or bicyclists are not proposed with the auxiliary lane improvements.

Climate Change

The Preliminary Environmental Assessment Report (PEAR) in Attachment E addresses how the proposed improvements will provide long-term benefits reducing congestion and therefore a reduction of greenhouse gas emissions.

Alternative Considered but Dropped from Further Studies

A full standard alternative was considered early in the PID but was rejected as a result of not meeting the purpose of the project. The full standard alternative would require reconstruction of the local arterial interchanges including Redondo Beach Boulevard, Hawthorne Boulevard, Inglewood Avenue, and Rosecrans Avenue interchanges. As indicated under Section 3, the alternatives considered shall meet the purpose and need of the project while minimizing environmental and right of way impacts. The full standard alternative was discussed involving the PDT and it was concluded that the significant needs for right of way acquisition along the project study area did not meet the second goal of the project purpose statement. The extents of environmental impacts resulting from a full standard alternative would include substantial impacts to residential properties and local businesses neighboring the I-405 freeway. The most notable environmental impacts would be to Lawndale High School and Glasgow Park.

8. RIGHT-OF-WAY

The proposed improvements are being planned within the State's right of way, therefore it is not anticipated that permanent right of way acquisition will be required. Attachment G reflects the Conceptual Cost Estimate – Right-of-Way Component. It is anticipated that temporary construction easement may be needed to accommodate a shift in the alignment at the Rosecrans SB Hook Off-Ramp.

Utilities:

A utility investigation was performed as part of the PSR-PDS. Potential utility owners were contacted to obtain information about their existing facilities. Based on the gathering of that information, Table 11 summarizes the types of facilities and owners present within the project limits.

Table 11: Summary of Utilities

Utility	Owner
Water	California Water Service
	City of Torrance
	Golden State Water Company
	Metropolitan Water District
	West Basin Municipal Water District
Sewer	Los Angeles County Department of Public Works
	City of El Segundo
	City of Lawndale
	City of Redondo Beach
	City of Torrance
Telephone/Communications	ACS State & Local Solutions
	AT&T – TCA
	CenturyLink
	Charter Communications
	Crown Castle International Corporation
	Frontier Communications
	Level 3 Communications
	Los Angeles County Internal Services Department
	MCI Communications
	Wilshire Connection LLC
	Zayo Group
Electrical	Southern California Edison
Gas	Southern California Gas Company
Oil	Andeavor
	Chevron Corporation
	Crimson Pipeline LP
	Phillips 66 Pipeline LLC
	Plains All American Pipeline
	Torrance Logistics Company LLC

Information provided by the Dig Alert web site and available utility as-built plans were used to prepare this list. Coordination with the identified utility companies will be carried out during the PA&ED, PS&E, and construction phases. It is anticipated that the proposed build alternative will impact existing facilities. The specific facilities in conflict with the proposed build alternative, and subsequent need for relocation of, will be confirmed and coordinated during PA&ED.

Railroad:

The existing Lawndale Overhead structure, which has been identified to require widening, used to accommodate a spur for the Atchison, Topeka and Santa Fe (AT&SF) Railway. This spur has been decommissioned, however ownership of this property has not been confirmed.

9. STAKEHOLDER INVOLVEMENT

Representatives from the cities of Hawthorne and Redondo Beach on behalf of the SBCCOG have attended a Project Development Team (PDT) meeting on June 26, 2018 with both Caltrans and Metro (project sponsor) to discuss the proposed improvements for the build alternative. The improvements are in-line with the purpose and need which have been developed and concurred by the PDT early in the project by Caltrans, Metro, and the consulting team. The members of the cities provided feedback on topics that have been previously discussed by their respective communities. The project team has documented the feedback from the cities and plans to include them for consideration into the PA&ED phase of the project. The representatives from each of the cities will have an opportunity to review the PSR-PDS prior to the final approval.

During the PA&ED phase, public outreach is anticipated prior to the completion of the draft environmental document through the various corridor cities within the project limits and Metro.

10. ENVIRONMENTAL COMPLIANCE

A PEAR has been prepared for this project, and includes an initial environmental evaluation of the project, summarizes key environmental issues, and identifies the environmental documentation that may be required for the project.

The project is being undertaken by a public agency and has the potential to result in a direct physical change to the environment (see Section 2 for project description). Therefore, the project requires environmental review under CEQA. In addition, because federal funds may be secured to implement the project, environmental review is required under NEPA.

Caltrans would be the Lead Agency under CEQA. Based on the preliminary evaluation conducted as part of the PEAR, the project is not anticipated to result in significant effects or extraordinary circumstances. The appropriate level of environmental documentation under CEQA would be a categorical exemption with technical studies under Article 19 Section 15301 of the CEQA Guidelines.

Caltrans would be the Lead Agency under NEPA. Based on the preliminary evaluation conducted as part of the PEAR, Caltrans has determined that the appropriate level of environmental documentation under NEPA would be a categorical exclusion with a Class of Action Concurrence of Class II for NEPA (23 CFR 771.117[c][26]).

A preliminary assessment of the Build Alternative has identified the potential for impacts related to visual/aesthetics, cultural resources, water quality and storm water runoff, geology, soils, seismic, and topography, hazardous waste/materials, traffic/transportation, air quality, noise, the biological environment, and cumulative impacts. Preparation of environmental technical reports would be required, including:

- Aerially Deposited Lead Study
- Air Quality Study Report and Air Quality Conformity Analysis
- Geotechnical Study
- Historic Property Survey Report, Historic Resource Evaluation Report, Finding of Effect, and Memorandum of Agreement
- Phase I Initial Site Assessment and Preliminary Site Investigation (potentially)
- Natural Environment Study (MI)
- Noise Study Report and Noise Abatement Decision Report
- Paleontological Identification and Evaluation Report
- Section 4(f) Evaluation
- Storm Water Data Report
- Traffic Impact/Circulation Study
- Visual Impact Assessment
- Water Quality Assessment Report

Anticipated environmental commitments for the Build Alternative are identified below:

- Utilities – Any disruptions to utility service would be scheduled and coordinated to ensure they would not adversely affect the surrounding community.
- Emergency Services – Coordination with local emergency service providers and communication with the surrounding community would be conducted to minimize traffic impacts during construction.
- Visual/Aesthetics – Landscaping and aesthetic treatments may be required to enhance the aesthetic appearance of the interchanges and overcrossings. The VIA would include an analysis of project impacts and would provide recommendations for visual enhancements to minimize potential impacts.
- Cultural Resources – Measures to avoid impacts on cultural resources would be implemented, and would include avoiding known and potential historic resources to the extent feasible, implementing a cultural resources monitoring plan, monitoring sensitive areas, providing education to construction crew, delineating environmentally sensitive areas, treating inadvertent discoveries, and identifying human remains if found in the project area during construction.
- Hydrology and Floodplain – Design and treatment BMPs would be incorporated into the final project design to capture pollutants and storm water runoff, and to avoid impacts on floodplains.
- Water Quality and Storm Water Runoff – Design and treatment BMPs could include the installation of biofiltration swales and strips and infiltration devices to capture pollutants in storm water runoff. Construction BMPs would include implementation of erosion control measures, street sweeping and vacuuming, and installation of temporary check dams, hydraulic mulch, cover, fences, concrete washout bins, fiber rolls, drainage inlet protection, and sediment barriers. BMPs would be finalized during final project design.

- Geology, Soils, Seismic, and Topography – Potential impacts would be minimized by incorporating appropriate project design features and constructing the project in conformance with the California Building Code (CBC) and Caltrans HDM. Temporary erosion control measures and project design elements to address slope stability, pile driving, soils, seismicity, and topography would be developed and finalized during final project design.
- Hazardous Waste/Materials – Evaluation of surface soils is recommended to identify the potential presence of ADL that could be disturbed during construction. Development of management and disposal options for soil containing potentially hazardous concentrations of lead is recommended. Appropriate environmental commitments would also be developed after the completion of the Phase I ISA, ADL survey, ACM and LCP surveys, and PSI that would be conducted to further assess potential impacts.
- Air Quality – The project would be constructed in compliance with Caltrans' Standard Specifications, Section 14-9 "Air Quality" and Caltrans' specifications for the control of construction-generated emissions. Additional measures may be developed in coordination with the SCAQMD to minimize potential impacts.
- Noise and Vibration – Implementation of abatement measures (typically in the form of soundwalls) may be required to comply with county, state, and federal guidelines. In addition, project construction, may include pile driving, structure demolition, blasting, or other impact-type noises; therefore, measures would be needed in the plans and specifications to minimize or eliminate adverse construction noise and vibration impacts on nearby land uses or activities. The measures would be based on the results of the NSR and NADR. The project would be constructed in compliance with Caltrans' Standard Specifications, Section 14-8.02 "Noise Control."
- Biological Environment – Measures to avoid and minimize impacts on nesting migratory birds and raptors, special-status species, and bats would be implemented, including BMPs to prevent construction debris and dust from entering waterways, pre-construction surveys, and reduced work areas. Formal or informal consultation with USFWS and CDFW is not anticipated to be required for species and habitat impacts, which would be confirmed during the NES (MI). Avoidance, minimization, and mitigation measures may be required if federal- or state-listed species are discovered within the project area.
- Section 4(f)/6(f) – Evaluation of historic sites, parks, and recreation areas will be required to identify applicable Section 4(f) resources within or adjacent to the project area. The evaluation of Section 4(f) resources would include an assessment of the potential adverse impact to, or occupancy of, a Section 4(f) resource. The Section 4(f) Evaluation would also include an analysis of project impacts to historic sites, parks, and recreation facilities. Consultation and coordination with the official(s) of the agency or agencies with jurisdiction over identified Section 4(f) resources would be required. Consultation and coordination is critical for determining the significance and use of a Section 4(f) resource, and developing measures to avoid or minimize harm.

11. FUNDING

It has not yet been determined if the project is eligible for Federal-aid funding. Determination will be based upon coordination with the Caltrans Federal Highway Administration (FHWA) Liaison. Currently, Metro has planned to utilize a combination of local sales tax funds for the project, and will seek other eligible funds.

Table 12: Capital Outlay Project Estimate

	Range of Estimate		Measure R Funds		Measure M Funds	
	Construction	Right-of-Way	Construction	Right-of-Way	Construction	Right-of-Way
Alternative 1	$0	$0	$0	$0	$0	$0
Alternative 2	$100M-$120M	$1M-$3M	TBD	TBD	TBD	TBD

The level of detail available to develop these capital outlay project estimates is only accurate within the above ranges and is useful for long-range planning purposes only. The capital outlay project estimates should not be used to program or commit local or State-programmed capital outlay funds.

Capital Outlay Support Estimate

Capital outlay support estimate for programming PA&ED is $3.2 million.

12. DELIVERY SCHEDULE

The following tentative milestone schedule has been identified for the preparation of preliminary engineering, environmental studies, and final design and construction documents for this project. The milestones shown in the Table 13 below are for planning purposes only and are used to indicate relative time frames.

Table 13: Delivery Schedule

Project Milestones		Scheduled Delivery Date (Month/Day/Year)
PROGRAM PROJECT	M015	01/2019
BEGIN ENVIRONMENTAL	M020	03/2019
PA & ED APPROVAL	M200	09/2020

The anticipated funding fiscal year for construction is 2023/2024.

13. RISKS

A Level 2 Risk Register has been prepared as part of the PID phase for the project which currently identifies 19 types of categories varying between design, organizational, environmental, and construction related types of risks for the project. The risk categories are intended to be carefully reviewed and updated as the project develops throughout the duration of the PID and throughout the project development process. The Risk Register is planned to be discussed with the PDT team and appropriate mitigation strategies to the assigned risks would be assessed for further considerations during the subsequent PA&ED, PS&E and construction phases. The Risk Register can be found in Attachment H.

14. EXTERNAL AGENCY COORDINATION

FHWA

This project is not identified as a 'Project of Division Interest" however it is anticipated that the project will be determined to be "Delegated/Assigned Project" and administered per the Project Responsibilities List under the Joint Stewardship and Oversight Agreement. Further involvement from FHWA is expected to occur in PA&ED phase.

The project requires the following coordination:

State Water Resource Control Board
Section 402 NPDES

Regional Water Quality Control Board
Clean Water Act Section 401
Water Quality Certification (Los Angeles Regional Water Quality Control Board-LARWQCB)

Local Agency - Metro
Cooperative Agreement with Caltrans (Cooperative Agreement No. 07-5123, executed on May 8, 2018)
Encroachment Permits with local corridor cities

15. PROJECT REVIEWS

The draft PSR-PDS was submitted on July 18, 2018 and reviewed by both Caltrans and Metro. The updated PSR-PDS was submitted on September 04, 2018. The final PSR-PDS is anticipated to be approved in October 2018.

16. PROJECT PERSONNEL

LA Metro

Isidro Panuco Project Manager	(213)418-3208
Aline Antaramian Program Manager	(213)922-7589

Caltrans District 7

Mohammed Chowdhury Project Manager	(213)897-0730
Mohamed A. Ahmed PID Design Manager	(213)897-5975

Local Agencies

Ted Semaan City of Redondo Beach	(310)318-0686 ext. 4172
Akbar Farokhi City of Hawthorne	(310)349-2983

Consultants

Jason Majzoub Project Manager, AECOM	(949)923-1545
Brian Smith Engineering Lead, AECOM	(951)285-8344
Francis Tan Project Engineer, AECOM	(213)593-8028
Vamshi Akkinepally Traffic Studies, AECOM	(714)689-7339
Richard Galvin Environmental Studies, GPA	(310)792-2690
Eric Diaz Project Engineer, OPTITRANS	(310)989-2993
Michael Hynes Storm Water/Utilities, WKE, Inc.	(949)887-3205