Laserfiche Office Project
Traffic Impact Analysis

DRAFT Report

November 15, 2018

Submitted to:

CITY OF LONG BEACH

10045 | Prepared by **Iteris, Inc.**

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1 INTRODUCTION

This report summarizes the results of a traffic analysis for the proposed Laserfiche Office project, hereinafter referred to as the "project", located at 3443 Long Beach Boulevard in the City of Long Beach. This report provides detailed information concerning the methodology, findings and conclusions of the traffic analysis. A total of nine intersections in the vicinity of the project site were analyzed. The traffic analysis evaluates project trips on existing traffic conditions and on project opening year traffic conditions, taking into account growth in traffic due to other known development projects in the surrounding area as well as overall ambient growth in background traffic.

1.1 Project Description

The proposed project consists of a 103,456 square foot office building and a new parking structure containing 432 spaces. The project site is currently vacant. Access to the project site will be provided via 35th Street. Laserfiche currently has an office complex north of the proposed site, at 3545 Long Beach Boulevard. **Figure 1** shows the project site plan.

1.2 Study Area

The proposed study area for analysis includes the following nine intersections in the vicinity of the project site:

1. Long Beach Boulevard/Bixby Road;
2. Long Beach Boulevard/36th Street;
3. Long Beach Boulevard/35th Street;
4. Crest Drive/Wardlow Road;
5. I-405 Northbound On-ramp/Wardlow Road;
6. Long Beach Boulevard/Wardlow Road;
7. Crest Drive/I-405 Southbound Ramps;
8. Long Beach Boulevard/I-405 Northbound Off-ramp; and
9. Long Beach Boulevard/Crest Drive.

The project site location and proposed study intersections are shown in **Figure 2**.

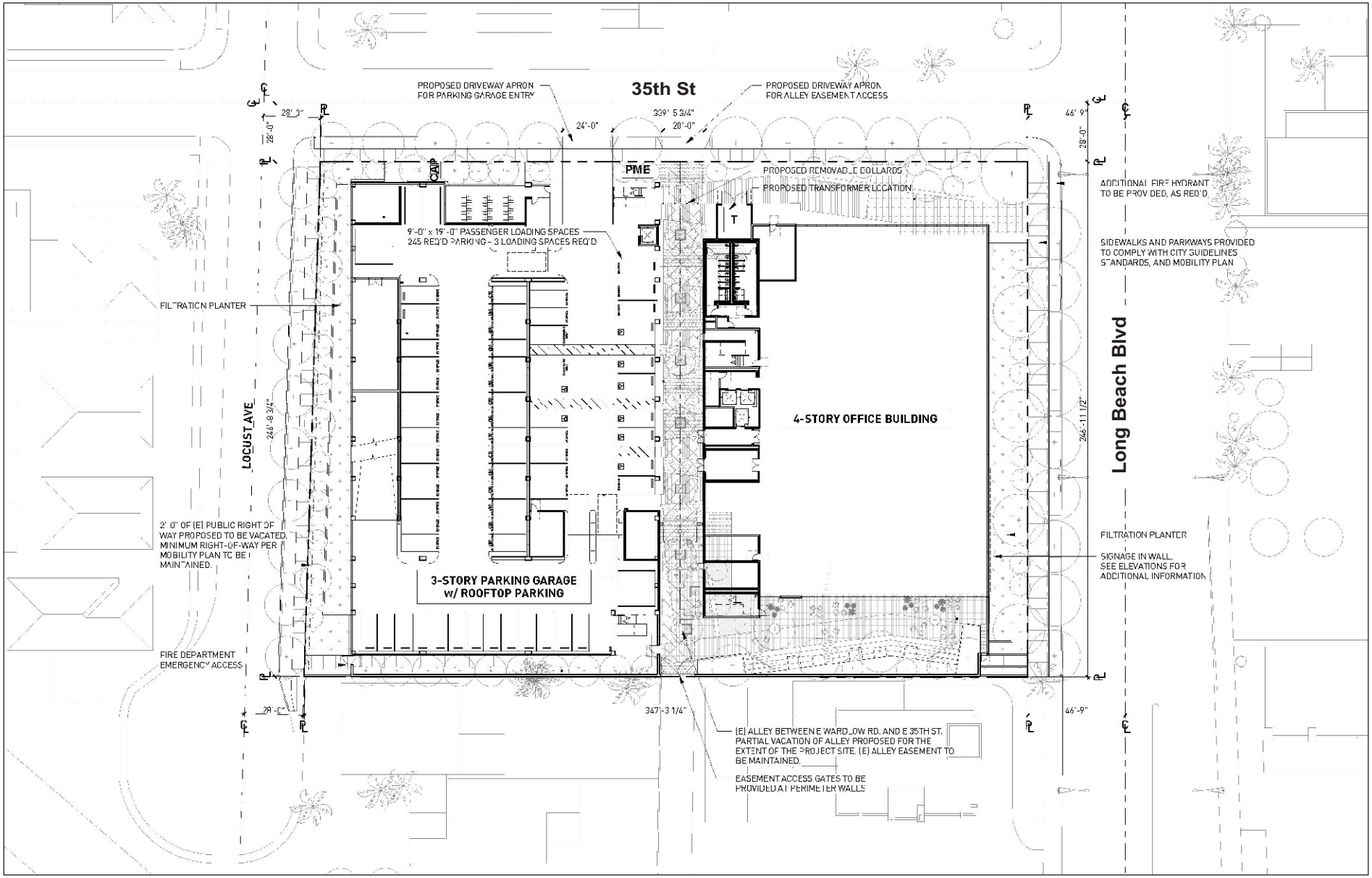

Figure 1
Site Plan

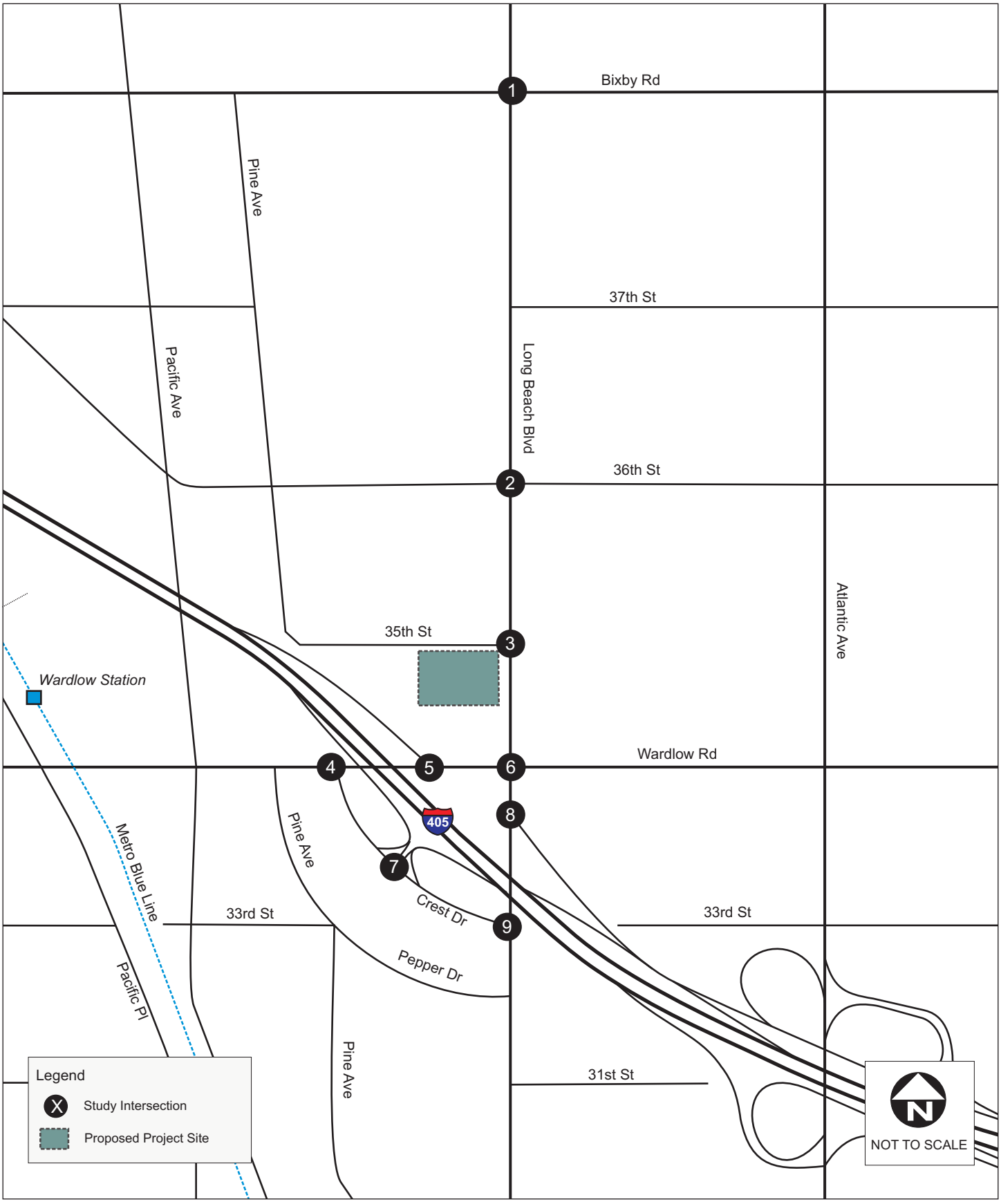

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Figure 2
Project Location and Study Intersections

1.3 Study Periods

Traffic operations were evaluated for each of the following scenarios during the weekday a.m. (7:00 – 9:00) and p.m. (4:00 – 6:00) peak hours during typical weekday conditions (during the school year):

- Existing Conditions;
- Existing Plus Project Conditions;
- Opening Year 2020 Without Project Conditions;
- Opening Year 2020 With Project Conditions;

Based on information provided by the project applicant, the projected opening year for the proposed project is 2020. The study area and study periods were confirmed with City staff.

2 ENVIRONMENTAL SETTING

This section presents an overview of the existing roadway system within the study area, and the methodology used to determine existing traffic volumes.

2.1 Roadway Configurations

The existing configurations of the roadways within the study area are shown in **Table 1**.

Table 1: Study Area Roadways

Roadway	Classification	Direction	Lanes		On-Street Parking	Bike Facility	Median
			NB/EB	SB/WB			
Long Beach Blvd	Boulevard	North/South	2	2	Yes, both sides	-	Yes
Wardlow Rd	Major Ave Minor Ave	East/West	2	2	Yes, both sides	-	Yes
Crest Dr	Local St	S East/ N West	1	1	Yes, both sides	-	No
36th St	Local St	East/West	1	1	Yes, both sides	-	No

Note: Roadway classification and bike facilities based on City of Long Beach General Plan Mobility Element 2013

2.2 Existing Traffic Volumes

Existing traffic counts at the study intersections were conducted in April 2018. All counts were conducted during the a.m. peak period (7:00 – 9:00) and p.m. peak period (4:00 – 6:00). The traffic impact analysis is based on the highest single hour of traffic during each time period at each location. Traffic counts were collected while schools were still in session, avoiding any holiday-related shifts in traffic patterns. Detailed vehicle turning movement data is included in **Appendix A**. **Figure 3** shows the existing intersection configurations and **Figure 4** shows the existing peak hour volumes at the study intersections.

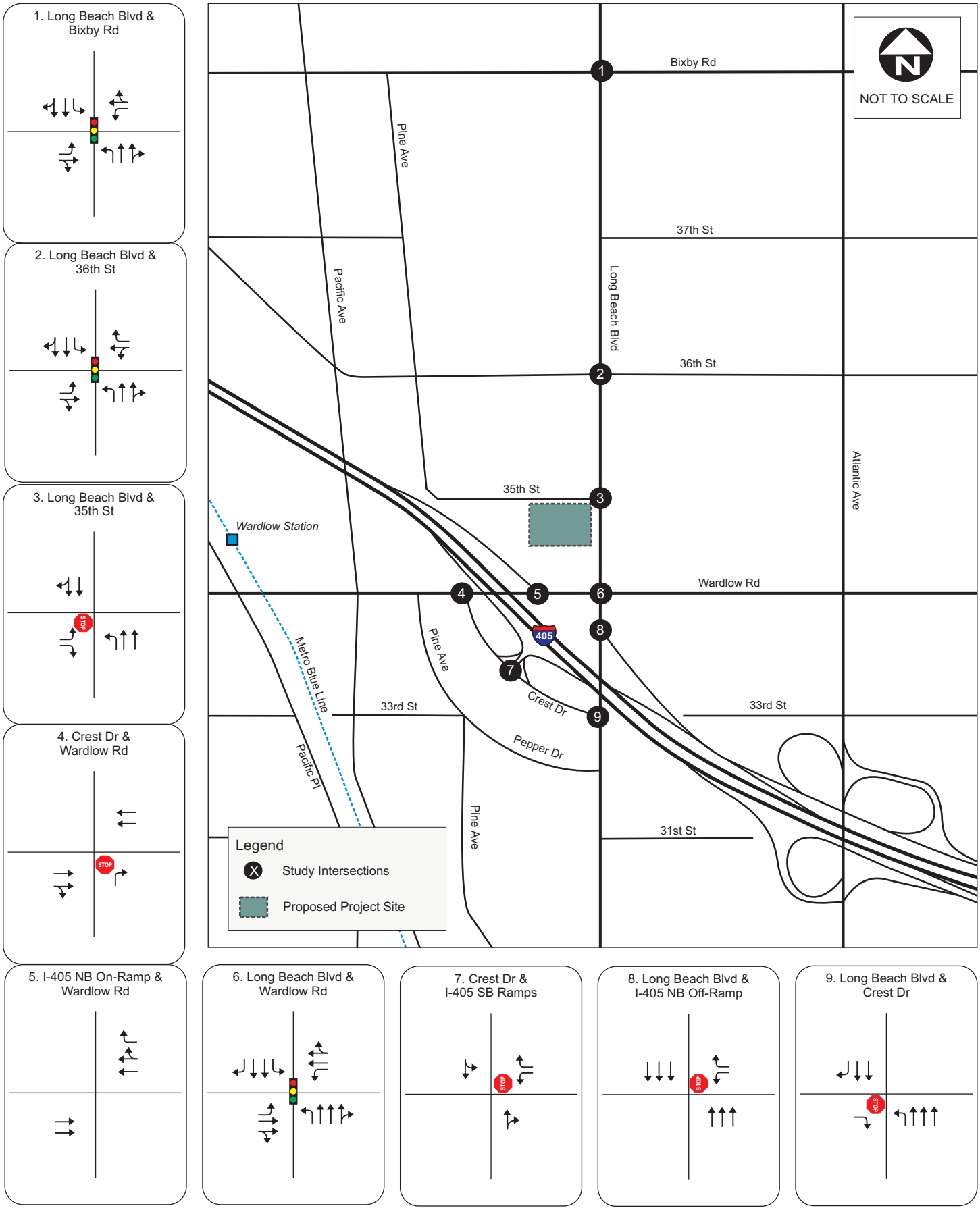

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Figure 3
Existing Intersection Lane Configurations

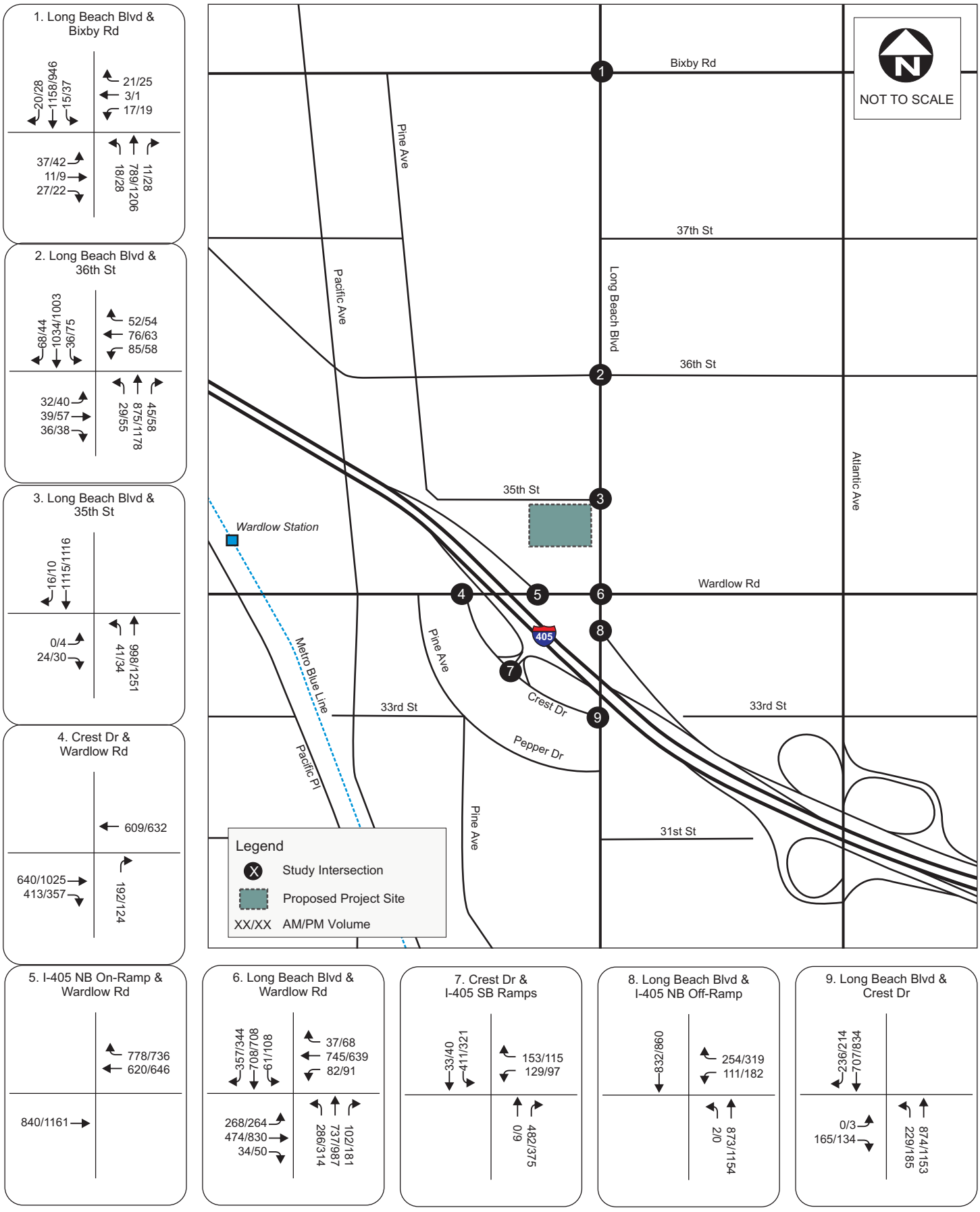

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Figure 4
Existing Intersection Volumes

3 TRAFFIC OPERATIONS ANALYSIS METHODOLOGY

The quality of traffic operations is characterized using the concept of level of service (LOS). Level of service is defined by a range of grades from A (best) to F (worst). At intersections, LOS "A" represents relatively free flow operating conditions with little or no delay. LOS "F" is characterized by extremely unstable flow conditions, severe congestion and delays with traffic volumes at or near the intersection's design capacity. This typically results in long vehicular queues extending from all approaches to intersection.

Analysis of traffic operations are conducted according to the traffic impact analysis guidelines used by the City of Long Beach. At signalized intersections within City jurisdiction, LOS analysis is performed using Intersection Capacity Utilization (ICU) operations methodology per the City's guidelines utilizing the Traffix software. In addition, analysis of traffic operations of intersections operated under Caltrans' jurisdiction and unsignalized intersections is conducted utilizing the Highway Capacity Manual (HCM) methodology, which uses vehicular delay criteria to determine LOS. **Table 2** presents a brief description of each level of service letter grade, as well as the range of delays or V/C ratios associated with each grade for signalized and unsignalized intersections.

Table 2: Intersection Level of Service Definitions – ICU and HCM Methodologies

Level Of Service	Description	Volume to Capacity (V/C) Ratio	HCM Average Delay (sec) - Signalized Intersections	HCM Average Delay (sec) - Unsignalized Intersections
A	Excellent operation. All approaches to the intersection appear quite open, turning movements are easily made, and nearly all drivers find freedom of operation.	0.000-0.600	≤ 10	≤ 10
B	Very good operation. Many drivers begin to feel somewhat restricted within platoons of vehicles. This represents stable flow. An approach to an intersection may occasionally be fully utilized and traffic queues start to form.	>0.600-0.700	>10-20	>10-15
C	Good operation. Occasionally drivers may have to wait more than 60 seconds, and back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted.	>0.700-0.800	>20-35	>15-25
D	Fair operation. Cars are sometimes required to wait more than 60 seconds during short peaks. There are no long-standing traffic queues.	>0.800-0.900	>35-55	>25-35
E	Poor operation. Some long-standing vehicular queues develop on critical approaches to intersections. Delays may be up to several minutes.	>0.900-1.000	>55-80	>35-50
F	Forced flow. Represents jammed conditions. Backups form locations downstream or on the cross street may restrict or prevent movement of vehicles out of the intersection approach lanes; therefore, volumes carried are not predictable. Potential for stop and go type traffic flow.	> 1.000	>80	>50

3.1 Thresholds of Significance

The City of Long Beach Traffic Impact Guidelines considers LOS D as the limit for acceptable intersection operations. Furthermore, an impact is considered significant when the resulting level-of service with the project traffic is E or F and project related traffic contributes a V/C of 0.02 or more to the critical movements. Note that local streets are not defined in the City's General Plan. Thus, significant impact criteria does not apply to local streets.

4 EXISTING CONDITIONS

A level of service analysis was conducted to evaluate existing intersection operations during the a.m. and p.m. peak hours at the study intersections. **Table 3** summarizes the existing LOS at the study intersections. LOS calculation sheets are provided in **Appendix B**.

Table 3: Existing Intersection Peak Hour Level of Service

Intersection		Control Type	AM Peak Hour			PM Peak Hour		
			V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS
1	Long Beach Blvd/Bixby Rd	signalized	0.526	-	A	0.575	-	A
2	Long Beach Blvd/36th St	signalized	0.603	-	B	0.681	-	B
3	Long Beach Blvd/35th St	stop-control	-	13.3	B	-	22.5	C
4	Crest Dr/Wardlow Rd	stop-control	-	17.8	C	-	20.5	C
5	I-405 NB On-ramp/Wardlow Rd*	stop-control	-	0.0	A	-	0.0	A
6	Long Beach Blvd/Wardlow Rd	signalized	0.955	-	E	0.928	-	E
7	Crest Dr/I-405 SB Ramps*	stop-control	-	109.1	F	-	28.8	D
8	Long Beach Blvd/I-405 NB Off-ramp*	stop-control	-	26.0	D	-	101.7	F
9	Long Beach Blvd/Crest Dr	stop-control	-	13.5	B	-	15.0	C

* HCM 2010 methodology used at Caltrans intersection
Notes:
V/C = Volume to Capacity Ratio, LOS = Level of Service.

As shown in **Table 3**, the signalized Long Beach Boulevard/Wardlow Road intersection is currently operating at LOS E during the a.m. and p.m. peak hour.

5 PROPOSED PROJECT TRAFFIC

The first step in analyzing traffic conditions with the project is to estimate the number of new trips expected to be generated by the proposed project. The proposed project consists of 103,456 square feet of office use and a new parking structure containing 432 spaces. The project site is currently vacant. Access to the proposed project will be provided off 35th Street. Laserfiche currently has an office complex north of the proposed site, at 3545 Long Beach Boulevard.

This section describes the methodology used to determine project trip generation and the distribution of project traffic within the study area. Trip generation rates for the proposed project were calculated based on the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition.

5.1 Project Trip Generation

The trip generation analysis was completed in a two-step process. First, the number of trips generated by the proposed development was calculated by multiplying the trip generation rate by the proposed number of units or square footage in the project. The result of this calculation is shown in **Table 4**.

Table 4: Proposed Project Trip Generation

Land Use (ITE Code)	Size	Trip Generation Rates							Trip Generation						
		AM Peak Hour			PM Peak Hour			Daily	AM Peak Hour			PM Peak Hour			Daily
		In	Out	Total	In	Out	Total		In	Out	Total	In	Out	Total	
Office (710)	103.456 tsf	86%	14%	1.16	16%	84%	1.15	9.74	103	17	120	19	100	119	1,008
								Total	**103**	**17**	**120**	**19**	**100**	**119**	**1,008**

As shown in **Table 4**, the proposed project is forecast to generate 120 new a.m. peak hour trips, 119 new p.m. peak hour trips, and 1,008 new daily trips. The current project site is vacant, thus no credit for existing site traffic is taken in this analysis.

5.2 Project Trip Distribution and Assignment

Trip distribution assumptions are used to determine the origin and destination of new vehicle trips associated with the project. Project trip distribution is based on the circulation network in the vicinity as well as residential information provided by the project applicant for the current Laserfiche office site on Long Beach Boulevard. The project trip distribution is shown in **Figure 5**.

The new trips generated by the project, as shown in **Table 4**, were then assigned to the surrounding roadway system based on the distribution patterns, shown in **Figure 5**, to estimate the project-related peak-hour traffic at each of the study intersections. **Figure 6** illustrates the proposed project trip assignment onto the roadway network during the a.m. and p.m. peak hours.

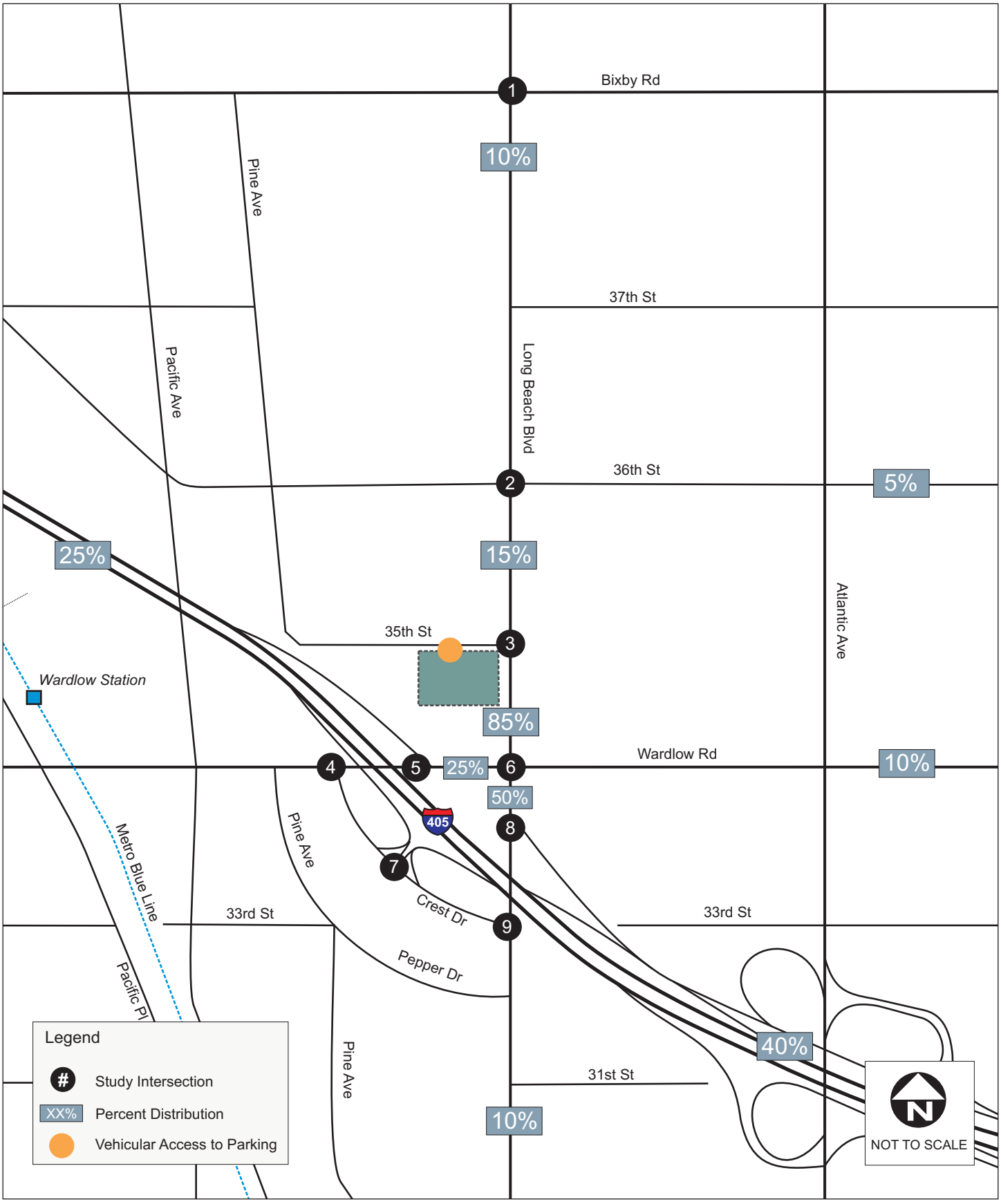

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Figure 5
Project Trip Distribution

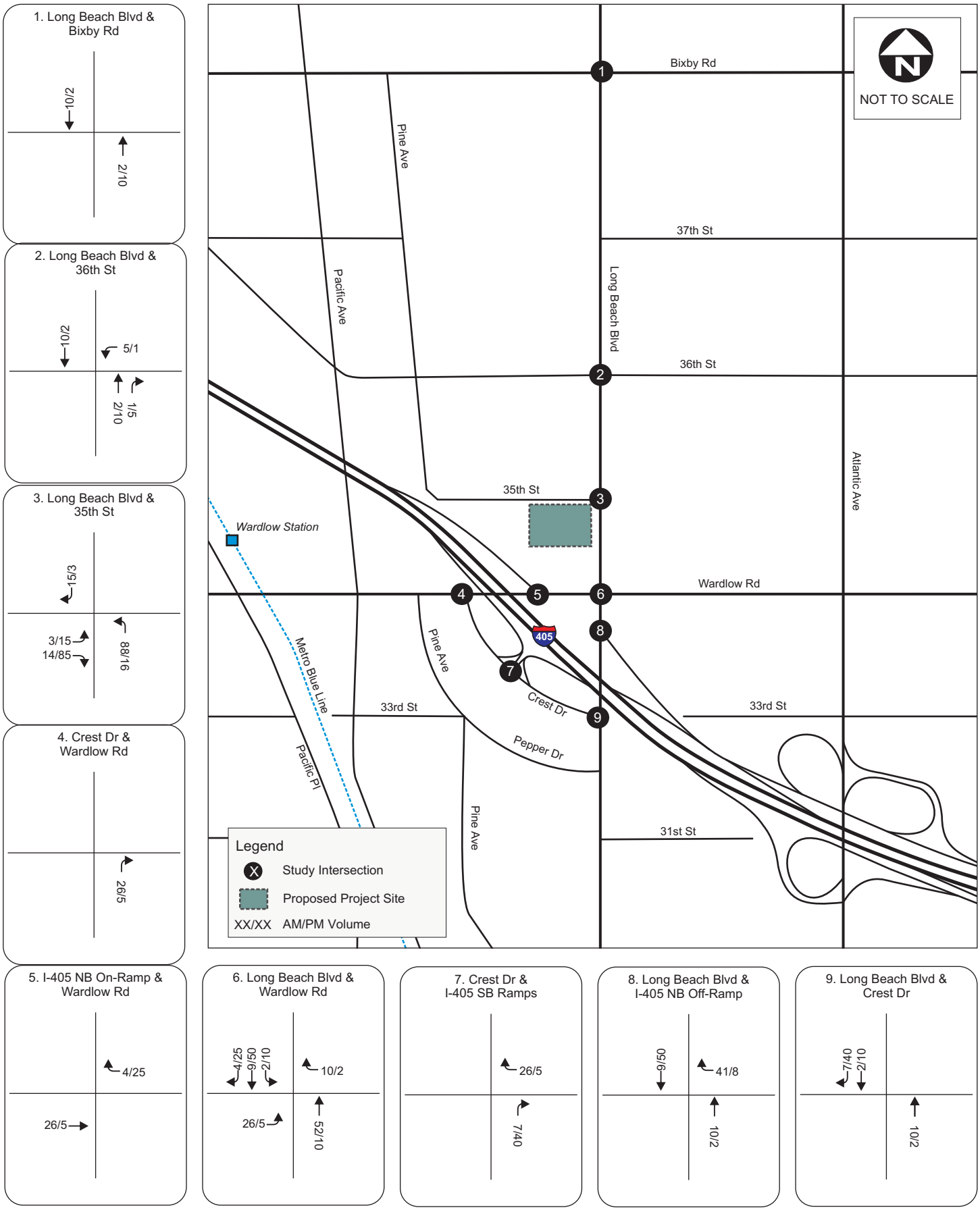

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Figure 6
Project Trip Assignment

6 EXISTING PLUS PROJECT CONDITIONS

Existing plus project conditions were developed by adding trips forecast to be generated by the proposed project, as described in **Section 5**, to existing volumes, as described in **Section 4**. **Figure 7** illustrates the existing plus project traffic volumes at the study intersections.

6.1 Existing Plus Project Intersection Levels of Service

A level of service analysis was conducted to evaluate existing plus project intersection operations during the a.m. and p.m. peak hours at the study intersections. **Table 5** summarizes the existing plus project levels of service at the study intersections. Level of service calculation worksheets are included in **Appendix B**.

Table 5: Existing Plus Project Intersection Peak Hour Level of Service

	Intersection	Existing Conditions						Existing Plus Project Conditions						Change in V/C or Delay		Significant Impact?
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour	PM Peak Hour	
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS			
1	Long Beach Blvd/Bixby Rd	0.526	-	A	0.575	-	A	0.529	-	A	0.578	-	A	0.003	0.003	No
2	Long Beach Blvd/36th St	0.603	-	B	0.681	-	B	0.610	-	B	0.687	-	B	0.007	0.006	No
3	Long Beach Blvd/35th St	-	13.3	B	-	22.5	C	-	20.1	C	-	52.2	F	6.8	29.7	No**
4	Crest Dr/Wardlow Rd	-	17.8	C	-	20.5	C	-	19.1	C	-	20.8	C	1.3	0.3	No
5	I-405 NB On-ramp/Wardlow Rd*	-	0.0	A	-	0.0	A	-	0.0	A	-	0.0	A	0.0	0.0	No
6	Long Beach Blvd/Wardlow Rd	0.955	-	E	0.928	-	E	0.978	-	E	0.948	-	E	0.023	0.020	Yes
7	Crest Dr/I-405 SB Ramps*	-	109.1	F	-	28.8	D	-	102.9	F	-	30.6	D	-6.2	1.8	No
8	Long Beach Blvd/I-405 NB Off-ramp*	-	26.0	D	-	101.7	F	-	28.9	D	-	108.3	F	2.9	6.6	No
9	Long Beach Blvd/Crest Dr	-	13.5	B	-	15.0	C	-	13.5	B	-	15.6	C	0.0	0.6	No

* HCM 2010 methodology used at Caltrans intersection

** Local streets are not defined in the City's General Plan. Thus, significant impact criteria does not apply at this location.

Notes:

V/C = Volume to Capacity Ratio, LOS = Level of Service.

As shown in **Table 5**, the Long Beach Boulevard/Wardlow Avenue intersection is forecast to be significantly impacted by the proposed project in existing conditions. Increases in average delay are anticipated at unsignalized intersections, though are not considered to be significantly impacted per the City's thresholds of significance.

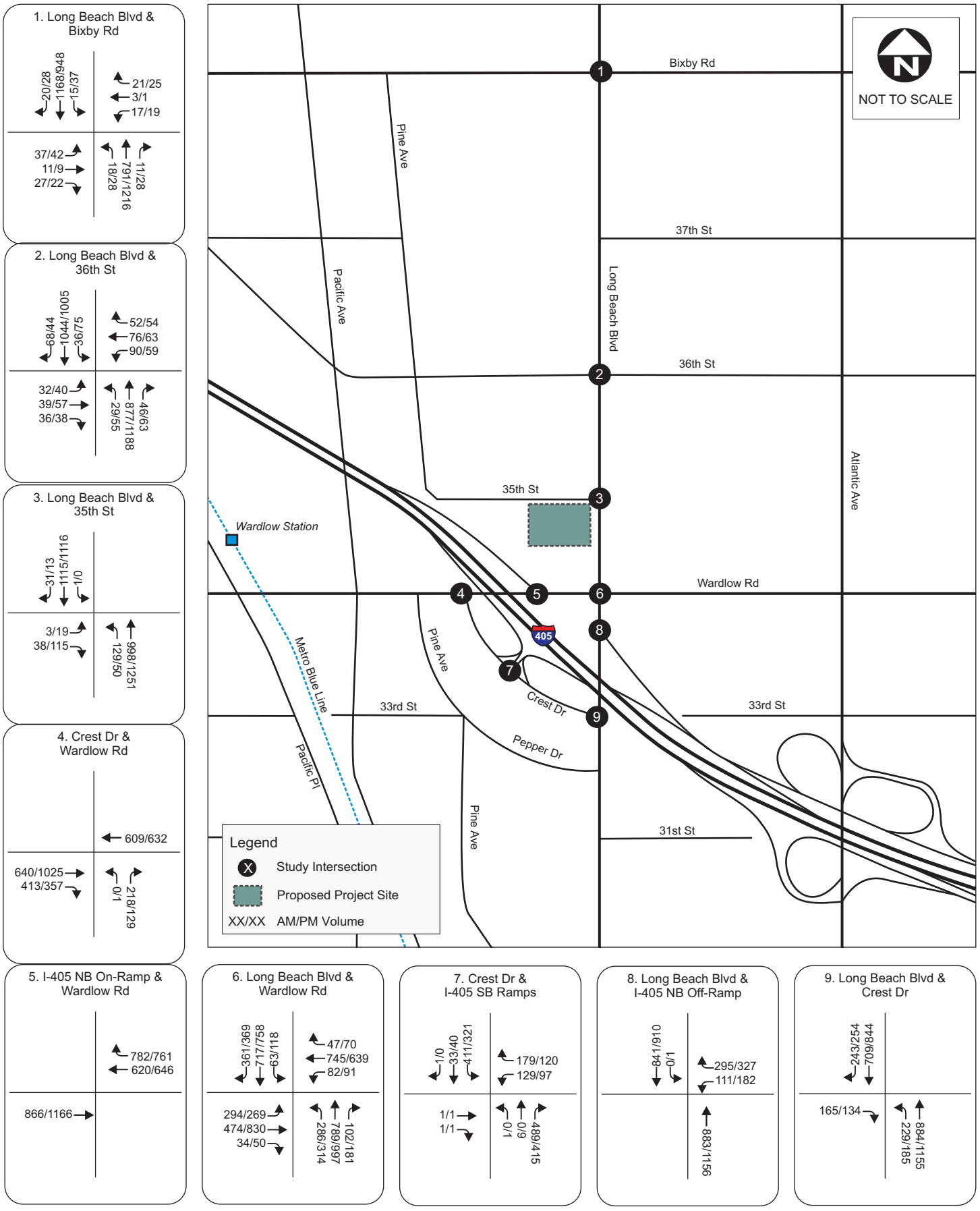

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Figure 7
Existing With Project Intersection Volumes

7 OPENING YEAR 2020 WITHOUT PROJECT CONDITIONS

The project opening year is 2020. Therefore, this section analyzes opening year 2020 traffic conditions without the proposed project. Opening year 2020 without project traffic volumes were developed by considering traffic increases due to ambient growth and specific, planned or approved development projects in the study area, without consideration of the proposed project.

7.1 Ambient Growth

Ambient traffic growth is the traffic growth that will occur in the study area due to general employment growth, housing growth and growth in regional through trips in Southern California. An ambient growth rate of one percent (1%) per year in the study area was assumed.

7.2 Cumulative Project Growth

Cumulative project traffic growth is growth due to specific, known development projects in the area surrounding the study locations that may affect traffic circulation. A list of cumulative, approved projects within the region was provided by the City of Long Beach as shown in **Table 6**. Detailed trip generation data for these four (4) cumulative projects within the vicinity of the project site is provided in **Appendix C**. The general location of each of the cumulative projects is shown in **Figure 8**. The peak hour vehicle trips expected to be generated by these developments are shown in **Figure 9**. Trip distribution for the cumulative projects were assigned depending on the type of development, residential or non-residential, and location with respect to freeways and major arterials.

Table 6: Cumulative Projects

Location		Land Use	Size/Description
1	1814 Pine Ave/ 101 Pacific Coast Hwy	Mixed-use	26 du 3.499 tsf retail
2	1900-1940 Long Beach Boulevard	Mixed-use	95 du 12.400 tsf retail
3	1836-1852 Locust Avenue	Mixed-use	48 du 3.600 tsf retail
4	1795 Long Beach Blvd.	Mixed-use	101 du 4.051 tsf retail

Note: du = dwelling unit, tsf = thousand square feet

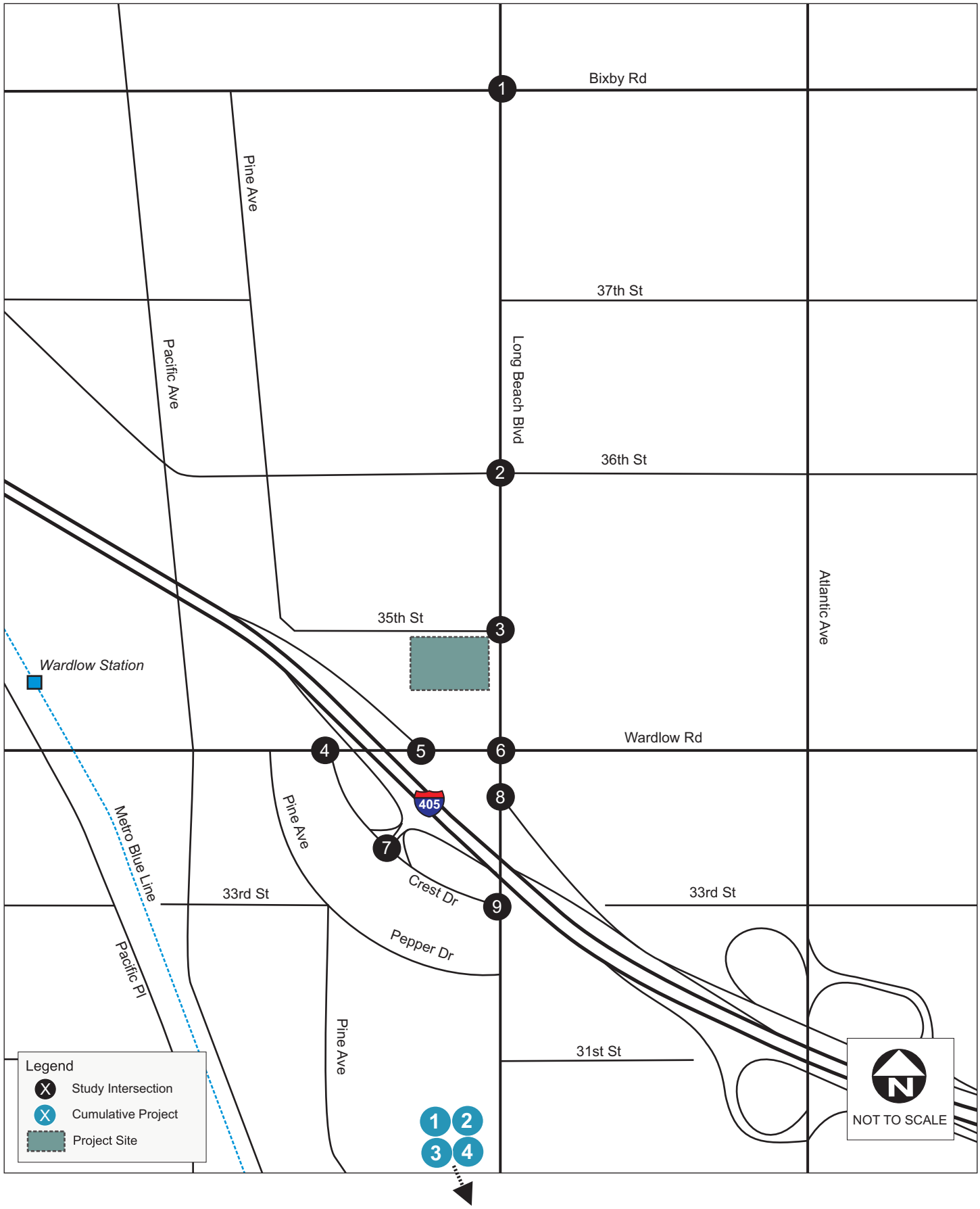

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Figure 8
Location of Cumulative Projects

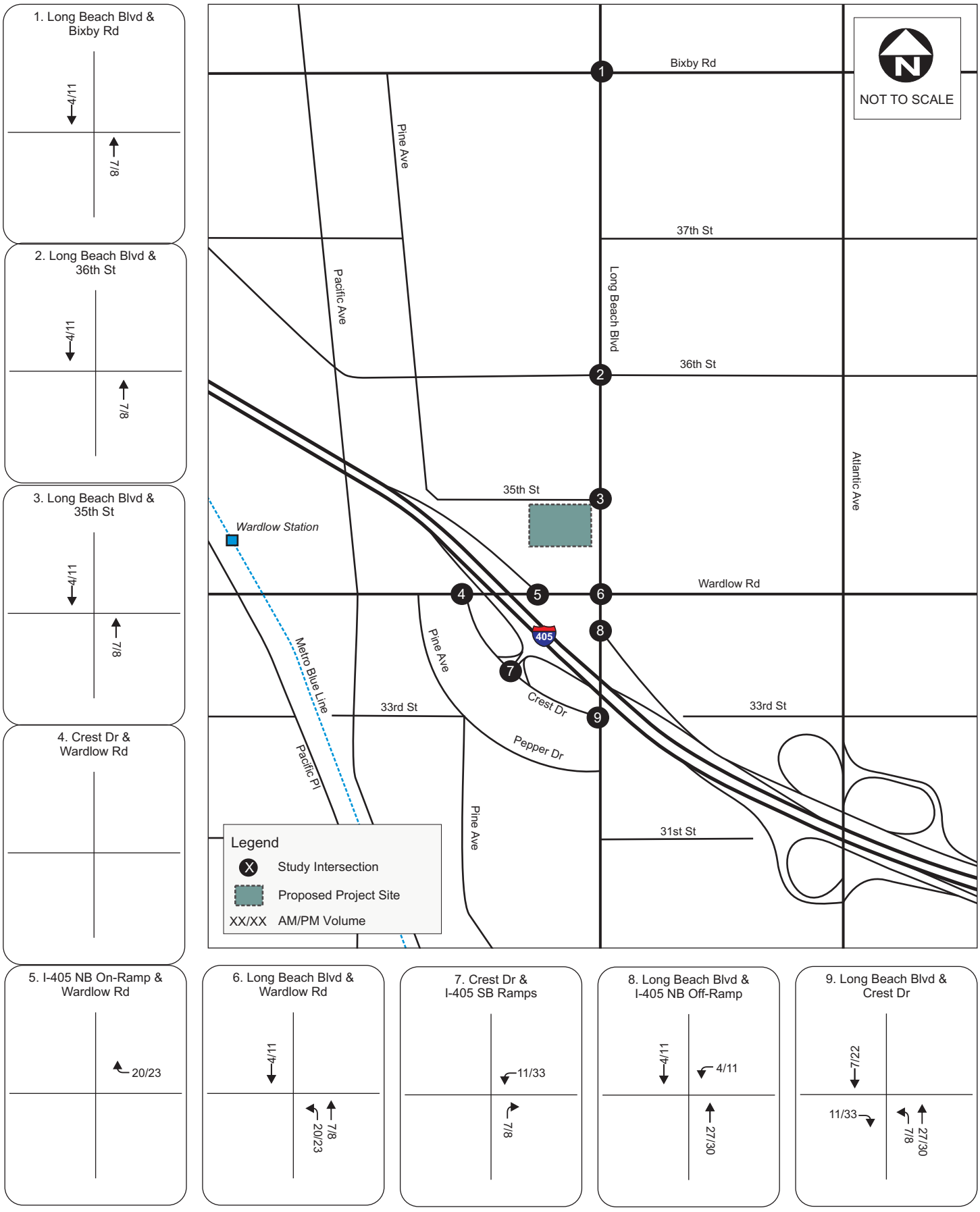

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Figure 9
Cumulative Projects Peak Hour Trip Assignment

7.3 Opening Year 2020 Without Project Intersection Levels of Service

A level of service analysis was conducted to evaluate opening year 2020 without project intersection operations during the a.m. and p.m. peak hours. **Figure 10** shows the opening year 2020 without project peak hour volumes at the study intersections. **Table 7** summarizes the opening year 2020 without project levels of service at the study intersections. Level of service calculation worksheets are included in **Appendix B**.

Table 7: Opening Year 2020 Without Project Intersection Peak Hour Level of Service

Intersection		Control Type	AM Peak Hour			PM Peak Hour		
			V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS
1	Long Beach Blvd/Bixby Rd	signalized	0.536	-	A	0.587	-	A
2	Long Beach Blvd/36th St	signalized	0.615	-	B	0.695	-	B
3	Long Beach Blvd/35th St	stop-control	-	13.4	B	-	23.8	C
4	Crest Dr/Wardlow Rd	stop-control	-	18.4	C	-	21.2	C
5	I-405 NB On-ramp/Wardlow Rd*	stop-control	-	0.0	A	-	0.0	A
6	Long Beach Blvd/Wardlow Rd	signalized	0.986	-	E	0.963	-	E
7	Crest Dr/I-405 SB Ramps*	stop-control	-	156.1	F	-	51.1	F
8	Long Beach Blvd/I-405 NB Off-ramp*	stop-control	-	29.2	D	-	141.5	F
9	Long Beach Blvd/Crest Dr	stop-control	-	14.0	B	-	16.7	C

* HCM 2010 methodology used at Caltrans intersection
Notes:
V/C = Volume to Capacity Ratio, LOS = Level of Service.

As shown in **Table 7**, the signalized Long Beach Boulevard/Wardlow Road intersection is forecast to continue to operate at LOS E during the a.m. and p.m. peak hour.

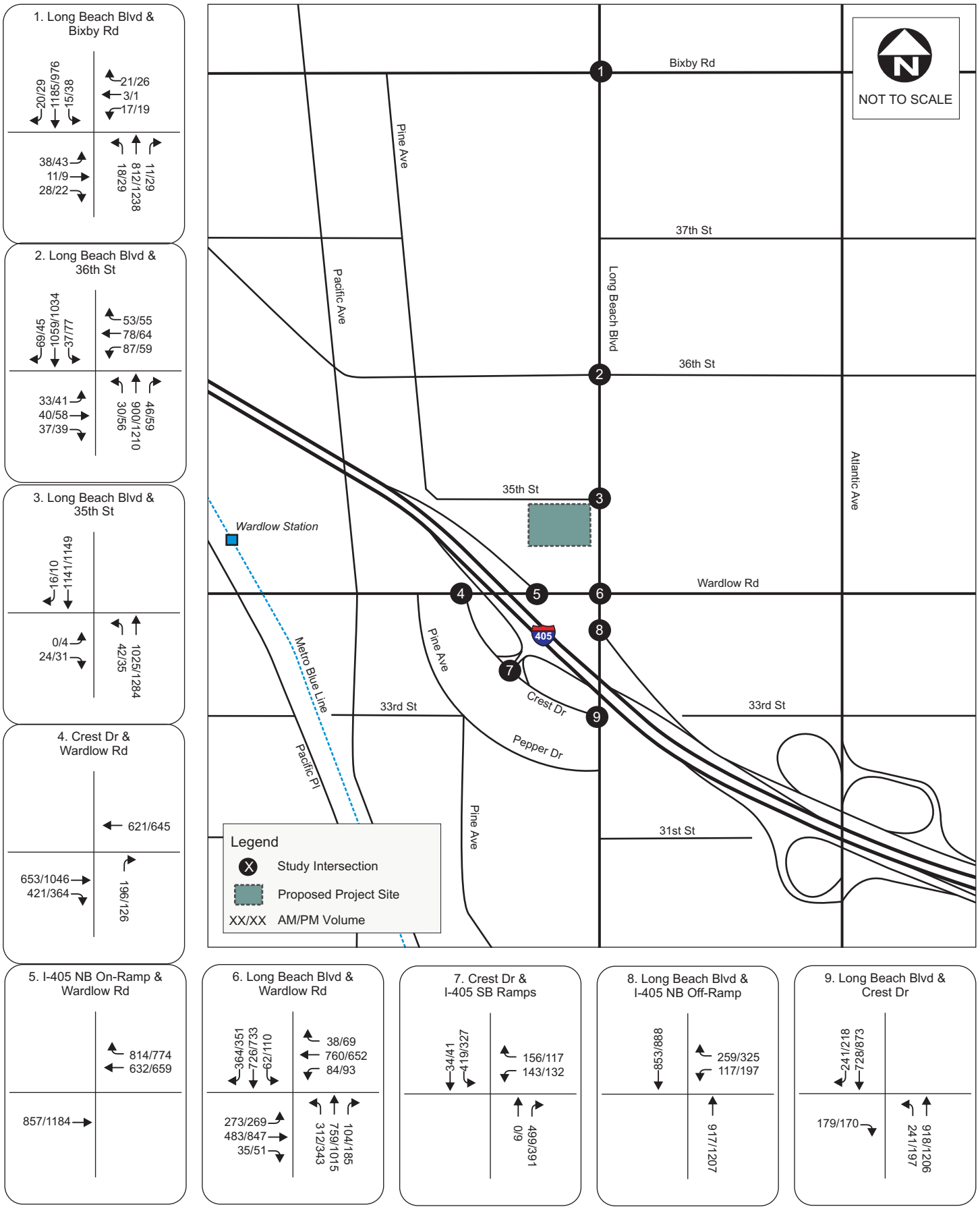

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Figure 10
Opening Year 2020 Without Project Intersection Volumes

8 OPENING YEAR 2020 WITH PROJECT CONDITIONS

Opening year 2020 with project conditions were developed by adding trips forecast to be generated by the proposed project, as described in **Section 5**, to opening year 2020 without project volumes, as described in **Section 7**. **Figure 11** illustrates the opening year 2020 with project traffic volumes at the study intersections.

8.1 Opening Year 2020 With Project Intersection Levels of Service

A level of service analysis was conducted to evaluate opening year 2020 with project intersection operations during the a.m. and p.m. peak hours. **Table 8** summarizes the opening year 2020 with project levels of service at the study intersections. Level of service calculation worksheets are included in **Appendix B**.

Table 8: Opening Year 2020 With Project Intersection Peak Hour Level of Service

	Intersection	Opening Year 2020 Without Project						Opening Year 2020 With Project						Change in V/C or Delay		Significant Impact?
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour	PM Peak Hour	
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS			
1	Long Beach Blvd/Bixby Rd	0.536	-	A	0.587	-	A	0.539	-	A	0.590	-	A	0.003	0.003	No
2	Long Beach Blvd/36th St	0.615	-	B	0.695	-	B	0.621	-	B	0.707	-	C	0.006	0.012	No
3	Long Beach Blvd/35th St	-	13.4	B	-	23.8	C	-	20.8	C	-	60.7	F	7.4	36.9	No**
4	Crest Dr/Wardlow Rd	-	18.4	C	-	21.2	C	-	19.8	C	-	21.6	C	1.4	0.4	No
5	I-405 NB On-ramp/Wardlow Rd*	-	0.0	A	-	0.0	A	-	0.0	A	-	0.0	A	0.0	0.0	No
6	Long Beach Blvd/Wardlow Rd	0.986	-	E	0.963	-	E	1.009	-	F	0.983	-	E	0.023	0.020	Yes
7	Crest Dr/I-405 SB Ramps*	-	156.1	F	-	51.1	F	-	147.4	F	-	56.5	F	-8.7	5.4	No
8	Long Beach Blvd/I-405 NB Off-ramp*	-	29.2	D	-	141.5	F	-	32.7	D	-	149.8	F	3.5	8.3	No
9	Long Beach Blvd/Crest Dr	-	14.0	B	-	16.7	C	-	14.0	B	-	17.4	C	0.0	0.7	No

* HCM methodology used at Caltrans intersection

** Local streets are not defined in the City's General Plan. Thus, significant impact criteria does not apply at this location.

Notes:

V/C = Volume to Capacity Ratio, LOS = Level of Service.

As shown in **Table 8**, the Long Beach Boulevard/Wardlow Avenue intersection is forecast to be significantly impacted by the proposed project in opening year 2020 with project conditions. Increases in average delay are anticipated at unsignalized intersections, though are not considered significantly impacted per the City's thresholds of significance.

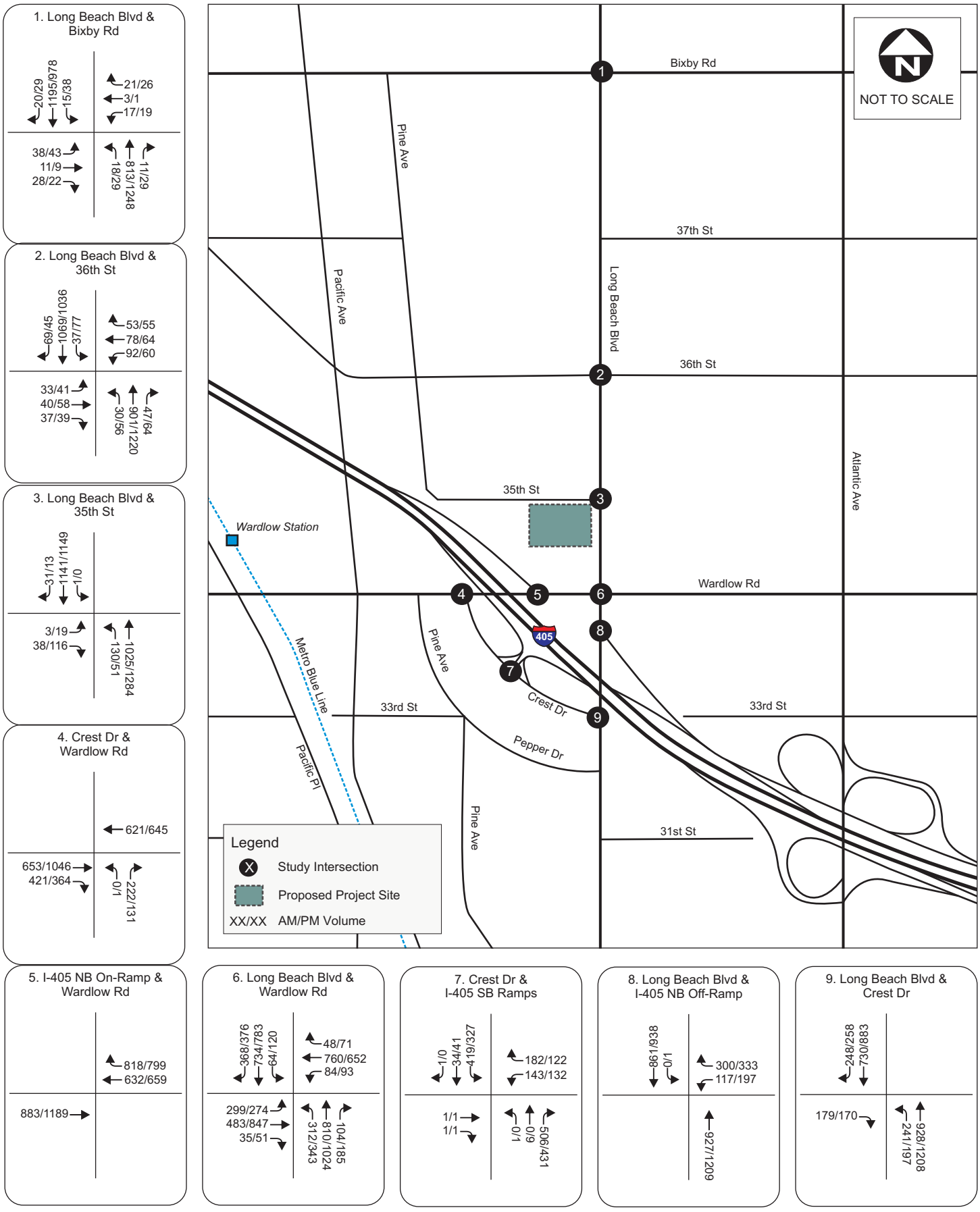

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Figure 11
Opening Year 2020 With Project Intersection Volumes

8.2 Signal Warrant Analysis

As mentioned, the Long Beach Boulevard/35th Street intersection would provide access to the project's parking structure. The intersection is currently stop-controlled along 35th Street, with Long Beach Boulevard operating at free-flow conditions. California Manual of Uniform Traffic Control Devices (CA MUTCD) signal warrant analysis was conducted for the Long Beach Boulevard/35th Street intersection, to determine if traffic volume forecasts are high enough to justify the installation of a traffic signal in opening year 2020. The investigation of the need for a traffic control signal includes an analysis of factors related to the existing operation and safety at the study location and the potential to improve these conditions, and the applicable factors contained in the nine traffic signal warrants as detailed in CA MUTCD Chapter 4C.

Per CA MUTCD, at a location that is under development or construction and where it is not possible to obtain a traffic count that would represent future traffic conditions, hourly volumes should be estimated as part of an engineering study for comparison with traffic signal warrants. Except for locations where the engineering study uses the satisfaction of Warrant 8 to justify a signal, a traffic control signal installed under projected conditions should have an engineering study done within 1 year of putting the signal into stop-and-go operation to determine if the signal is justified. If not justified, the signal should be taken out of stop-and-go operation or removed.

Twenty-four hour approach volumes were collected on Long Beach Boulevard and 35th Street on September 20, 2018. Hourly distribution of entering and exiting vehicle trips by land use was obtained for the General Office Building category (Land Use Code 710) from ITE Trip Generation Manual, 10th Edition, and are shown in **Table 9**.

Table 9: Hourly Distribution Percentages (Entering & Exiting Vehicles Trips)

Time	Percentage of 24-hour Traffic*	
	Entering	Existing
12-1 am	0.2%	0.1%
1-2 am	0.0%	0.1%
2-3 am	0.0%	0.0%
3-4 am	0.0%	0.1%
4-5 am	0.1%	0.2%
5-6 am	0.4%	0.1%
6-7 am	4.6%	0.5%
7-8 am	13.1%	1.9%
8-9 am	14.4%	3.5%
9-10 am	6.4%	4.3%
10-11 am	5.4%	5.9%
11 am-12 pm	6.2%	10.3%
12-1 pm	10.2%	10.4%
1-2 pm	9.0%	6.7%
2-3 pm	8.2%	6.5%
3-4 pm	7.4%	8.5%
4-5 pm	5.5%	15.2%
5-6 pm	4.2%	15.6%
6-7 pm	1.7%	2.9%
7-8 pm	0.9%	2.2%
8-9 pm	0.7%	1.3%
9-10 pm	0.5%	1.5%
10-11 pm	0.3%	2.0%
11 pm-12 am	0.4%	0.2%

*Source: ITE Trip Generation Manual, 10th Edition (Land Use 710)

As detailed in **Table 4** (Section 5-1 of the report), the total number of entering and exiting trips generated by a General Office Building in 24 hours (daily trips) is 1,008 (vehicles per day). The total number of daily trips was multiplied by the hourly distribution percentages shown in **Table 9** to obtain the hourly trip generation volumes as shown in **Table 10.** Further, the entering volumes were distributed in the northbound and southbound directions based on trip distribution percentages as detailed in Section 5-2 of the report. As shown in **Figure 5**, 85 percent of the traffic orginiates from the south (northbound at Long Beach Boulevard/35th Street), and 15 percent of the traffic orginates from the north (southbound at Long Beach Boulevard/35th Street). Since the only site access is through 35th Street, 100 percent of the calculated exiting volumes was assigned to eastbound approach at the Long Beach Boulevard/35th Street intersection.

Table 10: Hourly Distribution Volumes (Entering & Exiting Vehicles Trips)

Time	24-hour Total Site Traffic*		Entering – Long Beach Blvd		Exiting – 35th St
	Entering	Existing	Northbound (85% of Entering)	Southbound (15% of Entering)	Eastbound (100% of Exiting)
12-1 am	1	1	1	0	1
1-2 am	0	1	0	0	1
2-3 am	0	0	0	0	0
3-4 am	0	1	0	0	1
4-5 am	1	1	1	0	1
5-6 am	2	1	2	0	1
6-7 am	23	3	20	3	3
7-8 am	66	10	56	10	10
8-9 am	73	18	62	11	18
9-10 am	32	22	27	5	22
10-11 am	27	30	23	4	30
11 am-12 pm	31	52	26	5	52
12-1 pm	51	52	43	8	52
1-2 pm	45	34	38	7	34
2-3 pm	41	33	35	6	33
3-4 pm	37	43	31	6	43
4-5 pm	28	77	24	4	77
5-6 pm	21	79	18	3	79
6-7 pm	9	15	8	1	15
7-8 pm	5	11	4	1	11
8-9 pm	4	7	3	1	7
9-10 pm	3	8	3	0	8
10-11 pm	2	10	2	0	10
11 pm-12 am	2	1	2	0	1
Total	**504**	**510**	**429**	**75**	**510**

*Obtained using 24-hour trip estimate of 1,008 vehicles per day (Table 4), and multiplying with hourly distribution percentages tabulated in Table 9.

As noted earlier, an ambient growth rate of 1% per year was used in this study to increase traffic volumes for opening year 2020. The project site traffic volumes tabulated in **Table 10** were added to the opening year traffic volumes to obtain the total projected traffic volumes. These projected traffic volumes (opening year with project), summarized in **Table 11**, were used to conduct the traffic signal warrant analysis.

Table 11: 24-Hour Existing and Projected Traffic Volumes

Hour	Existing (2018)		Proposed Project Volumes (2020)		Opening Year Without Project (2020)		Opening Year With Project (2020)	
	Major St*	Minor St#	Major St*	Minor St#	Major St*	Minor St#	Major St*	Minor St#
0:00	155	5	1	1	159	6	160	7
1:00	99	4	-	1	102	5	102	6
2:00	87	1	-	-	89	2	89	2
3:00	132	4	-	1	136	5	136	6
4:00	293	3	1	1	300	4	301	5
5:00	570	10	2	1	583	11	585	12
6:00	1,157	23	23	3	1,181	24	1,204	27
7:00	2,007	52	66	10	2,048	54	2,114	64
8:00	2,056	66	73	18	2,099	68	2,172	86
9:00	1,675	51	32	22	1,710	53	1,742	75
10:00	1,589	67	27	30	1,622	69	1,649	99
11:00	1,813	58	31	52	1,850	60	1,881	112
12:00	1,822	59	51	52	1,859	61	1,910	113
13:00	1,921	66	45	34	1,961	68	2,006	102
14:00	1,940	70	41	33	1,980	72	2,021	105
15:00	2,078	44	37	43	2,121	45	2,158	88
16:00	2,295	57	28	77	2,342	59	2,370	136
17:00	2,255	65	21	79	2,301	67	2,322	146
18:00	1,793	60	9	15	1,830	62	1,839	77
19:00	1,310	53	5	11	1,337	55	1,342	66
20:00	1,012	24	4	7	1,033	25	1,037	32
21:00	713	17	3	8	728	18	731	26
22:00	485	16	2	10	495	17	497	27
23:00	303	15	2	1	310	16	312	17

*Major Street is the total of both approaches of Long Beach Boulevard; # Minor Street is the 35th Street approach.

Table 12 summarizes the results of the signal warrant analysis at the unsignalized study intersection based upon the criteria set forth in the CA MUTCD. The signal warrant analysis worksheets are included in **Appendix D**. It is noted that the CA MUTCD guidelines state "the satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal." Warrant applicability was based on the location and configuration of the intersection as well as available data.

Table 12: Signal Warrant Analysis Summary – Opening Year 2020

Warrants	Warrants Satisfied?
Warrant 1 Eight-Hour Vehicular Volume	Yes
Warrant 2 Four-Hour Vehicular Volume	Yes
Warrant 3 Peak Hour	Yes
Warrant 4 Pedestrian Volume	Not Applicable
Warrant 5 School Crossing	Not Applicable (No established school crossing across Major Street)
Warrant 6 Coordinated Signal System	Not Applicable (Resultant spacing of traffic control signals would be less than 1,000 feet)
Warrant 7 Crash Experience	No
Warrant 8 Roadway Network	Not Applicable (Minor Street not a major route)
Warrant 9 Intersection Near a Grade Crossing	Not Applicable (No Grade Crossing on Minor Street)

Source: CA MUTCD 2014 revision 3 (March 9, 2018).

As shown in **Table 12**, the traffic signal warrants 1, 2 and 3 are met for opening year 2020 volumes at the Long Beach Boulevard/35th Street intersection.

8.3 Mitigation Measures

Based on a review of the physical constraints, the following mitigation measures/improvements are recommended to improve traffic operations:

- **Long Beach Boulevard/35th Street** – Modify the intersection from a two-way stop-controlled intersection to a signalized intersection.
- **Long Beach Boulevard/Wardlow Avenue** – Add a 2nd northbound left-turn lane along Long Beach Boulevard. This configuration would require a traffic signal modification from protected plus permitted signal phasing to protected-only signal phasing at the northbound approach.

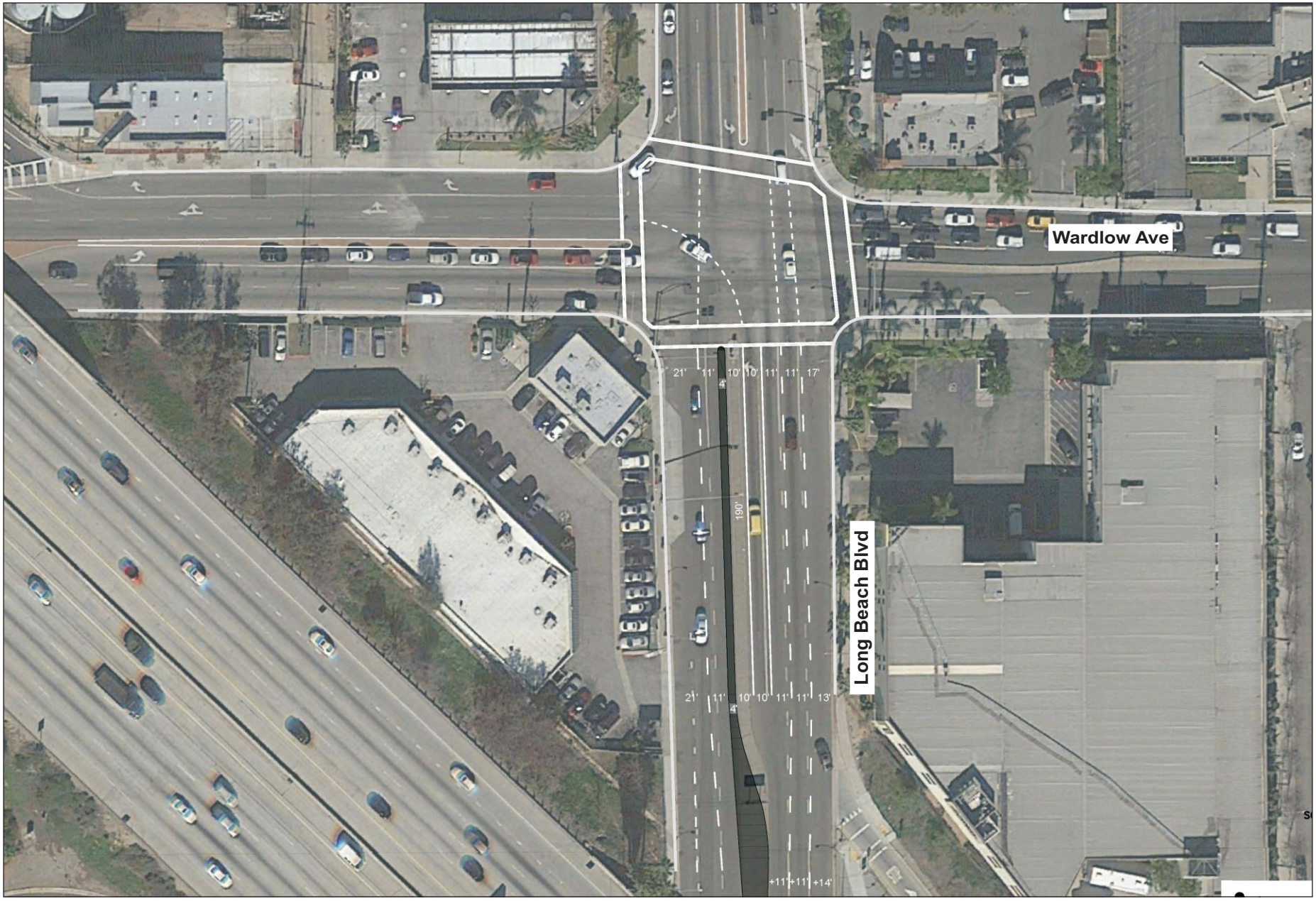
A conceptual plan showing the proposed lane alignments with the mitigation measure at the Long Beach Boulevard/Wardlow Avenue intersection is shown in **Figure 12**. **Table 13** summarizes the opening year 2020 with project LOS with implementation of the proposed improvements at the two study intersections. Level of service calculation worksheets are included in **Appendix B**.

Table 13: Opening Year 2020 With Project Intersection Peak Hour Level of Service

Intersection		Opening Year 2020 Without Project						Mitigated Opening Year 2020 With Project						Change in V/C or Delay		Significant Impact?
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour	PM Peak Hour	
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS			
3	Long Beach Blvd/35th St	-	13.4	B	-	23.8	C	0.588	-	A	0.622	-	B	N/A	N/A	No
6	Long Beach Blvd/Wardlow Rd	0.986	-	E	0.963	-	E	0.907	-	E	0.873	-	D	-0.079	-0.090	No

Notes:
V/C = Volume to Capacity Ratio, LOS = Level of Service.

As shown in **Table 13**, with implementation of the proposed improvements, the intersections are forecast to operate at an improved LOS as compared to opening year 2020 without project conditions.



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Laserfiche Office Project
Traffic Impact Study

Figure 12
Long Beach Blvd/Wardlow Ave
Proposed Mitigation - Conceptual Design

9 CONGESTION MANAGEMENT PROGRAM (CMP) ANALYSIS

The Congestion Management Program (CMP) was created statewide as a result of Proposition 111 and has been implemented locally by the Los Angeles County Metropolitan Transportation Authority (Metro). The CMP for Los Angeles County requires that the traffic impact of individual development projects of potential regional significance be analyzed. A specific system of arterial roadways plus all freeways comprise the CMP system. A total of 164 intersections are identified for monitoring on the system in Los Angeles County. This section describes the analysis of project-related impacts on the CMP system. The analysis has been conducted according to the guidelines set forth in the 2010 Congestion Management Program for Los Angeles County.

According to the CMP Traffic Impact Analysis (TIA) Guidelines developed by Metro, a CMP traffic impact analysis is required given the following conditions:

- CMP arterial monitoring intersections, including freeway on- or off-ramps, where the proposed project would add 50 or more trips during either the a.m. or p.m. weekday peak hours.
- CMP freeway monitoring locations where the proposed project would add 150 or more trips, in either direction, during either the a.m. or p.m. weekday peak hours.

Based on the CMP guidelines, a significant impact occurs when a proposed project increases traffic demand on a CMP facility by 2% of capacity (V/C ≥ 0.02 for arterial locations or D/C ≥ 0.02 for freeway locations), causing LOS F (V.C > 1.00 for arterial locations or D/C > 1.00 for freeway locations).

9.1 CMP Intersection Analysis

A review of the 2010 CMP showed the following stations located approximately two miles away from the proposed project, and where CMP impacts could potentially occur with the implementation of the proposed project:

- Lakewood Boulevard and Carson Street; and
- Pacific Coast Highway and Orange Avenue.

It is important to note that these two intersections are not study intersections. As shown In Section 5, the total number of a.m. and p.m. peak hour trips generated by the project is forecast to be higher than 50 trips. However, based to the proposed project trip distribution, the dispersal of project traffic onto multiple routes would result in the actual number of trips expected to pass through these intersections at less than the 50 trip threshold.

9.2 CMP Freeway Analysis

The proposed project is in close proximity to Interstate 405 (I-405). Based on incremental project trip generation estimates, the proposed project would not add more than 150 peak hour trips; therefore, a CMP mainline freeway segment analysis was not conducted.

10 CONCLUSIONS

The proposed Laserfiche Office Project, located at 3443 Long Beach Boulevard, consists of 103,456 square feet of office use. The proposed project is forecast to generate 120 new a.m. peak hour trips, 119 new p.m. peak hour trips, and 1,008 new daily trips.

The Long Beach Boulevard/Wardlow Avenue intersection is forecast to be significantly impacted by the proposed project in existing and opening year 2020 conditions.

MUTCD signal warrant analyses were conducted for the Long Beach Boulevard/35th Street intersection, to determine if traffic volume forecasts are high enough to justify the installation of a traffic signal in opening year 2020. The traffic signal warrants 1, 2 and 3 are met for opening year 2020 volumes at the Long Beach Boulevard/35th Street intersection.

Based on a review of the physical constraints, the following mitigation measures/improvements are recommended to improve traffic operations:

- **Long Beach Boulevard/35th Street** – Modify the intersection from a two-way stop-controlled intersection to a signalized intersection.
- **Long Beach Boulevard/Wardlow Avenue** – Add a 2nd northbound left-turn lane along Long Beach Boulevard. This configuration would require a traffic signal modification from protected plus permitted signal phasing to protected-only signal phasing at the northbound approach.

With implementation of the proposed improvements, the intersections are forecast to operate at an improved LOS as compared to opening year 2020 without project conditions.