

**MEMORANDUM**

**Date:** 11.10.2020  
**To:** Jonathan Frankel  
**From:** Billing Liu & Steven J Brown, PE  
**Subject:** Traffic Conditions with the Proposed Sierra Madre Residential Project

OC20-0744

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The following documents the expected changes in traffic conditions with the proposed 42-unit residential project (Project) in Sierra Madre, California. The Project is located on the north of Sunnyside Avenue and Fairview Avenue intersection and adjacent to the Mater Dolorosa Retreat Center in the City of Sierra Madre. The Project proposes 42 single-family units on a vacant land and is proposed to be built out and occupied in 2025.

**EXISTING CONDITIONS**

The following intersections and roadway segments would provide access to the site and are most likely to experience direct traffic effects, if any, from the Project:

Intersections:

1. Sunnyside Avenue & Fairview Avenue
2. Sunnyside Avenue & Sierra Madre Boulevard
3. Michillinda Avenue & Sierra Madre Boulevard
4. Michillinda Avenue & Foothill Boulevard

Roadway Segments:

1. Sunnyside Avenue between project site & Fairview Avenue
2. Sunnyside Avenue between Fairview Ave & Sierra Madre Boulevard
3. Sierra Madre Boulevard between Michillinda Avenue & Sunnyside Avenue
4. Michillinda Avenue between Fairview Avenue & Sierra Madre Boulevard
5. Michillinda Avenue between Sierra Madre Boulevard & Foothill Boulevard

Traffic counts were collected for the above intersections and segments in October 2020. Due to the COVID-19 pandemic in 2020, travel activity and traffic volumes were potentially atypical throughout the study area and Southern California. Thus, we reviewed multiple data sources in order to select a growth factor applying to existing counts to represent 2020 condition in a non-COVID environment. The findings from different data sources are listed below:

### 1. LADOT Data

LADOT analyzed the loop detector data for 12 intersections from March 10<sup>th</sup> to April 30<sup>th</sup> in 2020 and summarized the weekday volume for stages of “stay-at-home” conditions. Based on this study, the daily vehicle volume was reduced by 37% to 58% compared on non-COVID condition. However, data from other sources suggest that traffic conditions in Spring 2020 were different than October 2020, as many businesses and some schools have returned to at least partial on-site operating conditions.

### 2. Caltrans Performance Measurement System (PeMS) Data

PeMS collects real-time data from over 39,000 individual detectors on the freeway system across all major metropolitan areas in California. Based on the Project location, we reviewed the nearest I-210 freeway data, which is at Michillinda Avenue. **Table 1** presents the weekday Average Daily Traffic (ADT) values in February and October 2020. The October ADT were reduced by 6% to 14% compared to February pre COVID-19 conditions.

**Table 1: PeMS ADT Data at I-210 and Michillinda Avenue**

Location	Fed ADT	Oct ADT	Change
I-210 E Before On Ramp	102,812	88,722	-14%
I-210 E After On Ramp	108,810	96,592	-11%
I-210 W Before On Ramp	113,636	107,188	-6%
I-210 W After On Ramp	108,459	101,337	-7%

*Source: Caltrans PeMS Website, 2020*

### 3. Streetlight Data

Streetlight uses smartphones as sensors to measure travel activities on all streets. In this analysis, ADT data was collected from February to September 2020 at the 5 project study roadway segments to track the traffic changes after COVID-19. As shown below, the traffic decreased by approximately 45% in April and then gradually came back to approximately “normal” conditions in September. **Table 2-A** shows weekday conditions, while **Table 2-B** shows weekend conditions.

**Table 2-A: Weekday ADT**

Segment	Pre-COVID	Post-COVID						
	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Sunnyside Avenue between Project Site and Fairview Avenue	369	297	195	294	308	400	413	523
Sunnyside Avenue between Fairview Avenue and Sierra Madre Boulevard	1,947	1,669	1,221	1,605	1,960	2,108	2,211	2,098
Sierra Madre Boulevard between Michillinda Avenue and Sunnyside Avenue	7,045	5,905	4,211	5,603	6,606	6,987	7,289	7,178
Michillinda Avenue between Fairview Avenue and Sierra Madre Boulevard	8,611	6,984	4,320	6,301	7,985	8,392	8,895	8,678
Michillinda Avenue between Sierra Madre Boulevard and Foothill Boulevard	11,801	9,416	6,325	8,581	10,366	10,928	11,435	11,154
<i>Total</i>	29,773	24,271	16,272	22,384	27,225	28,815	30,243	29,631
<b>Change compared to Pre-COVID</b>		<b>-18%</b>	<b>-45%</b>	<b>-25%</b>	<b>-9%</b>	<b>-3%</b>	<b>2%</b>	<b>0%</b>

Source: Streetlight, 2020

**Table 2-B: Weekend ADT**

Segment	Pre-COVID	Post-COVID						
	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Sunnyside Avenue between Project Site and Fairview Avenue	401	304	155	334	327	433	371	809
Sunnyside Avenue between Fairview Avenue and Sierra Madre Boulevard	2,046	1,833	1,228	1,764	1,956	2,111	2,268	2,553
Sierra Madre Boulevard between Michillinda Avenue and Sunnyside Avenue	7,013	6,106	4,025	5,436	6,537	7,244	7,662	7,928
Michillinda Avenue between Fairview Avenue and Sierra Madre Boulevard	9,037	7,685	4,212	6,011	7,926	8,933	8,993	9,199
Michillinda Avenue between Sierra Madre Boulevard and Foothill Boulevard	12,160	10,374	6,461	8,609	10,195	11,769	12,019	11,951
<i>Total</i>	30,657	26,302	16,081	22,154	26,941	30,490	31,313	32,440
<b>Change compared to Pre-COVID</b>		<b>-12%</b>	<b>-46%</b>	<b>-26%</b>	<b>-10%</b>	<b>2%</b>	<b>5%</b>	<b>9%</b>

Source: Streetlight, 2020

As the COVID-19 pandemic is still affecting regional travel, we applied an upward adjustment of 10% to the October 2020 counts to represent a worst-case condition prior to COVID-19.

### MATER DOLOROSA RETREAT CENTER EVENT TRIPS

Mater Dolorosa Retreat Center is adjacent to the Project site in the north and held many weekly and special events before the COVID-19 pandemic. We were provided with 2019 data for the center, which included the date, duration, arrival window, departure window and estimated round trips for each event. We analyzed this information to estimate the average weekday and weekend trips associated with the center. The retreat center generated approximately 69 trips per weekday and 35 trips per weekend day in 2019. There were 13 AM peak hour trips (12 inbound/1 outbound) and 3 PM peak hour trips (1 inbound/2 outbound) per weekday.

**TABLE 3 - Mater Dolorosa Historical External Event Trips in 2019**

	Daily	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Weekday	69	12	1	13	1	2	3
Weekend	35						

Source: Fehr & Peers, 2020

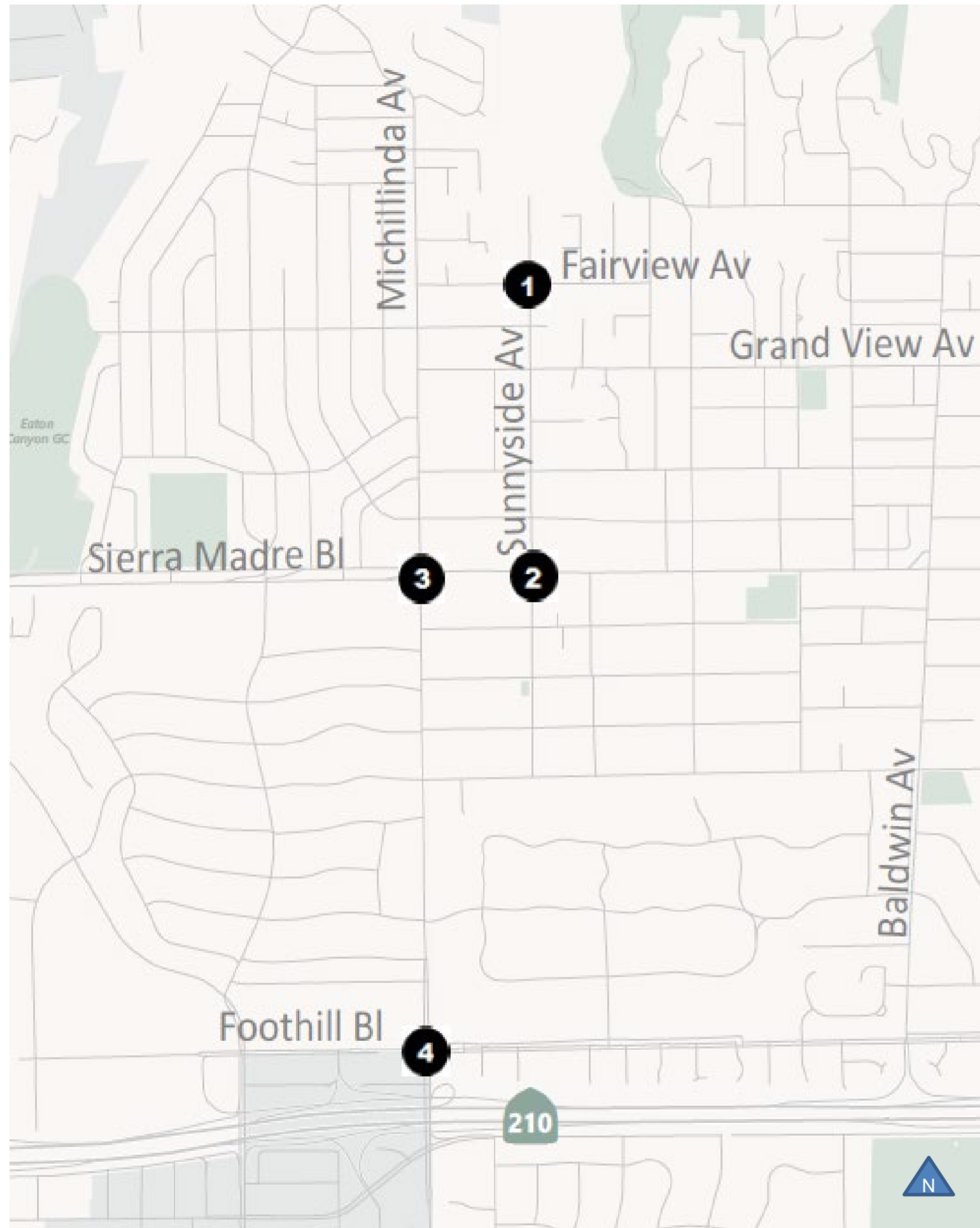
### EXISTING (2020) PRE-COVID CONDITION

We estimated the existing (2020) pre-COVID condition by applying the 10% growth factor and adding the retreat center trips to represent a full non-COVID traffic condition. **Table 4** and **Figure 1** present the segment ADT and peak hour intersection traffic.

**TABLE 4 - Existing (2020) Pre-COVID Segment ADT**

Segment	Weekday	Weekend
Sunnyside Avenue between Project Site and Fairview Avenue	340	310
Sunnyside Avenue between Fairview Avenue and Sierra Madre Boulevard	490	400
Sierra Madre Boulevard between Michillinda Avenue and Sunnyside Avenue	6,970	6,290
Michillinda Avenue between Fairview Avenue and Sierra Madre Boulevard	7,390	6,930
Michillinda Avenue between Sierra Madre Boulevard and Foothill Boulevard	9,550	8,200

Source: Fehr & Peers, 2020



**LEGEND**

- # Study Intersection
- AM (PM) Peak Hour Traffic Volume
- Stop Sign
- Signalized

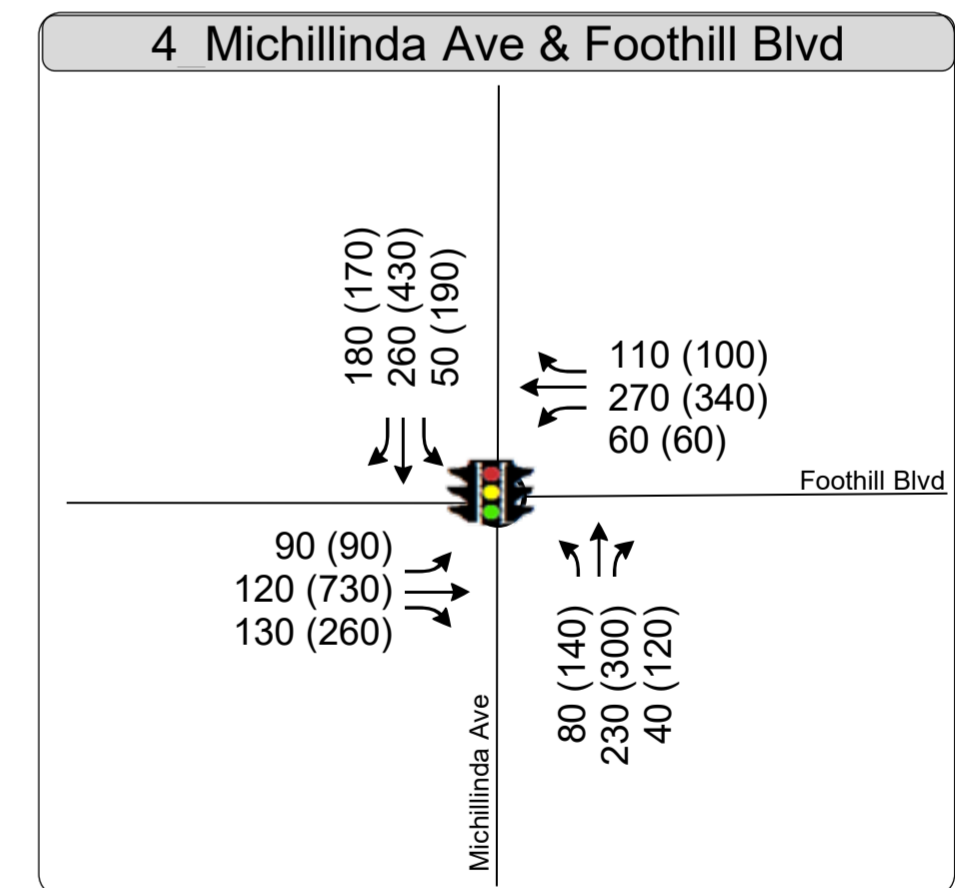
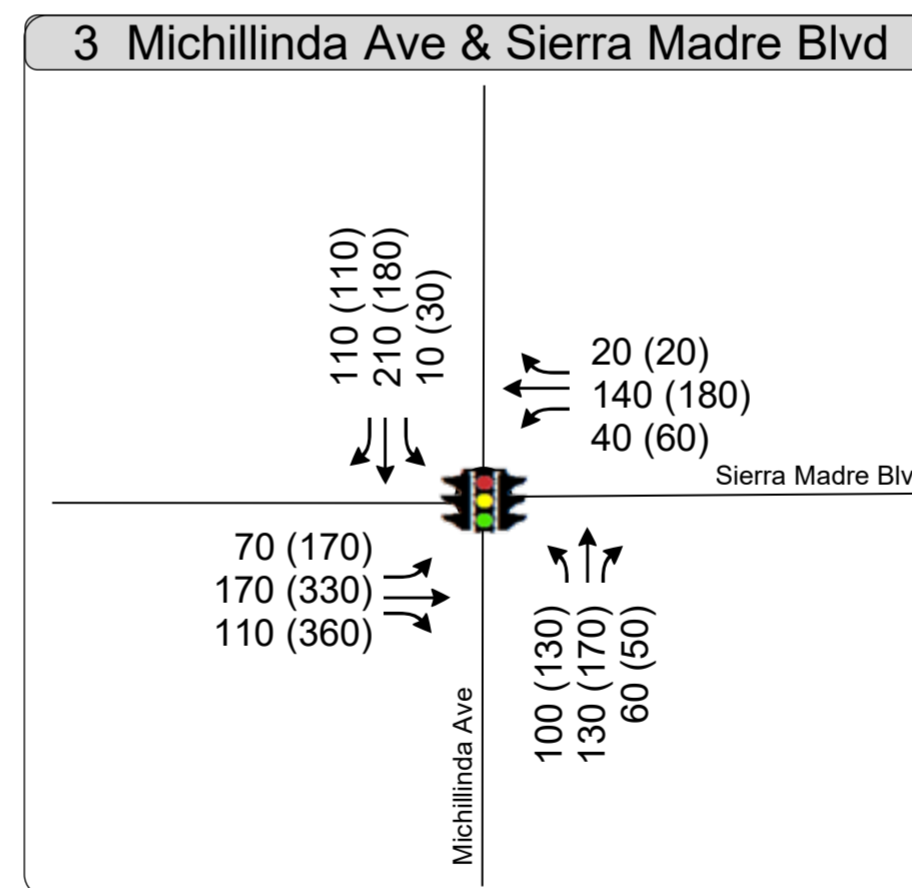
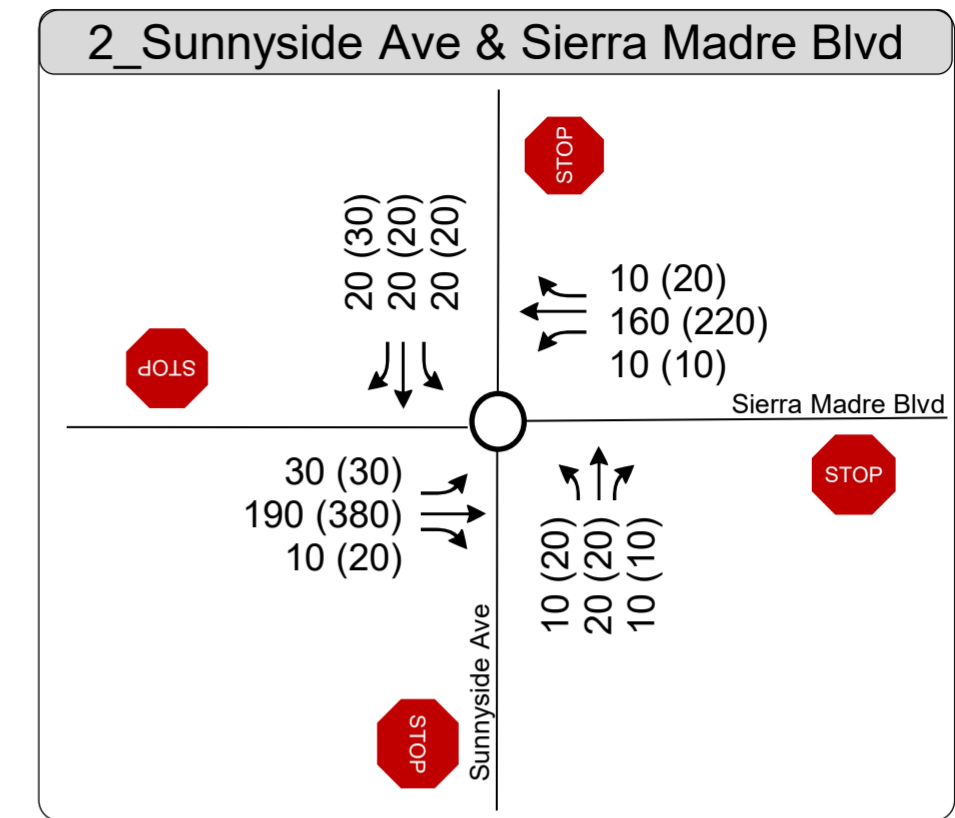
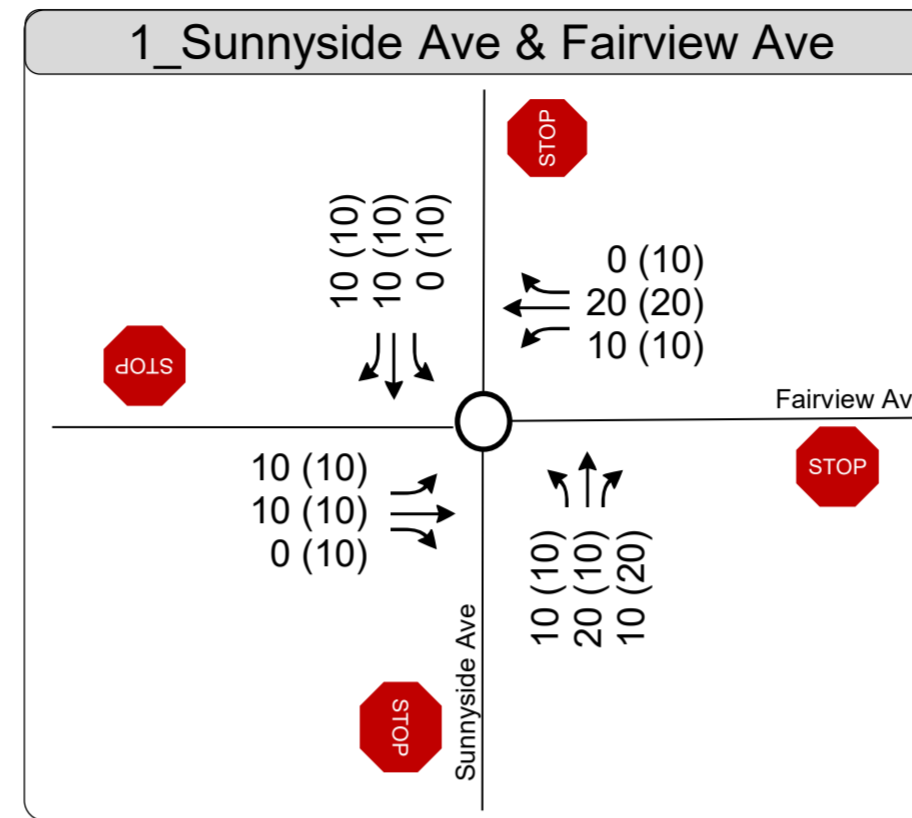


Figure 1  
Peak Hour Traffic Volumes and Lane Configurations  
Existing (2020) Pre-COVID Condition



## TRIP GENERATION

As shown in **Table 5-1**, the Project is expected to generate approximately 396 weekday daily trips, including approximately 31 trips (8 inbound/23 outbound) during the AM peak hour, and 42 trips (26 inbound/16 outbound) during the PM peak hour. On a typical weekend day, the Project will generate approximately 401 daily trips, including 39 trips (10 inbound/29 outbound) in AM peak hour, and 39 trips (25 inbound/14 outbound) in PM peak hour (**Table 5-2**).

**TABLE 5-1 - Weekday Trip Generation Estimates**

Land Use	Units	ITE Code	Quantity	Daily	AM Peak Hour			PM Peak Hour		
					In	Out	Total	In	Out	Total
Single-Family	DU	210	42	396	8	23	31	26	16	42
<b>Net New Trips</b>				<b>396</b>	<b>8</b>	<b>23</b>	<b>31</b>	<b>26</b>	<b>16</b>	<b>42</b>

**TABLE 5-2 - Weekend Trip Generation Estimates**

Land Use	Units	ITE Code	Quantity	Daily	AM Peak Hour			PM Peak Hour		
					In	Out	Total	In	Out	Total
Single-Family	DU	210	42	401	10	29	39	25	14	39
<b>Net New Trips</b>				<b>401</b>	<b>10</b>	<b>29</b>	<b>39</b>	<b>25</b>	<b>14</b>	<b>39</b>

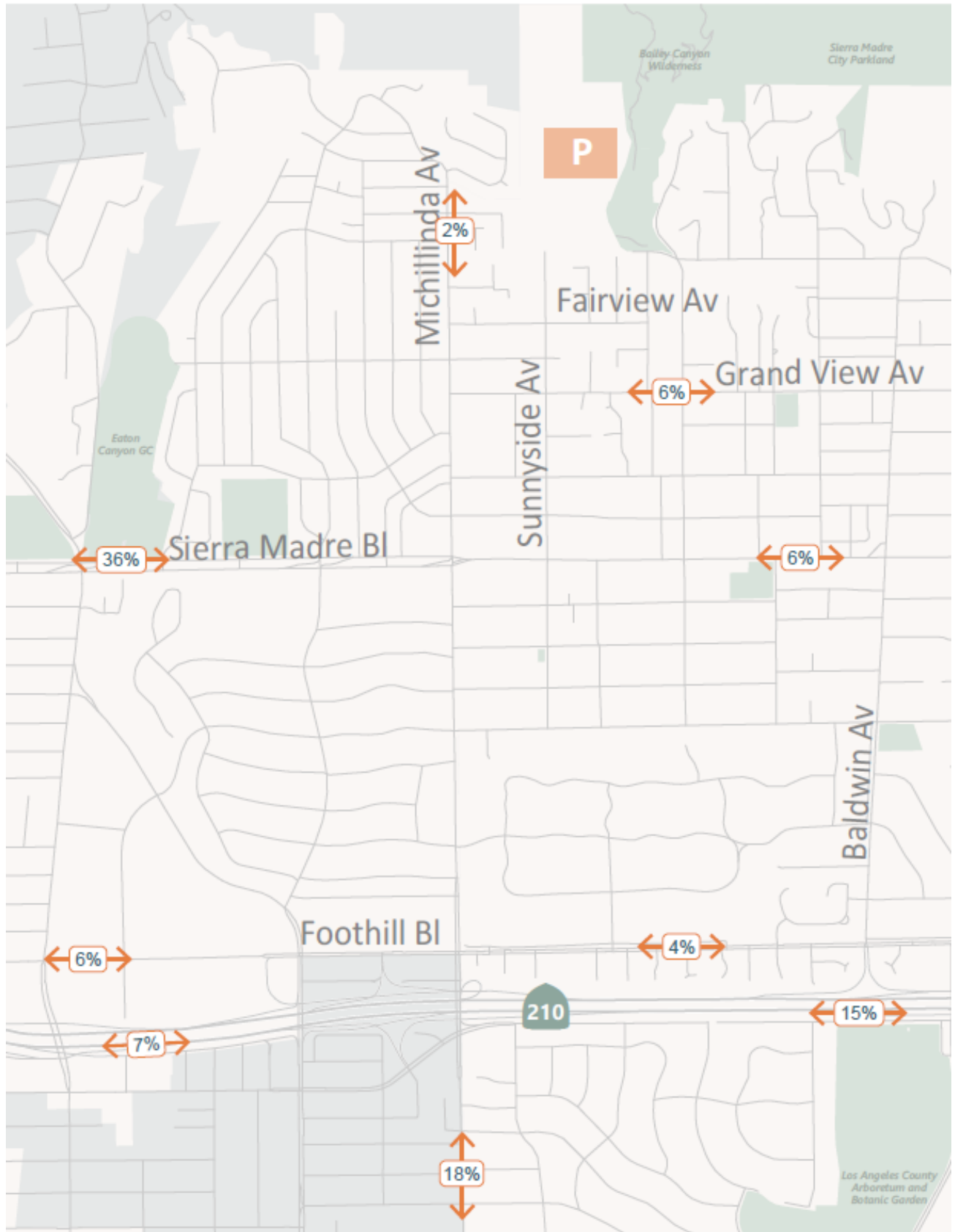
**Notes:**

1. DUs = Dwelling Units

Source: Fehr & Peers, 2020

## TRIP DISTRIBUTION

The Project trip distribution reflects the spatial distribution of trips traveling to and from the Project site. To determine where Project trips will travel, we applied a “select zone analysis” using the Southern California Association of Governments (SCAG) travel demand model. This method predicts where trips travel to/from for the area immediately surrounding the Project. The estimated trip distribution of the Project trips is shown on **Figure 2**.



Legend



↔ Trip Distribution

■ Project Site



Figure 2  
Trip Distribution



## TRAFFIC FORECASTS

The proposed Project was assumed to be built and occupied by 2025. The following traffic scenarios were developed and analyzed as part of this study:

- Existing (2020) Pre-COVID Condition
- Build-out (2025) without Project Condition
- Build-out (2025) with Project Condition

The best tool to determine background growth in the area is the SCAG model. The SCAG model predicts 2040 travel conditions in consideration of land development and transportation changes. It also includes a work-from-home assumption to reflect anticipated changes in how people travel. The results of these assumptions lead to a conclusion that traffic levels will slightly decrease in the study area by 2040. To be conservative, we assumed that the 2025 conditions will not decrease in comparison to existing (pre-COVID) conditions.

We added the Project trips to the study segments and intersections following the trip distribution identified above. The following **Table 6-1** and **Table 6-2** present the level of change expected on the study roadways as a consequence of the Project. The peak hour intersection traffic of Build-out (2025) with Project condition is shown in **Figure 3**.

**TABLE 6-1 – Weekday Build-out (2025) with Project Segment ADT**

Segment	2025 without Project	2025 with Project	Increase%
Sunnyside Avenue between Project Site and Fairview Avenue	340	740	118%
Sunnyside Avenue between Fairview Avenue and Sierra Madre Boulevard	490	850	73%
Sierra Madre Boulevard between Michillinda Avenue and Sunnyside Avenue	6,970	7,310	5%
Michillinda Avenue between Fairview Avenue and Sierra Madre Boulevard	7,390	7,390	0%
Michillinda Avenue between Sierra Madre Boulevard and Foothill Boulevard	9,550	9,680	1%

**TABLE 6-2 – Weekend Build-out (2025) with Project Segment ADT**

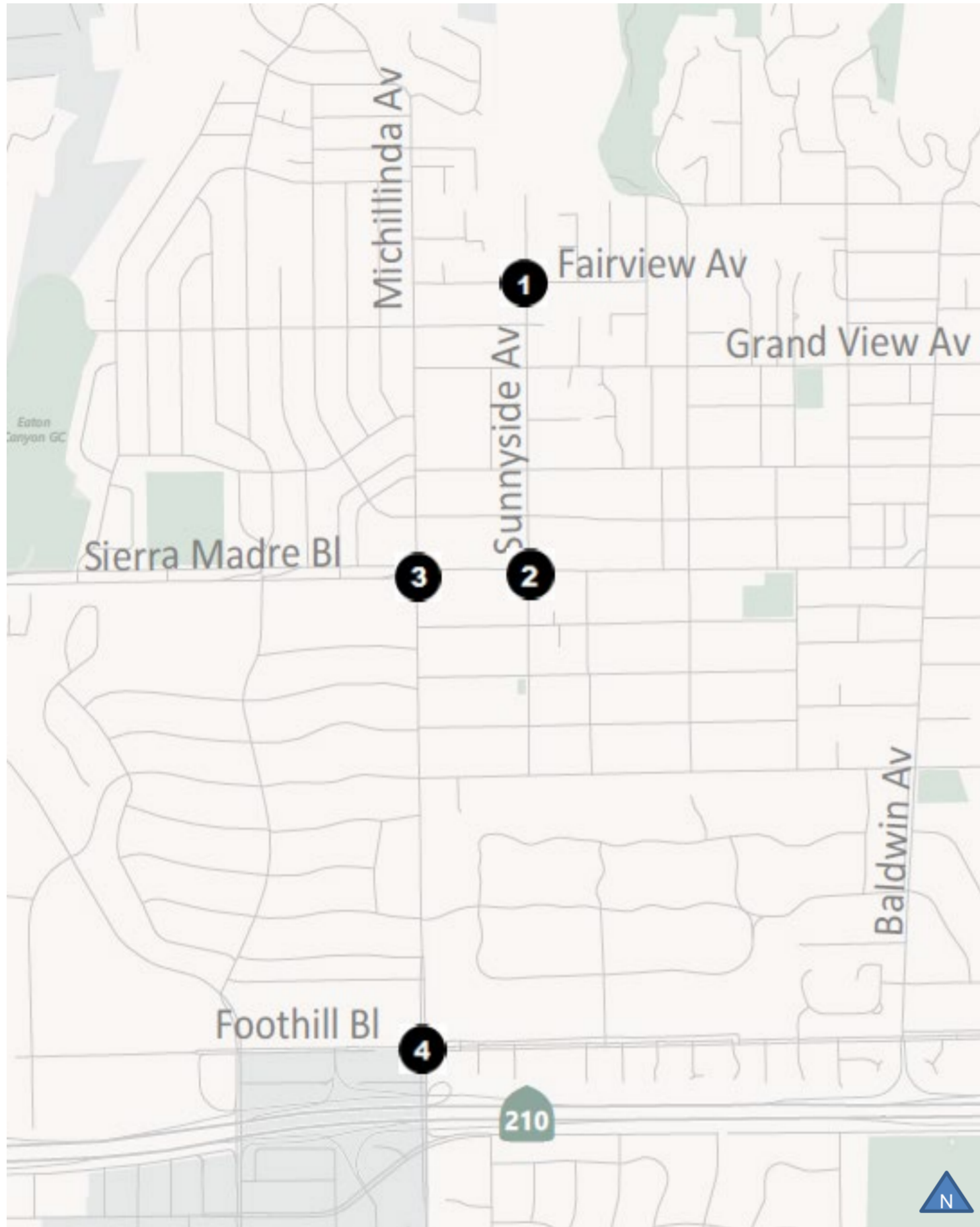
Segment	2025 without Project	2025 with Project	Increase%
Sunnyside Avenue between Project Site and Fairview Avenue	310	710	129%
Sunnyside Avenue between Fairview Avenue and Sierra Madre Boulevard	400	760	90%
Sierra Madre Boulevard between Michillinda Avenue and Sunnyside Avenue	6,290	6,640	6%
Michillinda Avenue between Fairview Avenue and Sierra Madre Boulevard	6,930	6,930	0%
Michillinda Avenue between Sierra Madre Boulevard and Foothill Boulevard	8,200	8,330	2%

Source: Fehr & Peers, 2020

## INTERSECTION LOS ANALYSIS

LOS is a measure of traffic operating conditions, which varies from LOS A (indicating free-flow traffic conditions with little or no delay) to LOS F (representing over-saturated conditions where traffic flows exceed design capacity resulting in long queues and delays). These ratings represent the perspective of drivers and indicate the comfort and convenience associated with driving. The analysis determines the intersection volume-to-capacity (V/C) ratio and corresponding LOS for the turning movements and intersection characteristics at signalized intersections. “Capacity” represents the maximum volume of vehicles in the critical lanes that have a reasonable expectation of passing through an intersection in one hour under prevailing roadway and traffic conditions. Traffic conditions for signalized intersections were evaluated using the Vistro Version 7.0 software - also reference as stop method<sup>1</sup>. The all-way stop intersections were evaluated using a standard method that predicts the delay for drivers. **Table 7** shows the LOS results for the study intersections:

<sup>1</sup> Intersection Capacity Utilization (ICU) method was applied in Vistro to estimate the roadway intersection capacity and LOS for signalized intersions.



**LEGEND**

- Study Intersection
- AM (PM) Peak Hour Traffic Volume
- Stop Sign
- Signalized

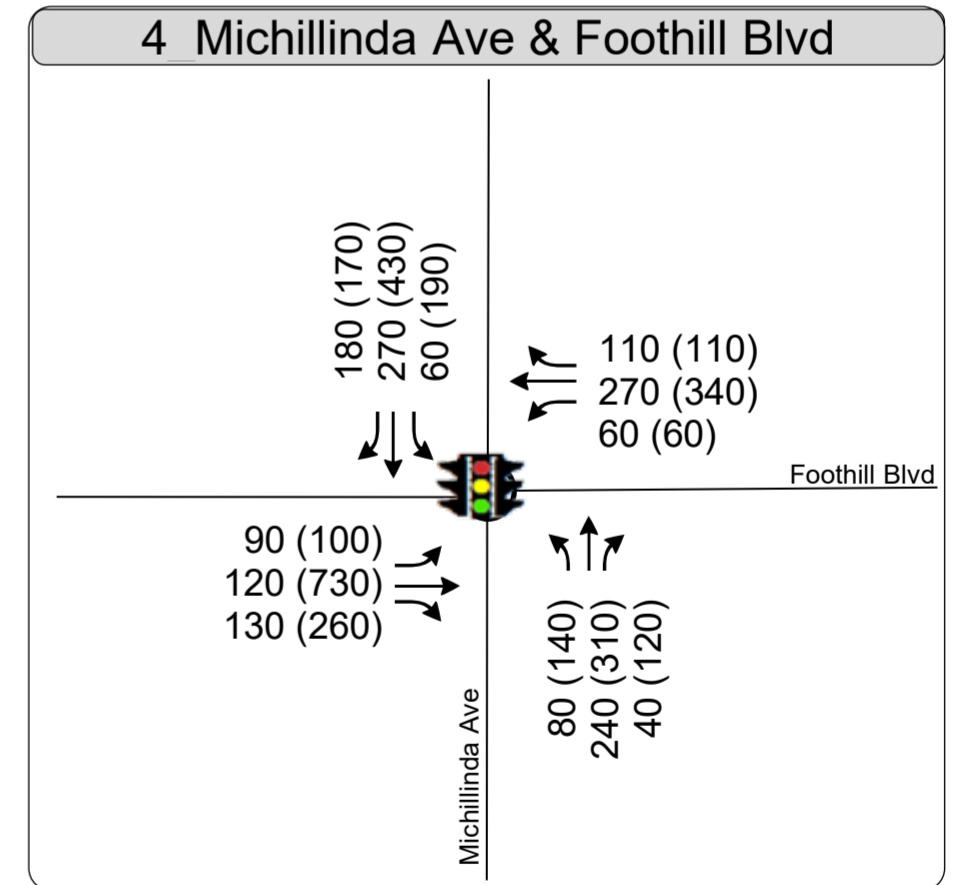
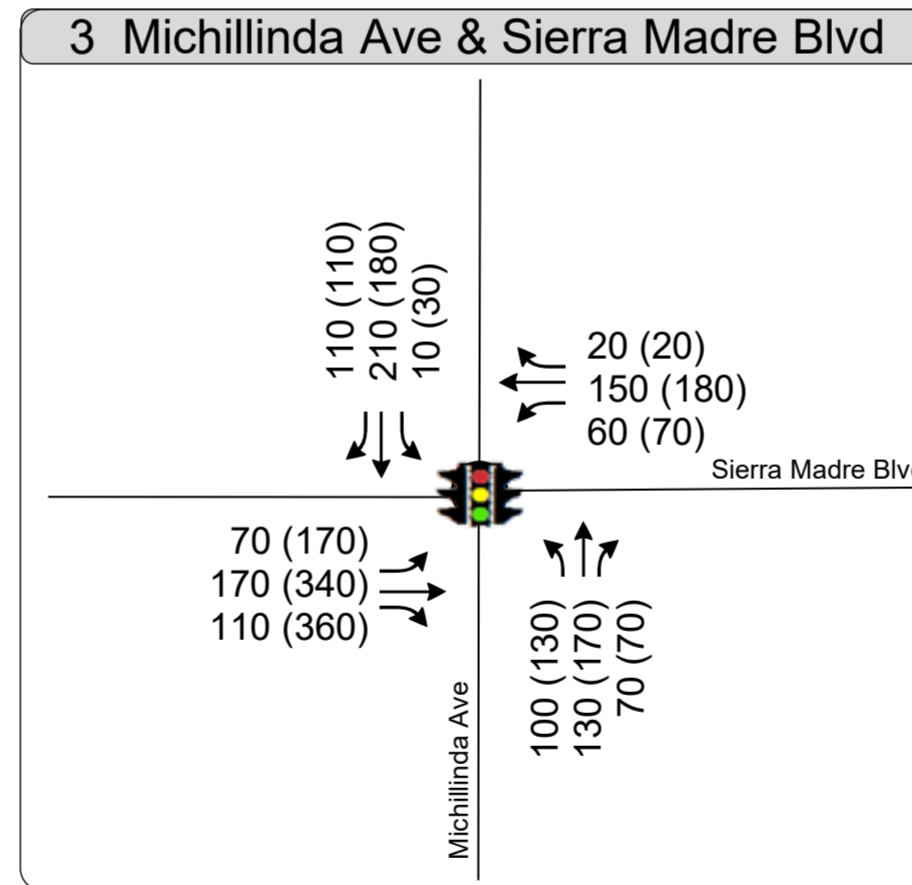
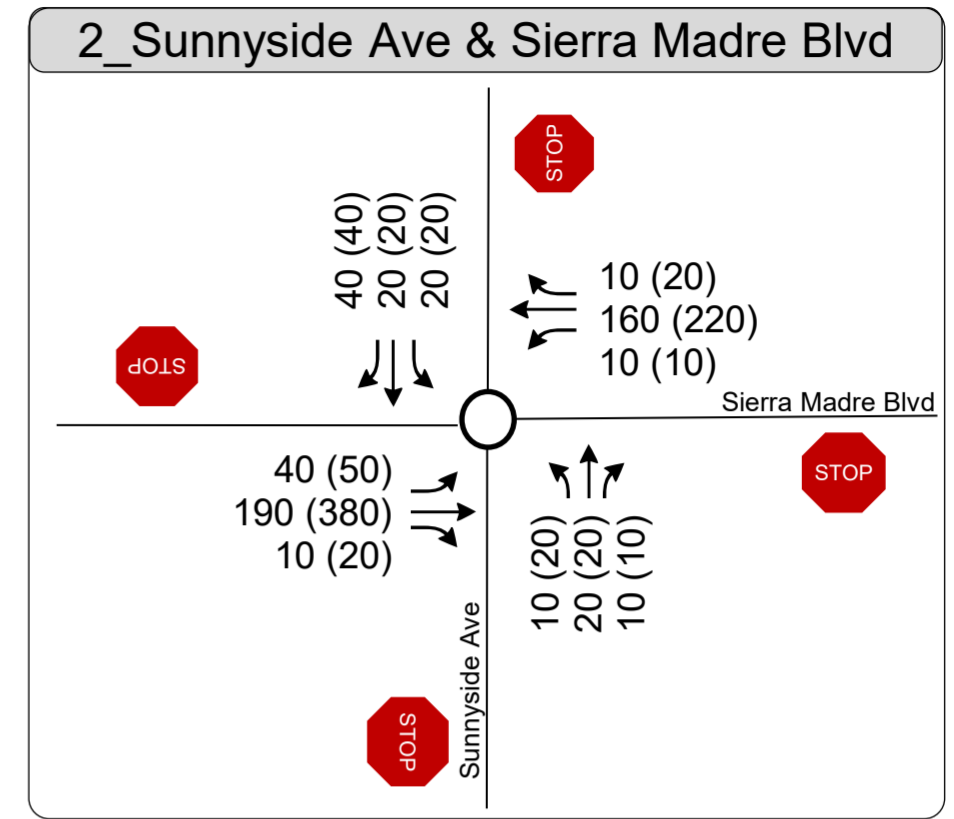
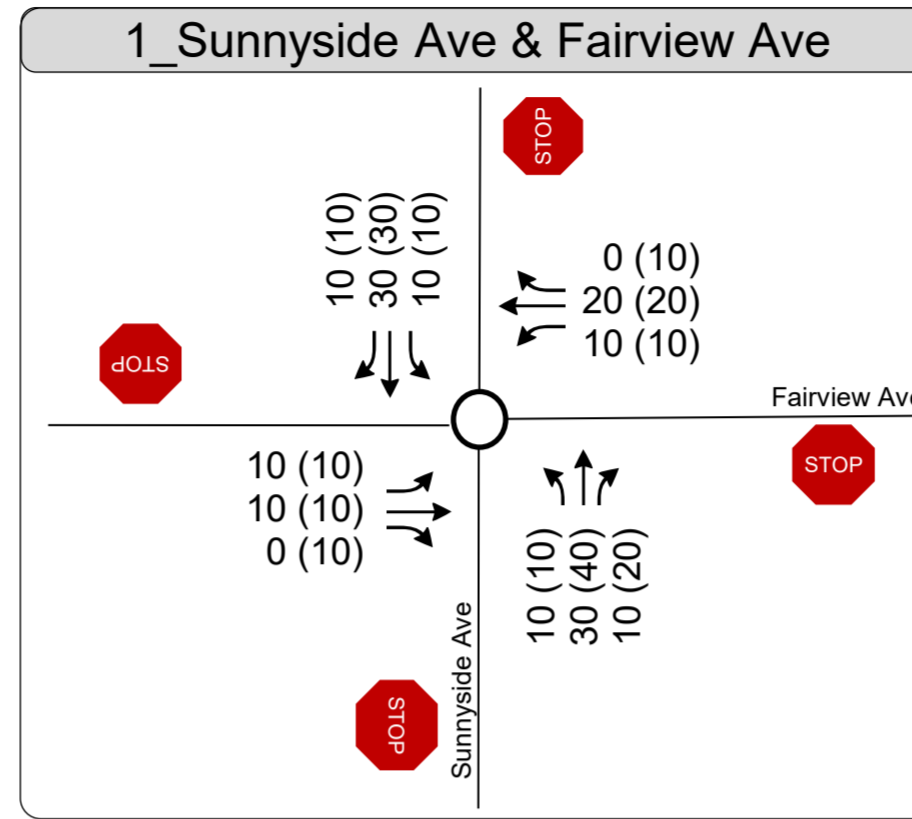


Figure 3  
Peak Hour Traffic Volumes and Lane Configurations  
Build-out (2025) With Project Condition



**TABLE 7 - Intersection LOS Analysis**

Intersection	Analysis Method	Existing (2020) Pre-COVID / Build-out (2025) without Project				Build-out (2025) with Project			
		AM V/C	AM LOS	PM V/C	PM LOS	AM V/C	AM LOS	PM V/C	PM LOS
1 - Sunnyside Ave & Fairview Ave	HCM 6th Edition		A		A		A		A
2 - Sunnyside Ave & Sierra Madre Blvd	HCM 6th Edition		A		B		A		B
3 - Michillinda Ave & Sierra Madre	ICU	0.36	A	0.53	A	0.38	A	0.54	A
4 - Michillinda Ave & Foothill Blvd	ICU	0.40	A	0.59	A	0.40	A	0.59	A

Source: Fehr & Peers, 2020

## CONCLUSION

Development of the proposed Project would result in 396 trips being generated on a typical weekday and 401 trips on a typical weekend. As a result, the traffic volume changes on the study roadways of approximately 0 to 120 percent according to the location. The performance of the study intersections, as measured by LOS, would result in no measurable difference as a result of the Project.