LAKE SLOW STREET EVALUATION

Summary of Findings | February 2022

Key Findings

- Current traffic conditions on Lake Street indicate that it is still a low-stress roadway, and its designation as a Slow Street is conducive to conducive to shared usage as a pedestrian and bicycle route.
- Traffic safety data on Lake Street further indicate that the street has become safer since its designation as a Slow Street.
- Findings from the Lake Slow Street impact analysis shows that the partial diversion of vehicle traffic from the Lake Slow Street has not negatively impacted the conditions on neighboring streets regarding traffic operations or traffic safety. Measured vehicle volume and speeds on parallel alternative streets to Lake Street have not changed significantly between the various observation periods.
- Any measured change in congestion levels in the area is minor or negligible.
- Vehicle travel time, a measure of impacts from the Lake Slow Street, have not been negatively affected by the partial diversion of vehicle traffic from Lake Street.

Evaluation Information

Dates of Traffic Data Collection:

- September 2019: 9/10 – 9/12
- August 2020: 8/11 – 8/13
- March 2021: 3/6, 3/8, 3/20, 3/22, 3/26 – 3/27
- November/December 2021: 11/30, 12/1 – 12/2
- January/February 2022: 1/27 – 1/29, 2/4 – 2/5, 2/7

Locations of Traffic Data Collection:

- Lake Street between
    - 2nd and 3rd avenues
    - 10th and 11th avenues
    - 15th and 16th avenues
    - 21st and 22nd avenues
    - 25th and 26th avenues
- California Street between
    - 2nd and 3rd avenues
    - 10th and 11th avenues
    - 15th and 16th avenues
    - 21st and 22nd avenues
    - 25th and 26th avenues
- Clement Street between
    - 2nd and 3rd avenues
    - 15th and 16th avenues

- 21st and 22nd avenues

Not all locations were collected in the data collection dates specified above and some data collection dates had more counts than others. Therefore, some locations/streets may not have data for all the dates listed above.

Study Areas Defined in the Analysis:

Rough approximations that break the area up by geographical location:

On Lake, California, and Clement streets:

- *Eastern portion: Arguello Boulevard to 10th Avenue*
- *Middle portion: 10th Avenue to 18th Avenue*
- *Western portion: 18th Avenue to 28th Avenue*

Additional evaluations:

The California Street Safety project team is also conducting an evaluation on their project and plan to release findings soon. Both project teams have coordinated on their respective evaluation efforts.

There may be minor differences in the reporting of values due to aspects like rounding or dimensional differences (i.e., time - peak periods timeframes may be different by an hour between the evaluations).

Lake Slow Street Traffic Safety

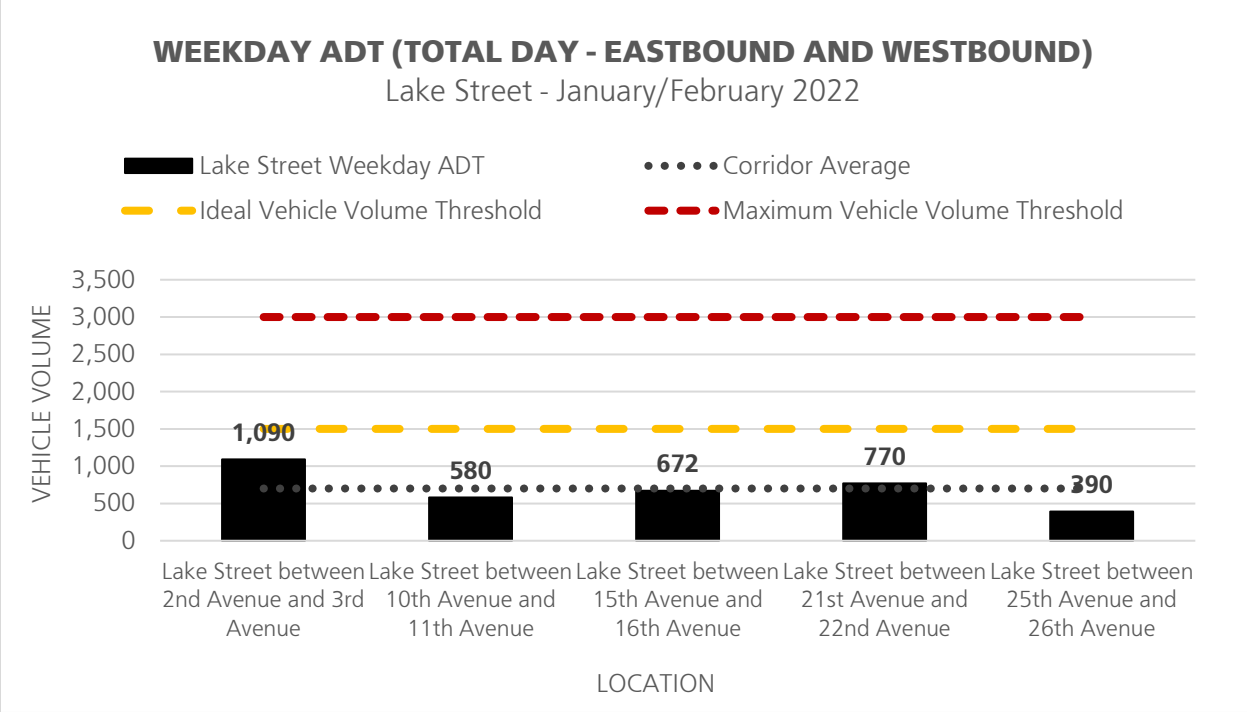
The following metrics were analyzed to evaluate the traffic safety conditions on Lake Slow Street:

Metric	Measured Impact	Data Source
Vehicle Volume (average daily traffic – ADT) in Relation to Low-Stress Street Criteria on Lake Slow Street	Traffic safety	Traffic counts
Vehicle Speed in Relation to Low-Stress Street Criteria on Lake Slow Street	Traffic safety	Traffic counts
Change in Annual Collision Rates	Impacts to traffic safety	Department of Public Health Traffic Collision Database

Vehicle Volume (ADT)

Average daily traffic (ADT), also known as average vehicles per day or average daily vehicle volumes, on Lake Street are still at a level that meet qualifications for a low-stress street and a street conducive to shared usage of the roadway.

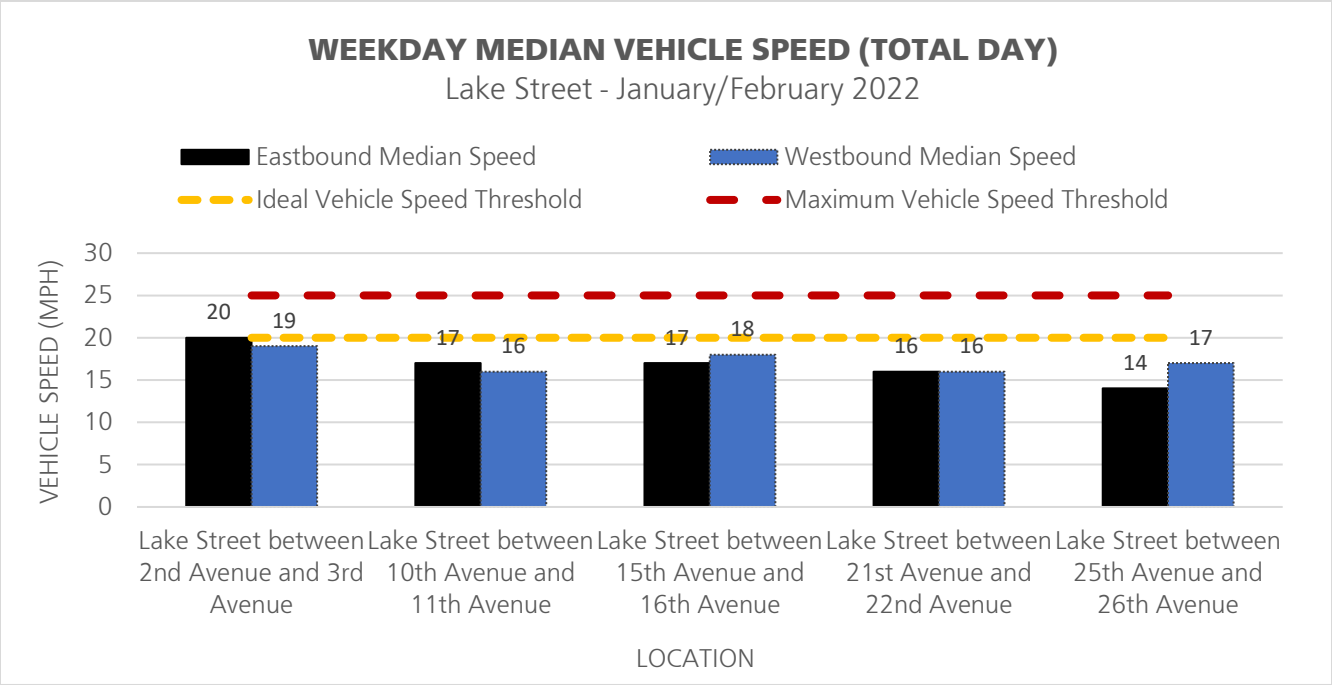
The ideal volume threshold is at or below 1,500 average vehicles per day and the maximum is below 3,000 vehicles per day. The current corridor average is about 700 vehicles per day and the location with most average vehicles per day has a measured volume of 1,090, which is 410 vehicles below the ideal threshold.



Vehicle Speed

Vehicle speeds on Lake Street are still at a level that meet qualifications for a low-stress street and a street conducive to shared usage of the roadway.

The ideal vehicle speed is at or below 20 miles per hour and the maximum acceptable for a low-stress facility is at or below 25 miles per hour. Measured vehicle speeds at all areas observed show vehicle speeds that are at or below the ideal vehicle speed threshold for a low-stress facility.



Collision Rate

Overall, the collision rate has improved. Compared to pre-implementation conditions, Lake Street has seen an estimated average decrease of 53% in collisions.

Collisions on Lake Street (between Arguello Boulevard and 28th Avenue				
Pre-Implementation 2017 - 2019 Annual Collision Rate (baseline)	Total Collisions 2020*	Total Collisions 2021	%Δ Pre-Implementation to 2020	%Δ Pre-Implementation to 2021
5.3	4**	1	-25%	-81%

*Lake Slow Street was implemented in May 2020 and the California Street Safety project was implemented in July 2020

**Of the 4 collisions in 2020, 2 occurred before March 2020, so prior to the implementation of Lake Slow Street

Lake Slow Street Impacts

There are two baselines considered when analyzing Lake Slow Street impacts to neighboring streets. The preferred baseline (where data is available), is pre-COVID-19 conditions (September 2019), and the second is early COVID-19 conditions (August 2020 and March 2021).

Metrics used to measure Lake Slow Street partial traffic diversion impacts to parallel alternative routes:

Metric	Measured Impact	Data Source
Change in Vehicle Speed on Parallel Alternative Routes	Impacts to traffic operations and traffic safety	Traffic Counts
Change in Vehicle Volume (average daily traffic – ADT) on Parallel Alternative Routes	Impacts to traffic operations and traffic safety	Traffic Counts
Vehicle-to-Capacity Ratio	Impacts to traffic operations	Traffic Counts
Change in Vehicle Travel Time on California Street	Impacts to traffic operations	INRIX – *GPS data*
Change in Annual Collision Rates on California Street	Impacts to traffic safety	Department of Public Health Traffic Collision Database

Vehicle Speed on Parallel Alternative Routes

Vehicle speed can be used to measure or gauge traffic flow and possible congestion, since traffic flow is a function of speed and density. If vehicle speeds are slower than expected or significantly lower than the posted speed limit, it can be assumed that there is some level of congestion.

Vehicle speed can also be used to measure traffic safety on the street. If there is evidence of frequent speeding by vehicles, the corridor may be more prone to traffic collisions and close calls since drivers will have less time to react to potential conflicts or create hazards from their driving behaviors.

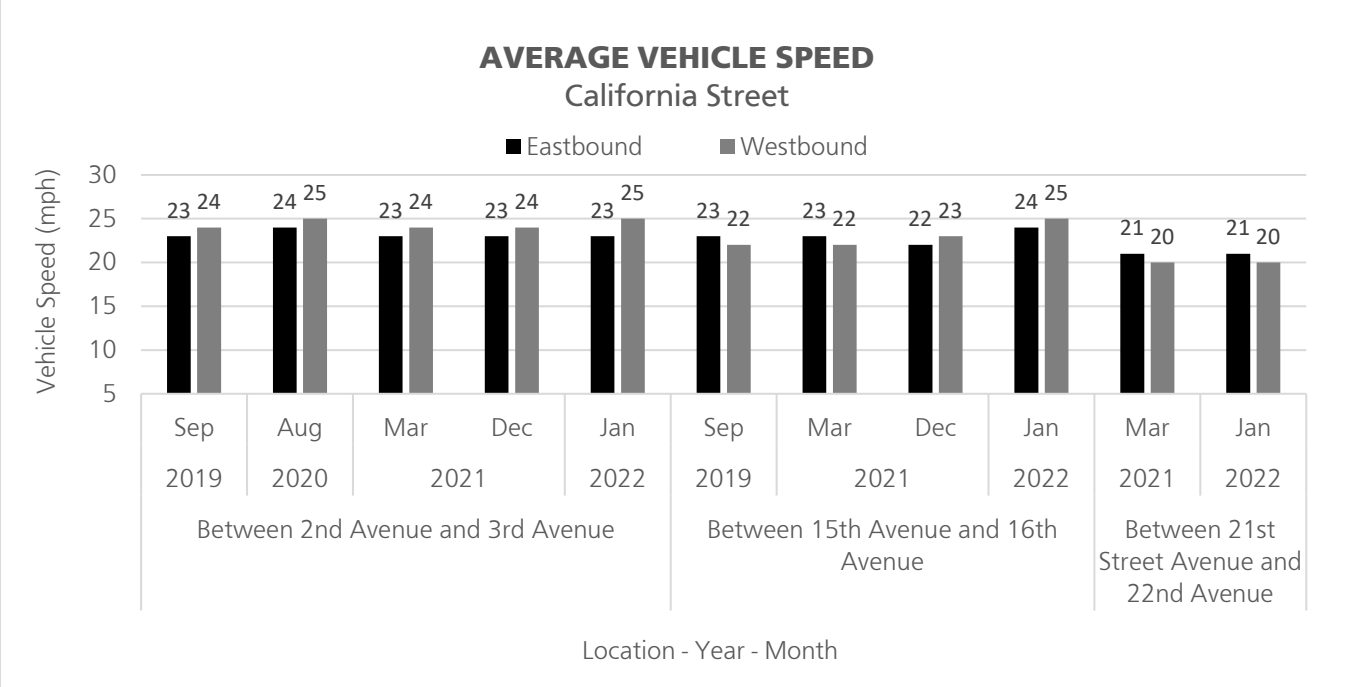
Overall, vehicle speeds have not changed from both the pre-COVID-19 level and during COVID-19 conditions on either California or Clement streets, the alternative parallel routes to Lake Street.

Prior to the onset of COVID-19, California Street in the eastbound direction had an average vehicle speed of 23 miles per hour in the eastern and middle portions of the corridor, and 21 miles per hour in the western portion. In the westbound direction, the eastern portion had an

average speed of 24 miles per hour, the middle section was 22 miles per hour, and the western portion was 20 miles per hour. Looking at the most recent data, average vehicle speeds have remained constant, or even increased (middle portion), indicating that traffic flow is still adequate on the corridor.

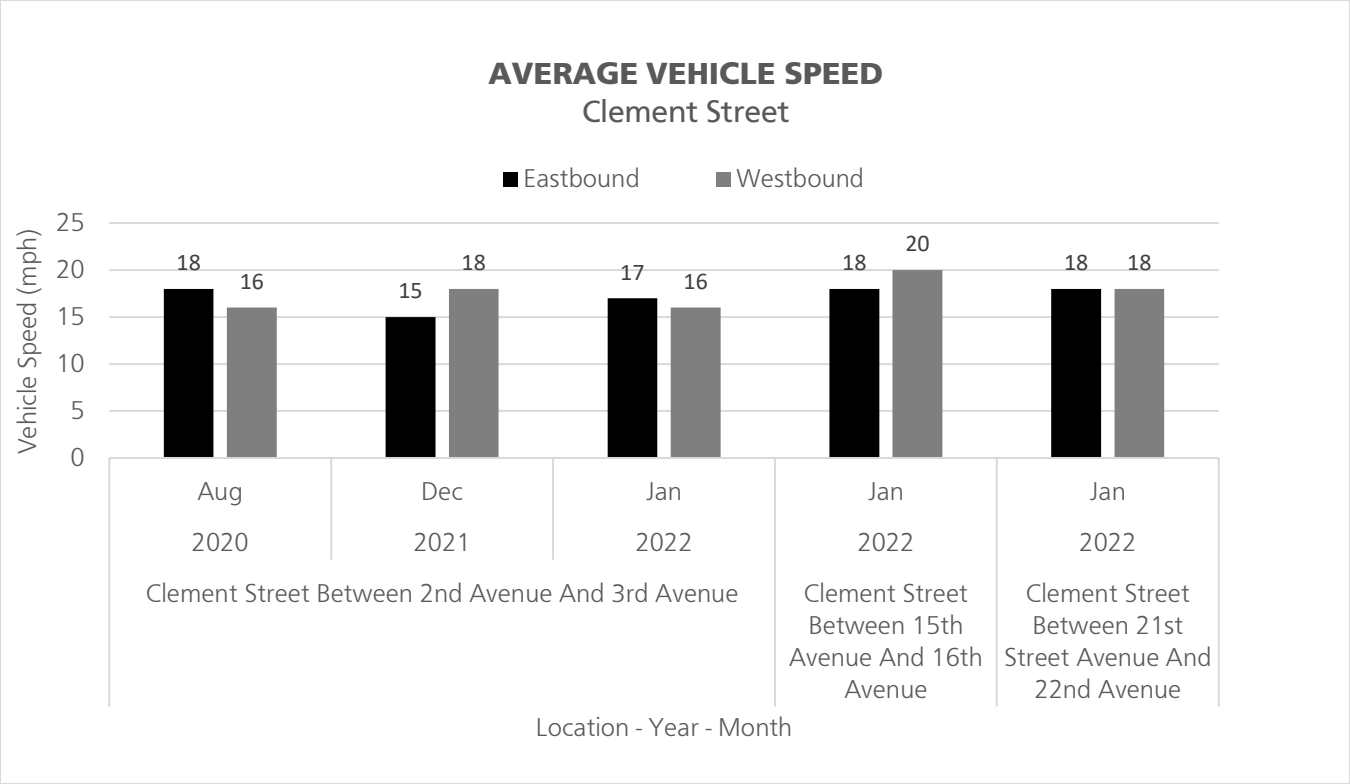
In terms of vehicle speeds in the aspect of traffic safety, the data indicates that the typical driver is traveling at a safe speed and speeding is not typically a concern on the corridor.

In the current COVID-19 conditions, even with increase in activity and the city "opening up", average vehicle speeds have remained steady. A 1 to 3 miles per hour change in vehicle speeds is not concerning or an indicator of significant change.



Even when considering other speed metrics like the median speed and 85th percentile speed, the latter which is the metric used to determine speed limits, vehicle speeds remain unchanged on California Street and do not show signs of traffic patterns interrupting or degrading current traffic flow and operations. In fact, most vehicles are traveling near the speed limit, which is the free flow speed on the corridor.

Data is not as available for Clement Street, but the vehicle speed changes and impacts seen on California Street are similar to those on California Street. The notable difference between Clement Street and California Street is that speeds are significantly slower. However, slower speeds on Clement Street are not concerning since Clement Street is a residential/local street like Lake Street. Slower speeds on residential/local streets are preferred since it creates a safer environment for all users of the road.



Vehicle Volume on Parallel Alternative Routes

Change in average daily traffic (ADT) was used to measure possible impacts to traffic flow and traffic safety from Lake Slow Street partial traffic diversion.

Typically speaking, any vehicle volume levels between periods that yields a -10% to +10% change can be considered as normal variation.

Overall, average daily vehicle volumes have not changed drastically between the various observation periods and events that have changed the neighborhood's traffic patterns and road network (i.e., pre-COVID-19/COVID-19, installation of the Lake Slow Street, and the implementation of the California Street Safety project).

Time Period	Weekday Average ADT %Δ between Observation Periods for Entire Corridor
Total Day *(Eastbound & Westbound)*	4%
AM-Peak *(Eastbound)*	1%
PM-Peal *(Westbound)*	-0.1%

When looking at change in vehicle volumes along the corridor by location for the first baseline (pre-COVID-19 to COVID-19), the eastern portion shows more variation for total day and during commute periods. The AM-Peak shows a significant decrease in vehicle volume (Weekday AM-Peak ADT %Δ pre-COVID to COVID-19 = -34%).

Weekday Average ADT %Δ from pre-COVID-19 to COVID-19 Conditions			
Time of Day	Corridor location		
	Eastern portion	Middle portion	Western portion
Total day *(Eastbound and Westbound)*	-8%	4%	N/A
AM-Peak *(Eastbound)*	-34%	-10%	N/A
PM-Peak *(Westbound)*	-14%	-7%	N/A

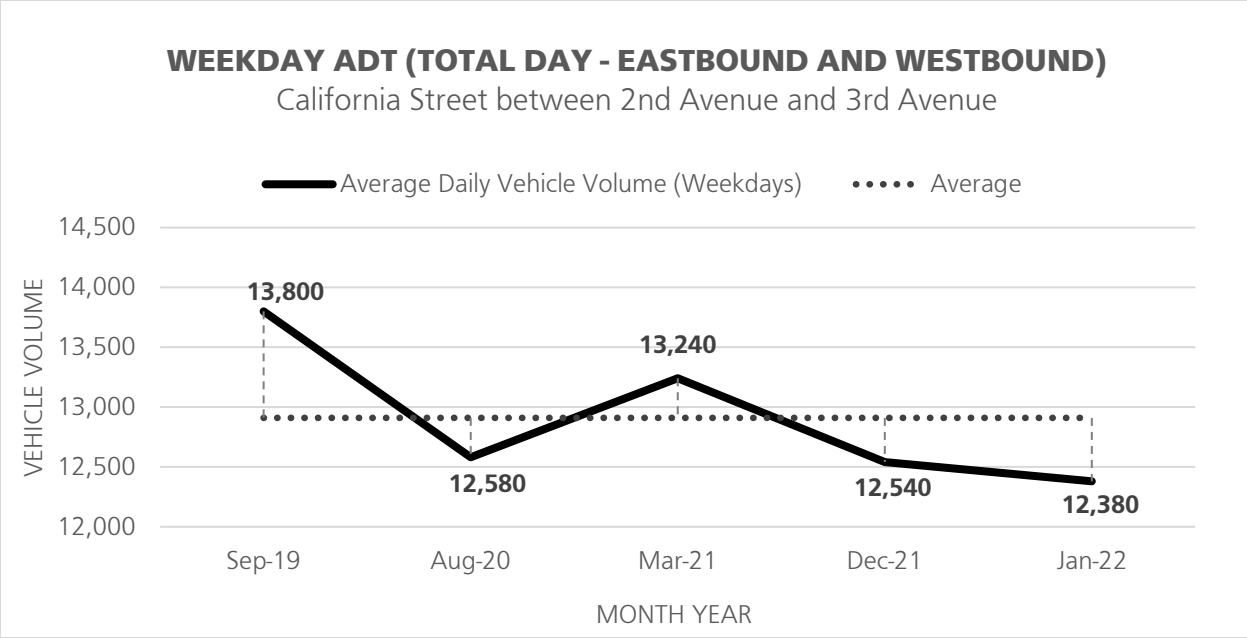
Data is not as available for the more western portion of California Street, but it is also subject to less change because the eastern and middle portions were impacted by both the Lake Slow Street and the California Street Safety project. The western portion was mostly only impacted by the Lake Slow Street, since the California Street Safety project's extents are between Arguello Boulevard and 12th Avenue. The change in the other two areas is either undetermined or not significant.

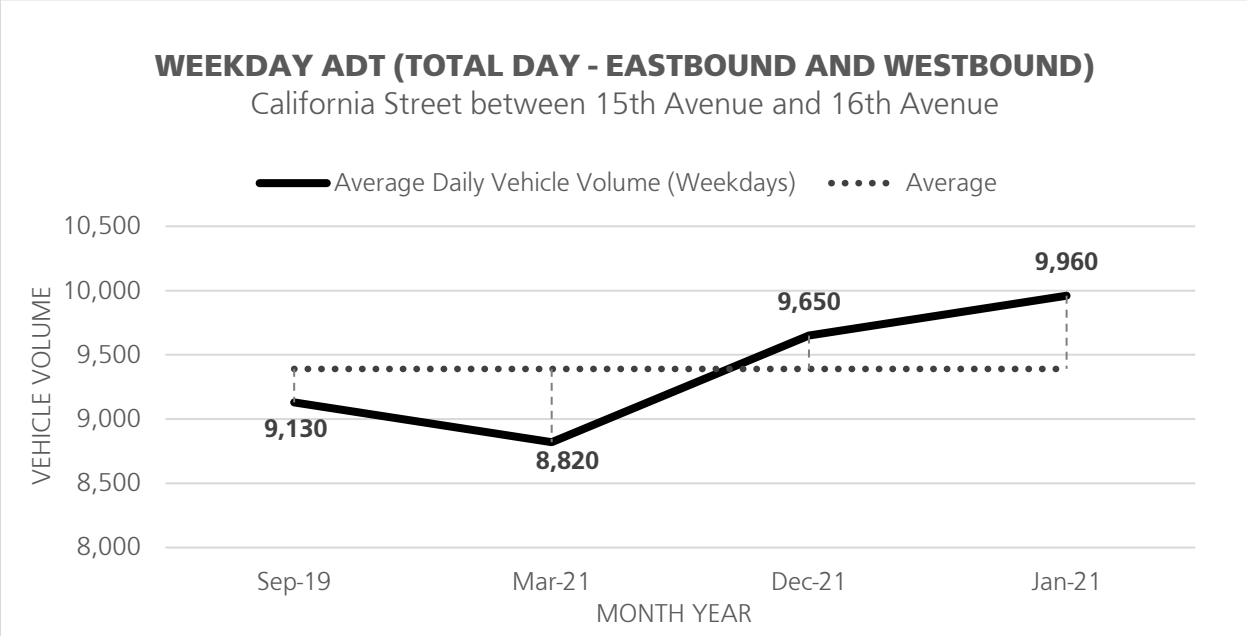
Therefore, comparing vehicle volumes between pre-COVID-19 to COVID-19 conditions and the implementation of the various street project efforts in the area, vehicle volumes on California Street are not worse or is about the same as before. There is not enough evidence to suggest that the Lake Slow Street partial traffic diversion impacts have negatively impacted vehicle volumes on California Street.

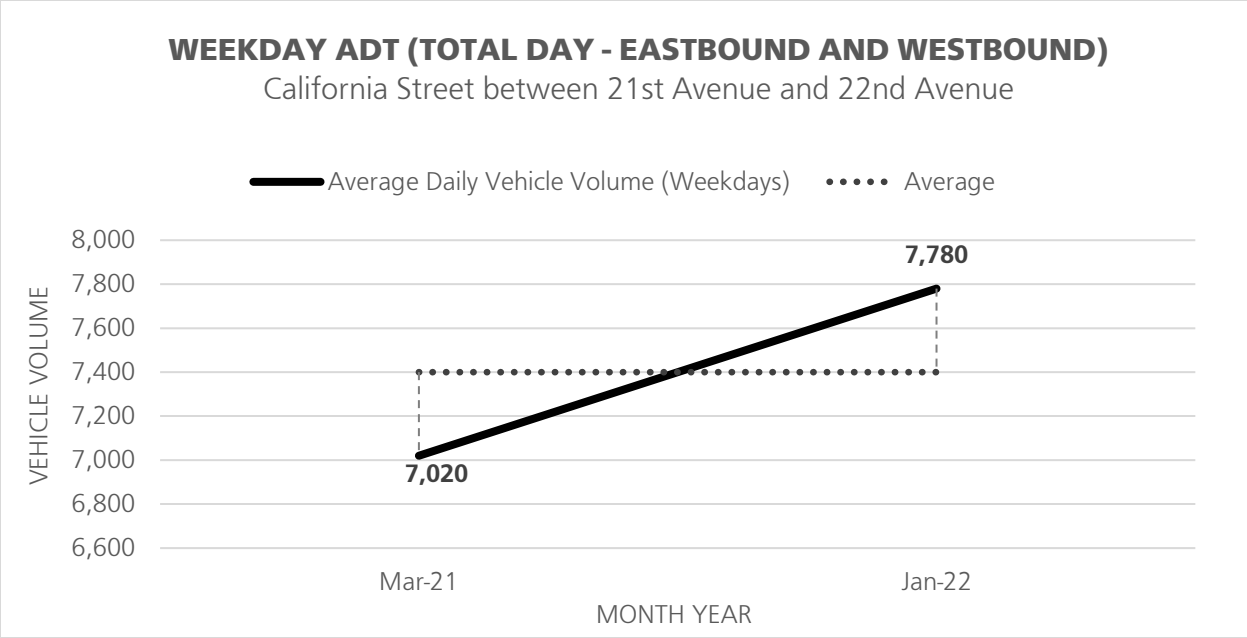
For the second baseline, which is during COVID-19 conditions (i.e., more dormant vs. more active periods due to aspects like "Shelter in Place" and COVID-19 restrictions), the volume change is also not very significant. The western portion did experience some minor increases in vehicle volumes for all times of the day, but it is only slightly significant.

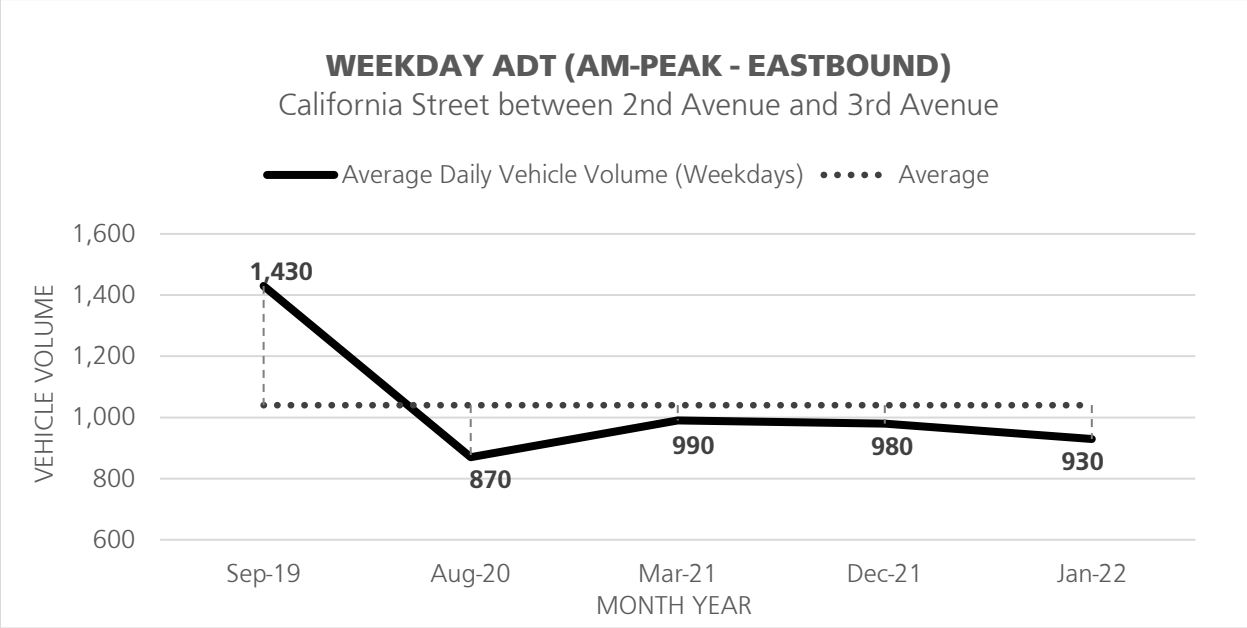
Weekday Average ADT % Δ during COVID-19 Conditions Between Observation Periods			
Time of Day	Corridor location		
	Eastern portion	Middle portion	Western portion
Total day *(Eastbound and Westbound)*	-0.4%	6%	11%
AM-Peak *(Eastbound)*	2%	3%	14%
PM-Peak *(Westbound)*	-6%	3%	14%

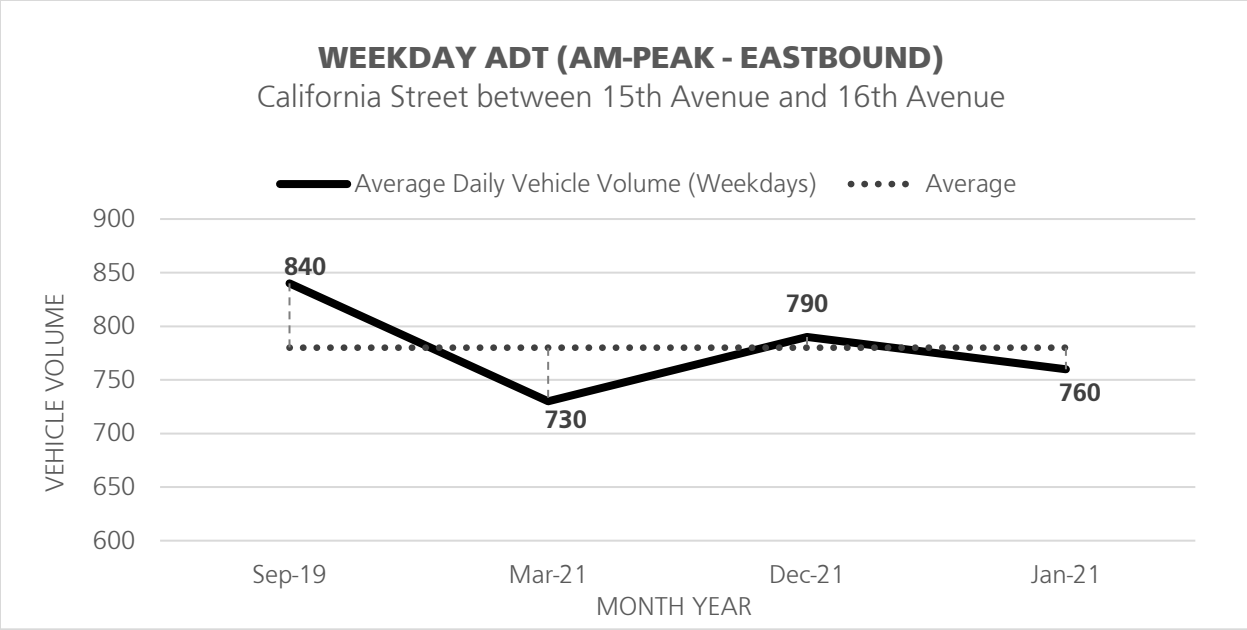
Overall, vehicle volumes have been about the same throughout the COVID-19 pandemic period, even with the increase in activity and the city "opening up" over time (i.e., more dormant vs. more active periods due to aspects like "Shelter in Place" and COVID-19 restrictions). Any increases are minor.

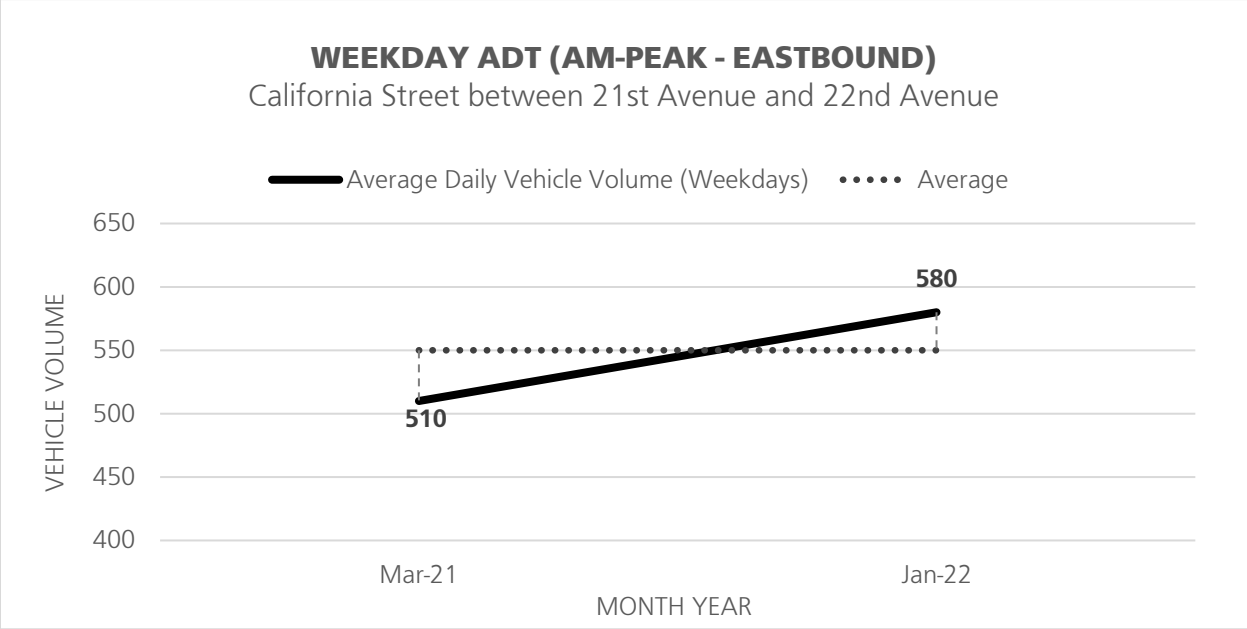

WEEKDAY ADT (TOTAL DAY - EASTBOUND AND WESTBOUND)
California Street between 2nd Avenue and 3rd Avenue
Average Daily Vehicle Volume (Weekdays)
Average
VEHICLE VOLUME
14,500
14,000
13,500
13,000
12,500
12,000
13,800
12,580
13,240
12,540
12,380
Sep-19
Aug-20
Mar-21
Dec-21
Jan-22
MONTH YEAR

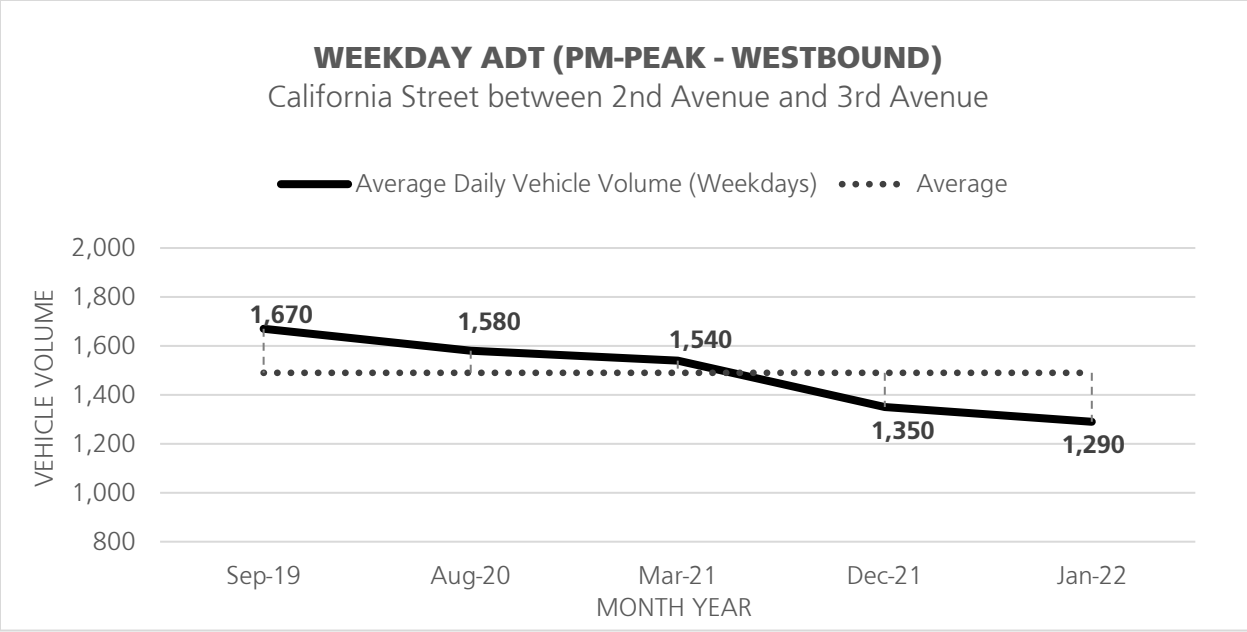

WEEKDAY ADT (TOTAL DAY - EASTBOUND AND WESTBOUND)
California Street between 15th Avenue and 16th Avenue
Average Daily Vehicle Volume (Weekdays)
Average
VEHICLE VOLUME
10,500
10,000
9,500
9,000
8,500
8,000
9,130
8,820
9,650
9,960
Sep-19
Mar-21
Dec-21
Jan-21
MONTH YEAR

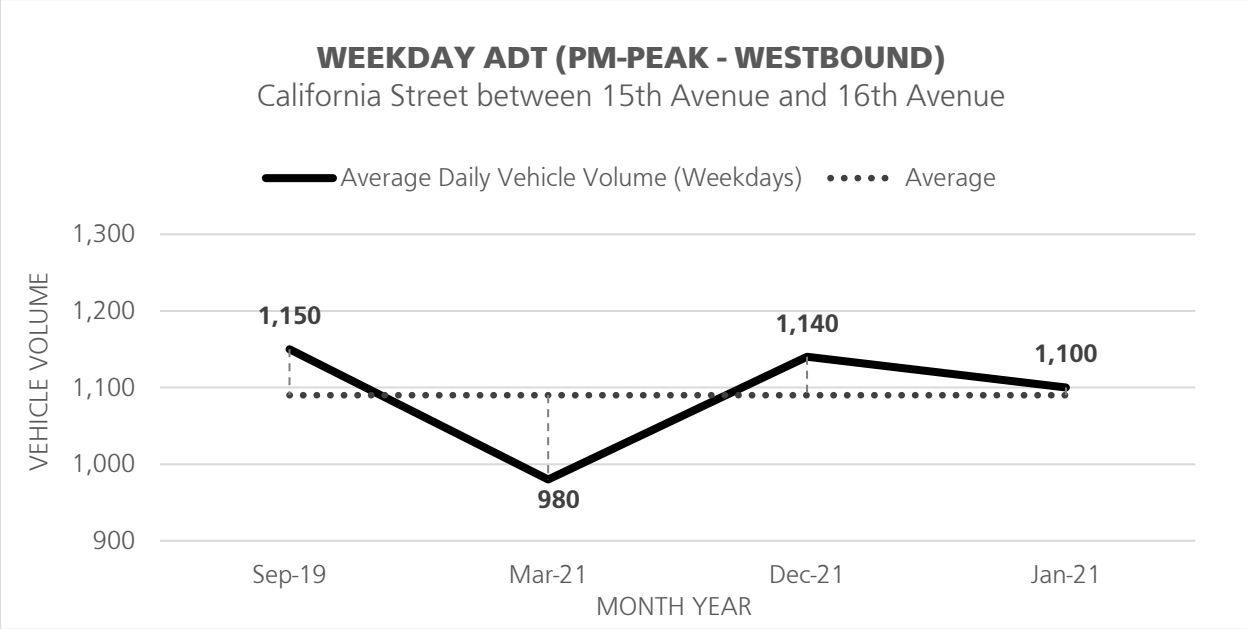

WEEKDAY ADT (TOTAL DAY - EASTBOUND AND WESTBOUND)
California Street between 21st Avenue and 22nd Avenue
Average Daily Vehicle Volume (Weekdays)
Average
VEHICLE VOLUME
8,000
7,800
7,600
7,400
7,200
7,000
6,800
6,600
7,780
7,020
Mar-21
Jan-22
MONTH YEAR

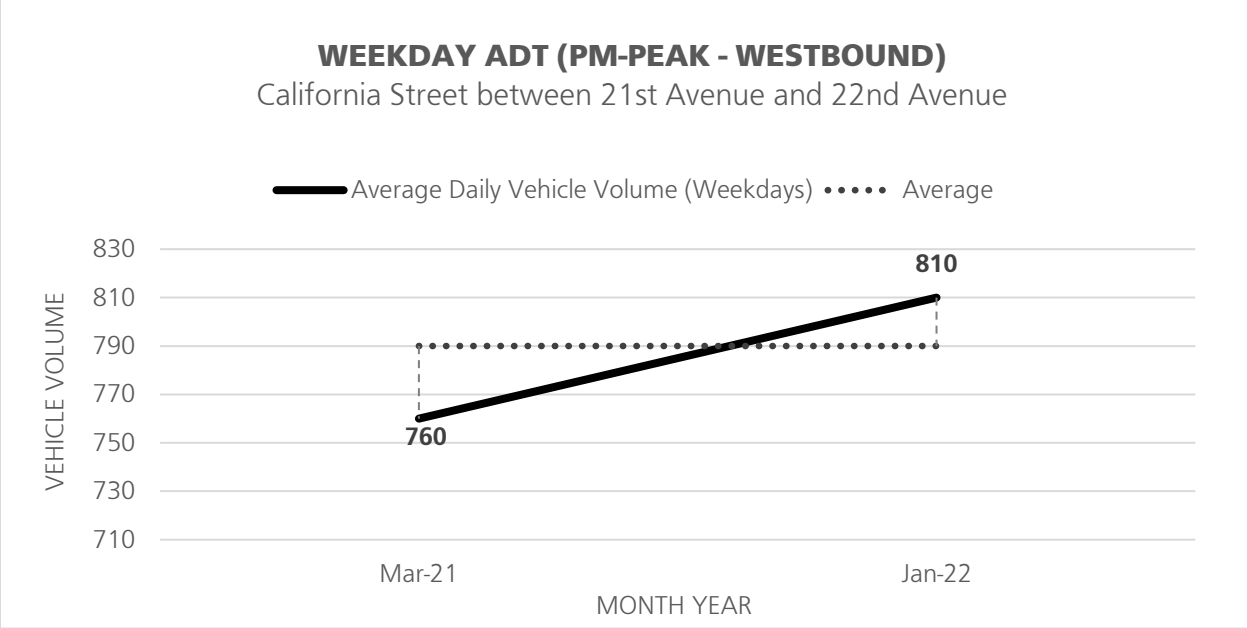

WEEKDAY ADT (AM-PEAK - EASTBOUND)
California Street between 2nd Avenue and 3rd Avenue
Average Daily Vehicle Volume (Weekdays)
Average
VEHICLE VOLUME
1,600
1,400
1,200
1,000
800
600
1,430
870
990
980
930
Sep-19
Aug-20
Mar-21
Dec-21
Jan-22
MONTH YEAR


WEEKDAY ADT (AM-PEAK - EASTBOUND)
California Street between 15th Avenue and 16th Avenue
Average Daily Vehicle Volume (Weekdays)
Average
900
850
800
750
700
650
600
VEHICLE VOLUME
840
730
790
760
Sep-19
Mar-21
Dec-21
Jan-21
MONTH YEAR

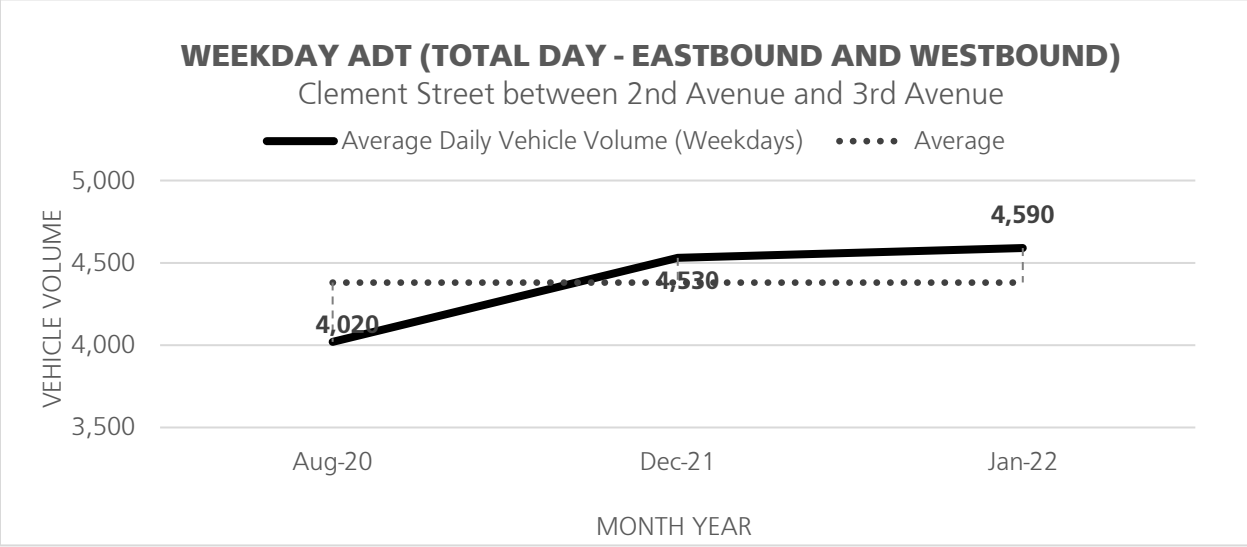

WEEKDAY ADT (AM-PEAK - EASTBOUND)
California Street between 21st Avenue and 22nd Avenue
Average Daily Vehicle Volume (Weekdays)
Average
650
600
550
500
450
400
VEHICLE VOLUME
580
510
Mar-21
Jan-22
MONTH YEAR


WEEKDAY ADT (PM-PEAK - WESTBOUND)
California Street between 2nd Avenue and 3rd Avenue
Average Daily Vehicle Volume (Weekdays)
Average
VEHICLE VOLUME
2,000
1,800
1,600
1,400
1,200
1,000
800
1,670
1,580
1,540
1,350
1,290
Sep-19
Aug-20
Mar-21
Dec-21
Jan-22
MONTH YEAR


WEEKDAY ADT (PM-PEAK - WESTBOUND)
California Street between 15th Avenue and 16th Avenue
Average Daily Vehicle Volume (Weekdays)
Average
VEHICLE VOLUME
1,300
1,200
1,100
1,000
900
1,150
980
1,140
1,100
Sep-19
Mar-21
Dec-21
Jan-21
MONTH YEAR



Data is not as available for Clement Street, but the vehicle volume changes and impacts seen on California Street are similar to those on Clement Street.



Overall, when looking at both California and Clement streets, vehicle volumes have not increased by significant amounts like 20 or 50%, even with the estimated 80% decrease in traffic volumes on Lake Street due to the Lake Slow Street corridor wide partial traffic diversion treatment. It was expected that the partial diversion of vehicle traffic from Lake Street to surrounding parallel streets would increase vehicle volumes on them. However, it was also expected that the impacts from partial traffic diversion would not be significant, since Lake Street is a residential street and not a major or minor arterial road, and the findings from this evaluation show that.

Vehicle to Capacity Ratio on Parallel Alternative Routes

Vehicle volume by itself is not the most accurate measure of changes in traffic flow or congestion.

The Vehicle to Capacity Ratio (V/C Ratio) measures the vehicle demand with the relative capacity of the street. The specific intervals of the ratio represent the varying operational conditions, or congestion level, of a street:

V/C Ratio	Relative Congestion Level
< 0.5	Low to no congestion
0.5 – 0.74	Moderate congestion
0.75 - 1	Heavy congestion
>1	Severe congestion

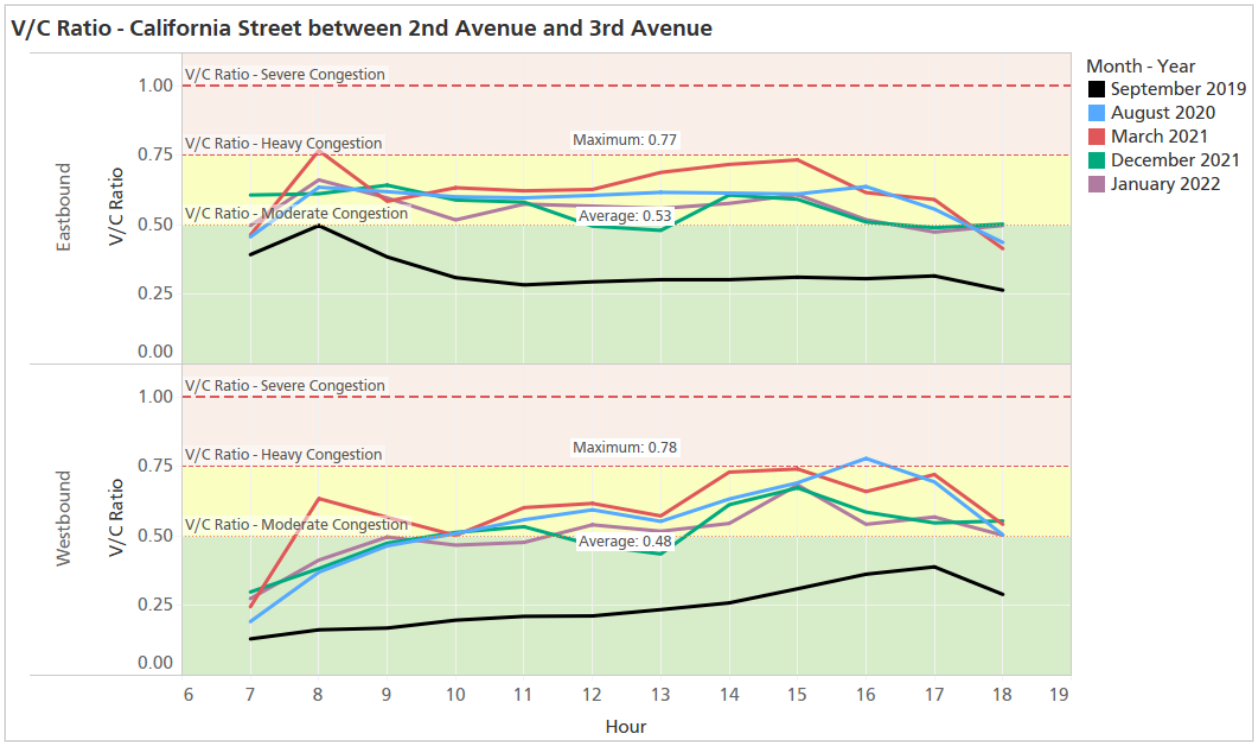
In an urban and city environment, moderate congestion is expected or not as concerning on most major roads due to the density of the area and a more compact road network.

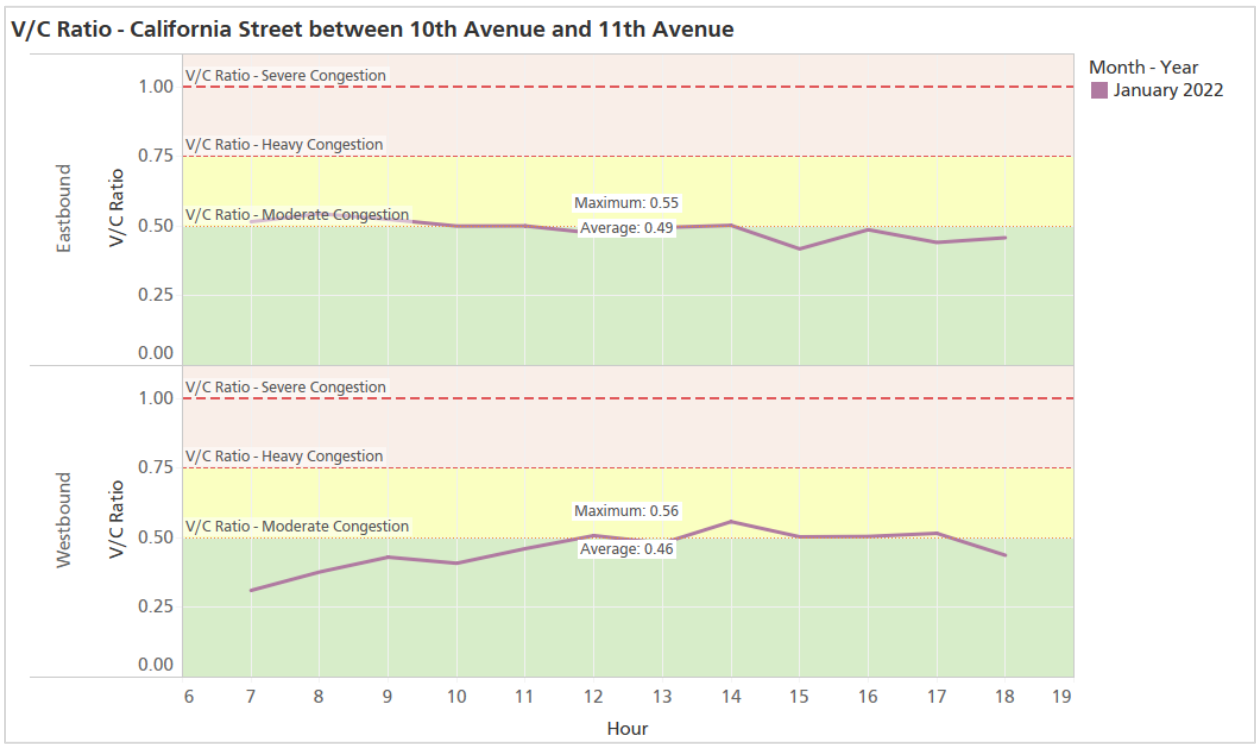
At current traffic levels, the partial diversion of traffic from the Lake Slow Streets to adjacent streets is not concerning since they still have the capacity to absorb extra traffic, and the magnitude of change is small. The most impacted portion along California Street is the eastern portion, specifically closer to Arguello Boulevard. Current congestion levels measured at California Street between 2nd and 3rd Avenue are moderate, but worse than before either the Lake Slow Street or California Street Safety projects were implemented. However, when comparing traffic flow and congestion just during COVID-19 conditions, there has been very little variation.

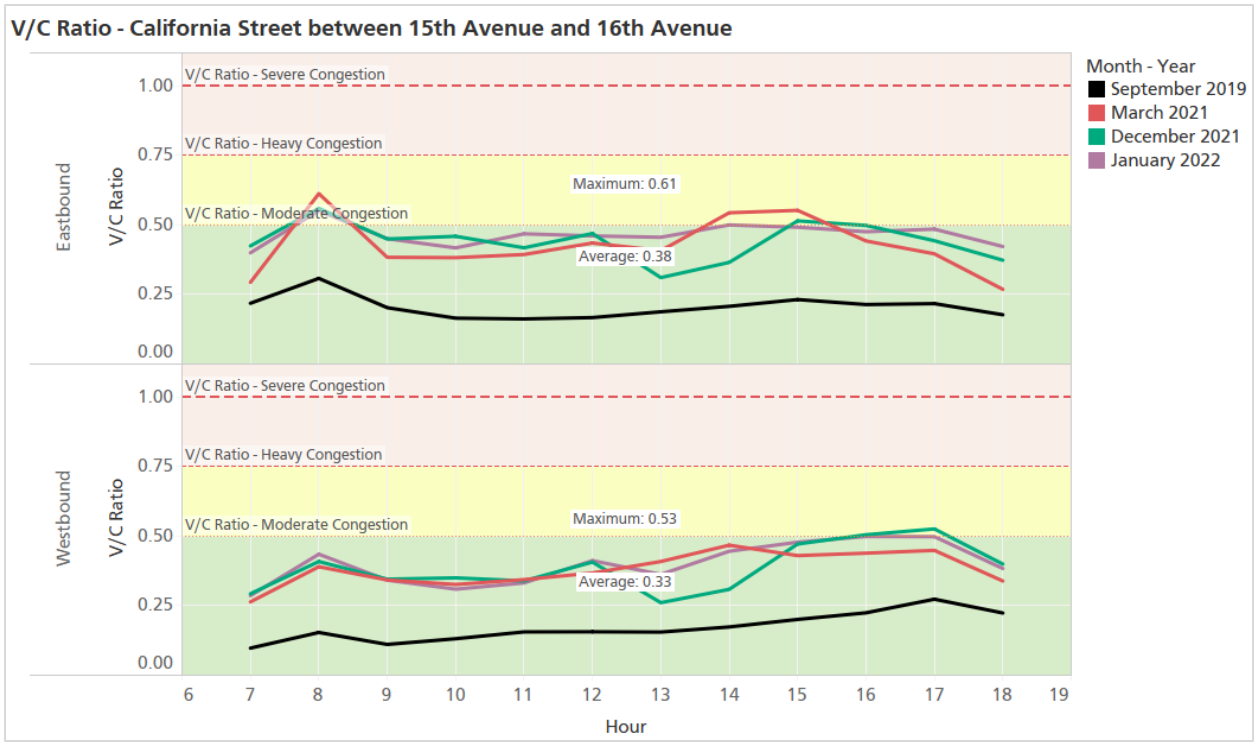
Moving westward along the corridor, the congestion impacts start to decrease. The middle portions, specifically the measured areas of California Street between 10th and 11th streets and 15th and 16th streets, show some periods between moderate and low to no congestion. The remaining locations, mostly the western portions of the corridor, have V/C ratios indicating that there is low to no congestion. Interestingly, these are the areas where there has been a slight increase to vehicle volumes and where vehicle speeds are the slowest along the corridor.

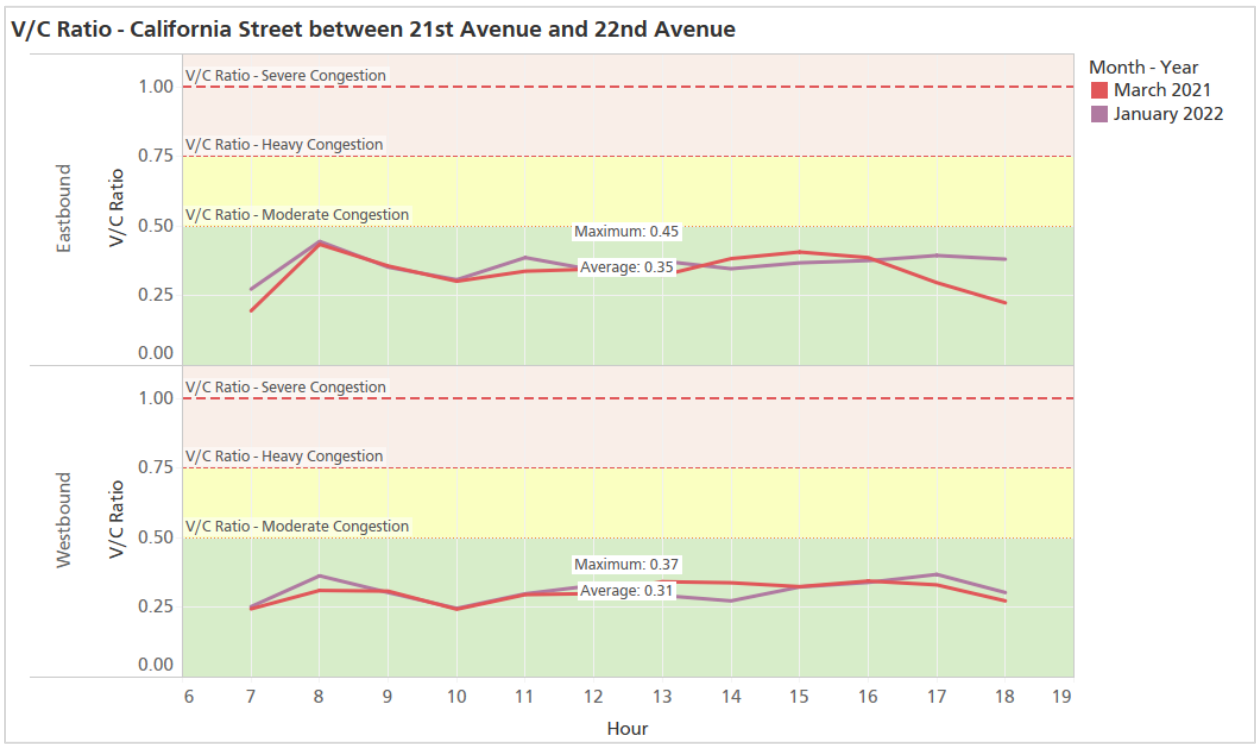
From this analysis, if congestion is a concern, it is mostly present in the eastern portions of California Street. Other than the very eastern area closest to Arguello Boulevard, congestion is low to moderate.

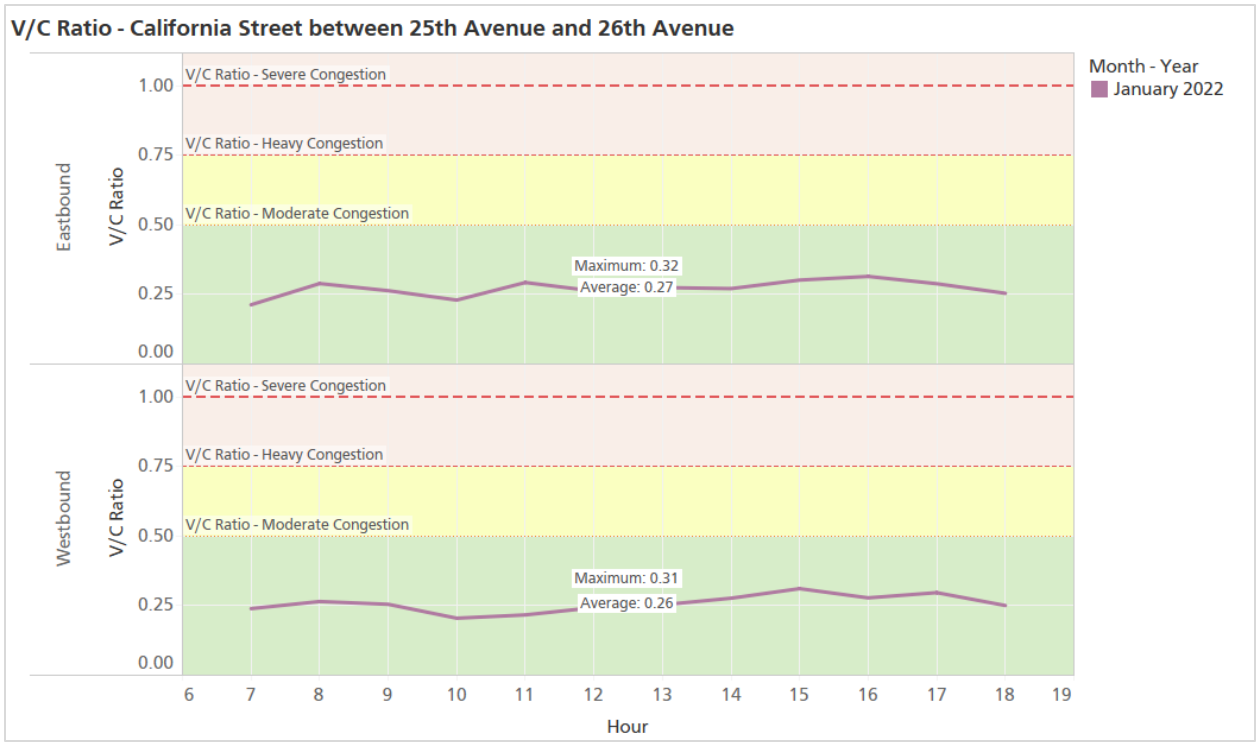
The findings for the V/C ratio analysis on Clement Street reflect the findings from California Street. Any concern around congestion is observed in the eastern portions of the corridor. Most of the V/C ratios measured on Clement also reflect that congestion levels are low to moderate.

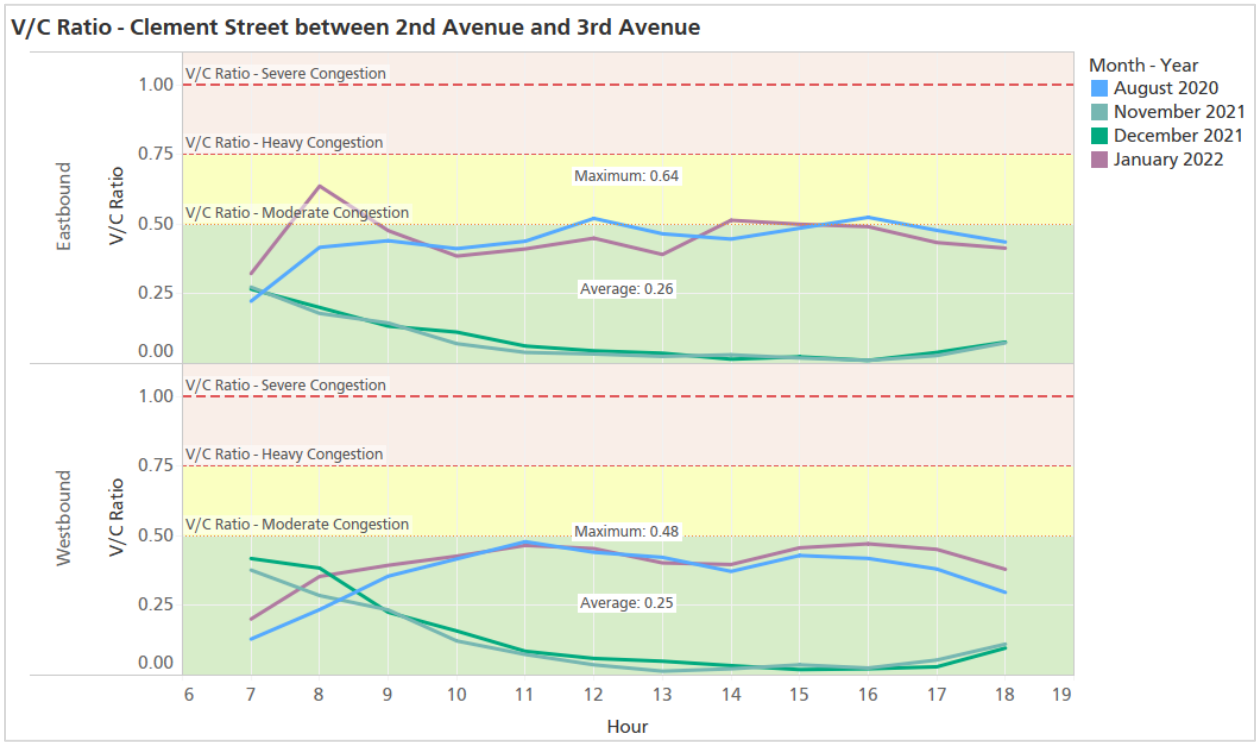

V/C Ratio - California Street between 2nd Avenue and 3rd Avenue
Eastbound
Westbound
V/C Ratio
V/C Ratio - Severe Congestion
V/C Ratio - Heavy Congestion
V/C Ratio - Moderate Congestion
Maximum: 0.77
Average: 0.53
Maximum: 0.78
Average: 0.48
1.00
0.75
0.50
0.25
0.00
6
7
8
9
10
11
12
13
14
15
16
17
18
19
Hour
Month - Year
September 2019
August 2020
March 2021
December 2021
January 2022

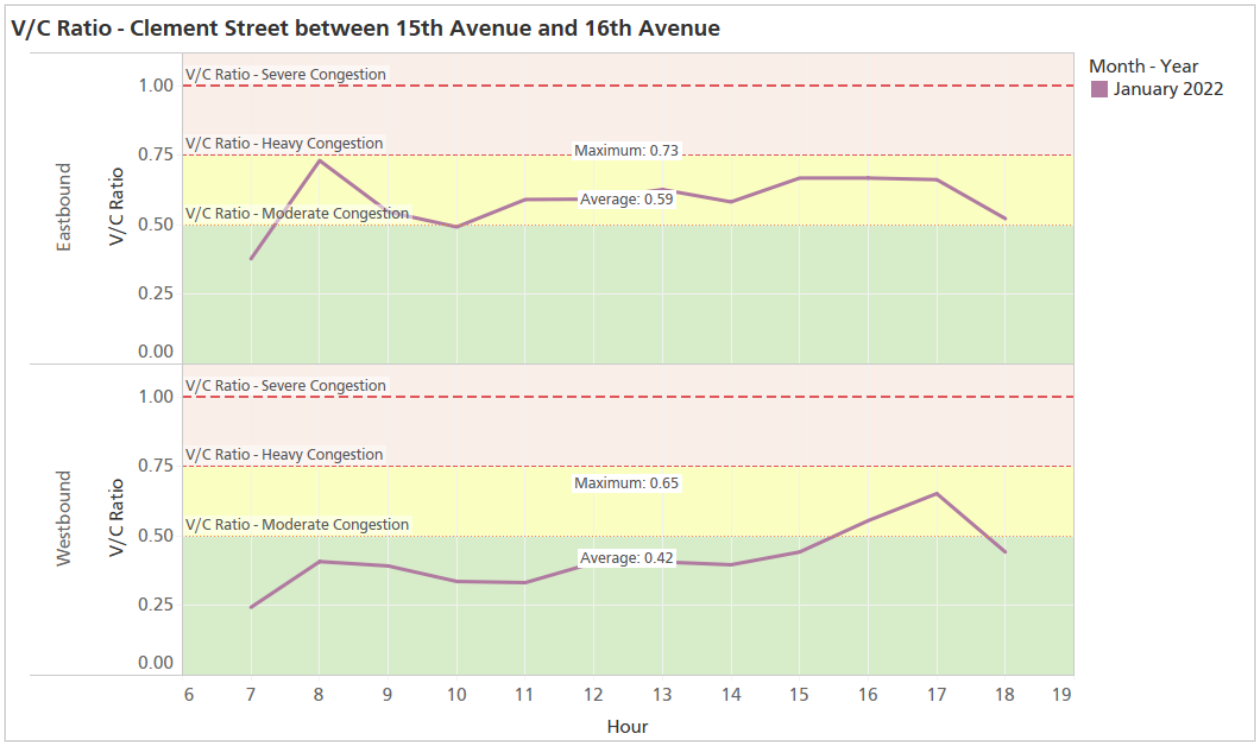

V/C Ratio - California Street between 10th Avenue and 11th Avenue
Eastbound
Westbound
V/C Ratio
V/C Ratio - Severe Congestion
V/C Ratio - Heavy Congestion
V/C Ratio - Moderate Congestion
Maximum: 0.55
Average: 0.49
Maximum: 0.56
Average: 0.46
1.00
0.75
0.50
0.25
0.00
6
7
8
9
10
11
12
13
14
15
16
17
18
19
Hour
Month - Year
January 2022

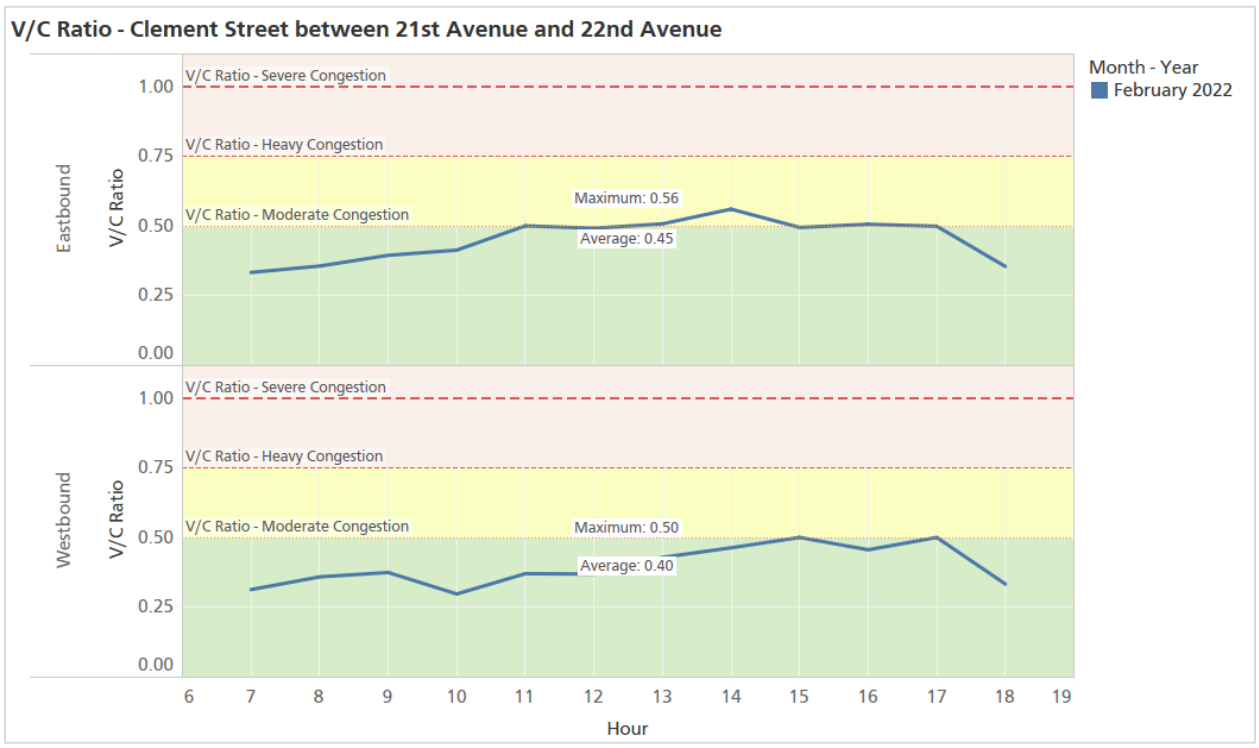

V/C Ratio - California Street between 15th Avenue and 16th Avenue
Eastbound
Westbound
V/C Ratio
V/C Ratio - Severe Congestion
V/C Ratio - Heavy Congestion
V/C Ratio - Moderate Congestion
Maximum: 0.61
Average: 0.38
Maximum: 0.53
Average: 0.33
1.00
0.75
0.50
0.25
0.00
6 7 8 9 10 11 12 13 14 15 16 17 18 19
Hour
Month - Year
September 2019
March 2021
December 2021
January 2022


V/C Ratio - California Street between 21st Avenue and 22nd Avenue
Eastbound
Westbound
V/C Ratio
V/C Ratio - Severe Congestion
V/C Ratio - Heavy Congestion
V/C Ratio - Moderate Congestion
Maximum: 0.45
Average: 0.35
Maximum: 0.37
Average: 0.31
1.00
0.75
0.50
0.25
0.00
6 7 8 9 10 11 12 13 14 15 16 17 18 19
Hour
Month - Year
March 2021
January 2022


V/C Ratio - California Street between 25th Avenue and 26th Avenue
Eastbound
Westbound
V/C Ratio
V/C Ratio - Severe Congestion
V/C Ratio - Heavy Congestion
V/C Ratio - Moderate Congestion
1.00
0.75
0.50
0.25
0.00
Maximum: 0.32
Average: 0.27
Maximum: 0.31
Average: 0.26
6 7 8 9 10 11 12 13 14 15 16 17 18 19
Hour
Month - Year
January 2022


V/C Ratio - Clement Street between 2nd Avenue and 3rd Avenue
Eastbound
Westbound
V/C Ratio
V/C Ratio - Severe Congestion
V/C Ratio - Heavy Congestion
V/C Ratio - Moderate Congestion
1.00
0.75
0.50
0.25
0.00
Maximum: 0.64
Average: 0.26
Maximum: 0.48
Average: 0.25
6 7 8 9 10 11 12 13 14 15 16 17 18 19
Hour
Month - Year
August 2020
November 2021
December 2021
January 2022

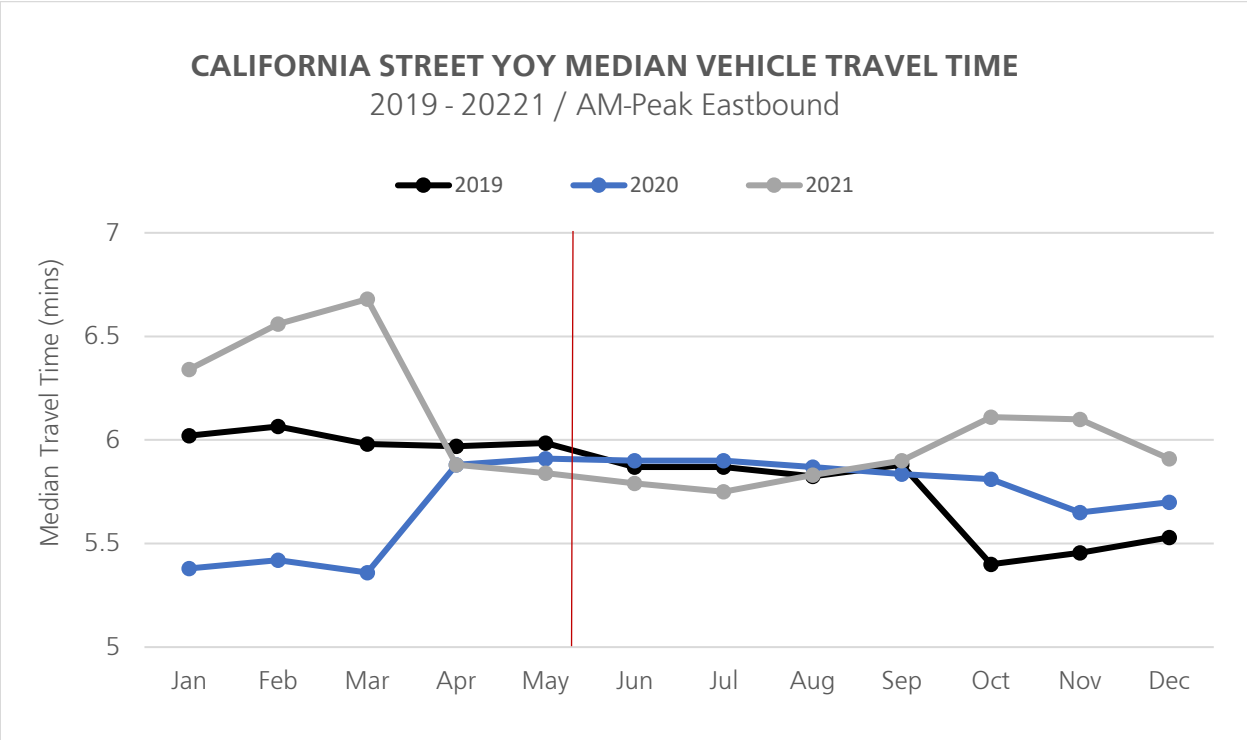

V/C Ratio - Clement Street between 15th Avenue and 16th Avenue
Eastbound
Westbound
V/C Ratio
V/C Ratio - Severe Congestion
V/C Ratio - Heavy Congestion
V/C Ratio - Moderate Congestion
Maximum: 0.73
Average: 0.59
Maximum: 0.65
Average: 0.42
1.00
0.75
0.50
0.25
0.00
6 7 8 9 10 11 12 13 14 15 16 17 18 19
Hour
Month - Year
January 2022

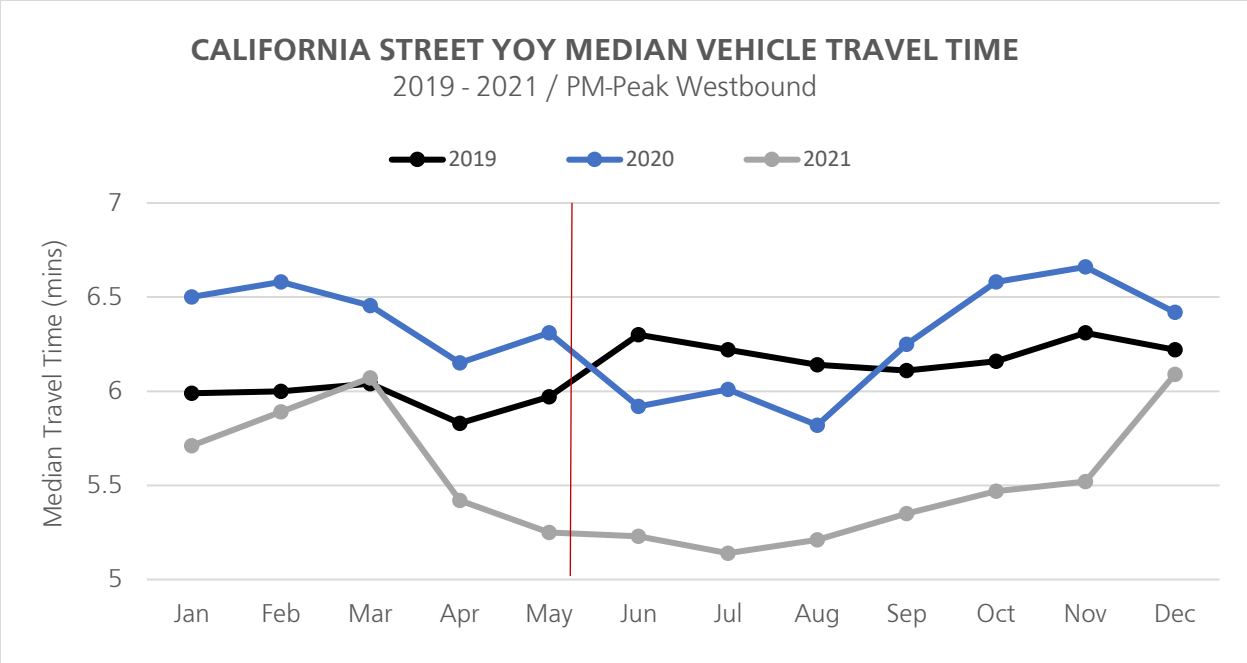

V/C Ratio - Clement Street between 21st Avenue and 22nd Avenue
Eastbound
Westbound
V/C Ratio
V/C Ratio - Severe Congestion
V/C Ratio - Heavy Congestion
V/C Ratio - Moderate Congestion
Maximum: 0.56
Average: 0.45
Maximum: 0.50
Average: 0.40
1.00
0.75
0.50
0.25
0.00
6 7 8 9 10 11 12 13 14 15 16 17 18 19
Hour
Month - Year
February 2022

Vehicle Travel Time on California Street

Median vehicle travel time was measured during the AM and PM peak commute periods on California Street to study the potential impacts of partial traffic diversion from Lake Street as part of the Lake Slow Street. Vehicle travel time was measured on California Street for the same extents as the Lake Slow Street, which is from 28th Avenue to Arguello Boulevard.

Overall, measured changes are not significant, and any change is relatively modest. Looking at the year over year changes, 2021, a year in which the city started to gradually "re-open" and more activity occurred, vehicle travel time is shown to be either faster or slightly slower to 2019 and 2020. In the AM-Peak, there was a slight increase, roughly about 30 seconds to three fourths of a one minute) in vehicle travel time during the periods where there were differences. In the PM-Peak, 2021 vehicle travel time was faster than both 2019 and 2020.





The table below shows the typical median vehicle travel time for each of the three years, and the difference in vehicle travel time between them. The AM-Peak commute period on California Street is showing longer travel time in 2021 when compared to both 2019 and 2020, but that difference and increase is only about 20 and 14 seconds. In the PM-Peak, vehicle travel time has improved year over year. When compared to 2019 and 2020, travel time has decreased by 47 and 35 seconds.

Typical Median Vehicle Travel Time Minutes (Arguello Boulevard to 28th Avenue)			
	Year	AM-Peak Eastbound Median Travel Time	PM-Peak Westbound Median Travel time
Minutes	2019	5.8	6.1
	2020	5.7	6.3
	2021	6.1	5.5
Seconds	2019	349	366
	2020	343	378
	2021	363	332
Difference in Seconds	Difference between 2019 and 2020	-6	+12
	Difference between 2020 and 2021	+20	-47
	Difference between 2019 and 2021	+14	-35
%Δ in Vehicle Travel Time Minutes	%Δ between 2019 and 2020	-2%	3%
	%Δ between 2020 and 2021	6%	-13%
	%Δ between 2019 and 2021	4%	-9%

Traffic Collisions on California Street

The analysis for traffic collision changes on California Street were conducted by the California Street Safety project team. The table below shows their findings:

Location	Average yearly injury collision rate (2017 to 2019)	Total Collisions 2020	Total Collisions 2021	Percentage Change (pre-project to 2021)
California between Arguello to Park Presidio	11	4*	4	-64%
California between Arguello to 28th Ave	17	10**	8	-53%
Citywide	3372	2405***	2592	-23%

*The project was installed in July 2020, amongst the four collisions in 2020, one occurred after project implementation

** Of the 10 injury collisions in 2020, three collisions occurred after project implementation

*** of the 2405 injury collisions in 2020, 1057 collisions occurred after project implementation

Overall, the collision rate has improved. For the entire section parallel to the Lake Slow Street, there has been a 53% decrease in the collision rate when comparing the average annual rate pre-implementation to post-implementation of both the Lake Slow Street and California Street Safety project. The data suggests that the Lake Slow Street has not negatively impacted traffic safety on California Street, even with slight increase in vehicle traffic in certain sections along the corridor.