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# Measuring, Analyzing and Identifying Small-Area VMT Reduction

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Disclaimer

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**Table of Contents**

Abstract.......xi

Executive Summary.......xiv

1. Introduction.......1

2. Materials and Methods.......4

2.1 Study Design.......4

2.2 Case Study Selection.......4

2.3. Built Environment Changes.......6

2.4 Travel Behavior Changes.......6

3. Results: Sacramento.......12

3.1. Introduction.......12

3.2 Key Policies.......14

3.3 Significant Land Use Changes.......18

3.4 Significant Transportation Changes.......27

3.5. Travel Behavior Changes.......31

3.6. Assessment.......56

4. Results: Fresno.......62

4.1 Introduction.......62

4.2 Key Policies and Plans.......63

4.3 Significant Land Use Changes.......67

4.4 Significant Transportation Changes.......71

4.5 Travel Behavior Changes.......74

4.6 Assessment.......87

5. Results: Santa Monica.......90

5.1 Introduction.......90

5.2. Key Policies and Plans.......91

5.3 Significant Land Use Changes.......95

5.4 Significant Transportation Changes.......103

5.5 Travel Behavior Changes.......119

5.6. Assessment.......137

6. Summary and Discussion of Case Studies.......140

7. Discussion: Scaling Up ....................................................................................143
8. Recommendations ........................................................................................147
References ........................................................................................................150
General References ........................................................................................150
Sacramento References ...................................................................................151
Fresno References ..........................................................................................155
Santa Monica References ................................................................................157
Appendices .......................................................................................................161

**List of Figures**

Figure 1.1. Conceptual Model ... 2

Figure 3.1. Sacramento Case Study Area ... 13

Figure 3.2. Map of bus and light rail system in study area ... 13

Figure 3.3. CADA's jurisdictional boundaries ... 21

Figure 3.4. Housing Units by Year and Geography in Sacramento ... 25

Figure 3.5. Housing Units in the Sacramento Central City, 2008 to 2018 ... 26

Figure 3.6. Map of bicycle network in study area ... 28

Figure 3.7. Change in Sacramento bus network relevance and investment by SacRT relative to 2008 ... 31

Figure 3.8. Share Driving to Work in Sacramento ... 32

Figure 3.9. Share Walking & Biking to Work in Sacramento ... 33

Figure 3.10. Share Using Transit to Work in Sacramento ... 35

Figure 3.11. Average Autos per Household (HH) Member ... 36

Figure 3.12. Autos per Household Driver in Sacramento ... 39

Figure 3.13. Median VMT per Household Member in Sacramento ... 40

Figure 3.14. Average Household VMT per Person for all Trips in Sacramento ... 48

Figure 3.15. Traffic Counts on L Street from 5th-7th Street 1992-2018 ... 54

Figure 3.16. Traffic Counts on R Street between 11th and 12th Streets 1998-2016 ... 55

Figure 3.17. Traffic Counts on Capitol Mall between 4th and 5th Street 1988-2018 ... 56

Figure 4.1. Fresno Case Study Area ... 62

Figure 4.2. Map of Underutilized Land and Development Potential from Fulton Corridor Specific Plan ... 65

Figure 4.3. The Fulton Mall in 1966 ... 68

Figure 4.4. Housing Units by Year and Geography in Fresno ... 70

Figure 4.5. Map of Downtown Fresno street improvements ... 72

Figure 4.6. Map of Fresno BRT Route ... 73

Figure 4.7. Share Driving to Work in Fresno ... 74

Figure 4.8. Walking and Bicycling to Work by Year and Geography ... 75

Figure 4.9. Transit to Work by Year and Geography in Fresno ... 77

Figure 4.10. Average Autos per Household Member ... 78

Figure 4.11. Autos per Household Driver in Fresno ... 81

Figure 4.12. Median VMT per Household Member in Fresno ....82
Figure 5.1. Santa Monica Case Study Area ....91
Figure 5.2. Santa Monica's "areas of conservation" (left) and "areas of significant change" (right), as identified in the 2010 LUCE ....96
Figure 5.3. Pico Branch Library at opening ....99
Figure 5.4. Schematic design of the Pico Branch Library (center top) in the context of Virginia Avenue Park ....100
Figure 5.5. The Annenberg Community Beach House in 2009 ....101
Figure 5.6. Housing Units by Year and Geography in Santa Monica Area ....102
Figure 5.7. The Metro Expo Line ....105
Figure 5.8. The Expo Line in Santa Monica and the LA Region ....105
Figure 5.9. Expo Line Light Rail Stations ....106
Figure 5.10. Santa Monica Bike Center ....108
Figure 5.11. Rendering of Ocean Park Boulevard illustrating the landscaped median, street trees, walking facilities, and green bike lanes ....110
Figure 5.12. Planned intersection investments on Ocean Park Boulevard in the 2016 Pedestrian Action Plan ....111
Figure 5.13. Breeze Bike Share Boundaries ....112
Figure 5.14. Santa Monica's Bicycle Network in 2007 ....117
Figure 5.15. Santa Monica's Bicycle Network in 2022 ....118
Figure 5.16. Driving to Work in the Santa Monica Area ....120
Figure 5.17. Transit to Work by Year and Geography in Santa Monica Area ....121
Figure 5.18. Active Travel to Work by Year and Geography in Santa Monica ....123
Figure 5.19. Average Autos per Household Member in Santa Monica ....124
Figure 5.20. Autos per Household Driver in Santa Monica ....127
Figure 5.21. Median VMT per Household Member in Santa Monica ....128
Figure 5.22. Big Blue Bus Ridership ....133
Figure 5.23. Pedestrian Count in Santa Monica ....134
Figure 5.24. Bicycle Count in Santa Monica ....135
Figure 5.25. Total VMT Santa Monica ....136
Figure 5.26. VMT by Vehicle Type Santa Monica ....136

**List of Tables**


Table 2.1. American Community Survey Tables Used ........ 7

Table 2.2. Case Study and Designated Comparison Areas ........ 8

Table 2.3. California and National Household Travel Surveys Used in Case Studies ........ 9

Table 3.1. Key Policies and Plans in Sacramento ........ 16

Table 3.2. CADA Projects and Development since 2000 ........ 22

Table 3.3. Notable Development Projects in Central Sacramento, 2000 to 2022 ........ 23

Table 3.4. Housing Units in Sacramento, 2010, 2015, 2019 ........ 25

Table 3.5. Total Population in Sacramento, 2010, 2015, 2019 ........ 26

Table 3.6. Median Income in Sacramento, 2010, 2015, 2019 (current dollars) ........ 27

Table 3.7. Share Driving to Work by Year and Geography in Sacramento ........ 32

Table 3.8. Share Walking and Biking to Work by Year and Geography in Sacramento ........ 34

Table 3.9. Share Using Transit to Work by Year and Geography in Sacramento ........ 35

Table 3.10. Average Autos per Household Member ........ 36

Table 3.11. NHTS & CHTS Sample Size of Households in Area in Sacramento ........ 37

Table 3.12. NHTS & CHTS Sample Size of Trips by Type by Area in Sacramento ........ 38

Table 3.13. Mode Share for Trips by Residents in Sacramento - NHTS and CHTS Data ........ 41

Table 3.14. Mode Share for Trips Ending in Area in Sacramento - NHTS and CHTS Data ........ 43

Table 3.15. Mode Share for Trips Starting in Area in Sacramento - NHTS and CHTS Data ........ 44

Table 3.16. Mode Share for Trips Internal to Area in Sacramento - NHTS and CHTS Data ........ 45

Table 3.17. Sample Size of Households in SACOG Regional Household Travel Surveys ........ 46

Table 3.18. Sample Size of Trips from SACOG Regional Household Travel Surveys ........ 47

Table 3.19. Mode Share for All Trips – SACOG Survey Data ........ 49

Table 3.20. Mode Share for Trips Ending in Area – SACOG Survey Data ........ 50

Table 3.21. Mode Share for Trips Starting in Area – SACOG Survey Data ........ 52

Table 3.22. Mode Share for Trips Internal to Area – SACOG Survey Data ........ 53

Table 3.23. Percent Change in Household VMT per Person in Sacramento, NHTS & CHTS Data ........ 57

Table 3.24. Percent Change in Household VMT per Person in Sacramento, SACOG Data ........ 58

Table 3.25. Summary of Results of ACS Analysis of Mode Share for Commute Trips ........ 59

Table 3.26. Summary of Results of NHTS/CHTS Analysis of Trips by Location for Sacramento ........ 60

Table 3.27. Summary of Results of SACOG Travel Survey Analysis of Trips by Location for Sacramento....61
Table 4.1. Annual Household Income in 2019....63
Table 4.2. Key Plans and Policies for Downtown Fresno....66
Table 4.3. Housing Units in Fresno, 2010, 2015, 2019....70
Table 4.4. Total Population in Fresno, 2010, 2015, 2019....70
Table 4.5. Median Household Income in Fresno, 2010, 2015, 2019....71
Table 4.6. Share Driving to Work by Year and Geography in Fresno....75
Table 4.7. Walking and Bicycling to Work by Year and Geography....76
Table 4.8. Transit to Work by Year and Geography in Fresno....77
Table 4.9. Average Autos per Household Member....78
Table 4.10. NHTS & CHTS Sample Size of Households in Fresno by Household Location....79
Table 4.11. NHTS & CHTS Sample Size of Trips by Type by Area in Fresno....80
Table 4.12. Mode Share of Trips by Residents by Area in Fresno....83
Table 4.13. Mode Share for Trips Ending in Area in Fresno....84
Table 4.14. Mode Share for Trips Starting in Area in Fresno....85
Table 4.15. Mode Share for Trips Internal to Area in Fresno....86
Table 4.16. Percent Change in Household VMT per Person in Fresno, NHTS & CHTS Data....87
Table 4.17. Summary of Results of ACS Analysis of Mode Share for Commute Trips for Fresno....88
Table 4.18. Summary of Results of NHTS/CHTS Analysis of Trips by Location for Fresno....89
Table 5.1. Key Plans & Policies....91
Table 5.2. Residential Development in the Santa Monica Case Study Area....97
Table 5.3. Constructed Commercial Projects....98
Table 5.4. Housing Units by Year and Geography in Santa Monica Area....102
Table 5.5. Total Population in Santa Monica, 2010, 2015, 2019....103
Table 5.6. Median Household Income in Santa Monica, 2010, 2015, 2019....103
Table 5.7. Santa Monica's self-assessed transportation conditions....104
Table 5.8. Completed pedestrian projects in the case study area, 2010-2019....114
Table 5.9. Completed pedestrian projects in the case study area, 2010-2019....114
Table 5.10. Driving to Work by Year and Geography in Santa Monica Area....119
Table 5.11. Transit to Work by Year and Geography in Santa Monica Area....120

Table 5.12. Active Travel to Work by Year and Geography in Santa Monica ........................... 122
Table 5.13. Average Autos per Household Member in Santa Monica ..................................... 124
Table 5.14. NHTS & CHTS Sample Size of Households in Santa Monica by Household Location ........................................................................................................... 125
Table 5.15. NHTS & CHTS Sample Size of Trips by Type by Area in Santa Monica ............... 126
Table 5.16. Mode Share for Trips by Households in Area in Santa Monica ............................. 129
Table 5.17. Mode Share for Trips Ending in Area in Santa Monica ........................................ 130
Table 5.18. Mode Share for Trips Starting in Area in Santa Monica ....................................... 131
Table 5.19. Mode Share for Trips Internal to Area in Santa Monica ....................................... 132
Table 5.20. Ridership on LA Metro’s Lines 4, 20, and 33 ....................................................... 134
Table 5.21. Percent Change in Median Household VMT per Person in Santa Monica, NHTS & CHTS Data ........................................................................................................... 137
Table 5.22. Summary of Results of ACS Analysis of Mode Share for Commute Trips for Santa Monica ........................................................................................................... 138
Table 5.23. Summary of Results of NHTS/CHTS Analysis of Trips by Location for Santa Monica ........................................................................................................... 139
Table A-1. Traffic Analysis Zones for 2000 Sacramento Household Travel Survey ................. 161
Table A-2. Traffic Analysis Zones for 2018 Sacramento Household Travel Survey ................. 161

**Abstract**

Senate Bill 375, signed into law in 2008, directed the California Air Resources Board to collaborate with the state's metropolitan planning organizations (MPOs) to set regional targets for reductions in GHG emissions from passenger vehicles. The MPOs are required to adopt Sustainable Communities Strategies (SCSs) that lay out the strategies by which the region will achieve its GHG reduction target, including strategies to reduce vehicle miles traveled (VMT). Strategies to reduce VMT include changes to the built environment, to both land development patterns and the transportation system, that reduce the need for driving. The goal of this project was to document on-the-ground changes in the built environment in selected communities over a two-decade period and assess whether changes in VMT have occurred over the same period. A secondary aim was to explore the contribution of local and/or regional policy change and public investments such as transit, bike, and pedestrian infrastructure as well as private development investments to the observed on-the-ground changes to the built environment. This project comprised case studies of Sacramento, Fresno, and Santa Monica, communities that experienced notable changes in their transportation systems and land development patterns between 2000 and 2019. The first part of the case-study analysis focused on identifying changes to the built environment in the area and the factors contributing to those changes, including public policies (broadly defined) and market forces. The second part of the case-study analysis examined changes in travel patterns in the area over this period of time using available data sources. Estimates of VMT showed reductions over time, while estimates of the shares of trips by active transportation modes increased, though the small sample sizes on which estimates were based makes them highly uncertain. In these case studies changes to the built environment were associated with changes in travel behavior consistent with the goal of reducing VMT. To more robustly evaluate the impact of built environment changes on VMT in specific areas, better data on travel patterns must be collected before and after the changes occur.

TITLE: Reducing vehicle miles traveled by changing the built environment: Does it work?

ISSUE/S: Senate Bill 375, signed into law in 2008, directed the California Air Resources Board to collaborate with the state's metropolitan planning organizations (MPOs) to set regional targets for reductions in GHG emissions from passenger vehicles. The MPOs are required to adopt Sustainable Communities Strategies (SCSs) that lay out the strategies by which the region will achieve its GHG reduction target, including strategies to reduce vehicle miles traveled (VMT). Strategies to reduce VMT include changes to the built environment, to both land development patterns and the transportation system, that reduce the need for driving. As one way to test the effectiveness of these strategies, this project used available data to qualitatively examine changes in travel patterns associated with changes in land-use patterns and the transportation system in three case study areas: the downtown areas of Sacramento, Fresno, and Santa Monica.

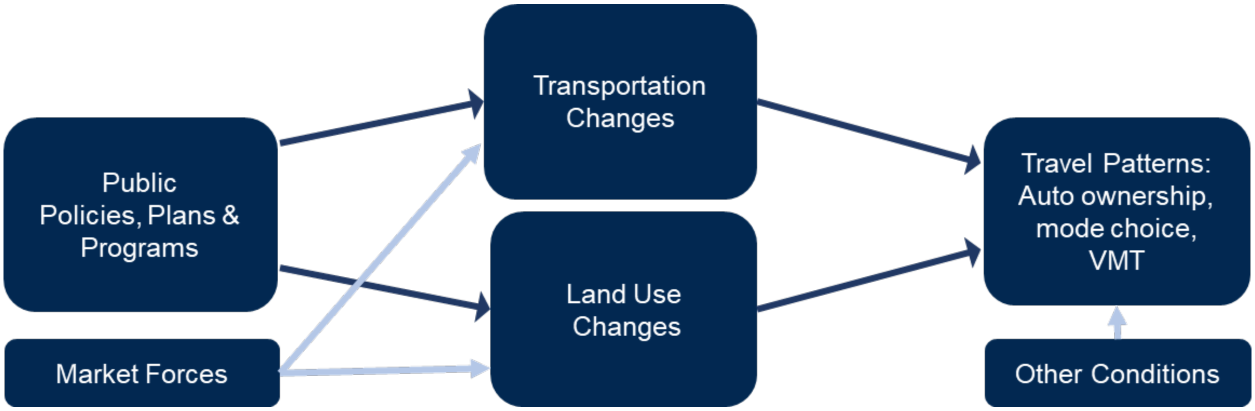
MAIN QUESTION: Are changes to the built environment associated with decreases in vehicle miles traveled in the case study areas?

KEY RESEACH FINDING/S: In all three case studies, the cities used innovative local plans, strategic infrastructure investments, private development projects, and support from the local community to bring about significant changes in the built environment over a two-decade period, changes that created the potential for a reduction in driving. Analysis of available data suggest that the case study areas had less driving and more walking and bicycling than elsewhere in their cities and that driving decreased and active travel increased more in the case study areas over the period. As a result, the gaps in estimated VMT and mode shares between the case study areas and the cities generally increased. This evidence of the potential impact of built environment changes on travel patterns is promising, though the small sample sizes on which estimates are based makes them highly uncertain and not definitive or conclusive.

CONCLUSION/S: The state has been pushing local governments to transform their built environments as a way to reduce car dependence through policies that include legislation such as SB 375, SB 743, SB 9, and AB 2097, funding programs such as the Active Transportation Program, and streamlining of the environmental review process under the California Environmental Quality Act. To robustly evaluate the impact of built environment changes on VMT in specific areas, data on travel patterns must be collected before and after the changes occur. The state can facilitate more robust evaluations by: 1. Developing a plan for preserving new sources of data at several points over time for a selection of areas where significant changes to the built environment are planned; and 2. Encourage or require before-and-after evaluations of specific projects, particularly those funded by the state, using methods appropriate to that type of project.

MORE INFORMATION: This work was completed under Contract No. 20RD006 Measuring, Analyzing and Identifying Small-Area VMT Reduction at the Institute of Transportation Studies at the University of California, Davis under the leadership of Principal Investigator Susan Handy (slhandy@ucdavis.edu) and CARB Contract Manager Jose Lopez-Perez (jose.lopez-perez@arb.gov.ca). The full report is available at [add URL].

**Conceptual Model for the Study**



## Executive Summary

### Background

Senate Bill 375, signed into law in 2008, directed the California Air Resources Board to collaborate with the state's metropolitan planning organizations (MPOs) to set regional targets for reductions in GHG emissions from passenger vehicles. The MPOs are now required to adopt Sustainable Communities Strategies (SCSs) in conjunction with their federally-required Regional Transportation Plans (RTPs). The SCSs lay out the strategies by which the region will achieve its GHG reduction target, including strategies to reduce vehicle miles traveled (VMT). Strategies to reduce VMT include changes to the built environment, to both land development patterns and the transportation system, that reduce the need for driving. The success of an SCS depends not just on the MPO's actions but also the actions and policies of the federal and state governments and of local governments – cities and counties – who have responsibility for land use policy as well as local streets. While a vast literature on the relationship between the built environment and travel behavior has established a strong association between them, few studies have examined changes in travel patterns associated with changes in the built environment.

### Objectives and Methods

The goal of this project was to use available data to qualitatively examine changes in travel patterns associated with changes in land-use patterns and the transportation system in three case study areas. Establishing an association is a necessary step towards establishing a causal relationship. The approach was in essence a "before-and-after" study of the effects of such changes, but because the study was conducted after the fact it relied on available data sources that provide both "before" and "after" data rather than original data collection tailored to the purpose of this study. The project comprised three case studies of areas where substantial transportation and land-use changes have taken place since 2000 and especially since 2010: the downtown areas of Sacramento, Fresno, and Santa Monica.

The first part of the case-study analysis focused on identifying changes to the built environment in the area and the factors contributing to those changes. The case studies explored how public policy may have shaped key changes in land-use patterns and the transportation system and the ways in which private developers contributed. The second part of the case-study analysis focused on the outcome: how did travel patterns change in the area over this period of time? This analysis relied on data from the American Community Survey, three household travel surveys that provide data for California over time, and other sources of data specific to each case study. Owing to the dramatic changes in travel patterns that occurred beginning in March 2020 in response to the Covid-19 pandemic, the analysis examined changes through 2019 only.

### Results

In all three case studies, cities were able to bring about significant changes in the built environment in their downtown areas that create the potential for a reduction in driving. They succeeded through some combination of innovative local plans, strategic infrastructure investments, projects initiated by private developers, and support from the local community. Santa Monica arguably saw the most significant change in the built environment in the 2010s; Sacramento was a close second, with some of the city's most significant changes having taken place in the early 2020s. Changes were more limited in Fresno, a smaller and less vibrant real estate market.

These changes together, in all three areas, improved conditions for transportation modes other than driving and might be expected to have both reduced VMT per capita and produced a shift in mode shares. To test whether changes in the built environment were associated with changes in travel patterns, VMT and mode share estimates for the case study areas were compared to estimates for larger comparison areas (i.e., the city or the city and the county, depending on the data source). The potential impact of changes to the built environment were assessed by examining changes in the gap between the case study area and the comparison area over time. Widening gaps stemming from a greater decrease in VMT and auto mode share or a greater increase in walk, bike, and transit mode shares in the case study area relative to the comparison area would provide evidence that the changes to the built environment could have impacted travel patterns. It is important to note that changes in socio-demographic characteristics and other factors not directly accounted for in the analysis could also have influenced travel patterns.

Estimates of VMT declined over the period, though the small sample sizes on which the VMT estimates were based makes them highly uncertain and the comparisons inconclusive. In Sacramento and Fresno, estimated VMT for residents was lower in the case study area than the comparison area, meaning that the increase in housing in these areas could have contributed to a VMT reduction even without a change in travel patterns within the case study area: more people are now living where it is possible to drive less. But the gap in estimated VMT between the areas did not always widen over the study period as expected. In Santa Monica, estimated VMT for residents was roughly equal in the case study and comparison area, though it decreased at a slightly faster rate in the case study area than the comparison area from 2009 to 2017. These results are suggestive but inconclusive given the high degree of uncertainty in the estimates.

Estimates of mode share also changed over the period, though the small sample sizes on which the mode share estimates are based makes them highly uncertain. In all three areas, estimated auto mode share was lower in the case study area than the comparison area and the estimated shares of other modes were mostly higher, but the gaps in estimates between the areas did not always widen over the study period as expected. In Sacramento, three data sources pointed to a decline in estimated auto mode share with an increase in walk, bike, and transit mode shares, but estimated trends were similar in the comparison area, meaning that the gap between the case study area and the comparison area did not necessarily widen. In Fresno, estimated auto mode share for commute trips was lower in the case study area than the comparison area but decreased only slightly, so that the gap did not widen over the period. In Santa Monica, estimated auto mode share was lower in the case study area than the comparison area and decreased in the former while increasing in the latter, leading to a wider gap between the areas. These results are suggestive but inconclusive given the high degree of uncertainty in the estimates.

### Conclusions

Given the small sample sizes, these findings should not be taken as definitive or conclusive. Nevertheless, they provide some evidence of a change in travel patterns associated with the documented changes in the built environment and thus support the hypothesis that a change in the built environment can cause a change in travel patterns. Santa Monica arguably achieved the most significant built environment changes during the period and had the strongest evidence of a change in travel patterns. That the evidence is not stronger across the case studies could reflect the fact that change is slow, both to the built environment and to travel patterns. Although these cities adopted ambitious plans that at least in part aimed to reduce car dependence up to two decades ago, the changes initiated by these plans can take decades to play out. In Fresno, for example, many of the changes occurred too recently to be reflected in the available data on travel patterns. In other words, the absence of strong evidence at this point in time is not evidence of an absence of an eventual shift in travel patterns away from driving and towards more sustainable alternatives. To more robustly evaluate the impact of built environment changes on VMT in specific areas, better data on travel patterns must be collected before and after the changes occur.

# Measuring, Analyzing and Identifying Small-Area VMT Reduction

## 1. Introduction

Senate Bill 375 (SB 375), signed into law in 2008, directed the California Air Resources Board to collaborate with the state's metropolitan planning organizations (MPOs) to set regional targets for reductions in GHG emissions from passenger vehicles. The MPOs are now required to adopt Sustainable Communities Strategies (SCSs) in conjunction with their federally-required Regional Transportation Plans (RTPs). The SCSs lay out the strategies by which the region will achieve its GHG reduction target, including strategies to reduce vehicle miles traveled (VMT). Strategies to reduce VMT include changes to the built environment, to both land development patterns and the transportation system, that reduce the need for driving. The success of an SCS depends not just on the MPO's actions but also the actions and policies of the federal and state governments as well as of local governments – cities and counties – who have responsibility for land use policy as well as local streets. Changes in local policies and investments are necessary to bring about a significant change in the built environment, which throughout California encourages, if not requires, driving. Some cities in California had begun adopting policies to reduce car dependence even before SB 375 requirements came into play, but significant changes to the built environment are so far limited to specific areas within the metropolitan regions of the state.

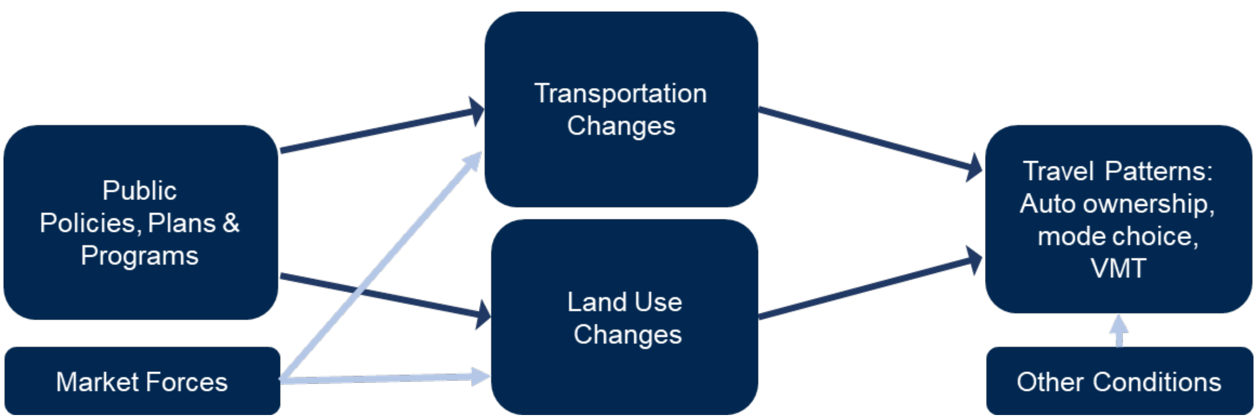
There is good reason to believe that changes to the built environment can reduce VMT under the right conditions. A vast literature on the relationship between the built environment and travel behavior has established that, at a given point in time, higher density neighborhoods with a mix of land uses, good transit service, and good bicycle and pedestrian facilities produce less VMT per capita than lower-density, auto-oriented neighborhoods, all else equal (Stevens 2017). But this literature consists almost exclusively of cross-sectional studies that show that differences in the built environment are associated with differences in travel patterns. Such studies are suggestive of the potential for changes in the built environment to produce changes in travel behavior but they do not directly demonstrate this causal effect. Stronger evidence comes from longitudinal studies that show that a change in the built environment is associated with a change in travel behavior. A few studies have examined changes in travel behavior for people who move from one kind of neighborhood to another (e.g., Handy et al., 2005). Other studies have focused on the impact of specific changes to the built environment, such as the installation of a new bicycle facilities (e.g., Monsere, et al. 2014) or the opening of a light-rail line (Spears, et al. 2017).

Studies examining changes in travel behavior stemming from a set of built environment changes occurring within a neighborhood or downtown district are rare even though built environment changes often occur in sets in relatively small areas: cities regularly adopt plans, change zoning, offer development incentives, and invest in new infrastructure all at once in an effort to reshape the built environment of a neighborhood or district, whether the goal is economic revitalization or reduced car dependence or both. As a result, isolating the effect of any one built environment change (or policy leading to a built environment change) on travel behavior is challenging given their interdependence, and, at the same time, understanding the effect of the entire set of changes is important given the potential for synergistic effects among them. Case studies of communities where a set of built environment changes has occurred are thus an important complement to these other types of studies in establishing the potential of built environment changes as a strategy for reducing VMT.

The goal of this project was to document on-the-ground changes to the built environment in selected communities over a two-decade period and to assess whether changes in VMT have occurred over the same period. Establishing an association between changes to the built environment and changes in travel behavior is a necessary step towards establishing that a change to the built environment causes a change in travel behavior. The approach was in essence a "before-and-after" study of the effects of built environment changes on travel behavior. Because it was conducted retrospectively, i.e., after the fact, it relied on available data sources that provide both "before" and "after" data rather than original data collection tailored to the purpose of this study. It mimicked a natural experiment in examining the association between changes in travel patterns from before to after a documented set of changes in the built environment. The study focused on three case studies of areas where notable transportation and land-use changes have occurred since 2000 and especially since 2010: the downtown areas of Sacramento, Fresno, and Santa Monica.

The first part of the analysis focused on identifying changes to the built environment and the factors contributing to those changes, including public policies (broadly defined) as well as market forces (Figure 1.1). The case studies explored how public policy and investments may have shaped key changes in land-use patterns and the transportation system and the ways in which private developers contributed. The second part of the case-study analysis focused on the outcome: how did travel patterns change in the area over this period of time? This analysis relied on data from the American Community Survey, three household travel surveys that provide data for California over time, and other sources of data specific to each case study. Owing to the dramatic changes in travel patterns that occurred beginning in March 2020 in response to the Covid-19 pandemic, the analysis focused on changes from the 2000s through 2019 only.

**Figure 1.1. Conceptual Model**




The analysis showed that all three case study areas experienced significant changes to the built environment in the 2000s and 2010s. These changes included changes in land-use patterns, especially an increase in housing density, as well as changes in the transportation system, including improvements to transit service and bicycling infrastructure. These changes came about as a result of local policies and investment decisions shaped by strong local leadership, but private developers were also instrumental. Estimates of VMT declined over the same period, though the small sample sizes on which VMT estimates were based makes them highly uncertain. In two of the three case study areas, VMT per person was lower than in surrounding areas, suggesting that the increase in housing in these areas will help to reduce VMT from a regional standpoint. Estimates of driving mode share declined while estimates of the shares of other modes increased over the period, though the small sample sizes make the estimates highly uncertain. That the evidence of a shift in travel patterns is not stronger across the case studies could reflect the fact that change is slow, both to the built environment and to travel patterns. Although these cities adopted ambitious plans that at least in part aimed to reduce car dependence up to two decades ago, the changes initiated by these plans can take decades to play out. For now, the trends in these areas appear to be largely in the direction of reduced VMT.

## 2. Materials and Methods

### 2.1 Study Design

The case studies presented here provide a holistic and largely qualitative assessment of the degree to which policies have changed the built environment in targeted areas and the degree to which these changes to the built environment have been associated with reductions in VMT and other favorable changes in travel patterns. The study design mimics a natural experiment in examining the association between changes in travel patterns from before to after a documented set of changes in the built environment. Establishing an association between changes to the built environment and changes in travel behavior is a necessary step towards establishing that a change to the built environment causes a change in travel behavior.

To better understand the changes in travel patterns, the patterns for each case were compared to travel patterns in larger geographic areas surrounding the case study areas. These comparison areas served as “counterfactuals” for the case studies in that they gave a rough indication of what changes in travel patterns might have been observed had the changes to the built environment within the district not occurred.

The expectations for the analysis of travel patterns were that the case study areas would have:

- lower VMT, lower auto ownership, lower auto mode share, and higher mode shares for transit, walking, and biking than the comparison areas at the start of the study period;
- declines in VMT, auto ownership, and auto mode share with increases in mode shares for transit, walking, and biking over the study period;
- greater gaps relative to the comparison areas with respect to VMT, auto ownership, and auto mode share, and mode shares for transit, walking, and biking than the comparison areas by the end of the study period.

It is important to recognize that travel patterns are influenced by many forces other than changes to the built environment, including socio-demographic changes as well as larger economic shifts, including fluctuations in gas prices. The analysis does not directly account for these forces, though changes in median incomes in the case study areas are noted.

### 2.2 Case Study Selection

To select the case study areas, the research team first identified areas in California that experienced notable changes in the transportation system and in land-use patterns in the last decade. A starting point for the identification of potential case study areas was the study of transit-oriented development policies in California by Barbour et al. (2021). The data collected in that study provided a basis for identifying communities where policies to reduce VMT have been adopted by cities and counties and where substantial change in transportation and land development may have occurred. Other sources included lists of projects funded through the California Climate Initiative programs, Metropolitan Planning Organizations (MPOs) funding programs and awards (e.g., One Bay Area Grants, SACOG Salutes), city and county general plans, specific plans, and the list of MPO’s “Best Practices” provided in Appendix C of the California Air Resources Board’s 2018 SB 150 Report. This initial analysis provided a cursory understanding of the nature of the changes in transportation and land use policy and projects in several areas including Santa Monica, downtown Fresno, central Sacramento, San Francisco, Sonoma County, Antioch, the East Bay Area, Merced, Turlock, and San Diego County.

The research team then gathered additional information about the areas identified in the preliminary analysis to assess the transportation and land use changes that have occurred on the ground and in concentrated districts within the cities. To assess the physical changes in these areas, the research team examined Google Street View images, reviewed city development agreements, local government staff reports, and press releases, and conducted in-person observations as necessary to understand the changes. Planning and policy documents were reviewed as well. Changes that were of particular interest included those that have the potential to reduce VMT: infill and transit-oriented development; transit, bicycle, and pedestrian investments; implementation of bike-sharing programs; and implementation of parking pricing. While many communities in California have implemented elements of the above list, the research team focused on communities that had implemented many of these strategies within a single district over a period of a decade or so, thereby maximizing the chances of triggering changes in travel behavior.

The case study areas that were selected – central Sacramento, downtown Fresno, and Santa Monica – have implemented a combination of such changes in a concentrated geographic area over an extended period throughout the 2000s and 2010s. While a statistical analysis of the effect of these changes on VMT and other measures of travel behavior across the case studies was not possible given the small sample size of just three case studies, it was possible to examine changes over time within these districts in more depth than would be possible from a practical standpoint with a large sample. This is the primary benefit of the case study approach.

The three case study areas have notable similarities and differences. All three serve as the cores of their respective cities, dating back to before wide-spread car ownership. The retain some of the characteristics of “traditional” pre-World War II neighborhoods, with a gridded street network, relatively high-density housing, and more mixing of land uses than is typical in newer parts of the cities. Prior to the policy changes described in the sections that follow, all three suffered from decades of car-oriented policies such as parking requirements, prioritization of cars in the use of street space, and freeway building that fostered suburban development in the post-war years to the detriment of traditional business districts. But their differences are also notable. Santa Monica launched its sustainable planning efforts before the others; its transportation problems are exacerbated by a daily influx of tourists. Sacramento adopted policies that aimed to enhance sustainability a bit later but still before SB 375 created the SCS requirement. Fresno’s efforts have been motivated more by the goal of economic revitalization than by sustainability, and it faces a more lack-luster real estate market.

The city in which each case study area sits was used as the primary comparison area, to given an indication of the “counterfactual”: what changes in travel patterns would have occurred in the case study area had the changes to the built environment not occurred. Cities are not a perfect counterfactual, in that the areas outside of the case study area are fundamentally different from the case study areas with respect to the built environment as well as socio-demographic characteristics. But they share other characteristics, such as city-wide policies and location within the region. Given the real-world (rather than laboratory) setting of the study, no comparison areas would have provided perfect counterfactuals for the case study areas. The analysis thus does not control for differences in or differences in changes in socio-demographic characteristics between the case study areas and comparison areas that could also influence travel patterns. The comparisons are nevertheless helpful in interpreting the trends in the case study areas, though they do not provide definitive evidence that the changes within the case study area contributed to those trends. For some data sources, the case study areas and their cities are also compared to their counties.

### 2.3. Built Environment Changes

To inventory changes to the built environment within the case study areas, the research team supplemented its initial research with interviews with local planners, systematic analysis of Google Street View archives, information from public agency sources (e.g., permit applications, development agreements), and site visits. Interviews and document analysis helped to identify the forces that contributed to these changes, including public policies, political actors, private sector actors, fiscal conditions, market dynamics, availability of developable land, and community activism. City documents often provided data on the built environment, particularly trends in housing units.

Through observations (in-person and virtual), interviews, and document analysis, the research team also identified contextual factors that may have contributed to changes in travel patterns, whether enhancing or dampening changes in VMT. For example, the rapid addition of new bike infrastructure might produce a greater impact on behavior than slower phasing of bicycle projects; a new stand-alone bike facility is likely to have less of an impact than one that closes an important gap in a bicycle network. Important contextual factors such as these were documented and considered in the case study analysis.

### 2.4 Travel Behavior Changes

The research team drew from many existing data sources to assess changes in VMT and other aspects of travel in the case study areas. Data sources included the American Community Survey (ACS), state and national household travel surveys, regional and local household travel surveys, and local sources such as vehicle counts, transit ridership counts, and pedestrian and bicycle counts to provide a more fine-grained assessment of changes in VMT and other aspects of travel. Many data sources did not specifically measure VMT; rather they measured aspects of travel that are related to automobility, such as mode share, or characteristics such as auto availability. The analysis included these related measures of travel as indicators of shifts that could produce a reduction in VMT in the case study areas.

The sample sizes for the case study areas for some of the data sources are quite small. Estimates produced from these small sample sizes have large margins of error and wide confidence intervals, meaning that estimated changes over time are highly uncertain and not statistically significant. In the absence of other data on changes in travel patterns, the results of the analysis even for small samples are presented in the subsequent sections but should be interpreted with extreme caution, as noted. The discussion of the results focuses on a qualitative assessment of general patterns and trends; statistical analyses were not conducted.

#### 2.4.1 American Community Survey

The American Community Survey is an annual survey conducted by the U.S. Census Bureau to gather population and household data from a nationally representative sample. The survey includes questions for workers about their commutes, including their usual mode of travel to work in the preceding week. The survey also asks about automobile ownership for households, and provides data on the number of housing units. Although the insights into travel behavior from this survey are limited, this is the only source of data on travel patterns that is available across the nation with a large enough sample that data can be examined at small geographic areas. Another benefit is that the ACS uses random sampling to achieve a representative sample of households and weights the sample to provide population-level estimates. Estimates of margins of error for the reported data are provided. In addition to the data on travel patterns, ACS data on selected population characteristics are incorporated into the case study chapters.

This analysis used the 5-year ACS data from 2010, 2015, and 2019 for each case study. The 5-year data represent the compilation of the samples for each of the five years within the period, thereby yielding a larger sample size and less uncertainty than the 1-year data. The case study analysis drew on tables listed in Table 2.1; Tables B08301, B08201, and S0801 were the sources of data for the analysis of travel patterns. Data were downloaded from the Census Bureau site for the census tracts making up the case study district as well as for the city and the county in which the district resides, as shown in Table 2.1. To simplify the analysis, the data for the case study area were not excluded from the data for the larger geographies. Because the case study areas are a small portion of each city and an even smaller share of each county, this simplification does not substantially affect the comparison of the case study area to the larger areas. Were the data for the case study area to be removed from the data for the larger areas, the differences shown in the analysis presented in subsequent sections could be even greater. In other words, the results presented were likely a conservative assessment of the differences between the case study areas and the larger areas.

Mode shares for the case study areas were calculated by summing the counts of workers by mode for each of the census tracts and dividing by the total number of workers. The measures of error were combined using the process laid out in the *ACS General Handbook*. The average number of autos per household was estimated by calculating the vehicles per household member for each category of people per household by vehicles per household then calculated a weighted average using the number of households in that category.

**Table 2.1. American Community Survey Tables Used**

- DP05 Demographic and Housing Estimates
- B25001 Housing Units
- DP04 Selected Housing Characteristics
- B08301 Means of Transportation to Work
- S1101 Households and Families
- S1901 Income in the Past 12 Months
- B08201 Household Size by Vehicles Available
- S0801 Commuting Characteristics By Sex

**Table 2.2. Case Study and Designated Comparison Areas**

| | Census Tracts | First Comparison Area | Second Comparison Area |
|---|---|---|---|
| **Fresno** | 1<br>5.02<br>6 | City of Fresno | Fresno County |
| **Sacramento** | 4<br>5<br>6<br>7<br>8<br>11.01<br>12<br>13<br>14<br>19<br>20<br>21 | City of Sacramento | Sacramento County |
| **Santa Monica** | 7012.02<br>7013.02<br>7014.02<br>7015.01<br>7015.02<br>7016.01<br>7016.02<br>7017.01<br>7017.02<br>7018.01<br>7018.02<br>7019.02 | City of Santa Monica | Los Angeles County |

### 2.4.2 State and National Travel Surveys

Household travel surveys provide much richer data about travel behavior than the ACS, but for much smaller sample sizes and not for every year. Four such surveys provide data for a sample of residents across the entire state of California (Table 2.3): the 2001 California Household Travel Survey (2001 CHTS), the 2009 National Household Travel Survey (2009 NHTS), the 2012 California Household Travel Survey (2012 CHTS), and the 2017 National Household Travel Survey (2017 NHTS). In all four surveys, data were collected for households using a 24-hour travel diary in which participants were asked to record all the trips they made, not just commute trips. The data include information about mode and destination, enabling a calculation of VMT for each trip, which was then aggregated to produce an estimate of VMT per household member. To appropriately scale results from the sample level to the population level, household weights were applied during the analysis.

Although the four surveys are largely similar, their methodologies differ in ways that might lead to differences in their results that would bias the comparisons between surveys. A recent analysis of data from three of these surveys concluded, however, that methodological differences had a limited effect on results for walking and bicycling travel (Pike and Handy, 2021). The analysis presented in subsequent sections puts more weight on comparisons between the 2009 and 2017 NHTS estimates because key data from the 2001 CHTS (e.g., VMT estimates) were often missing, and estimates from the 2012 CHTS often diverged significantly from the 2009 and 2017 NHTS estimates for reasons that most likely had to do with differences in methods.

**Table 2.3. California and National Household Travel Surveys Used in Case Studies**

| Survey | Number of California Households |
|---|---|
| 2001 CHTS | 17,040 |
| 2009 NHTS | 21,225 |
| 2012 CHTS | 42,500 |
| 2017 NHTS | 26,095 |

The data enabled an examination of travel behavior at the individual- and household-levels and analysis of travel patterns by geography and by socio-demographic characteristics, among other possible analyses. The data enabled both a longitudinal and a case-control analysis in which the case study area is compared to a "control" area. The longitudinal analysis examined changes in travel behavior over the years 2001 to 2017 (depending on data availability). The case-control analysis compared the case study area to the city, which served as a "control" or, as noted above, a possible counterfactual. More precisely, the comparison area was the city excluding the case study area: the estimates for the city were based on data that excluded the data for the case study area. It is important to note that the larger geographies do not provide perfect controls for the case study areas, in that their built environment characteristics and travel patterns differ significantly from the case study area even at the outset of the study period. To maintain consistency across the available surveys, the geographic areas were defined by zip code (records were not available at the census tract level for all four surveys).

Several metrics were presented for each of the case studies. Auto ownership was measured as the average number of available automobiles per licensed driver in a household. VMT was measured as median VMT per household member (essentially equivalent to the median VMT per person) for all trip purposes. Mode share, measured as the percentage of trips for all purposes by that mode, was estimated for four different sets of trips:

1. Trips made by households residing within the case or comparison areas (regardless of trip origin and destination);
2. Trips originating in the zip codes for the case or comparison areas (regardless of who made them);
3. Trips ending in the zip codes for the case or comparison areas (regardless of who made them);
4. Trips both originating and ending in the zip codes for the case or comparison areas (regardless of who made them), referred to as "internal trips."

The data tables for the CHTS and NHTS that were available for this study were not complete with respect to some attributes and therefore required further processing to be usable for this study, as follows:

- The household data table for CHTS 2001 did not include the household zip code. However, the location data table includes attributes about the trip destination purpose, trip destination zip code, and traveler household ID for each trip. The research team extracted the subset of location data with “home” as the trip destination purpose, then joined the household data with the data for this subset of trips based on the common household ID, with the destination zip code designated as the household zip code. This approach enabled the identification of residential location for most residents for each region. However, no zip code could be identified for households that made no trip.

- In the CHTS 2010 data set, the locations of trip destinations were missing for trips within trip chains. The trip destinations were found by joining trip data and location data based on a common location number. For trip origin, the research team followed a strategy based on the assumption that within a unique person’s trip chain, each trip destination will be the origin for the next trip. For trips with destination zip codes, a trip ID was created by combining household ID, person number in the household, and trip number in the chain. The possible “next trip ID” was created by adding 1 to the current trip ID. For those trips having a trip ID equal to any created “next trip ID,” the origin zip code was set as the current trip destination zip code. The trip origin for the first trip in a tour was defined as home, or in other words, the household zip code.

Given incomplete information in the available dataset, it was not possible to calculate VMT for 2001.

### 2.4.3 SACOG Travel Surveys

The Sacramento Area Council of Governments (SACOG) conducted household travel surveys, similar to the NHTS and CHTS surveys, in 2000 and 2018 (referred to as the 2000 HTS and the 2018 HTS). These surveys were similar to the NHTS and CHTS surveys, in that they involved a travel diary that collected data about all trips taken by the participants. A similar analysis approach was used as for the NHTS and CHTS data. In this case, the analysis was for three geographies: the case study area, the City of Sacramento (including the case study area), and Sacramento County. As with the other analyses, these larger geographies do not provide perfect counterfactuals for the case study areas. The traffic analysis zones (TAZs) used to define the three geographic areas are shown in Table A-1 and Table A-2 in the appendix.

VMT per capita and mode share were estimated for four sets of trips:

1. Trips originating in the case study or other areas;
2. Trips ending in the case study or other areas;
3. Trips that both started and ended in the case study or other areas; these are called “internal” trips;
4. All trips originating or ending in the case study or other areas.

VMT was estimated by compiling the distances covered by single-occupancy vehicles (SOV), high-occupancy vehicles (HOV2 and HOV3+) in the 2000 HTS data, and cars and taxis in the 2018 HTS data, respectively. To avoid duplicating VMT in calculations for drivers and passengers on the same trip, only the trip distances associated with drivers were included. To appropriately scale results from the sample level to the population level, household weights were applied during the analysis. Mode share was estimated based on counts of the number of trips for each travel mode.

Estimates were also made of the mode share of trips made by residents of the case study area versus residents of the two comparison areas. Mode shares for trips originating with the area, trips with destinations within the area, and trips both originating and ending in the area (i.e., internal to the area), regardless of where the traveler lived, were also estimated. The share of trips for each mode was calculated by simply dividing the number of trips by that mode by the total number of trips.

### 2.4.4 Other Data Sources

Local data sources often provide insights into trends in travel patterns, including transit ridership, bicycle counts, pedestrian counts, and traffic counts. The research team searched for local travel data for the case study areas by first looking online for open data sources on city websites Sacramento and Santa Monica both had open data portals for public use. A search through these portals for datasets that mentioned bike, pedestrian, or traffic counts yielded some relevant data, as summarized in the case studies that follow. In the absence of a data portal for the City of Fresno, the team reached out through the city's public records requests process for traffic count data. A search of city documents such as general plans, specific plans, modal plans, and general plan progress reports also yielded some data on travel patterns over time. Much of the data available from local sources is not helpful in examining trends over time or in isolating changes in travel patterns within the case study areas and is thus not included in the analysis.

# 3. Results: Sacramento

## 3.1. Introduction

The case study area for Sacramento is the 3.5 square mile region of Downtown, Midtown, and adjacent neighborhoods in central Sacramento bounded by the Sacramento River to the west, Highway 50 and Interstate 80 Business to the south and east (also called Capital City Freeway or “Business 80”), and the Union Pacific railroad tracks to the north (Figure 3.1). The area encompasses the oldest parts of the city, dating to the Gold Rush era. The California State Legislature officially moved to Sacramento in 1854, and in 1879 the city was named the permanent state capital. The State Capitol building is located at the center of the case study area, with many state office buildings nearby. The area is home to many historic buildings, including commercial buildings as well as grand Victorian houses. The historic Sacramento train station opened in 1926 near the site of the terminus of the first transcontinental rail line, completed in 1869.

This case study area is now commonly referred to as “The Grid,” the part of the city with lettered and numbered streets and 400-foot by 400-foot blocks. It is currently a mix of office, commercial, recreational, and residential land uses (City of Sacramento, 2023a). Major commercial corridors include J, K, and R Streets as well as $15^{th}$ and $16^{th}$ Street. The Golden 1 Center, located on two city blocks between K and L Streets and bounded by $5^{th}$ and $7^{th}$ Streets, anchors the Downtown Commons (“DoCo”) area with many restaurants, entertainment spaces, and shops, and is the home arena of a professional basketball team, the Sacramento Kings. The Golden 1 Center is also a major entertainment venue that holds concerts, commencement ceremonies, ice skating shows, and festivals. The Midtown area, generally east of 16th Street and between J and T Streets, is also home to many popular businesses, venues, restaurants, and bars (Midtown Association, 2023). The R Street district is also a popular destination within the case study area. The case study area is served by a light-rail system operated by Sacramento Regional Transit (“RT”) and bus service operated by many transit agencies (e.g., RT, Yolobus, Roseville Transit, Solano Express) (Figure 3.2). The MPO for Sacramento is the Sacramento Area Council of Governments (SACOG).

**Figure 3.1. Sacramento Case Study Area**

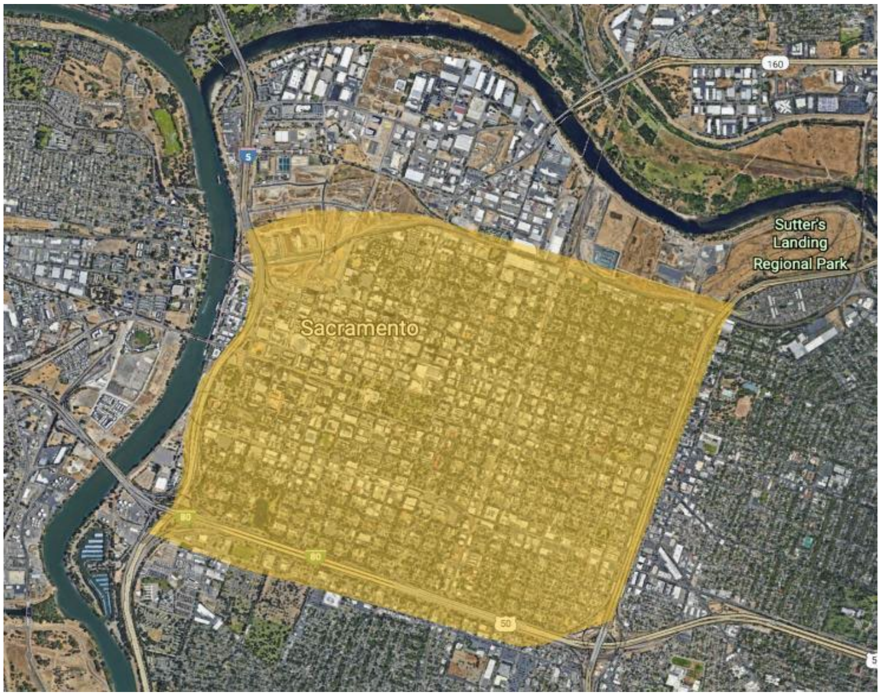
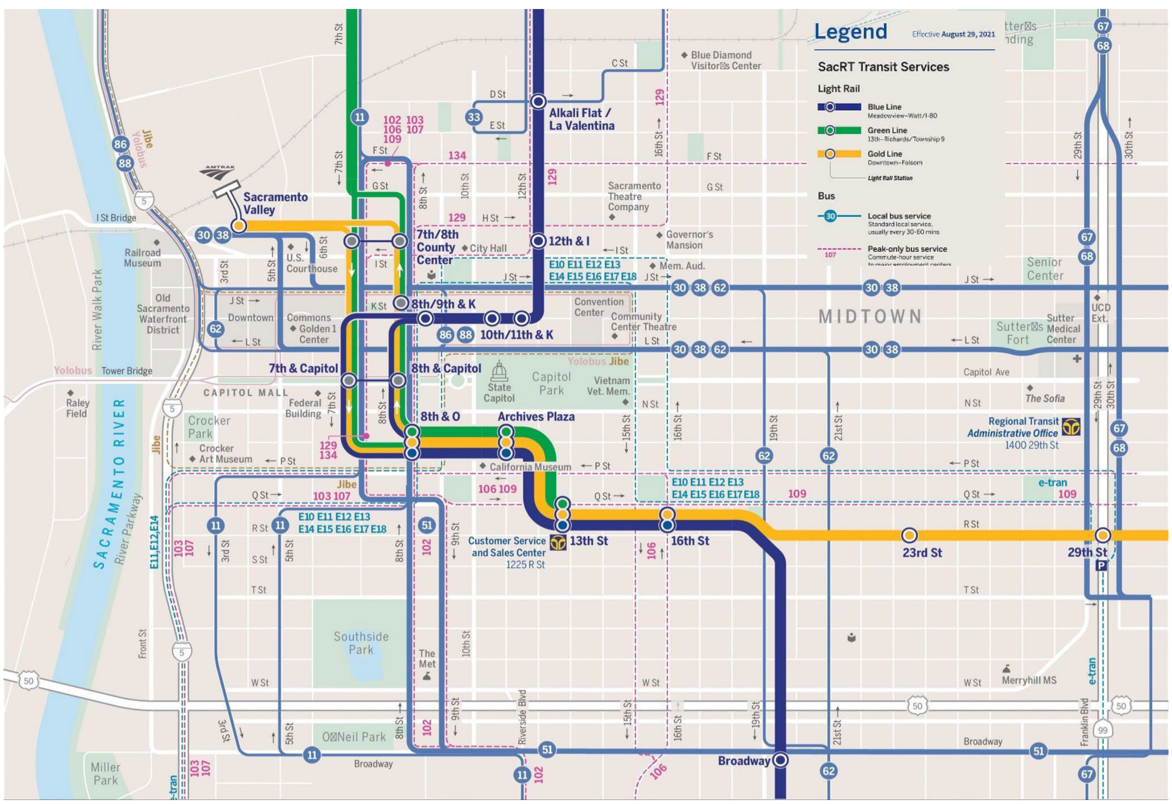



**Figure 3.2. Map of bus and light rail system in study area**




Source: Sacramento Regional Transit District, 2021b

### 3.2 Key Policies

Downtown Sacramento has seen significant changes in the last two decades as a result of a combination of bold planning initiatives on the part of the city and the efforts of private developers eager to take advantage of the opportunities the city created. Several key plans and policies have guided the change in Downtown Sacramento's land use patterns and transportation system (Table 3.1). The 2030 General Plan was an initial step toward the goal of growing smarter, reducing the city's carbon footprint, and developing a sustainable future (City of Sacramento 2015a). The new plan and the zoning code update that followed set the stage for subsequent plans and policies as well as important physical changes in the downtown area that had the potential to reduce vehicle travel. According to one analysis, Sacramento's planning efforts, which tie land use strategies to goals for transportation improvement, equity, and climate impacts, are "among the strongest statewide to integrate sustainability goals and policies" (Barbour et. al. 2021). The impacts of these plans and policies, many adopted between 2015 and 2018, are visible in the changes described in Sections 3.3 and 3.4 and will be important in shaping Downtown Sacramento in the years to come.

The **Sacramento 2030 General Plan** was adopted on March 3, 2009, and was the first review and revision of the plan in over twenty years. The previous version was adopted in 1988 and was amended over the years, but it was not until 2004 that a new General Plan was in development. The plan says in its introduction that thousands of city residents and business owners participated in community workshops and helped shape the plan for Sacramento's future. One of the plan's visions is that Sacramento will be linked to the rest of the region by an extensive, efficient, and safe network of roadways, bridges, mass transit, bikeways, pedestrian trails, and sidewalks. Development of this plan began in 2004, and its guiding principles of growing smarter, developing a sustainable future, and reducing our carbon footprint lead discussions in the plan of the issues that come along with climate change and how Sacramento plans to reduce greenhouse gas emissions. The city proposed that to reduce their greenhouse gas emissions, they will include strategies to encourage mixed-use development that supports walking and biking, use of public transit, "green building" practices, use of solar energy systems, architectural design to reduce heat gain, recycled construction materials, and water conservation measures (Sacramento 2030 General Plan 2009, page 1-5). According to one analysis, Sacramento's planning efforts, which tie land use strategies to goals for transportation improvement, equity, and climate impacts, are "among the strongest statewide to integrate sustainability goals and policies" (Barbour et. al. 2021). This plan, which preceded SB375, refers to the California Global Warming Solutions Act of 2006 (AB 32) in highlighting its goal of reducing GHG emissions. It was adopted in the wake of the adoption by SACOG, of its path-breaking 2004 Sacramento Region Blueprint, which aimed to implement smart growth principles, in part to reduce vehicle emissions (SACOG 2004).

As an implementation measure of the 2030 General Plan, the city updated its **Zoning Code** in 2013. In 2011 City Council directed staff to initiate the update and stated that the goal of the update was to provide a clear, concise, and consolidated plan of direction for development in the City. Up to that point, the zoning code had not been changed in 50 years. The purpose of this update was to streamline the development review process by creating a consistent site plan and design review process, provide flexibility in development standards to incentivize infill and sustainable development, and recognize urban and traditional development patterns referenced in the General Plan. For example, zoning for residential mixed-use projects changed maximum density from 36 dwelling units per acre to 60 dwelling units per acre and increased the maximum height in the zone from 35 feet to 45 feet. The new code allowed neighborhood-serving commercial development in higher-density residential areas and allowed housing in commercial zones. Updates to the parking requirements in the zoning code to eliminate minimum parking requirements for the core of the case study area and in specific situations elsewhere in the area were a “game changer,” according to city staff (City of Sacramento 2012; City of Sacramento n.d. 4).

The **2035 General Plan**, introduced in 2015, is the most current plan used by the city. In 2013, the city began a review and update of the 2030 General Plan. The update focused on updating programs and policies, in part to reflect new state laws, and streamlining development review and implementation. This plan introduces and connects transit-oriented development in both its land use and transportation elements. According to one analysis, the plan also supports TOD by calling for the city to facilitate infill development, require that new development maximize connections and remove barriers between neighborhoods and corridors, and remove physical barriers to transit. (Barbour et. al. 2021). The plan refers to the need to coordinate with SACOG and other regional entities but not to SACOG’s Sustainable Communities Strategy for the region, though its vision is consistent with the objectives of the SCS to reduce GHG emissions.

The **Grid 3.0 Plan**, introduced in 2016, was designed to serve “The Grid” of the central city and to further develop the area to accommodate new growth in the city over time. This plan’s goals are to create an interconnected system where pedestrians, cyclists, transit, and drivers exist in harmony with one another. This plan also strives to lower greenhouse gas emissions through making walking and biking trips more accessible and convenient and to improve the transit system to better serve common destinations. Another goal of this plan is to allow for an array of transportation choices through the accommodation of new and different modes on the streets of the central city while improving safety. The plan takes advantage of the gridded street network to propose a well-connected bike network that offers parallel options for bicyclists.

The Grid 3.0 Plan connects many other city plans, including the Central City Specific Plan, Bicycle Master Plan, and the 2035 General Plan. The layered transportation network approach of the Grid 3.0 Plan combines these plans together and divides its goals between them for implementation. This plan introduces Preferred Networks with maps for each layer of the network (roadway, pedestrian, bicycle and transit) with 10-year investment goals. Each network plan consists of new and improved infrastructure, roads, and streetscapes. The overall goal of this plan is to safely accommodate the projected increase in trips in “The Grid " stemming from expected population growth in the future. By removing and converting road lanes to prioritize walking, biking, and transit the plan aims to improve travel option in the central city. The city secured funding for the plan soon after its adoption. Early projects included parking-protected bikeways on P and Q Streets. Planning for the North 12$^{th}$ Complete Streets cycle track was also launched soon after adoption of the plan.

The purpose of the City of Sacramento’s **Bicycle Master Plan**, approved on August 16, 2016, is to set forth bicycle related investments, policies, programs, and strategies to establish a complete bicycle system. The goal of this plan is to encourage more bicycling for both transportation and recreation, as a way to help the city meet its emission targets. The plan aims to increase safety and ridership through a cohesive network of bikeways that accommodates riders of varying abilities and to establish efficient routes for bicycle commuters. The plan proposes an additional 148 miles of on-street bikeways for the city, for a total of 464 miles. The plan also calls for an additional 120 miles of off-street bikeways, for a total of 208 miles.

The **Central City Specific Plan** was adopted in March of 2018. This plan sets infrastructure policy and planning initiatives for the next 20 years in “The Grid.” The plan covers a wide array of topics, including employment, public art, historic resources, sustainability, public safety, utilities. One of the goals of the specific plan is to guide the construction of ten thousand new housing units, including affordable units, in the next ten years in the downtown area. To achieve this goal, the city has put in place many streamlining and assistance processes for identified opportunity areas (pg. 10). Development projects in compliance with the Specific Plan may benefit from streamlining of the development and environmental review process (pg. 167). The plan also aims to incentivize transit-oriented development (TOD) throughout downtown Sacramento.

The **Vision Zero Sacramento Action Plan** was adopted in August 2018 to address safety for pedestrians and bicyclists. As reported in the plan, thirteen percent of all trips in Sacramento are made on foot, but forty percent of all fatal crashes in the city involve a pedestrian; traffic crash victims who walk are ten times more likely to be killed or seriously injured in Sacramento than crash victims who drive (Vision Zero Sacramento Action Plan, 2018). The plan aims to eliminate all injuries and fatalities that could be prevented by changing in attitudes about road safety and improving safety for all modes of transportation, for example, by lowering traffic speeds and redesigning key streets. The plan uses crash data to identify a High Injury Network in need of improvement and the most common causes of serious crashes. The plan outlines "countermeasures" to increase safety in these areas.

**Table 3.1. Key Policies and Plans in Sacramento**

| Plan/ Policy | Year | Goals and Objectives |
|---|---|---|
| **General Plans** | 2009-2015 | General Plan 2030:<br>"Sacramento will be linked to the rest of the region by an extensive, efficient, and safe network of roadways, bridges, mass transit, bikeways, pedestrian trails, and sidewalks. It will be linked to the rest of California and the world by an international airport, conventional and high-speed passenger rail, interstate highways, and high-speed communication systems"<br><br>General Plan 2035:<br>"The General Plan will reduce GHG emissions primarily through land use patterns that support public transit, increased opportunities for pedestrians and bicycle use and encouraging 'green building' practices and alternative energy systems" |
| **Bicycle Master Plan** | 2016 | To encourage bicycling for transportation and recreation and increase safety, this plan will:<br>• Set forth bicycle related investments,<br>• policies, programs and strategies to establish a complete bicycle system<br>• Create a cohesive network of bikeways to accommodate riders of varying abilities.<br>• Establish direct commute routes to create efficient routes for riders that value ease of use and commute time.<br>• Routes should be designed around eliminating common conflicts to accommodate less confident riders" |

| Plan/ Policy | Year | Goals and Objectives |
|---|---|---|
| | | The plan proposes an additional 148 miles of on-street bikeways, totaling 464 miles of on-street bikeways. Also calls for an additional 120 miles of off-street bikeways, totaling 208 miles of off-street bikeways. |
| **Central City Specific Plan** | 2018 | The goal of this plan is to:<br>• Set up infrastructure policy and planning initiatives for the next 20 years in "The Grid".<br>• For land use, special zoning changes have been established to allow for development to be close to transportation.<br>• Develop 10,000 new housing units in 10 years<br>Many streamlining and assistance processes have been put in place for identified opportunity areas. Each project is subject to compliance with CEQA, but many development projects that comply with the Central City Specific Plan may not be subject for additional reviews, further streamlining the process.<br>The plan also supports development in affordable housing for denser areas that also support low income individuals. |
| **Grid 3.0** | 2016 | Designed to serve "The Grid" of the Central City and to further develop the area to accommodate new growth in the city over time.<br>This plan's goals are to:<br>• Create an interconnected system where pedestrians, cyclists, transit, and drivers exist in harmony with one another<br>• Lower greenhouse gas emissions through making walking and biking trips more accessible and convenient and to improve the transit system to better serve common destinations<br>• Accommodate new and different transportation modes while improving on the safety of its users to allow for new transportation choices to be made<br>This system is ideal for efforts to ease travel due to the availability of parallel alternate routes and simple navigation. |
| **Vision Zero** | 2018 | Vision Zero is a plan to eliminate all injuries and fatalities that could be preventable by a change in attitudes about road safety and allowing safe mobility for all modes of transportation by 2027.<br>By using historic crash data to pinpoint the factors contributing to traffic deaths and serious injuries, this plan can identify proven safety countermeasures to address those factors through education, engineering, enforcement, and evaluation.<br>With the help of crash data, the city:<br>• Identified corridors with the highest levels of serious crashes and labeled them their High Injury Network in need of improvement. |

| Plan/ Policy | Year | Goals and Objectives |
|---|---|---|
| | | • Identified the top ten most common causes of these serious crashes and developed safety countermeasures to increase safety in the future. |

### 3.3 Significant Land Use Changes

Central Sacramento has seen significant changes in land-use patterns in the last 20 years. Over 18 new apartment complexes built in the downtown and midtown areas offer over 2,500 units, several of which are affordable, as well as over 100,000 square feet of retail space (CADA n.d. 1; Downtown Sacramento Partnership 2021). Several new state buildings were built to hold thousands of state workers (Sacramento Downtown Partnership 2021). The redevelopment of the Downtown Commons area, including construction of the Golden 1 Center, brought new activity to the heart of Downtown. The R Street Corridor, an historical industrial area, was revitalized with street improvements for modes other than driving and has attracted new housing, restaurants, retail and services, and art experiences. The city's efforts encouraged and shaped these changes, but these changes also resulted from private sector interest in infill development opportunities, fostered by public subsidies, in up-and-coming areas. These changes have had the potential to reshape travel to and within the case study area with the possibility of a net decrease in driving.

#### 3.3.1 Golden 1 Center and the Downtown Commons

One of the most recognizable changes to the downtown area is the completion in 2016 of the Golden 1 Center, an entertainment and sports arena that brought new life to the K Street area and stands as the centerpiece of Downtown Commons. The Golden 1 Center, paid for by the with a mix of public and private funds, moved quickly from concept to completion. In 2013, the owners of the Sacramento Kings, unhappy with their old arena (the oldest in the NBA), were threatening to leave the city. The idea for putting a new arena on the site of an underutilized shopping center built downtown in the 1970s was heavily endorsed by former Sacramento Mayor Kevin Johnson, also a former professional basketball player. According to a City of Sacramento planner, there was no plan to develop an arena downtown until the owners of the Sacramento Kings threatened to leave the city. The 2030 General Plan was flexible enough to allow the plan for a new arena to be approved with minor amendments. One of the many goals of the 2030 General Plan was to make Sacramento the "most livable city in America" with a downtown vibrant with art, culture, entertainment, and a 24-hour population (City of Sacramento 2009). According to the City of Sacramento planner, the arena was about much more than basketball: it would be an opportunity to make progress toward the city's goals for downtown. In 2013, Senator Darrell Steinberg, California Senate President pro Tempore and the leader of the majority party in the California State Senate, proposed a bill, which eventually became Senate Bill 743, that would streamline the environmental review process for the new arena's transportation analysis (Grimes 2013). The bill changed the law such that the aesthetic and parking impacts of a residential, mixed-use residential, or employment center project on an infill site within a transit priority area would not be considered significant impacts on the environment (Steinberg 2013). In May 2014, Sacramento City Council finalized and approved the plans for the Golden 1 Center. The grand opening of the Golden 1 Center was just over two years later, in September 2016.

Concerns about the traffic congestion before and after events at the center prompted the city to adopt strategies that would encourage attendees to use modes other than driving. The site is served by the regional light-rail system, with three lines stopping just a block away. Amenities such as bike parking and a bike valet service, specified drop-off locations for ride sharing services, and electric vehicle charging stations are available for all events. The Golden 1 Center was also built without any additional parking spaces beyond those originally allotted for the old shopping center and nearby office space. The Transportation Management Plan for the arena seeks to reduce conflicts between users of all transportation modes, with the goal of ensuring the safety and effectiveness of the multi-modal transportation system around it for people leaving and entering the area (City of Sacramento 2016c).

The new arena generated new shopping, dining, and hospitality opportunities for the surrounding area. This area had previously gone through a substantial redevelopment process that led to the construction of the Downtown Plaza shopping center in 1971, which over time housed stores like Macy’s, United Artists Theaters, and the Hard Rock Cafe. The mall was sold to Westfield America Inc. in 1998, but was acquired in 2012 by JMA Ventures, LLC after several store vacancies and little investment by owners or the city (Bizjak 2012). To make room for the new Golden 1 Center, the Sacramento Kings began to acquire land in the mall. The only party that showed resistance to this were the owners of Macy’s Men’s and Furniture, who sued the city. A Sacramento Superior Court judge eventually awarded possession of the store to the city through eminent domain (Kasler and Lillis 2014). In 2015, the Sacramento Kings and JMA Ventures LLC announced the renaming of the area to Downtown Commons, or DOCO, with the intention of creating a mixed-use entertainment, dining, and shopping center (Sacasingh 2015). DOCO features 128,000 square feet of office space, 300,000 square feet of retail, a 250-room boutique hotel managed by Kimpton Hotels, and 50 residential units (Sacasingh 2015). DOCO is also home to the first Kaiser Permanente medical offices in the central city (Kaiser Permanente 2021). As of 2023, the area has 20 restaurants, 10 retail businesses, a movie theater, and a 24-Hour Fitness gym (DOCO 2023).

In a 2016 TV interview, Valerie Mamone of the Downtown Business Partnership reported that the partnership received many inquiries from retailers wanting to locate in the downtown area as well as investors looking to purchase properties during the Golden 1 Center construction. She also reported that pedestrian counts were up to three times higher during events than before the construction of the new arena (KCRA 2017). In February 2015, counts of pedestrians passing selected points showed that about 900 people visited the area where the Golden 1 Center stands during the hours of 12:00-1:00 pm and 7:00-8:00 pm on a typical week day (Downtown Sacramento Partnership 2015), with counts increasing to up to 90,000 on concert and game days (Downtown Sacramento Partnership 2022; Golden 1 Center n.d. 1; Golden 1 Center n.d. 2).

### 3.3.2 R Street Corridor

Over the last 20 years, the R Street Corridor has been transformed from an underutilized industrial area to a thriving activity center. According to a City of Sacramento planner, the R Street revitalization began with a series of city planning initiatives in partnership with property owners and developers. In 2002, the R Street Corridor, an historic industrial area served by one of the earliest rail lines in the state, was added to the city’s Streetscape Enhancement Plan. In 2014, work started on the first phase of a complete street revitalization of R Street. The project included street reconfigurations to improve safety for bicyclists and pedestrians as well as landscaping and upgrades to utilities, all while maintaining historic integrity.

Private development soon followed. In 2005, a Safeway, the central city's only full-service grocery store, opened on the east end of the corridor in a strip mall with businesses like a UPS Store and Panda Express (Downtown Sac, 2015; CYS Structural Engineers, Inc. n.d.). One of the first major housing projects, the Warehouse Artist Lofts, an infill apartment complex constructed in 2015 in one of the historic warehouses, added 116 total units to the area, 86 of them affordable-rate units by the city's definition, as well as 13,000 square feet of commercial space (CADA 2021). Another major project completed in 2017, the Ice House Midtown, offers 142 units (Apartments.com 2023).

According to a City of Sacramento planner, the R Street revitalization was successful because it was pushed forward by city officials who were excited and passionate about making a change in the corridor and by developers who were interested in making use of the architecturally interesting warehouses to transform the area into one of Sacramento's best entertainment commercial corridors. The planner also said that these property owners and developers were central to the planning process as well as the implementation of new projects for dining, entertainment, and shopping.

### 3.3.3 Infill Housing & Commercial Development

Infill development has increased the housing stock in the case study area, with notable projects throughout the case study period. In *Sacramento Places*, published in 2016, the city provided a long list of recent development projects that were consistent with "smart growth" principles including the goal of creating "compact, mixed-use development [that] reduces vehicle miles traveled (VMT) by enabling shorter trips, transit use, pedestrian activity, and biking" (City of Sacramento 2016a, p. 6).

In 2001, The Fremont Building was redesigned to accommodate 69 apartments on three stories over ground floor retail, with 11 of them at affordable rates (CADA, 2011). The Fremont Mews, an infill apartment complex located within one block of the light rail station at 16th Street, was completed in 2005 with 119 apartments, 40% of which are at market rates (CADA, 2011). La Valentina Station, completed in 2012, has 63 units and is an affordable and transit-oriented development project that faces the Alkali Flat/La Valentina light-rail platform and contains space for ground floor retail (David Baker Architects, 2023). These projects benefit from financing provided by the Sacramento Housing and Redevelopment Agency. The 2030 General Plan, completed in 2009, placed emphasis on "growing smarter" by encouraging strategic improvements to facilitate infill development and supporting new mixed-use and residential neighborhoods (City of Sacramento 2009). In 2015, Mayor Kevin Johnson set the goal to create 10,000 new housing units in Sacramento over the next 10 years (Hall 2015). From 2015 to 2021, the city constructed 2,500 new units, according to a planner for the city. From 2011 to 2019, fifteen projects for which information is available added a total of over 1,300 new units to the downtown area (CADA n.d. 1; Downtown Sacramento Partnership 2021). These developments increased the availability of both affordable and market-rate housing in the case study area. The Central City Specific Plan, adopted by the city in 2018, created a variety of incentives for infill development, including CEQA streamlining for quicker project approvals.

The Capitol Area Development Authority (CADA) has been a major player in residential and commercial development in the area immediately south of the California State Capitol and along the R Street Corridor. CADA is a public agency that formed in 1978 as a joint powers authority between the State of California and the City of Sacramento, charged with residential and commercial development on downtown property acquired by the State for government offices but ultimately not needed (CADA, n.d. 2). CADA serves both as the State's property manager and facilitates construction of new residential projects by private developers. CADA's jurisdictional boundaries are shown in Figure 3.3. CADA's residential and mixed-use developments are summarized in Table 3.2 (CADA n.d. 3).

**Figure 3.3. CADA's jurisdictional boundaries**

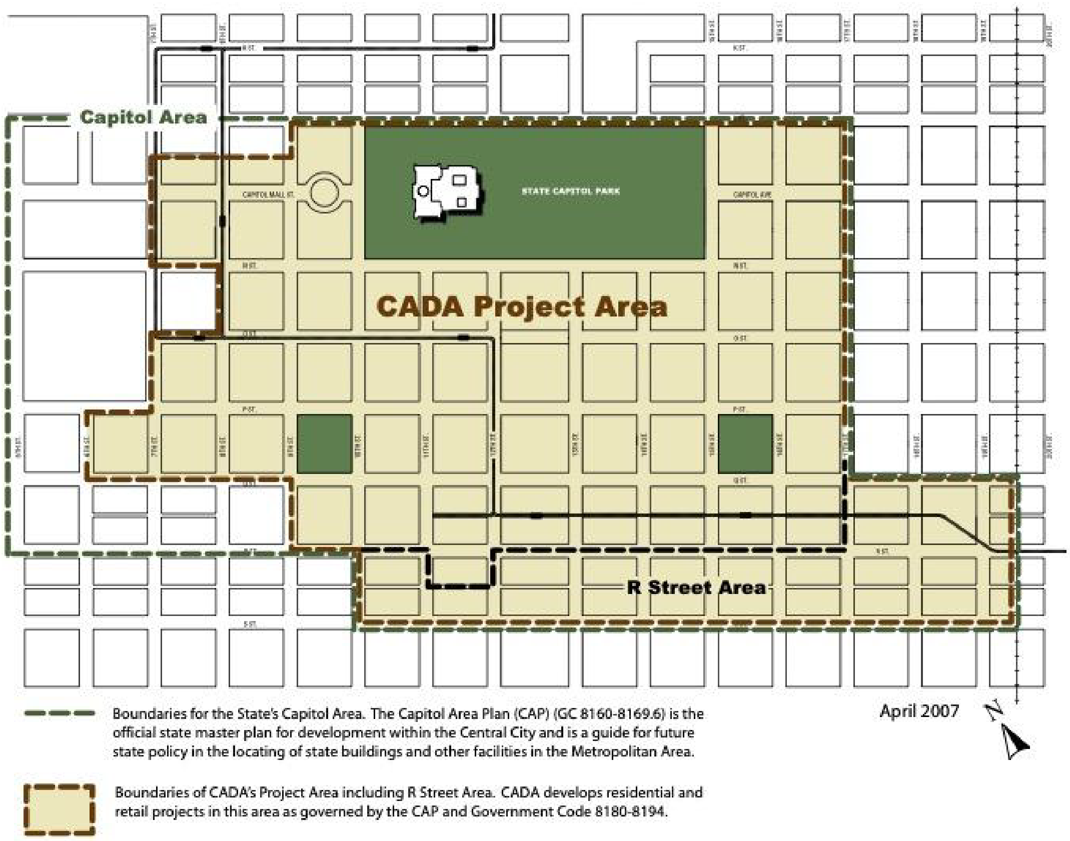


**Table 3.2. CADA Projects and Development since 2000**

| Project Name | Year Built | Total Housing Units | Affordable Units | Commercial SqFt |
|---|---|---|---|---|
| Inn Off Capitol Park | 2000 | 0 | 0 | 28,800 |
| Fremont Building | 2001 | 69 | 11 | 12,000 |
| 17th & N | 2001 | 18 | – | 0 |
| East End Office Complex | 2003 | 0 | 0 | 1.47 million |
| 1500 Q Street & the Q Street Lofts | 2001 | 6 | 2 | 1,090 |
| Capitol Park Homes | 2003 | 64 | 18 | 0 |
| Fremont Mews | 2005 | 119 | 48 | 0 |
| Fremont Community Garden | 2005 | 0 | 0 | 0 |
| Legado de Ravel | 2014 | 84 | 0 | 13,000 |
| 16 Powerhouse | 2015 | 50 | 0 | 7,700 |
| 1610 17th Street | 2015 | 1 | 0 | 0 |
| Warehouse Artist Lofts (WAL) | 2015 | 116 | 86 | 13,000 |
| Rochdale Building | 2016 | 0 | 0 | 9,000 |
| EVIVA Midtown | 2016 | 118 | 0 | 5,100 |
| Truitt Park | 2017 | 0 | 0 | 0 |
| **Case Study Timeframe (2010-2019)** | **6 projects** | **369** | **86** | **47,800** |
| **Overall Total (2000-2019)** | **13 projects** | **645** | **165** | **1.55 million** |

Source: CADA

SKK Developments, specializing in mixed-use urban infill and mixed-income housing, has also been a key player in residential development in Midtown. The company is responsible for many of the infill projects in Downtown Sacramento, including The Press, Eleanor Apartments, Q16, 20PQR, and The Fremont Building. The Hardin, a mixed-income building located close to light rail at 8th and K streets, added 137 new units, 84 at affordable rates, and 72,000 square feet of retail space in 2018 by CFY Development, an affordable housing developer, and D and S Development (Wang 2018). D and S Development is responsible for other market rate projects like 16 Powerhouse, completed in 2015, 14R as a cornerstone for the R Street Corridor redevelopment, as well as more recent developments (D and S Development 2023). Heller Pacific and Fulcrum Property have partnered to develop many mixed-use and adaptive reuse projects in the central city including Elliot Building, the Midtown Art Retail Restaurant Scene (MARRS) building, and the Ice Blocks on eastern end of the R Street Corridor (comprised of the Ice House, Ice Shed, and Ice Shops). A sample of projects developed in the central city are summarized in Table 3.3.

**Table 3.3. Notable Development Projects in Central Sacramento, 2000 to 2022**

| Project Name | Year Built | Total Housing Units | Affordable Units | Commercial SqFt |
|---|---|---|---|---|
| Fremont Building | 2001 | 69 | 12 | 12,000 |
| Capitol Park Homes(1) | 2002 | 64 | 0 | 0 |
| The Elliott Building(7, 8) | 2003 | 18 | 0 | 22,000 |
| 01 Lofts(7, 8) | 2005 | 14 | 0 | 14,000 |
| MARRS Building(7) | 2006 | 0 | 0 | 55,000 |
| 1801 L Street(1) | 2006 | 164 | 12 | 10,000 |
| iLofts(2) | 2006 | 9 | na | 5,000 |
| The Cannery | 2006 | 0 | 0 | 270,000 |
| L Street Lofts(1) | 2008 | 92 | 0 | 6,400 |
| Globe Mills Apartments(3) | 2008 | 143 | 143 | 0 |
| Sutter Brownstones(7, 8) | 2008 | 28 | 0 | 0 |
| 2600 Capitol Ave(7, 8) | 2008 | 0 | 0 | 55,000 |
| 17th and Broadway(2) | 2009 | 0 | 0 | 12,000 |
| 14R(2) | 2009 | 13 | na | 13,000 |
| Maydestone(2) | 2011 | 32 | na | 0 |
| Alhambra Medical Building(1) | 2012 | 0 | 0 | 110,000 |
| La Valentina(4) | 2012 | 81 | 81 | 0 |
| 7th & H(6) | 2013 | 150 | 150 | 7,500 |
| R12(7) | 2015 | 0 | 0 | 25,000 |

| Project Name | Year Built | Total Housing Units | Affordable Units | Commercial SqFt |
|---|---|---|---|---|
| 16 Powerhouse[2] | 2015 | 50 | 0 | 8,000 |
| Ice Sheds[7, 8] | 2016 | 0 | 0 | 16,000 |
| Ice House[7, 8] | 2017 | 142 | 0 | 16,000 |
| 20PQR @ Midtown Quarter[1] | 2017 | 32 | 0 | 0 |
| Q19 @ Midtown Quarter[1] | 2018 | 68 | 0 | 2,000 |
| Hardin[2] | 2018 | 137 | 84 | 65,000 |
| Ice Shops[7, 8] | 2018 | 0 | 0 | 133,000 |
| The Press @ Midtown Quarter[1] | 2020 | 277 | 0 | 8,600 |
| H16 Midtown[1] | 2020 | 95 | 0 | 0 |
| 1430Q[2] | 2020 | 75 | na | 9,000 |
| Eleanor Apartments[1] | 2021 | 95 | 0 | 0 |
| Capitol Duplex[2] | 2021 | 2 | 0 | 0 |
| Lavender Courtyard[5] | 2022 | 53 | 53 | 0 |
| Mansion Apartments[1] | 2022 | 186 | 0 | 3,010 |
| **Case Study Timeframe (2010-2019)** | **12 projects** | **692** | **231** | **382,500** |
| **Overall Total (2001-2022)** | **33 projects** | **2,089** | **439** | **874,510** |

Sources: [1] SKK Development, [2] D&S Development 2021, [3] CFY Development, [4] Domus Management Company, [5] Mutual Housing of California, [6] Mercy Housing, [7] Heller Pacific, [8] Fulcrum Property

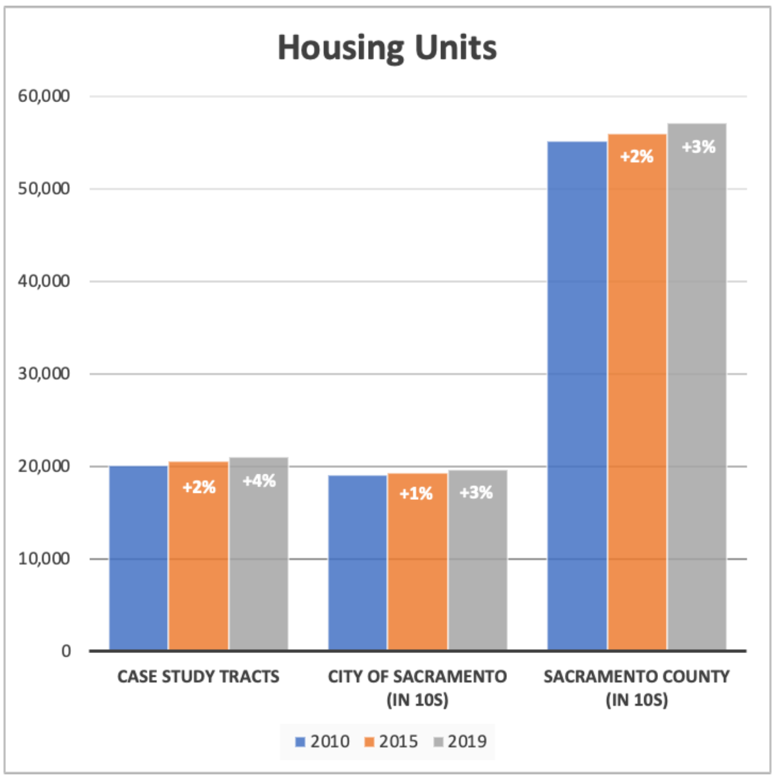
The American Community Survey shows a net increase of 874 housing units in the central city between 2010 and 2019, an increase of 4.3 percent over the nine-year period. Total housing units in the City of Sacramento and Sacramento County grew by 3.0 and 3.4 percent during the same time period, respectively (Table 3.4; Figure 3.4 (note that the scale for housing units is in 10s for the city and county)).

**Table 3.4. Housing Units in Sacramento, 2010, 2015, 2019**

| | 2010 | 2015 | 2019 | 2010-15 | 2010-19 |
|---|---|---|---|---|---|
| Case Study Tracts | 20,129 | 20,593 | 21,003 | +2% | +4% |
| City of Sacramento | 191,000 | 193,298 | 196,652 | +1% | +3% |
| Sacramento County | 551,985 | 560,271 | 570,752 | +2% | +3% |

Source: ACS 5-Year Estimates, Table B25001

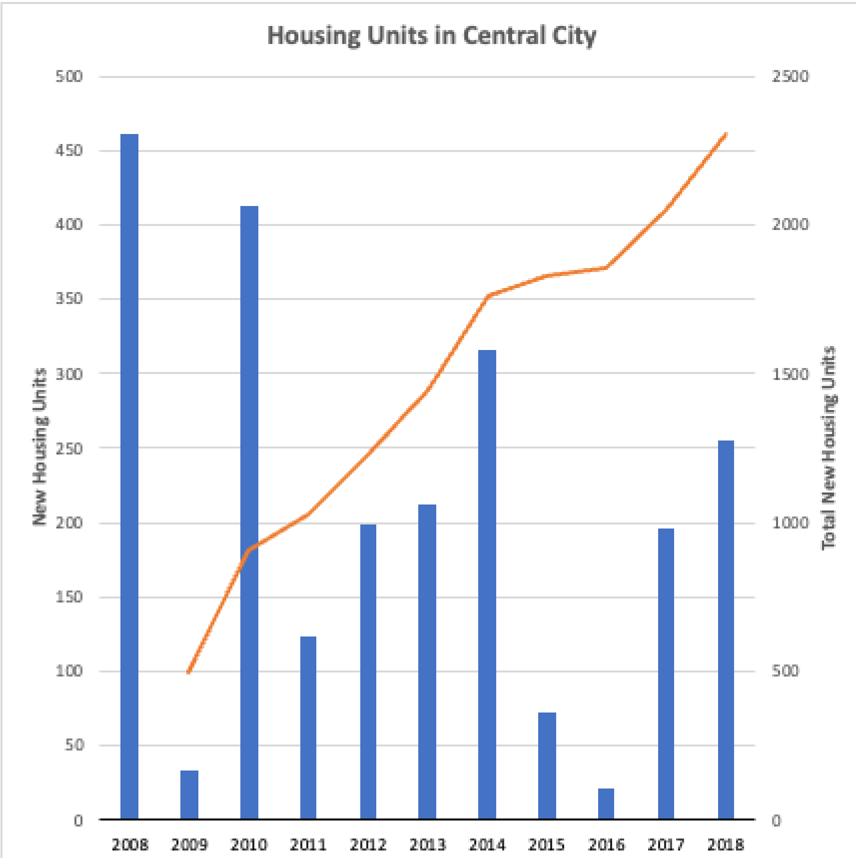
**Figure 3.4. Housing Units by Year and Geography in Sacramento**




Source: ACS 5-Year Estimates, Table B25001

The City of Sacramento prepared a status report in 2018 on its General Plan documenting the progress the city had made toward the development of housing in the central city, which nearly precisely overlaps with the case study area. It shows the increase in housing units by year and cumulatively over the case study timeframe, with nearly 2,500 new housing units added to the central city between 2009 and 2018, as shown in Figure 3.5.

**Figure 3.5. Housing Units in the Sacramento Central City, 2008 to 2018**




Source: City of Sacramento General Plan Annual Report for 2018

Despite the growth in housing units, the population in the case study area grew only slightly from 2010 to 2019, while the population of the city and the county grew by 9% (Table 3.5). Median income grew faster in the case study area than in the case study area than in the city or the county as a whole (Table 3.6), thought it remained lower in the case study area. This trend suggests a shift in the demographics of the residents of the case study area.

**Table 3.5. Total Population in Sacramento, 2010, 2015, 2019**

| | 2010 | 2015 | 2019 | 2010-15 | 2010-19 |
|---|---|---|---|---|---|
| Case Study Tracts | 32,095 | 31,130 | 32,326 | –3% | +1% |
| City of Sacramento | 459,511 | 480,566 | 500,930 | +5% | +9% |
| Sacramento County | 1,395,144 | 1,465,832 | 1,524,553 | +5% | +9% |

Source: ACS 5-Year Estimates, Table DP05

**Table 3.6. Median Income in Sacramento, 2010, 2015, 2019 (current dollars)**

| | 2010 | 2015 | 2019 | 2010-15 | 2010-19 |
|---|---|---|---|---|---|
| Case Study Tracts | $35,447 | $39,580 | $54,113 | 12% | 53% |
| City of Sacramento | $50,267 | $50,739 | $62,335 | 1% | 24% |
| Sacramento County | $56,439 | $55,987 | $67,151 | -1% | 19% |

Source: ACS 5-Year Estimates, Tables S1901, S2503

### 3.4 Significant Transportation Changes

The City of Sacramento also made notable changes to the transportation system through the 2010s, with the first projects starting around 2009. In 2016, the city adopted the Sacramento Grid 3.0 plan to improve safety for all transportation users and to enhance the street grid through various complete street and transit station improvements. The city has created new on-street and off-street bikeways, and more are planned.

#### 3.4.1 R Street Corridor

As noted above, construction on the R Street revitalization project began in 2004 and went on for several years in phases: the section between 10$^{th}$ and 13$^{th}$ Streets was completed in 2012, 16$^{th}$ to 18$^{th}$ Street was completed in 2015, and 13$^{th}$ to 16$^{th}$ Street was completed in 2018. This streetscape revitalization project included new pavement with one travel lane in each direction, new raised sidewalks, curb ramps, improved lighting, updates to the storm drain system, and new trees (City of Sacramento, n.d. 3). The light rail station on 16th street was reconstructed by Sac RT between 2015 and 2017, a project that included demolition of the existing station, site furnishings, irrigation, pole light LED retrofits, shelter LED lighting, mini-high shelter LED lighting, general clean-up, and security camera enhancements (Sacramento Regional Transit District 2017).

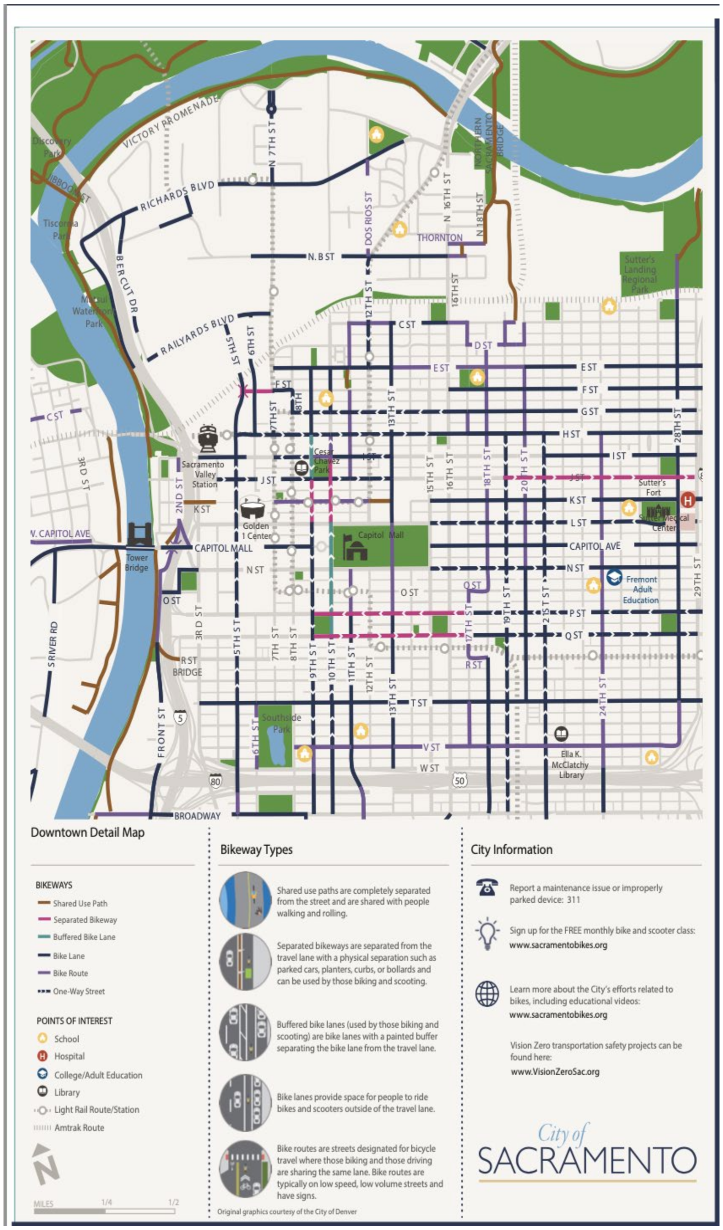
#### 3.4.2 Bicycle Lanes

Another change is the addition of 268 miles of new on- and off-street bikeways on many streets throughout Sacramento and the downtown area (Figure 3.6). Approximately 30 miles of these bikeways are in the case study area (City of Sacramento, n.d. 1). One of the city's goals for downtown Sacramento is to create an interconnected system of bikeways that serves “the Grid” and to increase the safety of those who cycle around the town (City of Sacramento, 2016). In 2018, as a part of the Downtown Mobility Project, an implementation phase of the Sacramento Grid 3.0 Plan, the city expanded its protected bikeway network on 9th Street on Q Street to L Street, 10th Street on Broadway to Q Street, 19th Street on H Street to Broadway, 21st Street on I Street to Broadway, P Street on 15th Street to 21st Street, and Q Street on 14th Street to 21st Street (City of Sacramento, n.d. 2).

#### 3.4.3 R Street Bike Bridge

After the construction of Interstate 5 in the 1960s, connections between downtown to the riverfront and Old Sacramento were scarce. To enhance connections between downtown and the Riverfront, in the fall of 2000, the City of Sacramento began a detailed study of the technical feasibility and environmental issues associated with bridging I-5 somewhere between just north of Capitol Mall (M Street) and approximately R Street to the south to connect downtown with the riverfront (City of Sacramento 2011). The study found that some type of connection over the I-5 freeway was feasible, and a planning-level study began in 2003, which included significant public involvement and meetings with local stakeholders (City of Sacramento 2011). After several years of reviewing as many as sixteen different concepts for the project, three concepts were presented at a Public Open House on November 15, 2006 (City of Sacramento 2011). After its approval, the final concept for a bike and pedestrian bridge from R Street over Interstate 5 to the trail on the other side was constructed in 2009 and opened in 2010 (Ruppenstein 2023).

**Figure 3.6. Map of bicycle network in study area**




Source: City of Sacramento, 2020

### 3.4.4 Bicycle and Scooter Share

In 2013, the Sacramento City Manager asked city Public Works staff to provide the city council with an update on programs to promote walking and biking as viable transportation options in the city (City of Sacramento 2013). One of the programs the city was interested in was a bike share program. The consideration of this program was based on consistency with General Plan policies to promote multimodal access to activity centers and utilize the city's public right of way (City of Sacramento 2013).

In 2014, the Sacramento Area Council of Governments (SACOG) awarded $3.9 million to the Sacramento Metropolitan Air Quality Management District and the cities of Davis, Sacramento, and West Sacramento to implement a bike share system in the cities (SACOG 2018). In 2015, SACOG took on the coordination of the bike share project by request from the Sacramento Metropolitan Air Quality Management District and the cities. In 2016, SACOG shifted from the concept of a publicly owned system to a public-private partnership, with private ownership and operation of the system, reflecting the emergence of a private bike-share industry. Moving forward, SACOG worked with their Bike Share Project Management Team (PMT), Bike Share Policy Steering Committee, and JUMP, an electric bike share company, to design a bike share system in the three cities (SACOG 2018).

In May 2018, JUMP Bikes released 190 electric bicycles in Downtown Sacramento (SACOG 2019). Uber purchased JUMP in 2018 to expand their network beyond cars (SACOG, 2019). As of November 2018, the electric bicycle fleet was at approximately 900 bicycles (Fitch et al., 2020). Soon after, more people in the study area rode Uber's electric bikes than used their ride-hailing service (Newcomer 2019). In 2019, JUMP increased the fleet in Sacramento to over 1,000 bicycles (Good Day Sacramento 2019). In February 2019, following the success of bike share in Downtown Sacramento, JUMP released 50 electric scooters downtown (KCRA 2019). In March 2020, Uber announced that they would be removing JUMP bikes and scooters from Sacramento and suspending service because of the coronavirus pandemic (Kasler 2020).

### 3.4.5 Car Share

Sacramento has had car share service since 2011, when the car share company Zipcar ran a successful pilot program in the city. In 2018, the city approved a new program that issues parking permits to car share operators meeting specified criteria. The program accommodates both car share with dedicated parking spaces and "free-floating" car share; it incentivizes zero-emission vehicles through the schedule of permit fees (City of Sacramento 2022). The city sees the car share program as a component of implementing the 2035 General Plan goals to use emerging transportation technologies and services to increase transportation system efficiency, promote multimodal transportation options, and build public-private transportation partnerships (City of Sacramento 2022). In March 2019, GIG Car Share released 260 free-floating electric car share vehicles that can be used anywhere inside a designated "Home Zone" (City of Sacramento 2022). The "Home Zone" is determined by census track boundaries and must include 20% by area of low income and disadvantaged communities

### 3.4.6 SacRT Green Light Rail Line

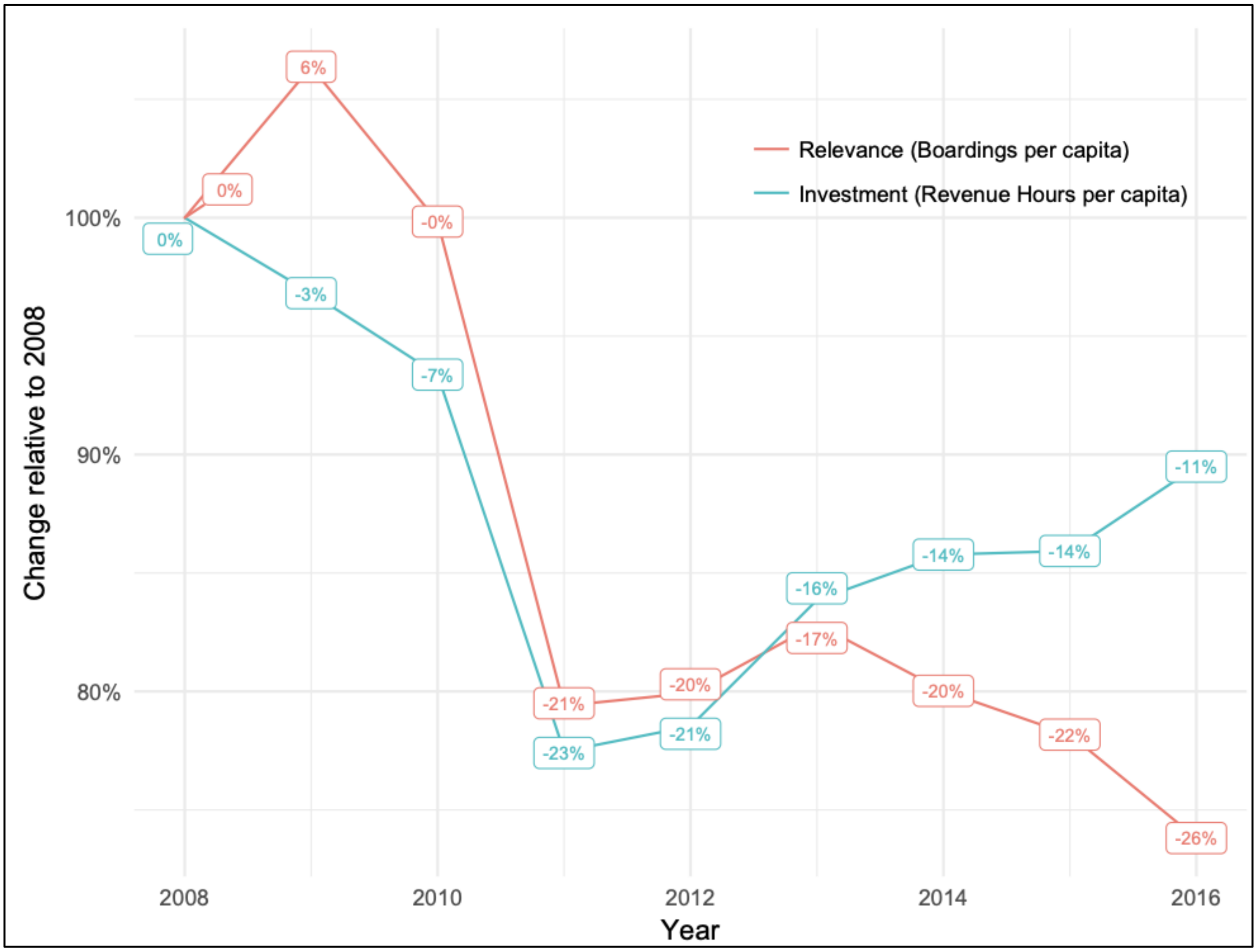
Light rail has been an important component of Sacramento's regional transportation system since the 1980s. In 1987, Sacramento Regional Transit opened an 18.3-mile light rail system linking the northeastern and eastern corridors of downtown Sacramento (Sacramento Regional Transit District 2022). In 1991, SacRT completed a Systems Planning Study examining several corridors for future light rail extensions within the Greater Sacramento Metropolitan Area

(Sacramento Regional Transit District 2021a). In 2001, SacRT completed another study of multiple corridors and identified that a Green Line extension that generally follows 7th Street and Truxel Road from downtown Sacramento to the airport would be a potentially cost-effective transit corridor (Sacramento Regional Transit District 2021a). In 2007, a Program Environmental Impact Report (PEIR) was prepared to assess the environmental impacts for the entire project area (Sacramento Regional Transit District 2021a). A new 1.1-mile extension of the Green Line from downtown Sacramento to Richards Boulevard along 7th Street and the 7th and Richards/Township 9 station opened in June 2012 (Sacramento Regional Transit District 2021a).

### 3.4.7 SacRT Forward

Bus service has also been important to the regional transportation system, though Sacramento Regional Transit (SacRT) has faced many challenges. Due to the 2008 recession, severe service cuts to the SacRT bus network were necessary from 2009–2011 to balance the agency's budget, leading to decreases in ridership (Walker 2018). SacRT worked hard to restore service as more funding became available starting in 2012, though service levels in 2016 remained below 2008 levels. An effort to restore ridership began in April 2018 with a Transit Choices Report assessing current conditions. In December 2018, a draft plan called SacRT Forward was released for public comment (Sacramento Regional Transit District 2019b). This plan detailed a major redesign of the bus network to provide a network that reflected customer needs, met current travel patterns, and featured improved connectivity with more direct service and better frequency (Sacramento Regional Transit District 2019b). SacRT received more than 600 comments from the public from more than 70 community, neighborhood association, and stakeholder meetings; agency staff rode every bus route in the system to hand out information to customers and bus operators (Sacramento Regional Transit District 2019a). The SacRT board of directors approved the new bus network in February 2019 and thus began another extensive process to alert the public of the changes ahead (Sacramento Regional Transit District 2019a). In September 2019, SacRT launched the new SacRT Forward program. The improved network consists of 27 regular routes, 15 peak hour-only routes; all except one route has 7-day service, all except one route has 45 minute or better service (Sacramento Regional Transit District 2019b). The recent history of SacRT investment and "relevance" (boardings per capita) is shown in Figure 3.7.

**Figure 3.7. Change in Sacramento bus network relevance and investment by SacRT relative to 2008**




Source: Walker, 2018

### 3.5. Travel Behavior Changes

Several data sources provide evidence of changes in travel patterns in the Sacramento case study area. Travel patterns and trends in Central Sacramento were compared to travel patterns and trends in the entire City of Sacramento and Sacramento County. These comparisons show the extent to which travel behavior trends were unique to the case study area of the central city or reflect changes that also occurred city- or county-wide.

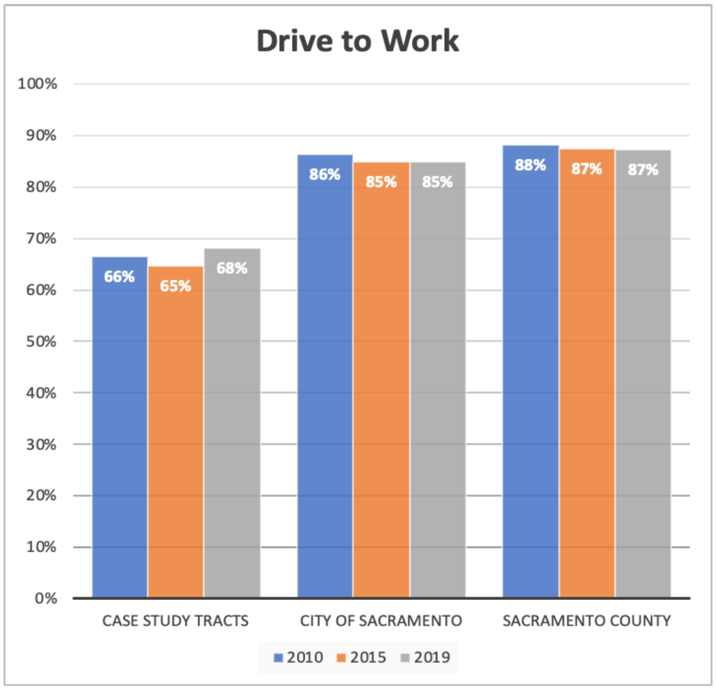
### 3.5.1 ACS Data Analysis

The American Community Survey (ACS), conducted by the U.S. Census Bureau, was a primary data source for identifying potential changes in commute mode share and auto ownership. Data were analyzed for the years 2010, 2015, and 2019 (thus ending before the Covid-19 pandemic). The case study area (consisting of 12 census tracts; see Table 2.1) is compared to the City of Sacramento and Sacramento County, which serve as reference geographies for this case study.

#### 3.5.1.1 Commute Mode Share

Driving to work was less prevalent in the central city than in the City of Sacramento and Sacramento County throughout the time period (Figure 3.8; Table 3.7). Between 66 and 68 percent of workers commuted by car throughout the case study timeframe, compared to about 85 percent of city residents and 87 percent of county residents. The share of workers driving to work was essentially constant between 2010, 2015, and 2019.

**Figure 3.8. Share Driving to Work in Sacramento**




Source: ACS 5-Year Estimates, Table B08301

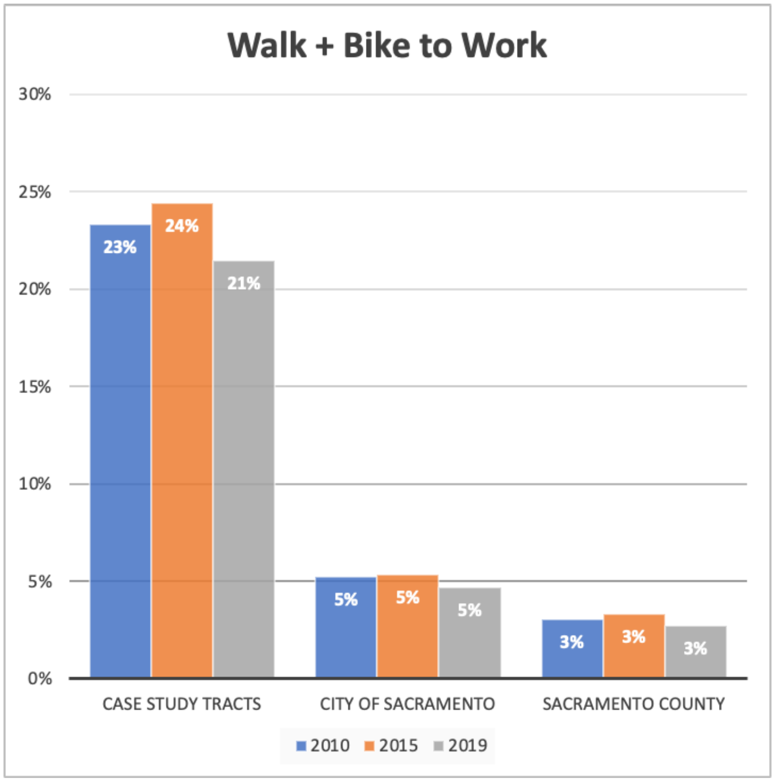
**Table 3.7. Share Driving to Work by Year and Geography in Sacramento**

| | 2010 | | 2015 | | 2019 | |
|---|---|---|---|---|---|---|
| **Resident Geography** | **Estimate** | **MOE** | **Estimate** | **MOE** | **Estimate** | **MOE** |
| **Case Study Area** | 66.4% | +/-2.7% | 64.6% | +/-2.2% | 68.0% | +/-2.4% |
| **City of Sacramento** | 86.3% | +/-0.4% | 84.9% | +/-0.6% | 84.9% | +/-0.7% |
| **Sacramento County** | 88.1% | +/-0.3% | 87.5% | +/-0.3% | 87.2% | +/-0.4% |

MOE = Margin of Error
Source: ACS 5-Year Estimates, Table B08301

The shares of bicycling and walking to work by workers living in the central city were much higher than shares for the city and county. Walking and bicycling to work among central city residents increased from 23% in 2010 to 24%in 2015, then decreased to 21%in 2019 (Figure 3.9. However, the differences are within the margins of error for these statistics, meaning that it is possible that the percentages did not change over the period (Table 3.8).

**Figure 3.9. Share Walking & Biking to Work in Sacramento**




Source: ACS 5-Year Estimates, Table B08301

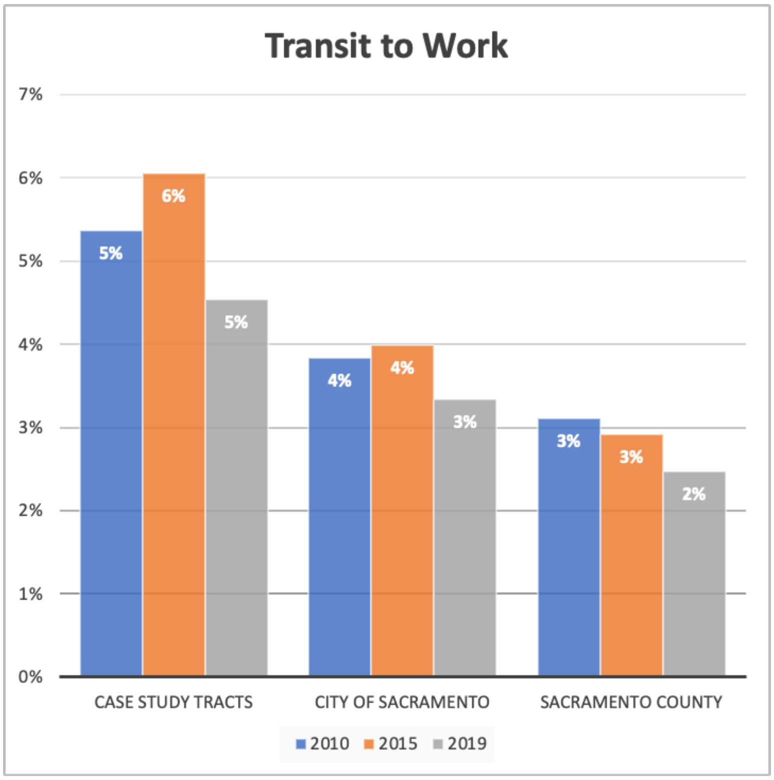
**Table 3.8. Share Walking and Biking to Work by Year and Geography in Sacramento**

| | 2010 | | 2015 | | 2019 | |
|---|---|---|---|---|---|---|
| **Resident Geography** | **Estimate** | **MOE** | **Estimate** | **MOE** | **Estimate** | **MOE** |
| **Case Study Area** | **23.3%** | **–** | **24.4%** | **–** | **21.5%** | – |
| Walk | 14.6% | +/-2.1% | 16.5% | +/-2.1% | 14.1% | +/-1.8% |
| Bike | 8.7% | +/-1.8% | 7.9% | +/-1.3% | 7.4% | +/-1.2% |
| **City of Sacramento** | **5.4%** | **–** | **5.3%** | **–** | **4.7%** | – |
| Walk | 3.1% | +/-0.3% | 3.2% | 0.3% | 2.8% | +/-0.2% |
| Bike | 2.2% | +/-0.3% | 2.1% | 0.2% | 1.9% | +/-0.2% |
| **Sacramento County** | **3.1%** | **–** | **3.3%** | **–** | **2.7%** | – |
| Walk | 2.0% | +/-0.1% | 2.2% | 0.2% | 1.8% | +/-0.1% |
| Bike | 1.1% | +/-0.1% | 1.2% | 0.1% | 0.9% | +/-0.1% |

Source: ACS 5-Year Estimates, Table B08301

Results for transit mode share to work (by bus, light rail, rail, and ferryboat) requires careful interpretation. The share of commuting by transit was higher among workers living in the case study area and in the city than among workers living in Sacramento County across all three survey years (Figure 3.10). In the case study area, the difference in transit use between survey years was within the reported margin of error (Table 3.9), meaning that it is possible that the percentage did not change over the period.

**Figure 3.10. Share Using Transit to Work in Sacramento**




Source: ACS 5-Year Estimates, Table B08301

**Table 3.9. Share Using Transit to Work by Year and Geography in Sacramento**

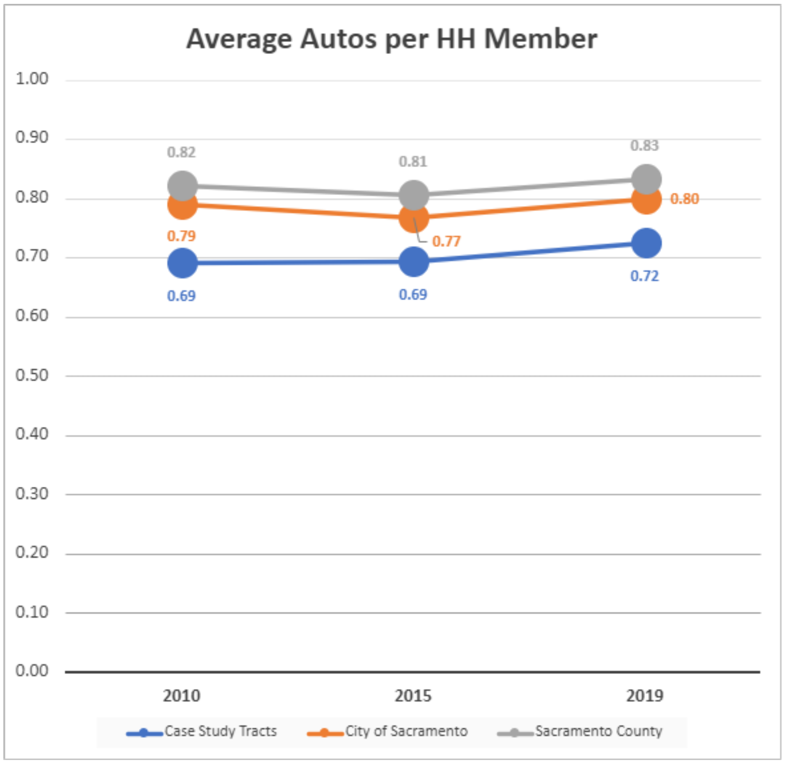
| | 2010 | | 2015 | | 2019 | |
|---|---|---|---|---|---|---|
| **Resident Geography** | **Estimate** | **MOE** | **Estimate** | **MOE** | **Estimate** | **MOE** |
| **Case Study Area** | 5.4% | +/-1.5% | 6.1% | +/-1.3% | 4.5% | +/-1.2% |
| **City of Sacramento** | 3.8% | +/-0.3% | 4.0% | +/-0.3% | 3.3% | +/-0.3% |
| **Sacramento County** | 3.1% | +/-0.2% | 2.9% | +/-1.3% | 2.5% | +/-0.2% |

Source: ACS 5-Year Estimates, Table B08301

### 3.5.1.2 Auto Ownership

Auto ownership, measured as the average number of autos per household member, grew slightly in the case study area from 2010 to 2019 (Figure 3.11, Table 3.10).

**Figure 3.11. Average Autos per Household (HH) Member**




Source: ACS 5-Year Estimates, Table B08301

**Table 3.10. Average Autos per Household Member**

| | 2010 | 2015 | 2019 |
|---|---|---|---|
| Case Study Tracts | 0.69 | 0.69 | 0.72 |
| City of Sacramento | 0.79 | 0.77 | 0.80 |
| Sacramento County | 0.82 | 0.81 | 0.83 |

Source: ACS 5-Year Estimates, Table B08201

### 3.5.2 NHTS & CHTS Data Analysis

The National Household Travel Survey (NHTS) and the California Household Travel Survey (CHTS) were also primary data sources for identifying potential travel behavior changes in Sacramento. The survey data include household vehicle miles traveled (VMT), auto availability per household driver, and mode share for all household trips. The comparison area for this analysis is the City of Sacramento leaving out the case study area. In this section, for simplicity, "the city" refers to the City of Sacramento excluding the case study area.

#### 3.5.2.1 Sample Size

The different metrics used in this analysis have different sample sizes. For household-based statistics – e.g., household VMT, automobile availability – the sample size is the number of households sampled in each geographic area (Table 3.11). It is important to note that the sample size in the case study area is small, particularly for the surveys administered in 2001, 2009, and 2012. Estimates produced from these small sample sizes will have large margins of error and wide confidence intervals, meaning that estimated changes over time are highly uncertain and not statistically significant. In the absence of other data on changes in travel patterns, the results of the analysis for households are presented in the subsequent sections but should be interpreted with extreme caution.

**Table 3.11. NHTS & CHTS Sample Size of Households in Area in Sacramento**

| | 2001 | 2009 | 2012 | 2017 |
|---|---|---|---|---|
| Case Study Area | 20 | 18 | 31 | 103 |
| City of Sacramento* | 113 | 203 | 244 | 708 |

* City of Sacramento without case study area

For trip-based statistics – e.g., mode share of trips ending in the case study area – the sample size is the number of trips that meet the relevant criteria. Table 3.12 shows the number of trips generated by the households in the survey samples in that area, the number of trips originating in that area in the survey sample, the number of trips ending in that area, and the number of trips internal to that area (both originating and ending in that area) – in all three cases regardless of where the traveler lives. These sample sizes are large enough to provide some certainty in the values reported; this is more true for auto trips, which account for the majority of trips, than for transit, walking and bicycling trips, for which the sample sizes are much smaller. As discussed in Section 2, differences in survey methods may also affect the comparisons between years. The uncertainty stemming from both small sample sizes and differences in survey methods should be kept in mind when considering the results presented in the following sections.

**Table 3.12. NHTS & CHTS Sample Size of Trips by Type by Area in Sacramento**

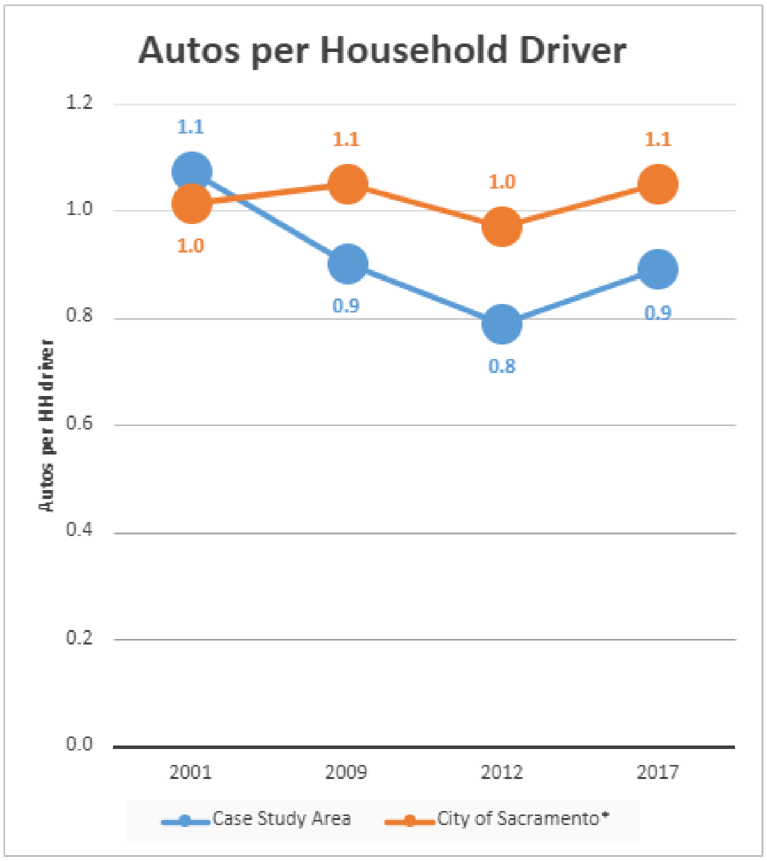
| | 2001 | 2009 | 2012 | 2017 |
|---|---|---|---|---|
| **Trips by households in…** | | | | |
| Case Study Area | 167 | 107 | 240 | 561 |
| City of Sacramento* | 1,128 | 1,465 | 3,430 | 5,075 |
| **Trips starting in…** | | | | |
| Case Study Area | 428 | 254 | 340 | 1,412 |
| City of Sacramento* | 1,110 | 1,057 | 3,450 | 4,378 |
| **Trips ending in…** | | | | |
| Case Study Area | 406 | 249 | 861 | 1,430 |
| City of Sacramento* | 1,075 | 1,076 | 3,507 | 4,360 |
| **Trips internal to…** | | | | |
| Case Study Area | 406 | 249 | 861 | 1,430 |
| City of Sacramento* | 1,075 | 1,076 | 3,507 | 4,360 |

* City of Sacramento without case study area

#### 3.5.2.2 Average Automobile Availability per Licensed Driver

Trends in estimated household automobile availability per licensed driver in the case study area and the City of Sacramento are shown in Figure 3.12. In 2001 households in both the case study area and the comparison area had about one automobile per licensed driver. Estimated automobile availability in the city was relatively consistent around one car per driver in across the four years. Households in the case study area were estimated to have had a downward trend in automobile availability between 2001 and 2017. Given small sample sizes, these estimates are highly uncertain.

**Figure 3.12. Autos per Household Driver in Sacramento**

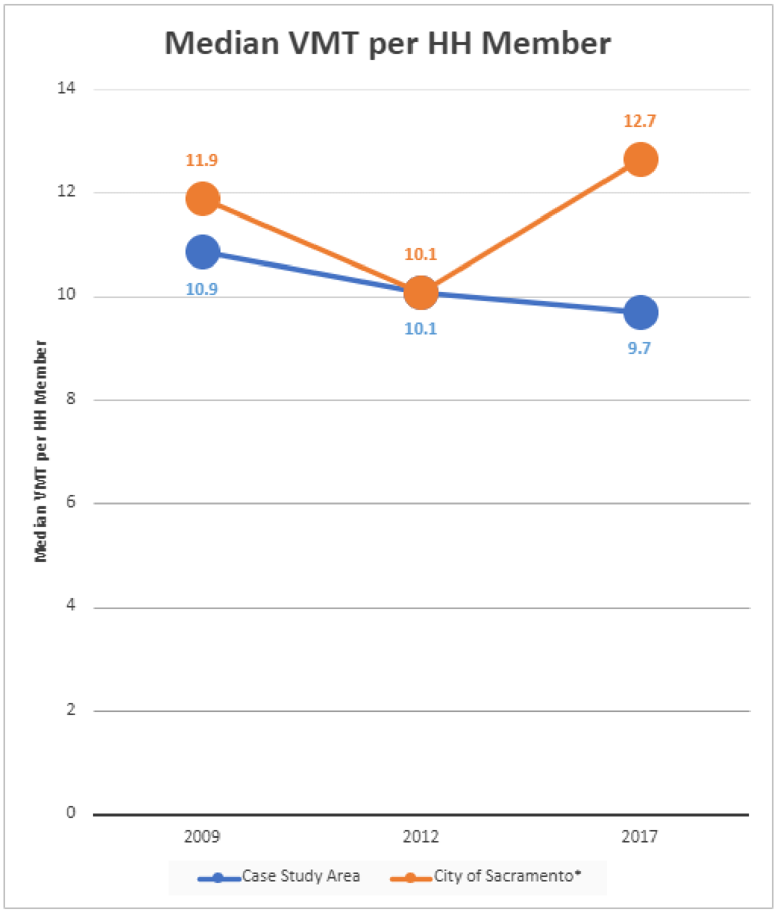



Source: NHTS and CHTS data; *City of Sacramento without case study

#### 3.5.2.3 Median VMT per Household Member

Estimated median VMT per household member was lower in the case study area than the City of Sacramento in 2009 and 2017 but equal in 2012 (Figure 3.13). Estimated median VMT in the case study area decreased from 2009 to 2017. Over the same period, estimated median VMT in the city increased. Given small sample sizes, these estimates are highly uncertain.

**Figure 3.13. Median VMT per Household Member in Sacramento**




Source: NHTS and CHTS data; *City of Sacramento without case study

#### 3.5.2.4 Mode Share – Trips by Residents

The estimated mode shares of trips made by residents of the case study area are compared to estimated mode shares for residents of the City of Sacramento in Table 3.13. Given small sample sizes, these estimates are highly uncertain.

Estimated auto mode share in 2001 was much higher among residents in the case study area than residents in the city, but in the three subsequent survey years, estimated automobile mode share was lower – sometimes quite markedly – among residents in the case study area than residents in the city. Between 2009 and 2017, the gap between the estimated auto mode share in the case study area versus the city widened.

Differences between the estimated bus share of trips made by residents of the case study area and the estimated share by residents of the city were inconsistent. The estimated bus mode share for 2001 for the city was an outlier at 36% and likely reflects an anomaly in the data, the estimated bus mode share for the three subsequent survey years was more reasonable. These estimates were similar to the estimated bus mode share for residents of the case study areas; mode share of residents in the case study area for the 2009 survey could not be estimated owing to the absence of such trips in the sample. With the exception of the outlier estimate in 2001, estimated bus ridership was low among residents in both the case study area and the city.

The estimated walking mode share for residents of the case study area was consistently higher than the walking mode share for residents of the city. Estimated walking mode share for residents in the case study area increased substantially from 2001 to 2017, reaching an estimated 30% in 2017. In 2012 and 2017 the estimated walking mode share for residents in the case study area was more than double the estimated walking mode share for households in the city.

Differences between the estimated biking share of trips made by residents of the case study area and the estimated share by residents of the city were inconsistent. The estimated bicycling mode share increased slightly among residents in the city between 2001 and 2017. The estimated bicycling mode share among residents in the case study area changed markedly in each survey and follows no clear pattern. These substantial survey-to-survey changes are likely a result of the small sample size of case study area households and the small number of trips taken by bike. Given the small samples sizes, these estimates are highly uncertain. With that caveat, it is notable that, with the exception of 2012, bicycling mode share was higher for residents in the case study area than in the city – substantially so in 2009 and 2017.

**Table 3.13. Mode Share for Trips by Residents in Sacramento - NHTS and CHTS Data**

| | | 2001 | 2009 | 2012 | 2017 |
|---|---|---|---|---|---|
| Auto | Case Study Area | 87.8% | 70.8% | 62.5% | 65.2% |
| | City of Sacramento* | 60.0% | 80.0% | 78.9% | 84.1% |
| Bus | Case Study Area | 1.8% | N/A | 3.8% | 1.0% |
| | City of Sacramento* | 35.9% | 3.4% | 1.6% | 2.0% |
| Train | Case Study Area | N/A | N/A | N/A | N/A |
| | City of Sacramento* | N/A | N/A | N/A | N/A |
| Walk | Case Study Area | 8.1% | 20.1% | 29.8% | 27.0% |
| | City of Sacramento* | 3.0% | 14.9% | 14.3% | 10.9% |
| Bike | Case Study Area | 2.3% | 9.1% | 2.1% | 4.5% |
| | City of Sacramento* | 0.9% | 1.2% | 3.1% | 2.1% |

Source: NHTS and CHTS data; *City of Sacramento without case study

#### 3.5.2.5 Mode Share - Trips Ending in the Area

The estimated mode shares of trips ending in the case study area are compared to estimated mode shares for residents of the City of Sacramento in Table 3.14. Given small sample sizes, these estimates are highly uncertain.

Estimated auto mode share in 2001 was much higher for trips ending in the case study area than trips ending in the city, but in the three subsequent survey years, estimated automobile mode share was markedly lower trips ending in the case study area than in the city. Between 2009 and 2017, the estimated auto mode share increased for trips ending both in the case study area and the city, but the gap between the shares widened somewhat.

The estimated share of trips into the case study area by transit – bus and train trips –varied markedly across survey years. The estimated bus mode share for 2001 for the city was an outlier at 38% and likely reflects an anomaly in the data; the estimated bus mode share for the three subsequent survey years was more reasonable. The estimated share of trips by bus into the case study area and city were similar in 2009, 2012, and 2017.

A higher estimated share of trips into the case study area were taken by train than of trips into the city. The case study area includes both an Amtrak station and many light rail stations, as well the Sacramento region's primary business and employment center. The estimated shared of trips by train into the case study area increased markedly from 2009 to 2012 but declined somewhat from 2012 to 2019.S

The estimated active transport mode share – the percentage of trips by walking and bicycling – was generally higher for trips into the case study area than for trips into the city. Estimated walking mode shares were over twice as high for trips ending in the case study area as for trips ending in the city. Estimated bicycling share for trips ending in the city Increased from 2009 to 2012, but the estimated bicycling share for trips ending in the case study area declined.

**Table 3.14. Mode Share for Trips Ending in Area in Sacramento - NHTS and CHTS Data**

| | | 2001 | 2009 | 2012 | 2017 |
|---|---|---|---|---|---|
| Auto | Case Study Area | 81.5% | 58.1% | 58.7% | 63.5% |
| | City of Sacramento* | 57.8% | 78.8% | 81.5% | 84.4% |
| Bus | Case Study Area | 5.5% | 3.5% | 3.0% | 3.6% |
| | City of Sacramento* | 38.0% | 3.3% | 1.1% | 1.9% |
| Train | Case Study Area | 1.9% | 0.5% | 4.9% | 3.9% |
| | City of Sacramento* | 0.5% | 0.1% | 1.3% | 1.1% |
| Walk | Case Study Area | 9.6% | 29.0% | 31.3% | 24.1% |
| | City of Sacramento* | 2.9% | 16.5% | 12.5% | 10.3% |
| Bike | Case Study Area | 1.4% | 8.9% | 2.1% | 4.8% |
| | City of Sacramento* | 0.9% | 1.4% | 3.0% | 2.2% |

Source: NHTS and CHTS data; *City of Sacramento without case study

#### 3.5.2.6 Mode Share – Trips Starting in Area

The estimated mode shares of trips starting in the case study area are compared to estimated mode shares for residents of the City of Sacramento in Table 3.15. Estimates are not available for 2012. Given small sample sizes, these estimates are highly uncertain.

Estimated auto mode share in 2001 was much higher for trips starting in the case study area than trips starting in the city, but in the three subsequent survey years, estimated automobile mode share was markedly lower trips starting in the case study area than in the city. The estimated auto mode share of trips starting in the case study area remained constant between 2009 and 2012, while the estimated share for trips starting in the city increased somewhat, leading to a larger gap between the shares.

The estimated share of trips starting in the case study area by transit – bus and train trips – varied markedly across survey years. The estimated bus mode share for 2001 for the city was an outlier at 38% and likely reflects an anomaly in the data; the estimated bus mode shares for the three subsequent survey years was more reasonable. The estimated bus mode share for trips starting in the case study area almost doubled from 2009 to 2017 but declined for trips starting in the city, leading to a larger gap between the shares.

The estimated train mode shares of trips starting in the case study area fluctuated between 2001 and 2017., though they were consistently higher than the shares for trips starting in the city. The estimated train mode shares for both geographies grew markedly between 2009 and 2012, but the gap between the shares widened. The estimated walk mode shares of trips starting in the case study area and in the city were substantially lower in 2001 than in 2009 and 2012. From 2009 to 2012, the estimated walking mode shares were much higher for trips starting in the case study area than in the city. The shares declined in both geographies but at a faster rate in the city, leading to a wider gap between the shares.

The estimated bike mode share for trips starting in the case study area increased substantially between 2001 and 2017 for both geographies. The estimated bike mode share for trips starting in the city increased between 2009 and 2012, but the share decreased for trips starting in the case study area.

**Table 3.15. Mode Share for Trips Starting in Area in Sacramento - NHTS and CHTS Data**

| | | 2001 | 2009 | 2012 | 2017 |
|---|---|---|---|---|---|
| Auto | Case Study Area | 82.2% | 62.0% | N/A | 62.8% |
| | City of Sacramento* | 57.9% | 79.6% | N/A | 84.6% |
| Bus | Case Study Area | 5.4% | 2.4% | N/A | 4.1% |
| | City of Sacramento* | 38.1% | 3.3% | N/A | 1.9% |
| Train | Case Study Area | 2.2% | 0.7% | N/A | 3.6% |
| | City of Sacramento* | 0.2% | 0.1% | N/A | 0.9% |
| Walk | Case Study Area | 9.0% | 27.8% | N/A | 24.9% |
| | City of Sacramento* | 3.0% | 15.7% | N/A | 10.2% |
| Bike | Case Study Area | 1.3% | 7.2% | N/A | 4.5% |
| | City of Sacramento* | 0.9% | 1.4% | N/A | 2.3% |

Source: NHTS and CHTS data; *City of Sacramento without case study

#### 3.4.2.7 Mode Share - Trips Internal to Area

The estimated mode shares of trips internal to (i.e., starting and ending in) the case study area are compared to estimated mode shares for residents of the City of Sacramento in Table 3.16. Estimates are not available for 2012, and bus estimates for trips internal to the case study area were only available for 2017.Given small sample sizes, these estimates are highly uncertain.

Estimated auto mode share in 2001 was much higher for trips internal to the case study area than trips internal to the city, but in the three subsequent survey years, estimated automobile mode share was markedly lower trips internal to the case study area than to the city. The estimated auto mode share of internal trips in the case study area increased somewhat from 2009 to 2017 but increased to a greater extent for trips internal to the city, leading to a wider gap.

The estimated walk mode share of internal trips increased substantially in both the case study area and the city between 2001 and 2009 but then dropped somewhat from 2009 to 2017. The decrease for the city was greater than for the case study area, so that the gap between the estimated walk mode share for the case study and the city increased from 2009 to 2017.

The estimated bike mode share of internal trips increased in both the case study area and the city between 2001 and 2017 but was more than twice as high in the case study area. The estimated bike mode share fell slightly in the case study area from 2009 to 2017, while it increased in the city, leading to a narrowing of the gap in the shares for the two areas.

**Table 3.16. Mode Share for Trips Internal to Area in Sacramento - NHTS and CHTS Data**

| | | 2001 | 2009 | 2012 | 2017 |
|---|---|---|---|---|---|
| Auto | Case Study Area | 56.3% | 31.5% | N/A | 33.2% |
| | City of Sacramento* | 44.8% | 69.5% | N/A | 79.4% |
| Bus | Case Study Area | N/A | N/A | N/A | 1.8% |
| | City of Sacramento* | 50.6% | 2.7% | N/A | 1.8% |
| Train | Case Study Area | 5.8% | N/A | N/A | 1.6% |
| | City of Sacramento* | 0.1% | N/A | N/A | 0.4% |
| Walk | Case Study Area | 33.2% | 60.2% | N/A | 56.4% |
| | City of Sacramento* | 3.3% | 26.2% | N/A | 15.6% |
| Bike | Case Study Area | 4.6% | 8.3% | N/A | 7.1% |
| | City of Sacramento* | 1.2% | 1.6% | N/A | 2.7% |

Source: NHTS and CHTS data; *City of Sacramento without case study

### 3.5.3 Regional Travel Survey Data Analysis

The SACOG Travel Survey provides data on household VMT and mode share for 2000 and 2018 surveys for three geographies: the case study area, the City of Sacramento, and Sacramento County.

#### 3.5.3.1 Sample Size

SACOG's household travel survey provides travel behavior information with a much larger sample size than the National Household Travel Survey (NHTS) and California Household Travel Survey (CHTS). The number of households for each geography are shown in Table 3.17. The number of trips by category for each geography and for each survey year are summarized in Table 3.19 below. The larger sample sizes mean that the estimates presented are less uncertain. However, as was true for the NHTS and CHTS, differences in survey methods between the 2000 and 2018 SACOG surveys may explain some portion of the observed changes over the period. The uncertainty stemming from both small sample sizes for some estimates and differences in survey methods should be kept in mind when considering the results presented in the following sections.

**Table 3.17. Sample Size of Households in SACOG Regional Household Travel Surveys**

| | 2000 | 2018 |
|---|---|---|
| Case Study Area | 143 | 335 |
| City of Sacramento | 1,458 | 1,450 |
| Sacramento County | 2,947 | 2,740 |

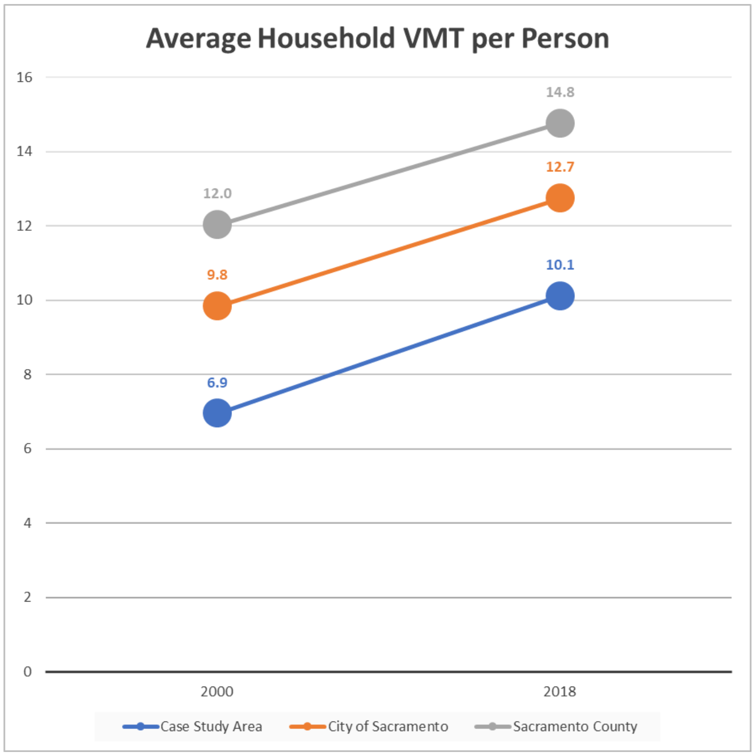
**Table 3.18. Sample Size of Trips from SACOG Regional Household Travel Surveys**

| Trips starting in… | 2000 | 2018 |
|---|---|---|
| Case Study Area | 207 | 3,011 |
| City of Sacramento | 5,423 | 27,620 |
| Sacramento County | 14,312 | 63,392 |
| **Trips ending in…** | | |
| Case Study Area | 207 | 2,984 |
| City of Sacramento | 5,431 | 27,512 |
| Sacramento County | 14,332 | 63,394 |
| **Trips internal to…** | | |
| Case Study Area | 101 | 1,431 |
| City of Sacramento | 4,471 | 23,213 |
| Sacramento County | 13,521 | 59,698 |

#### 3.5.3.2 Household VMT per Person

Estimated household VMT per person was lower in the case study area than both the City of Sacramento and Sacramento County comparison areas, in both survey years (Table 3.14). In 2018, estimated average household VMT per person was 10.1 miles in the case study area, compared to 12.7 miles in the City of Sacramento and 14.8 in Sacramento County. Estimated household VMT per person also increased between 2000 and 2018 in all three geographies: from 6.9 to 10.1 miles in the case study area; from 9.8 to 12.7 miles in the city; and from 12.0 to 14.8 in the county. The gaps between the case study area and the two comparison areas remained roughly the same over time.

**Figure 3.14. Average Household VMT per Person for all Trips in Sacramento**




Source: SACOG Travel Survey

#### 3.5.3.3 Mode Share for All Trips

The estimated mode shares of trips made by residents of the case study area are compared to estimated mode shares for residents of the City of Sacramento and Sacramento County in Table 3.19.

Estimated auto mode share was lower for trips starting and/or ending in the case study area than for the two comparison areas in both 2000 and 2018, and it decreased in all three geographies between 2000 and 2018. In the case study area, an estimated 63% of all trips were made by car in 2000, with the share falling to 56% in 2018. In the City of Sacramento and Sacramento County, an estimated 88% and 91% of trips were made by car in 2000, respectively, with the shares falling to 83% and 85% in 2018, respectively.

The estimated transit mode share of trips to and/or from the Sacramento case study area decreased markedly between the 2000 and 2018 – from 10% in 2000 to 5% in 2018. The transit mode share in the two comparison areas was mostly unchanged between 2000 and 2018. In the City of Sacramento, an estimated 3% of trips were made by transit in both 2000 and 2018. In Sacramento County, estimates suggest that just under 3% of trips were by transit in 2000 and 2% of trips were by transit in 2018.

The estimated walk mode share of trips starting or ending in the Sacramento case study area increased markedly between the 2000 and 2018 – from 20% in 2000 to 30% in 2018. The estimated walk mode share of trips to and/or from the two comparison areas also increased between 2000 and 2018, though less dramatically. The estimated walk mode share in case study area was 2.5 times the share in the City of Sacramento and 3 times the share in Sacramento County.

The estimated bicycle mode share of all trips to and/or from the Sacramento case study area was unchanged between 2000 and 2018 but – at 6% – was significantly higher than the estimated bike mode share for trips to and/or from the comparison areas even those these shares increased slightly.

**Table 3.19. Mode Share for All Trips – SACOG Survey Data**

| | | 2000 | 2018 |
|---|---|---|---|
| Auto | Case Study Area | 62.6% | 55.9% |
| | City of Sacramento | 87.6% | 82.8% |
| | Sacramento County | 90.9% | 84.8% |
| Transit | Case Study Area | 9.9% | 5.0% |
| | City of Sacramento | 2.9% | 2.8% |
| | Sacramento County | 2.6% | 2.1% |
| Walk | Case Study Area | 19.9% | 30.2% |
| | City of Sacramento | 8.0% | 11.6% |
| | Sacramento County | 5.7% | 10.1% |
| Bike | Case Study Area | 6.2% | 6.2% |
| | City of Sacramento | 1.2% | 2.0% |
| | Sacramento County | 0.7% | 1.9% |

#### 3.5.3.4 Mode Share – Trips Ending in Area

The estimated mode shares of trips ending in the case study area are compared to estimated mode shares for trips ending in the City of Sacramento and Sacramento County in Table 3.20.

The estimated auto mode share for trips ending in the Sacramento case study area decreased between 2000 and 2018, from 73% in 2000 to 56% in 2018. The estimated auto mode shares of trips ending in the comparison areas also decreased, but less significantly than in the case study area and remained higher than in the case study area. The estimated auto mode share for trips ending in the case study area was higher than the auto mode share for residents of the case study area (Table 3.20).

Estimated transit mode share trends differed for trips ending in the case study area compared to the comparison areas. The estimated transit mode share of trips ending in the case study area increased from 6% in 2000 to 8% in 2018, while the estimated transit mode shares of trips ending in the comparison areas stayed constant or decreased slightly between 2000 and 2018.

The estimated walking mode share of trips ending in the case study area increased significantly between 2000 and 2018, from 18% in 2000 to 33% in 2018. Estimated walking mode shares of trips ending in the comparison areas also increased, but less significantly than in the case study area and remained below the share for the case study area.

The estimated bicycling mode share for trips ending in the Sacramento case study area increased only slightly between 2000 and 2018 – from 2.2% in 2000 to 2.6% in 2018. Estimated bicycle mode shares of trips ending in the comparison areas also increased very slightly, but remained below the share in the case study area at 1.8% in both areas.

**Table 3.20. Mode Share for Trips Ending in Area – SACOG Survey Data**

| | | 2000 | 2018 |
|---|---|---|---|
| Auto | Case Study Area | 73% | 56% |
| | City of Sacramento | 88% | 80% |
| | Sacramento County | 91% | 84% |
| Transit | Case Study Area | 6% | 8% |
| | City of Sacramento | 3% | 3% |
| | Sacramento County | 3% | 2% |
| Walk | Case Study Area | 18% | 33% |
| | City of Sacramento | 8% | 14% |
| | Sacramento County | 6% | 10% |
| Bike | Case Study Area | 2% | 3% |
| | City of Sacramento | 1% | 2% |
| | Sacramento County | 1% | 2% |

#### 3.5.3.5 Mode Share – Trips Starting in Area

The estimated mode shares of trips starting in the case study area are compared to estimated mode shares for trips starting in the City of Sacramento and Sacramento County in Table 3.21.

The estimated auto mode shares by trip origin were nearly identical to auto mode shares by trip destination. The estimated auto mode share of trips starting in the Sacramento case study area decreased between 2000 and 2018, from 74% in 2000 to 56% in 2018. Estimated auto mode shares of trips starting in the comparison areas also decreased, but less so than in the case study area and remained signification above the mode shares in the case study area.

The estimated transit mode shares by trip origin were nearly identical to transit mode shares by trip destination. The estimated transit mode share of trips starting in the case study area increased from 6% in 2000 to 8% in 2018, while the estimated transit mode shares of trips starting in the comparison areas stayed constant or decreased slightly between 2000 and 2018 and remained less than half the shares as for the case study area.

The estimated walking mode shares by trip origin were nearly identical to estimated walk mode shares by trip destination. The estimated walk mode share of trips starting in the Sacramento case study area increased significantly between 2000 and 2018, from 18% in 2000 to 32% in 2018. Estimated walk mode shares of trips starting in the comparison areas also increased, but less so than in the case study area and remained less than half of the share in the case study area.

The estimated bicycling mode shares by trip origin were nearly identical to estimated bike mode shares by trip destination. The estimated bike mode share of trips starting in the Sacramento case study area increased very slightly between 2000 and 2018, from 2.3% in 2000 to 2.7% in 2018. Estimated bike mode shares of trips starting in the comparison areas also increased but at a faster rate than in the case study area, closing the gap between the case study area and the comparison areas somewhat.

**Table 3.21. Mode Share for Trips Starting in Area – SACOG Survey Data**

| | | 2000 | 2018 |
|---|---|---|---|
| Auto | Case Study Area | 73.7% | 56.0% |
| | City of Sacramento | 87.8% | 80.2% |
| | Sacramento County | 90.8% | 84.4% |
| Transit | Case Study Area | 5.5% | 7.9% |
| | City of Sacramento | 2.8% | 3.3% |
| | Sacramento County | 2.5% | 2.2% |
| Walk | Case Study Area | 17.7% | 32.3% |
| | City of Sacramento | 8.1% | 13.8% |
| | Sacramento County | 5.8% | 10.4% |
| Bike | Case Study Area | 2.3% | 2.7% |
| | City of Sacramento | 0.9% | 1.8% |
| | Sacramento County | 0.7% | 1.8% |

### 3.5.3.6 Mode Share - Trips Internal to Area

The estimated mode shares of trips internal to (i.e., starting and ending in) the case study area are compared to estimated mode shares for trips internal to the City of Sacramento and Sacramento County in Table 3.22.

The estimated auto mode share of internal trips in the case study area decreased significantly between 2000 and 2018, from 47% in 2000 to 29% in 2018 . Estimated auto mode shares of internal trips in the comparison areas also decreased over the same timeframe, though less significantly than in the case study area and remained significantly higher than in the case study area.

The estimated transit mode share of internal trips decreased for the case study area as well as Sacramento County, but stayed essentially constant for the City of Sacramento. The estimated transit mode share of trips internal to the case study area was lower in 2018, at 2% than for the city, at 3%.

The estimated walk mode shares of internal trips increased in both the case study area and the comparison areas between 2000 and 2018. In the case study area, the estimated share of internal walk trips increased significantly from 45% in 2000 to 63% in 2018. Estimated walk mode shares of internal trips in the comparison areas also increased though at a slower rate, remaining significantly lower than for internal trips in the case study area.

The estimated bike mode share of internal trips slightly decreased in the case study area between 2000 and 2018, from 3.8% to 3.6%. In contrast, estimated bike mode shares of internal trips in the comparison areas both increased to 1.9% of internal trips between 2000 and 2018.

**Table 3.22. Mode Share for Trips Internal to Area – SACOG Survey Data**

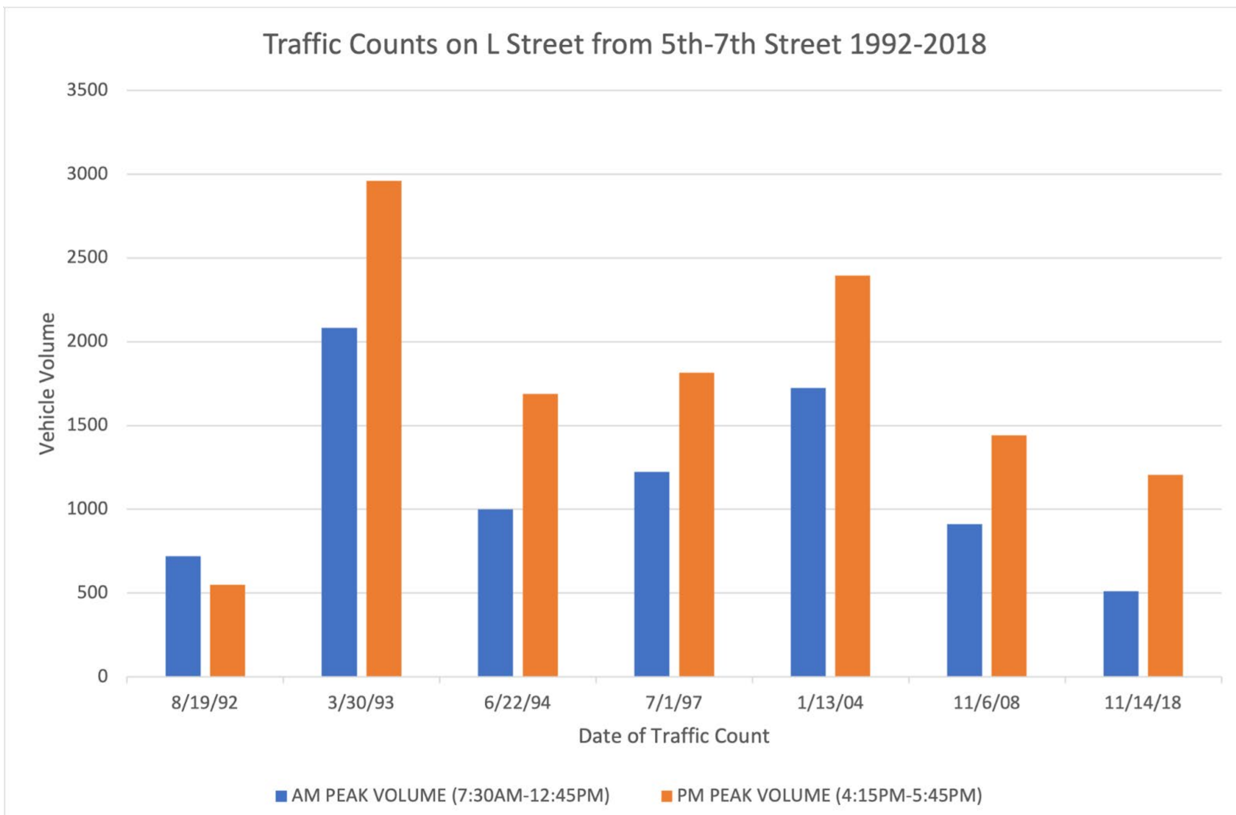
| | | 2000 | 2018 |
|---|---|---|---|
| Auto | Case Study Area | 47.1% | 29.0% |
| | City of Sacramento | 84.8% | 75.9% |
| | Sacramento County | 90.4% | 83.7% |
| Transit | Case Study Area | 3.4% | 2.4% |
| | City of Sacramento | 3.0% | 3.2% |
| | Sacramento County | 2.5% | 2.2% |
| Walk | Case Study Area | 44.9% | 63.0% |
| | City of Sacramento | 10.8% | 18.0% |
| | Sacramento County | 6.1% | 11.1% |
| Bike | Case Study Area | 3.8% | 3.6% |
| | City of Sacramento | 1.1% | 1.9% |
| | Sacramento County | 0.7% | 1.9% |

### 3.5.3.7 Other Data Sources

Traffic counts provide another indicator of possible change in travel patterns in the case study area. Traffic counts do not translate directly into VMT, since the length of the trips is uncertain, but they do provide an indicator of the change in car activity in the area. The change in car activity may reflect a change in economic activity, a change in travel modes, or a combination of both. The City of Sacramento keeps a record of city traffic counts for major streets from as far back as the 1960s to the present. These counts are made of vehicles traveling on a road on a typical day, considered to be a Tuesday, Wednesday, or Thursday (City of Sacramento 2023), but the specific days on which the counts are taken may reflect unique circumstances (e.g., construction on nearby streets) as well as seasonal effects. Golden 1 Center events are not reflected in the counts.

In the area near the Golden 1 Center (completed in 2016), traffic counts peaked in the early 1990s as the popularity of the shopping mall peaked but eventually declined as businesses in the mall declined (Figure 3.15). The more recent traffic counts likely do not reflect major events at the Golden 1 Center, which tend to happen on Friday, Saturday, and Sunday evenings. The trend toward lower counts over two and a half decades likely reflects a decline in economic activity in the area but could also reflect some shift toward modes other than driving.

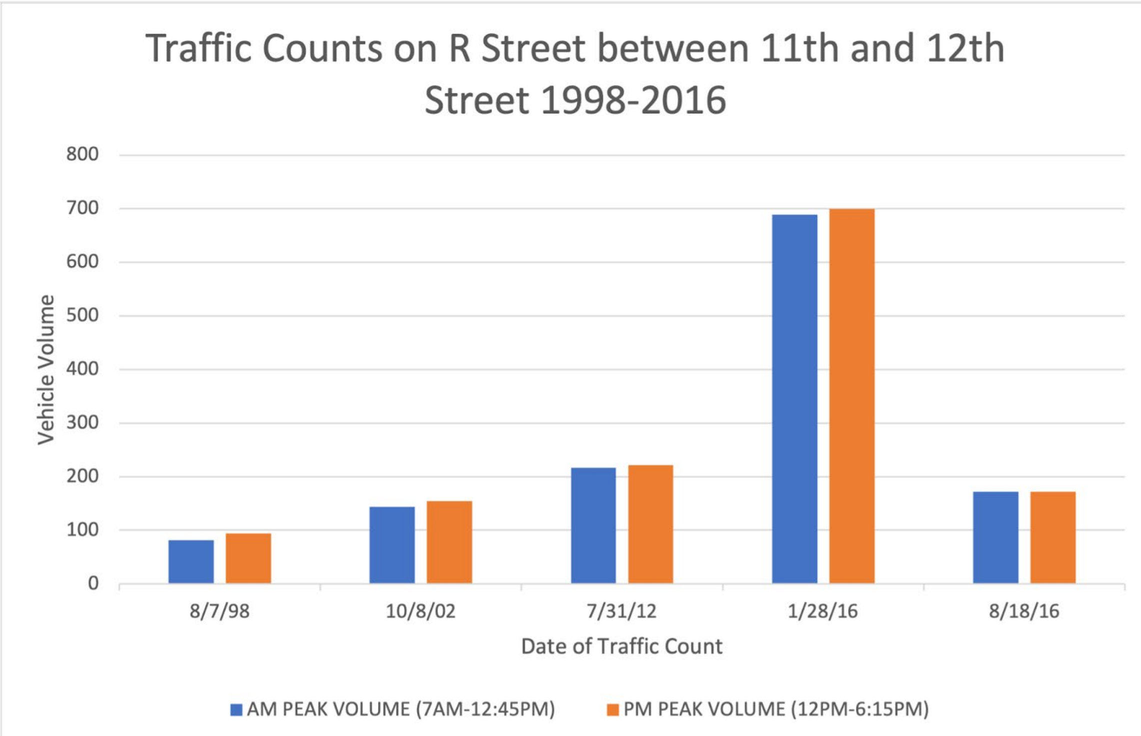
**Figure 3.15. Traffic Counts on L Street from 5th-7th Street 1992-2018**




Source: City of Sacramento, 2023b

Projects completed on the R Street Corridor between 10$^{th}$ and 13$^{th}$ Streets from 2004 to 2018 changed the streetscape as well as the land development in the surrounding area. Vehicle counts rose after the completion of the streetscape project in 2012 but fell again to below 2012 levels after the completion of the streetscape project between 16th and 18th Streets (Figure 3.16). Given the increase in businesses in this corridor during the 2010s, the decrease in traffic counts likely reflects the increasingly pedestrian-oriented character of the street rather than a decline in economic activity. The counts for January 2016 appear to be an anomaly.

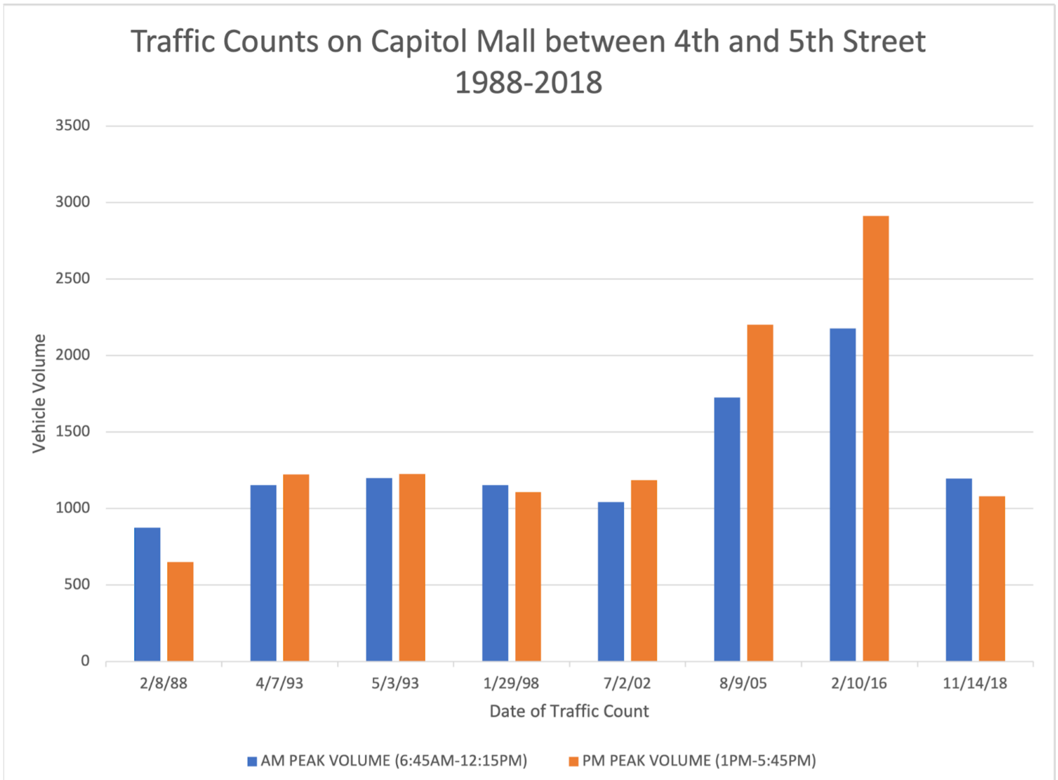
**Figure 3.16. Traffic Counts on R Street between 11th and 12th Streets 1998-2016**




Source: City of Sacramento, 2023b

Capitol Mall, between the Golden 1 Center and the R Street Corridor, is the location of many state office buildings and a major job center in the city. Traffic counts in the area were relatively stable from 1988 to 2002 but increased in 2005 and peaked in 2016 (Figure 3.17). Counts returned to levels found in the early 2000s by 2018. The reason for the increase and subsequent decrease is not clear.

**Figure 3.17. Traffic Counts on Capitol Mall between 4th and 5th Street 1988-2018**




Source: City of Sacramento, 2023b

The JUMP e-bike share service was launched in Sacramento in 2018. The service area encompassed but was larger than the case study area. Ride Report's Global Micromobility Index reports that e-bike usage increased from 600 average vehicles used per day in mid-2019 to over 1,100 average vehicles used per day by December 2019 (Ride Report, 2023). A study of the impact of the Sacramento bike share program evaluated on car use found that nearly 40% of weekday bike share trips substituted for car trips, and over 40% of weekend bike share trips substituted for car trips (Fukushige et al. 2021). This study estimated that each bike in the bike share fleet reduced users' VMT by an average of 2.8 miles per day.

### 3.6. Assessment

The built environment in the Sacramento case study area changed in significant ways over the study period. By all measures, the housing stock in the area increased at a faster rate than housing stock in the city as a whole. Planners credited the zoning code reforms – particularly parking ratio reform in the central city – and a willing infill development industry for the rapid increase in housing and mixed-use development in the central city. The stock of new infill housing made it possible for more residents to live in the central city where they have access to destinations like jobs, entertainment, and services within walking and biking distance. Improvements to bike infrastructure and the implementation of the bike-share system in the central city also gave residents an opportunity to drive less.

Determining the impacts of these changes on VMT is challenging given the limited data sources that measure VMT, especially longitudinally. For the Sacramento case study, SACOG's household travel survey (HHTS) is a primary source of VMT data and a particularly important one given its large sample size relative to the sample for Sacramento from the California Household Travel Survey and the National Household Travel Survey. But the long time interval between administrations of these travel surveys (for the SACOG HHTS, almost 20 years) and the multiple agencies administering the different surveys result in data collected using somewhat different sampling and measurement methods. VMT estimates from different surveys thus require careful interpretation and comparison.

According to the NHTS and CHTS data, VMT per person decreased in the Sacramento case study area over the case study time frame and increased in the Sacramento comparison area (the City of Sacramento excluding the case study area) (Table 3.23). Median household VMT per person decreased between 2009 – the midst of the Great Recession – and 2012 in both the Sacramento case study area and comparison area, but especially so in the comparison area (a percent change of -15%, compared to -7% in the case study area). Household VMT per person continued to decrease between 2012 and 2017 in the case study area (-4%) but increased dramatically in the comparison area (+26%). Over the entire eight-year span between 2009 and 2017, household VMT per person decreased by 11% in the case study area while VMT in the comparison area increased by 6%. The decrease in VMT in the case study area at the same time that VMT was increasing in the comparison area support the possibility that changes to the built environment in the case study area helped to reduce car dependence.

**Table 3.23. Percent Change in Household VMT per Person in Sacramento, NHTS & CHTS Data**

| | VMT in 2009 | VMT in 2012 | VMT in 2017 | 2009 to 2012 | 2012 to 2017 | 2009 to 2017 |
|---|---|---|---|---|---|---|
| Case Study Area | 10.9 | 10.1 | 9.7 | -7% | -4% | -11% |
| City of Sacramento* | 11.9 | 10.1 | 12.7 | -15% | 26% | 6% |

Source: NHTS and CHTS data; *City of Sacramento without case study area

SACOG's household travel survey, in contrast, shows that household VMT per person generally increased between 2000 and 2018 in the case study area, in the City of Sacramento, and in Sacramento County (Table 3.24). The percent increase in household VMT per person was greater in the case study area than in the city and the county, though the absolute household VMT per person was lower in the case study area than in the comparison areas. The consistency in the changes from 2000 to 2018 across the three geographies suggest the possibility that the changes in part reflect differences in the methods used in the two surveys.

**Table 3.24. Percent Change in Household VMT per Person in Sacramento, SACOG Data**

| | 2000 | 2018 | Percent Change |
|---|---|---|---|
| **All trips** | | | |
| Case Study Area | 6.9 | 10.1 | +46% |
| City of Sacramento | 9.8 | 12.7 | +29% |
| Sacramento County | 12.0 | 14.8 | +23% |

Source: SACOG Travel Survey

Analysis of mode shares provides further evidence on changes in travel patterns. According to all three data sources, auto mode share was lower in the case study area than in the comparison areas, and shares of transit, walking, and bicycling were higher (Table 3.25, Table 3.26, and Table 3.27). The trends in mode shares for the case study area versus the comparison areas are more difficult to interpret. According to the ACS data, the trends in mode share were similar for the case study area and the comparison area, so that the gap in mode shares between them did not change significantly; the percentage point difference between the mode shares in the case study area versus the comparison area remained about the same over the period (Table 3.25).

The NHTS/CHTS data suggests some changes in mode shares in the case study area relative to the comparison area that are consistent with an increase in multimodal travel. The auto mode share in the case study area declined relative to the auto mode share in the comparison area for trips made by residents, trips originating in the case study, and internal trips (Table 3.26). The walking mode share in the case study area increased relative to the walking mode share in the comparison area for the same types of trips. For both modes, the gap stayed the same for trips ending in the case study area. Transit shares did not change appreciably (ignoring anomalously high values for the transit share in the case study area in 2001, and these shares were similar for the case study area and the comparison area. The results for biking suggest that the comparison area may have improved relative to the case study area, that is, that biking became more popular throughout the region.

The SACOG travel survey data tell a similar study, though robustly given the larger sample size. Auto mode share decreased for all types of trips in both the case study area and the comparison areas, but the decreases were larger in the case study area, meaning that the gaps between the case study area and the comparisons areas increased (Table 3.27). Transit mode shares were consistently higher in the case study area than the comparison areas (with the exception of internal trips), and while the transit share of all trips for the case study area declined, the transit share for trips ending and originating in the case study area increased, widening the gaps between the case study area and the comparison areas. The walking share of trips in the case study area was higher and increased more than in the comparison areas for all types of trips, widening the gaps between the areas. The biking share of trips in the case study area was higher than in the comparison areas for all trip types, but these shares decreased in the case study area while they were increasing in the comparison areas, again suggesting that biking became more popular throughout the region.

Thus, despite mixed results on the trend in VMT in the Sacramento case study area (a decrease according to NHTS/CHTS) and an increase according to SACOG data) and no decline in auto ownership (according to both ACS and NHTS/CHTS data), the analysis generally showed that travel was far more multimodal in the case study area than in the comparison areas and that multimodality may have increased over the study period.

**Table 3.25. Summary of Results of ACS Analysis of Mode Share for Commute Trips**

| Trip Type | Mode | Case study area vs. comparison area | Case study 2010 to 2019 | Comparison 2010 to 2019 | Change in gap |
|---|---|---|---|---|---|
| Journey to work | Auto | Lower | Decrease | Stable | 0 |
| | Bus | Higher | Decrease | Decrease | 0 |
| | Walk/Bike | Higher | Decrease | Decrease | 0 |

**Table 3.26. Summary of Results of NHTS/CHTS Analysis of Trips by Location for Sacramento**

| Trip Type | Mode | Case study area vs. comparison area | Case study 2009 to 2017 | Comparison 2009 to 2017 | Change in gap |
|---|---|---|---|---|---|
| Residents of area | Auto | Lower | Decrease | Increase | + |
| | Bus | Similar | Stable | Stable | 0 |
| | Walk | Higher | Increase | Decrease | + |
| | Bike | Higher | Decrease | Increase | - |
| Ending in area | Auto | Lower | Increase | Increase | 0 |
| | Bus | Similar | Stable | Stable | 0 |
| | Train | Higher | Increase | Increase | + |
| | Walk | Higher | Decrease | Decrease | 0 |
| | Bike | Higher | Decrease | Increase | - |
| Originating in area | Auto | Lower | Stable | Increase | + |
| | Bus | Similar | Stable | Stable | 0 |
| | Train | Higher | Increase | Increase | + |
| | Walk | Higher | Decrease | Decrease | + |
| | Bike | Higher | Decrease | Increase | - |
| Internal to area | Auto | Lower | Stable | Increase | + |
| | Walk | Higher | Decrease | Decrease | + |
| | Bike | Higher | Decrease | Increase | - |

**Table 3.27. Summary of Results of SACOG Travel Survey Analysis of Trips by Location for Sacramento**

| Trip Type | Mode | Case study area vs. comparison areas | Case study 2009 to 2017 | Comparison 2009 to 2017 | Change in gap |
|---|---|---|---|---|---|
| All trips to and/or from area | Auto | Lower | Decrease | Decrease | 0 |
| | Transit | Higher | Decrease | Stable | - |
| | Walk | Higher | Increase | Increase | + |
| | Bike | Higher | No change | Increase | - |
| Ending in area | Auto | Lower | Decrease | Decrease | + |
| | Transit | Higher | Increase | Stable | + |
| | Walk | Higher | Increase | Increase | + |
| | Bike | Higher | Increase | Increase | - |
| Originating in area | Auto | Lower | Decrease | Decrease | + |
| | Transit | Higher | Increase | Stable | + |
| | Walk | Higher | Increase | Increase | + |
| | Bike | Higher | Increase | Increase | - |
| Internal to area | Auto | Lower | Decrease | Decrease | + |
| | Transit | Higher | Decrease | Incr/Decr | * |
| | Walk | Higher | Increase | Increase | + |
| | Bike | Higher | Decrease | Increase | - |

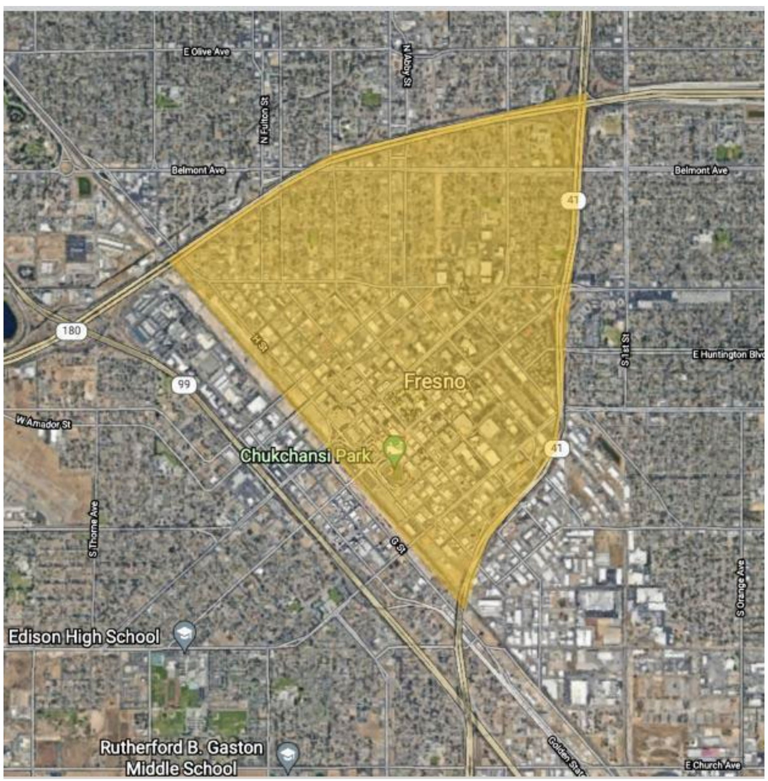
## 4. Results: Fresno

### 4.1 Introduction

The case study area for the City of Fresno is a 2 square mile area of Downtown Fresno and its adjacent neighborhood. It is bounded by railroad tracks, Highway 180, and Highway 41 to create a triangle-shaped study area (Figure 4.1). Fresno was founded in the decades after the Gold Rush and eventually became one of largest cities in the San Joaquin Valley, a major agricultural region. In the decades before World War II, downtown Fresno flourished as the financial and commercial center of the region. Many historic buildings from this period remain.

The case study area now has a mix of residential, commercial, and office land uses. Chukchansi Park, home to the Fresno Grizzlies, is located on Tulare and H Street and is one of the major attractions of the area with many shopping and dining opportunities nearby on major corridors like Fulton and Inyo Streets. The area's most popular restaurants and breweries are concentrated in these walkable areas. The Fresno County Superior Courthouse with its surrounding park is another major landmark of the area just a few blocks away. This area is served by bus service operated by the Fresno Area Express (FAX), a part of the Fresno Department of Transportation. The Fresno Council of Governments is the metropolitan planning organization for Fresno County, where the City of Fresno is located.

**Figure 4.1. Fresno Case Study Area**




Household incomes in the case study area were substantially lower than in the city as a whole and in the county in 2019 (Table 4.1). As described in the 2016 Downtown Neighborhoods Community Plan, a number of factors contributed to concentrated poverty among residents in the downtown neighborhood: a lack of focus by the City of Fresno on implementing previously adopted community plans, geographic isolation of neighborhoods by freeways and railroad tracks, high unemployment rates throughout the city, major barriers to employment among those looking for work, suburban sprawl, and an overwhelmed public education system. The plan cites these conditions as contributing to an aging and deteriorating building stock, low owner occupancy rates, high vacancy rates, higher costs for goods and services within the inner city, and elevated crime, among other challenges. Over the years, many significant downtown buildings have been demolished and replaced with vacant land and parking lots. The corridors that separate various neighborhoods are difficult to differentiate from one another and are designed to move traffic quickly and efficiently without regard to pedestrians, cyclists, or transit users (City of Fresno 2016a).

**Table 4.1. Annual Household Income in 2019**

| | Median Income (2019 dollars) | Mean Income (2019 dollars) |
|---|---|---|
| Case Study Tracts | $ 25,497 | $ 37,236 |
| City of Fresno | $ 50,432 | $ 69,880 |
| Fresno County | $ 53,969 | $ 74,776 |

Source: 2019 ACS 5-Year Estimates, Table S1901

### 4.2 Key Policies and Plans

The City of Fresno has adopted several important policies and plans with the goal of fostering economic development and revitalizing the downtown area. Although a few important developments went up in downtown Fresno in the early 2000s, the most significant changes occurred more recently, following the adoption in 2016 of the Downtown Neighborhoods Community Plan and the Fulton Corridor Specific Plan that together aimed to encourage both residential and commercial infill development to create a safe and vibrant downtown community. The Fresno Transit Long Range Master Plan, adopted in 2002, was an important step in improving transit service to the downtown area and led eventually to the adoption of the Fresno Bus Rapid Transit Plan in 2008 and the opening of the city’s first BRT line in 2018. The city has also invested in improvements to streetscapes in the area to improve safety for pedestrians and bicyclists. Key policies and plans are summarized in Table 4.2.

The **Fresno Transit Long Range Master Plan**, adopted in 2002, discussed the future growth of Fresno and the need for transit to grow along with it. This plan first introduced bus rapid transit (BRT) as an option for the city. The plan identified areas with high concentrations of employment and thus high potential for transit ridership. The plan recognized transit as having an important role in the city’s efforts to revitalized downtown.

The **Fresno Bus Rapid Transit Plan** was approved by the city in 2008 to implement a Bus Rapid Transit, or BRT, system in Fresno. In addition to presenting a proposed BRT network, this plan for implementation explored the improvements a BRT line would bring to the downtown area. According to the plan, a BRT line would transport people to and from downtown in a more efficient and cost-effective way and could generate significant urban development benefits, supporting the goals of other city plans. The proposed network, developed with community input, took advantage of major streets stretching the length of the city, with several lines beginning and ending in the downtown area. The plan identified the Blackstone/Kings Canyon corridor as an early implementation project given ridership projections and retail-oriented land uses. As noted below, this line opened in 2018.

The **Fresno Green Handbook** was adopted in 2009 to encourage more sustainable building practices. The city established incentives for compliance through a point-based system. Projects earning a minimum number of points qualify for reductions in planning fees and expedited processing of development applications. Points are awarded for locations within the downtown area, locations near public transit, renovations of historic buildings for housing, projects that mix residential with commercial uses, providing a bike or pedestrian path for residents, installing electric vehicle charging stations, and other sustainable features. Developers who qualify are eligible for a Fresno Green award and can use the Fresno Green brand in their marketing.

In 2013, the city under the leadership of Mayor of Fresno Ashley Swearengin created the **General Plan Implementation & Infill Development Task Force** in partnership with the California Governor's Office of Planning and Research and with technical assistance support from the US Environmental Protection Agency (EPA) through the White House Strong Cities, Strong Communities (SC2) initiative. The goal of this task force, comprising around 30 financing and infill development experts, was to help the city develop new strategies to encourage infill development in Downtown Fresno. The recommendations of the task force were incorporated into the 2035 General Plan, adopted in 2014. In 2016, the recommendations were also incorporated into the Downtown Neighborhood Community Plan, which calls for infill of vacant lots and buildings.

The **Downtown Neighborhoods Community Plan** was adopted in 2016.The city intends this plan to be the guiding document for improving neighborhoods in Downtown Fresno after years of neglect by the city. The goal of this plan is to create a safe and vibrant downtown community with a mix of residential and commercial uses. Walkable pedestrian-friendly streets, a multi-modal transportation system, increased access to transit, and new housing were all goals put forward by residents in community meetings as during the preparation of the plan. The plan includes a more specific plan for each neighborhood in Downtown Fresno with the aim of addressing the specific needs and retaining the unique character of each area.

The city adopted the **Fulton Corridor Specific Plan** in 2016 and intends for this plan to be fully implemented by 2035 for a newly revitalized downtown (Figure 4.2). This plan covers an area entirely within the boundaries of the Downtown Neighborhood Community Plan, translating the goals of that plan into specific projects with time frames and funding sources. One of the plan's goals is to bring more people into the downtown area to live, work, and play. The Specific Plan provides for the addition of 6,300 residential units, 3.9 million square feet of office space, 1.5 million square feet of retail space, and 145,000 square feet of industrial space to the area. The plan prioritizes infill and mixed-use development and housing variability as well as walkability, bikeability, and connectivity of all transportation modes. Downtown subareas are reimagined with their own distinct improvements and additions. The plan anticipates the future arrival of a high-speed rail station as a potential catalyst for further infill development and local transportation improvements.

**Figure 4.2. Map of Underutilized Land and Development Potential from Fulton Corridor Specific Plan**

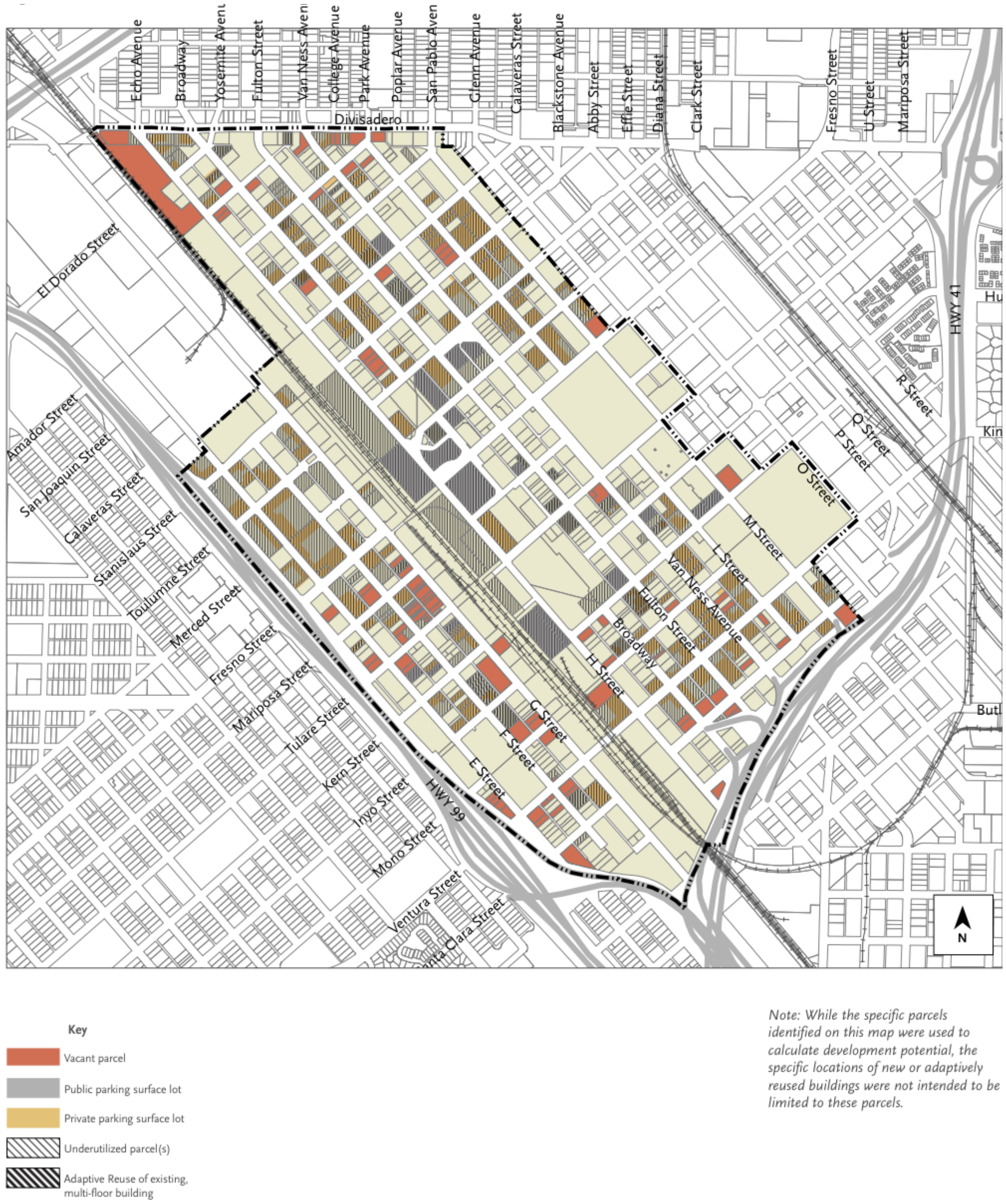



**TABLE 3.4B - Development Potential by Downtown District (High)**

| Land Use | Fulton District | Mural District | Civic Center | South Stadium | Chinatown | Armenian Town/ Convention Center | Divisadero Triangle | Total |
|---|---|---|---|---|---|---|---|---|
| Residential (units) | 1,338 [1] | 1,719 | 191 | 691 | 1,587 | 447 | 320 | **6,293** |
| Office (s.f.) | 1,338,402 | 1,172,463 | 57,775 | 290,845 | 891,318 | 206,191 | -60,115 | **3,896,879** |
| Retail | 483,053 | 662,143 | 35,385 | 108,058 | 246,541 | 32,280 | 19,026 | **1,586,486** |
| Industrial | - | -42,180 | - | -848 | 204,062 | -15,949 | - | **145,085** |

[1] Includes 860 units within existing vacant buildings.

The **Downtown Development Code**, adopted in 2016, is an amendment to the city's zoning code for the downtown area designed to implement the Downtown Neighborhoods Community Plan and the Fulton Corridor Specific Plan. The adoption of this "form-based" code allows the city to focus more on the design of streets and public spaces and enables greater flexibility in land uses than would a traditional zoning code. Some of the main design goals built into this form-based code are that: the streets will be interconnected, easy to navigate, and open to both vehicles and pedestrians; buildings will create a "streetscape"; open space will be distributed around the area for a variety of needs; and buildings will support a sustainable environment. This code allows an update to zoning districts for infill housing projects if they align with the vision of the Downtown Neighborhoods Community Plan or the Fulton Corridor Specific Plan.

**Table 4.2. Key Plans and Policies for Downtown Fresno**

| Plan/Policy | Year | Goals and Objectives |
|---|---|---|
| Fresno Transit Long Range Master Plan | 2002 | Provides a vision of what public transit might/should look like in twenty years based on adopted regional and local goals and objectives. The Plan presents an evaluation of current and future transit needs and issues, plus recommendations for creating a system to address those needs in an effective and efficient manner. |
| Fresno Bus Rapid Transit Master Plan | 2008 | The overall vision of the BRT Master Plan is to demonstrate how improved efficiency, speed, and service can attract new transit ridership, improve customer satisfaction, and benefit the broader community by providing a quality of service similar to light rail systems through the use of bus technology. |
| Fresno Green Residential Handbook | 2009 | This handbook explains how developers can qualify for the Fresno Green program. A proposed Fresno Green project must have a minimum of 20 points spread over at least 5 of the major categories in either the Residential or Non-residential program. Incentives for certified Fresno Green projects include: 25% fee reductions of many planning fees, 20% minor deviation from development standards, if needed (25% if public art is incorporated into the project), expedited processing through the "Green Team", and Eligibility for a Fresno Green award and use of the Fresno Green brand for the project |
| Downtown Neighborhoods Community Plan | 2016 | The community's tool for guiding the successful regeneration of Downtown Fresno and its surrounding neighborhoods. It is a visionary document that lays out the community's long-term goals for the Community Plan Area and provides detailed policies concerning a wide range of topics, including land use and development, transportation, the public realm of streets and parks, infrastructure, historic resources, and health and wellness. |
| Fulton Corridor Specific Plan | 2016 | The community's tool for guiding the future development of Downtown Fresno. It is both a visionary document that lays out the community's long-term goals for the Plan Area, as well as an implementation plan for immediate and midterm actions needed to achieve the long-term vision. It provides detailed policies concerning a wide range of topics, including land use and development, historic resources, the public realm, transportation, and infrastructure. These policies provide the foundation for urban and economic growth, as well as the basis for the City to make the tough daily choices regarding growth, historic preservation, housing, transportation, the environment, community facilities, and community services. |

| Plan/Policy | Year | Goals and Objectives |
|---|---|---|
| Downtown Development Code | 2016 | Implements the vision of the Downtown Neighborhoods Community Plan and Fulton Corridor Specific Plan by creating new regulations for private development. In the Downtown core, a form-based code is utilized which focuses on creating dense and attractive urban buildings that shape pleasing public spaces. In the neighborhoods, major streets are envisioned to transform into walkable mixed-use, multi-modal corridors, while residential areas will be preserved and enhanced with complimentary infill projects guided by the code. The Downtown Development Code is now a part of the Fresno Municipal Code. |

### 4.3 Significant Land Use Changes

The City of Fresno has been working to bring people back to the downtown core so as to foster economic growth. One of the first big changes to Downtown Fresno after 2000 was the opening in 2002 of Chukchansi Park, a 10,650-capacity baseball stadium that houses the minor league baseball team the Fresno Grizzlies. The Fulton Mall, once a street closed to vehicle traffic in 1964 to create a pedestrian shopping mall, was opened to vehicles once again in 2017 with the goal of increasing the viability of businesses along the street. Many storefronts have been redesigned for a more modern look and many new restaurants, shops, and about 150 apartments have been built in the Fulton Mall area. In response to the city's increased emphasis on infill and mixed-use housing in plans adopted over the past 20 years, over 600 new housing units have been built in Downtown Fresno to date. The City of Fresno is now anticipating the construction of a new high-speed rail station on H Street between Fresno and Tulare Streets, and the Fulton Corridor Specific Plan and Downtown Neighborhoods Community Plan anticipate growth within the city when the line is completed and operational.

#### 4.3.1 Chukchansi Park

One of the largest attractions in Fresno, Chukchansi Park, originally Grizzlies Stadium, opened in 2002 as one of the first projects in the revitalization effort. Negotiations between the Fresno City Council and the Diamond Group, the owners of the Fresno Grizzlies, about the new stadium went on for about 8 years. The stadium was eventually built on empty city-owned land entirely with public funds at a cost of $46 million (Fagerstrom Engineering 2018). It is owned by the city but leased to the owners of the baseball team for 30 years at $1.5 million a year. The entrance to the park is located on Tulare and H Street with another entrance on Fulton Street. Its location in the heart of downtown, with access to shops and restaurants on Fulton Street, have brought new economic activity to the area. According to one estimate, the Chukchansi Economic Development Authority disburses $50 million in payroll and benefits into the local economy every year (milb.com 2021). Other events held at Chukchansi Park have included concerts and a taco truck competition.

#### 4.3.2 Fulton Mall

Fulton Street, historically Downtown Fresno's main commercial district, has gone through many changes over the last 100 years. It was truly the core of the community until the 1960s, when businesses started moving north out of the downtown area and the historic buildings of the past were being torn down or renovated to look modern (ABC 30 Fresno 2017). In 1958 Victor Gruen was hired by the city for his background in mall revitalization to help revitalize Downtown Fresno. He created a plan for a new pedestrian mall on Fulton Street (Tokmakian and McKnight

2013). Working with Victor Gruen, architect Garret Eckbo redesigned the street as a pedestrian mall of the future. The city closed Fulton Street to vehicular traffic and started construction with a groundbreaking ceremony on March 31, 1964 (McEwen 2016). Construction finished in September 1964, and the mall quickly gained national interest as a place worth visiting with its combination of art and architecture (Tokmakian and McKnight 2013). The redesigned mall is shown in Figure 4.3.

**Figure 4.3. The Fulton Mall in 1966**


Source: Wyoming History Day, 2023

This success did not last. By the 1970's the mall was in decline, with many stores closing or leaving to other areas of the city, including the newly built suburban shopping malls. The Fulton Corridor Specific Plan of 2016 stated that the Fulton Mall by 1990 was "in a state of physical, economic, and social free fall” and was contributing only 5.7 percent of its revenue-generating potential in 2008 (Fulton Corridor Specific Plan 2016). Similar stories can be found throughout the U.S.: the failure of pedestrian malls created in downtown areas as an attempt to compete with suburban shopping malls. Urban planners came to believe that rather than helping businesses, the absence of car traffic contributed to their demise by reducing visibility and access, and many of the pedestrian malls have been reopened to car traffic (Amos 2020).

In 2016, led by Fresno Mayor Ashley Swearengin, the city launched a $20 million project to open Fulton Street back up to vehicles. The city won a $16-million federal grant to pay for most of the work (ABC 30 Fresno, 2017). In a newspaper interview, Craig Scharton, a Fulton Mall business owner and downtown association board member who is a former Fresno City Council member, said that they had by then learned that the best thing for downtown revitalization was to have a complete street (Benjamin 2016). He lauded the plan for slow-moving, two-way traffic with on-street parking and wide sidewalks and for restaurants, coffee shops, small, unique retail and entertainment venues combined with business offices and government operations (Benjamin 2016). Many business owners were ready to see the change on Fulton Street In 2017, construction was completed, and the city reopened Fulton Street to vehicles while prioritizing pedestrian safety by implementing a complete streets approach. New retail space and restaurants opened, and at least four infill apartment and townhouse buildings brought about 150 new units to the area.

After the completion of the project in 2017, \city leaders and developers urged the public to have patience, that revitalization would take some time (Sheehan 2018). Many building owners hoped to remodel in order to attract new businesses, but that proved challenging. Financing was a problem, for example, for Shay Maghame, whose company bought the Radin-Kamp department store building, later known as the J.C. Penney building, in 2013 with plans to establish retail stores on the ground floor with residential apartments on the upper floors (Sheehan 2018). The onset of the pandemic was another blow to revitalization efforts.

### 4.3.3 Infill Housing

Over 600 new housing units have been built in Downtown Fresno to date in response to the city’s policies supporting infill and mixed-use development. Developer Fresno Housing specializes in affordable housing in Fresno and as of 2023, they have built over 100 units in the study area alone (Fresno Housing, 2023). City View at Van Ness apartments, completed in 2014, is an infill complex with 45 new units with close access to public transportation (Fresno Housing 2023). Fenix Apartments, completed in 2017, is an infill affordable family housing complex with 22 units (Fresno Housing 2023). Granville Reality has also been a leader of development in the downtown area, developing and renovating 10 apartment communities in the study area (Granville Reality 2023). The Lede, completed in 2016, is an infill project on Fulton Street that offers 85 units and was built on the site of Fresno’s first commercial radio station and first television station (Granville Reality 2023).

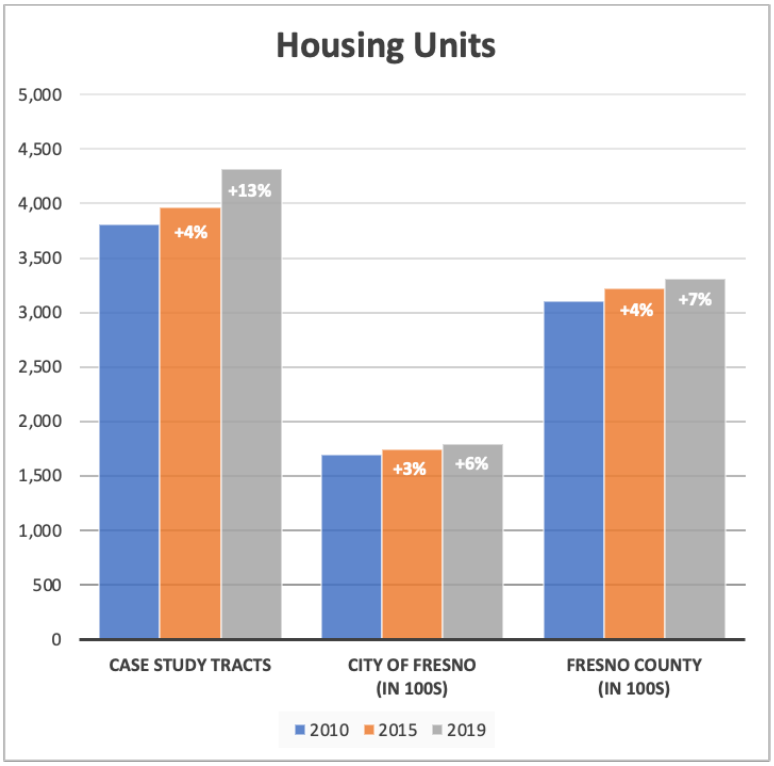
The number of housing units grew twice as fast in the case study area as in the city and the county from 2010 to 2019 (Table 4.3; Figure 4.4 (note that the scale for housing units is in 10s for the city and county)). Population declined by 8%, however, while it grew by 8% in the city and the county (Table 4.4). Median household income grew at just 3% in the case study area, compared to 17% and 16% for the city and county, respectively (Table 4.5), suggesting that the gentrification effects of infill development have been at most modest.

**Table 4.3. Housing Units in Fresno, 2010, 2015, 2019**

| | 2010 | 2015 | 2019 | 2010-15 | 2010-19 |
|---|---|---|---|---|---|
| Case Study Tracts | 3,810 | 3,961 | 4,318 | +4% | +13% |
| City of Fresno | 169,066 | 174,593 | 178,831 | +3% | +6% |
| Fresno County | 310,219 | 321,955 | 331,142 | +4% | +7% |

Source: ACS 5-Year Estimates, Table B25001

**Figure 4.4. Housing Units by Year and Geography in Fresno**




Source: ACS 5-Year Estimates, Table B25001

**Table 4.4. Total Population in Fresno, 2010, 2015, 2019**

| | 2010 | 2015 | 2019 | 2010-15 | 2010-19 |
|---|---|---|---|---|---|
| Case Study Tracts | 13,074 | 11,488 | 12,020 | -12% | -8% |
| City of Fresno | 484,008 | 510,451 | 525,010 | +5% | +8% |
| Fresno County | 908,830 | 956,749 | 984,521 | +5% | +8% |

Source: ACS 5-Year Estimates, Table DP05

**Table 4.5. Median Household Income in Fresno, 2010, 2015, 2019**

| | 2010 | 2015 | 2019 | 2010-15 | 2010-19 |
|---|---|---|---|---|---|
| Case Study Tracts | $24,805 | $18,509 | $25,497 | -25% | 3% |
| City of Sacramento | $43,124 | $41,531 | $50,432 | -4% | 17% |
| Sacramento County | $46,430 | $45,233 | $53,969 | -3% | 16% |

Source: ACS 5-Year Estimates, Tables S1901 and S2503

### 4.4 Significant Transportation Changes

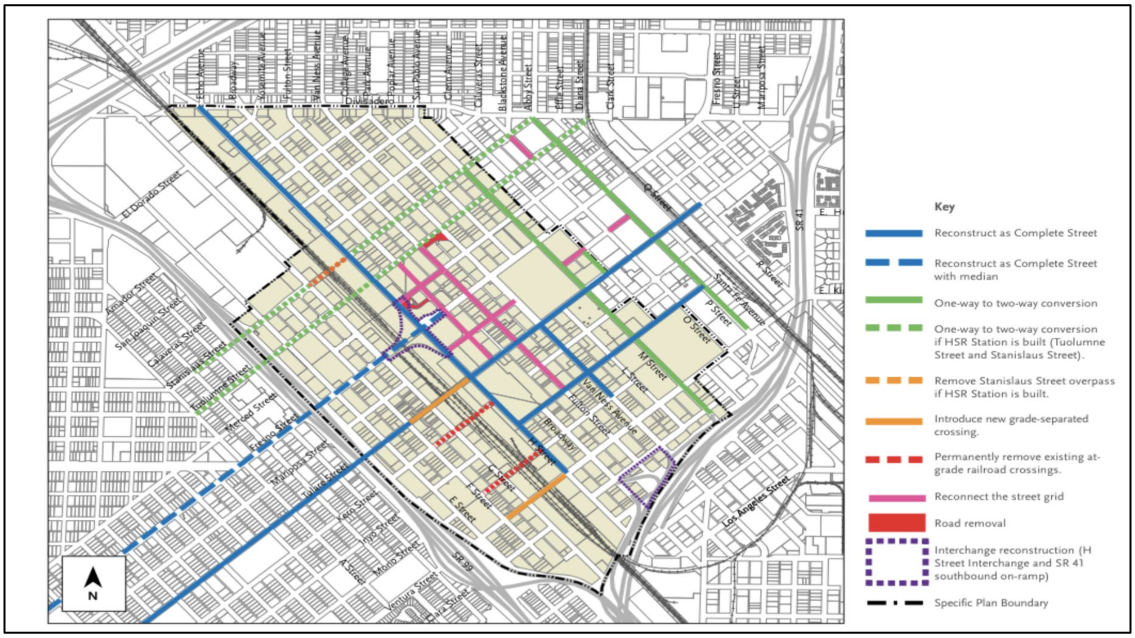
The city has invested in transportation improvements with the goal of increasing walkability, transit use, and safety in the downtown area. Several major corridors have benefited from traffic calming and pedestrian safety improvements as well as new bike lanes. In 2018, the city added a new BRT line to serve Blackstone and Kings Canyon Road to better serve the downtown area.

#### 4.4.1 Traffic Calming

To implement the 2016 Downtown Neighborhoods Community Plan, the city added traffic calming measures downtown and within residential neighborhoods and around schools (Figure 4.5). These projects included removing unnecessary travel lanes, narrowing travel lanes, reducing excessively wide turning radii at intersections, introducing on-street parking, and converting existing on-street parallel parking to diagonal parking. Projects also included sidewalk improvements for utilities and pedestrian safety on various streets and installing corner bulb outs at intersections, widening sidewalks, planting trees to narrow perceived street width, and installing bike lanes.

Projects completed so far are on major arterials like Fulton Street, Van Ness Avenue, and Inyo Street. Van Ness Avenue is an important corridor for the new BRT line that serves the downtown area (see Section 4.4.2). The Van Ness bus station, located across the street from the Fresno County Superior Courthouse, benefited from a project completed in 2018 that added an in-street bus stop as well as a bus pull-out for safer boardings and alightings. A project completed in 2021 gave Inyo Street, which runs along Chukchansi park, approximately 0.34 miles of marked bike lanes starting at L street to where it ends at Santa Fe Avenue. A city project on the intersection of Fulton and Inyo Street has added 4 sidewalk bulb outs for shorter pedestrian crossings near Chukchansi Park.

**Figure 4.5. Map of Downtown Fresno street improvements**

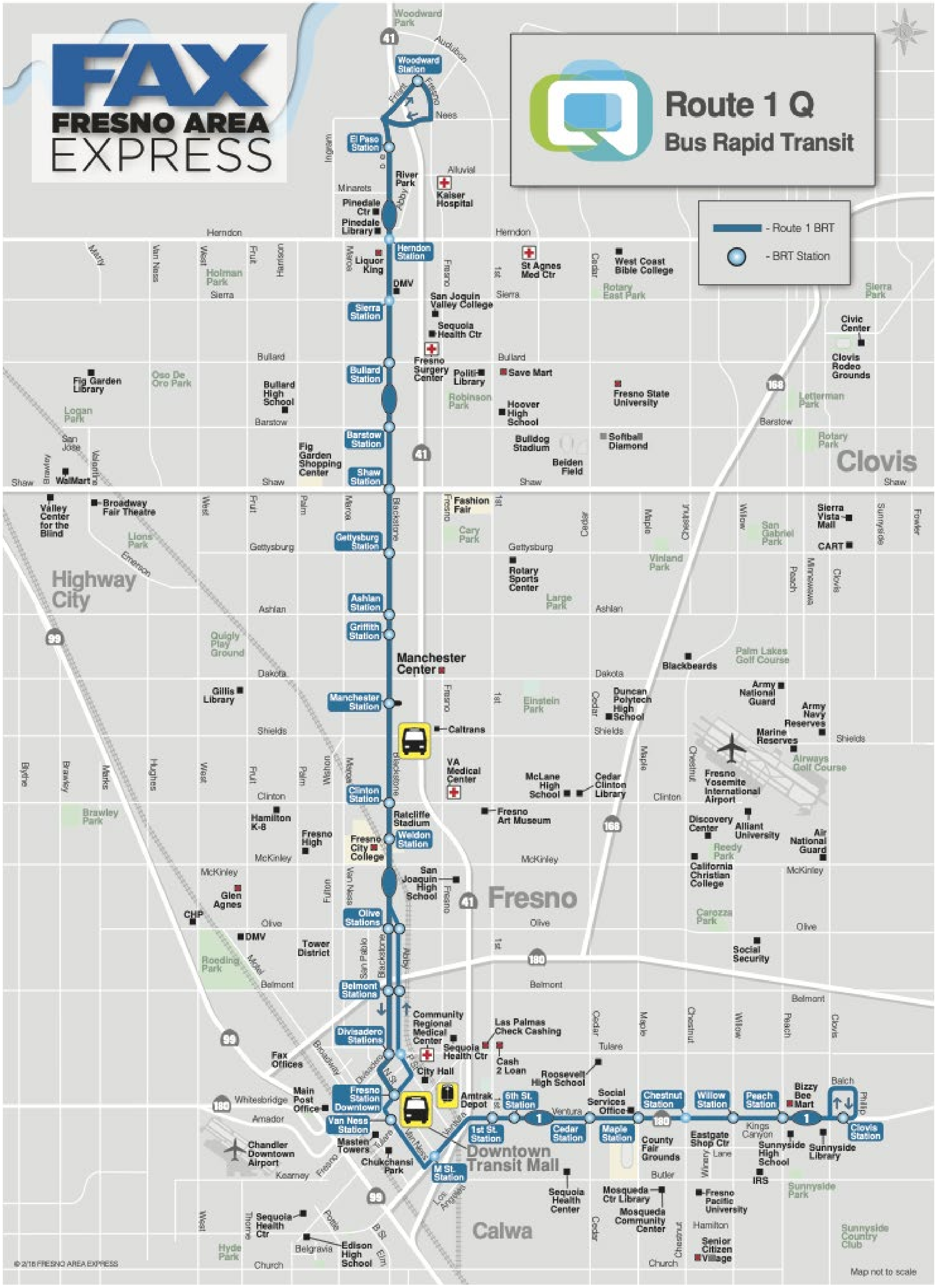



Source: Fulton Corridor Specific Plan

### 4.4.2 BRT Implementation

The Fresno Area Express (FAX) “Q” Blackstone/Kings Canyon Bus Rapid Transit (BRT) line began service in February of 2018. This 15.7-mile line connects northern Fresno with downtown and southeast Fresno and includes 51 station pairs, two terminal stations, and one shared platform station (Figure 4.6). It serves many popular shopping centers, hospitals, and the downtown area with 10-minute frequencies at peak times for faster service in comparison to the regular FAX service. The City of Fresno Department of Transportation reports that between July 1, 2018, and June 30, 2019, ridership on Q surpassed 2.5 million (City of Fresno Department of Transportation n.d.). In 2020, Fresno Mayor (at the time) Lee Brand stated that Fresno Area Express experienced a 13% increase in ridership on the BRT Q line in the first half of the fiscal year (The Business Journal Staff 2020). The degree to which the BRT trips replace driving trips (and thus reduce VMT) rather than bus trips is not clear.

**Figure 4.6. Map of Fresno BRT Route**




Source: https://www.fresno.gov/transportation/fax/maps-and-guides/

### 4.5 Travel Behavior Changes

Several data sources provide evidence of changes in travel patterns in the Fresno case study area. Travel patterns and trends in those patterns in downtown Fresno were compared to those in the entire City of Fresno and/or Fresno County. These comparisons show the extent to which travel behavior trends were unique to the case study area or reflect changes that also occurred city- or county-wide.

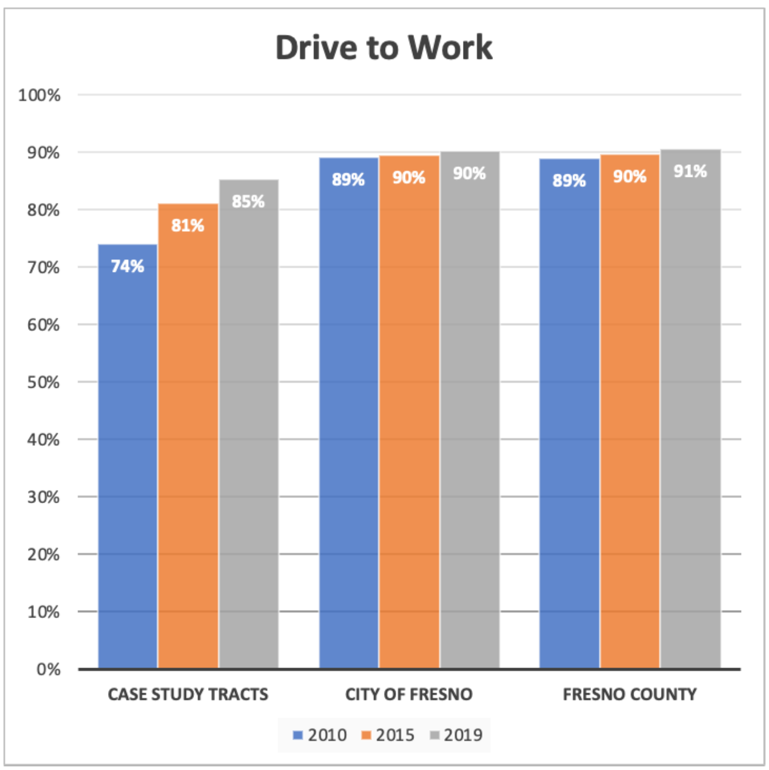
#### 4.5.1 ACS Data Analysis

The American Community Survey (ACS), conducted by the U.S. Census Bureau, was a primary data source for identifying potential changes in commute mode share and auto ownership. Data were analyzed for the years 2010, 2015, and 2019 (thus ending before the Covid-19 pandemic). The case study area (consisting of 3 census tracts; see Table 2.2) is compared to the City of Fresno and Fresno County, which serve as reference geographies for this case study.

##### 4.5.1.1 Commute Mode Share

Driving to work was less prevalent in the downtown area than in the City Fresno and Fresno County throughout the time period (Figure 4.7). Driving appears to have increased among residents of the case study area over the 2010s, from 74% in 2010 to 85% in 2019. The increase of 10 percentage points is larger than the margins of errors for the two estimates, meaning that the increase is relatively certain (Table 4.6).

**Figure 4.7. Share Driving to Work in Fresno**




Source: ACS 5-Year Estimates, Table B08301

**Table 4.6. Share Driving to Work by Year and Geography in Fresno**

| | 2010 | | 2015 | | 2019 | |
|---|---|---|---|---|---|---|
| **Resident Geography** | **Estimate** | **MOE** | **Estimate** | **MOE** | **Estimate** | **MOE** |
| **Case Study Area** | 74% | +/-8% | 81% | +/-5% | 85% | +/-5% |
| **City of Fresno** | 89% | +/-0% | 90% | +/-0% | 90% | +/-1% |
| **Fresno County** | 89% | +/-0% | 90% | +/-0% | 91% | +/-0% |

MOE = Margin of Error
Source: ACS 5-Year Estimates, Table B08301

The share of bicycling and walking to work by residents of downtown Fresno were much higher than shares for residents of the city and county (Figure 4.8). According to the ACS data walking and bicycling to work among downtown Fresno residents increased from 6 percent in 2010 to 10 percent in 2015, then decreased to 5 percent in 2019. However, these estimates rely on small sample sizes with large margins of error and should be interpreted with caution (see Table 4.7). The trend for both the city and the county was downward; the larger samples for these areas make the estimates more certain.

**Figure 4.8. Walking and Bicycling to Work by Year and Geography**

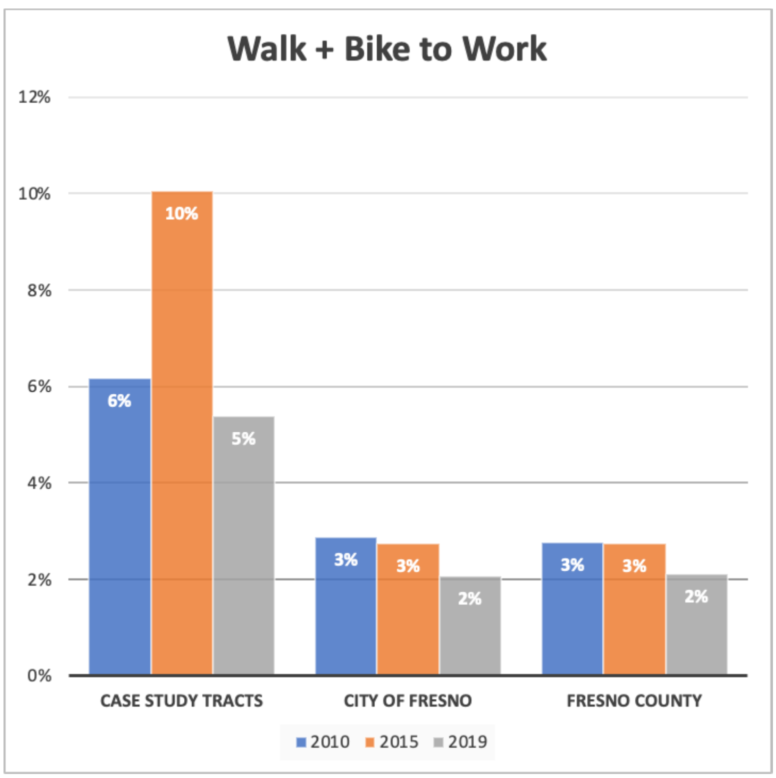


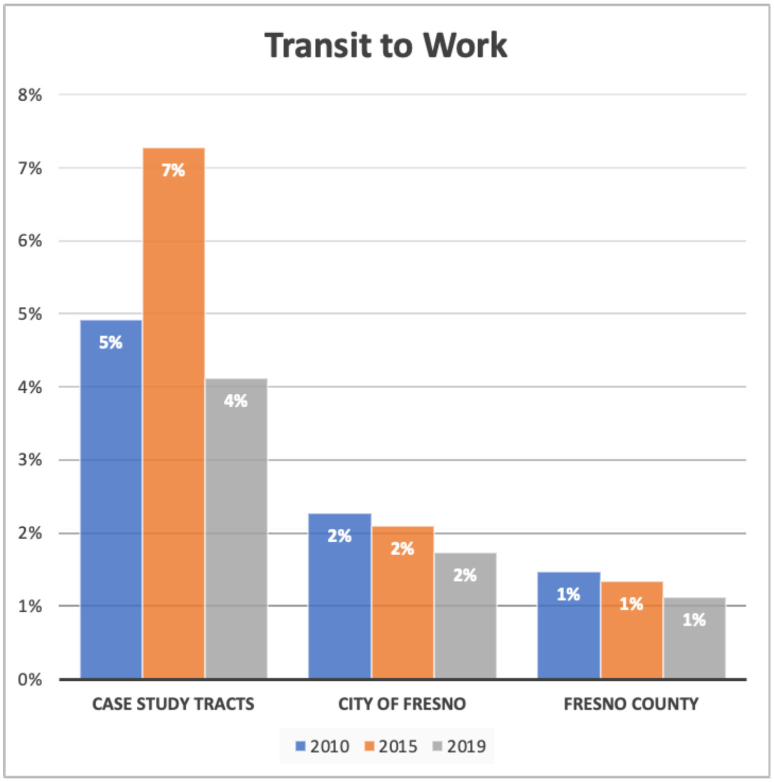
**Table 4.7. Walking and Bicycling to Work by Year and Geography**

| | 2010 | | 2015 | | 2019 | |
|---|---|---|---|---|---|---|
| **Resident Geography** | **Estimate** | **MOE** | **Estimate** | **MOE** | **Estimate** | **MOE** |
| **Case Study Area** | **6%** | **–** | **10%** | **–** | **6%** | – |
| Bike | 1% | +/-7% | 4% | +/-2% | 2% | +/-2% |
| Walk | 5% | +/-6% | 6% | +/-3% | 4% | +/-2% |
| **City of Fresno** | **3%** | **–** | | **–** | **2%** | – |
| Bike | 1% | +/-0% | 1% | +/-0% | 1% | +/-0% |
| Walk | 2% | +/-0% | 2% | +/-0% | 1% | +/-0% |
| **Fresno County** | **3%** | **–** | **3%** | **–** | **2%** | – |
| Bike | 1% | +/-0% | 1% | +/-0% | 0% | +/-0% |
| Walk | 2% | +/-0% | 2% | +/-0% | 2% | +/-0% |

MOE = Margin of Error
Source: ACS 5-Year Estimate, Table B08301

The share of people who commuted via transit follows a similar pattern to commuting via active modes in the Fresno area. ACS data show a spike in transit use between 2010 and 2015 – from 5% to 7% – followed by a decrease to 4% between 2015 and 2019 (Figure 4.9). Across the same time period, the city and county each saw slight decreases in the share of residents commuting via transit. The small sample size and large margins of error for the case study area require careful interpretation of the trends (Table 4.8).

**Figure 4.9. Transit to Work by Year and Geography in Fresno**




Source: ACS 5-Year Estimates, Table B08301

**Table 4.8. Transit to Work by Year and Geography in Fresno**

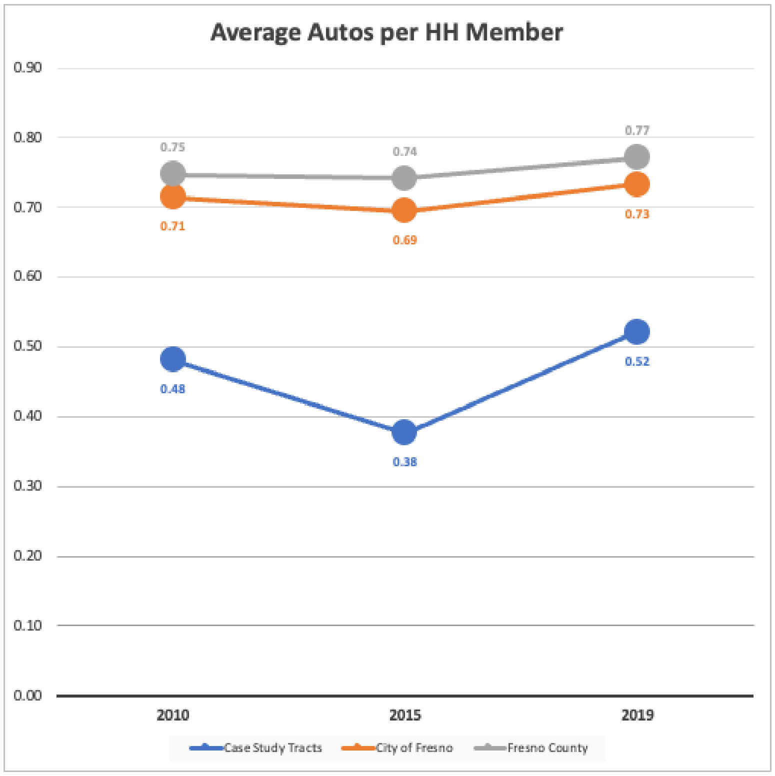
| | 2010 | | 2015 | | 2019 | |
|---|---|---|---|---|---|---|
| **Resident Geography** | **Estimate** | **MOE** | **Estimate** | **MOE** | **Estimate** | **MOE** |
| **Case Study Area** | 5% | 7.5% | 7.3% | 6.8% | 4.1% | 2.9% |
| **City of Fresno** | 2.3% | 0.3% | 2.1% | 0.3% | 1.7% | 0.3% |
| **Fresno County** | 1.5% | 0.2% | 1.3% | 0.2% | 1.1% | 0.1% |

MOE = Margin of Error
Source: ACS 5-Year Estimates, Table B08301

#### 4.5.1.2 Auto Availability

Auto availability per household member, a measure correlated with vehicle trips and VMT, was consistently lower in the case study area of downtown Fresno than in the City of Fresno and Fresno County as a whole (Figure 4.10). Households in the case study area had an average of about one vehicle for every two household members during the case study timeframe (or– between 0.48, 0.38, and 0.52 vehicles for every one person in 2010, 2015, and 2019 respectively). Households in the city and county both had higher levels of auto availability – an average vehicle per household member of ratio of about 0.75, or about 3 vehicles for every 4 household members (Table 4.9).

**Figure 4.10. Average Autos per Household Member**




Source: ACS 5-Year Estimates, Table B08301

**Table 4.9. Average Autos per Household Member**

| | 2010 | 2015 | 2019 |
|---|---|---|---|
| Case Study Tracts | 0.48 | 0.38 | 0.52 |
| City of Fresno | 0.71 | 0.69 | 0.73 |
| Fresno County | 0.75 | 0.74 | 0.77 |

Source: ACS 5-Year Estimates, Table B08301

### 4.5.2 NHTS & CHTS Data Analysis

The National Household Travel Survey (NHTS) and the California Household Travel Survey (CHTS) were also primary data sources for identifying potential travel behavior changes in Fresno. The survey data include household vehicle miles traveled (VMT), auto availability per household driver, and mode share for all household trips. In this analysis, the comparison area is the City of Fresno excluding the case study area, in other words, the donut around the case study area. In this section, for simplicity, “the city” refers to the City of Fresno excluding the case study area.

#### 4.5.2.1 Sample Size

The different metrics used in this analysis have different sample sizes. For household-based statistics – e.g., household VMT, automobile availability – the sample size is the number of households sampled in each geographic area (Table 4.10). It is important to note that the sample size of households in the case study area is small for all years. Estimates produced from these small sample sizes will have large margins of error and wide confidence intervals, meaning that estimated changes over time are highly uncertain and not statistically significant. In the absence of other data on changes in travel patterns, the results of the analysis for households are presented in the subsequent sections but should be interpreted with extreme caution.

**Table 4.10. NHTS & CHTS Sample Size of Households in Fresno by Household Location**

| | 2001 | 2009 | 2012 | 2017 |
|---|---|---|---|---|
| Case Study Area | 9 | 5 | 18 | 10 |
| City of Fresno* | 339 | 200 | 536 | 335 |

* City of Fresno without case study area

For trip-based statistics – e.g., mode share of trips ending in the case study area – the sample size is the number of trips that meet the relevant criteria. Table 4.11 shows the number of trips generated by the households in the survey samples in that area, the number of trips originating in that area in the survey sample, the number of trips ending in that area, and the number of trips internal to that area (both originating and ending in that area) – in all three cases regardless of where the traveler lives. These sample sizes are large enough to provide some certainty in the values reported; this is more true for auto trips, which account for the majority of trips, than for transit, walking and bicycling trips, for which the sample sizes are much smaller. As discussed in Section 2, differences in survey methods may also affect the comparisons between years. The uncertainty stemming from both small sample sizes and differences in survey methods should be kept in mind when considering the results presented in the following sections.

**Table 4.11. NHTS & CHTS Sample Size of Trips by Type by Area in Fresno**

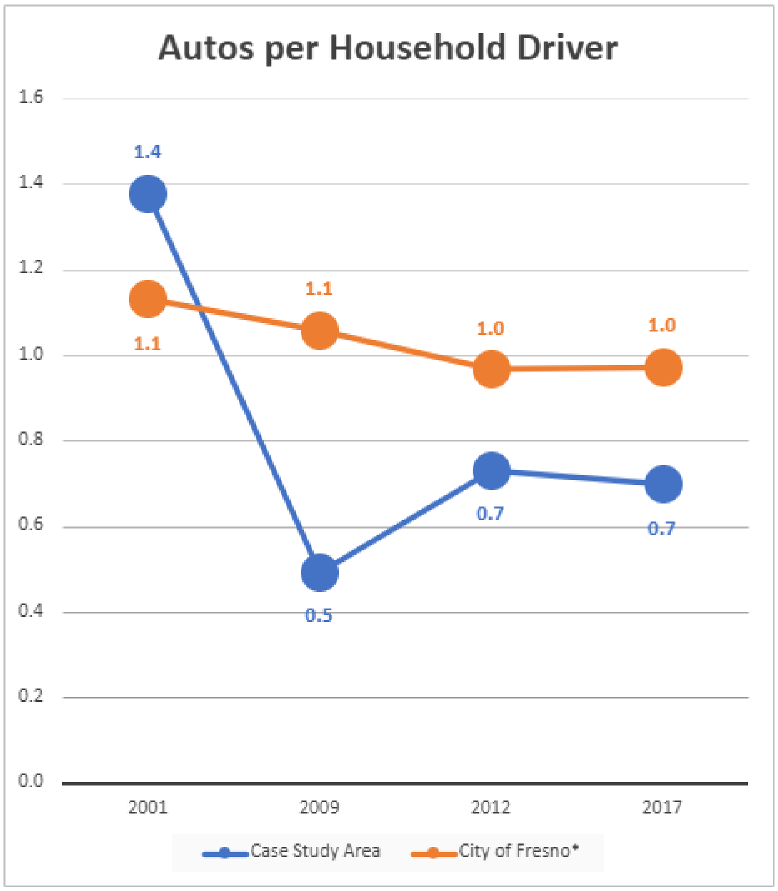
| | 2001 | 2009 | 2012 | 2017 |
|---|---|---|---|---|
| **Trips by households in…** | | | | |
| Case Study Area | 66 | 25 | 306 | 63 |
| City of Fresno* | 3124 | 1467 | 6939 | 2374 |
| **Trips starting in…** | | | | |
| Case Study Area | 164 | 56 | 319 | 143 |
| City of Fresno* | 3528 | 1041 | 6925 | 2456 |
| **Trips ending in…** | | | | |
| Case Study Area | 162 | 57 | 463 | 141 |
| City of Fresno* | 3270 | 1005 | 7325 | 2442 |
| **Trips internal to…** | | | | |
| Case Study Area | 54 | 18 | 240 | 39 |
| City of Fresno* | 2699 | 665 | 6100 | 1892 |

* City of Fresno without case study area

#### 4.5.2.2 Automobile Availability per Licensed Driver

Trends in estimated household automobile availability per licensed driver in Fresno are shown in Figure 4.11. Estimates from the four surveys suggest that average automobile availability per driver was relatively consistent in the city across the four time periods, at around one car per driver. Auto availability in the case study area was estimated to be about half the rate of the comparison area in 2009, 2012, and 2017. These estimates are highly uncertain.

**Figure 4.11. Autos per Household Driver in Fresno**

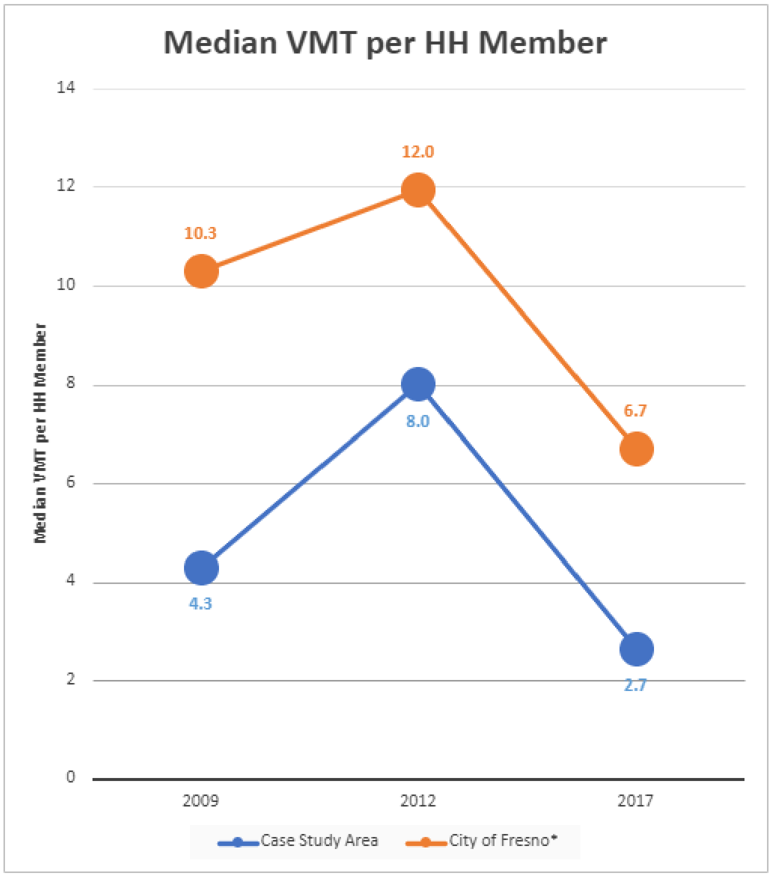



Source: NHTS and CHTS data; *City of Fresno without the case study area

### 4.5.2.3 VMT per Household Member

Median VMT per household (HH) member was estimated to be lower in the case study area than the comparison area in 2009, 2012, and 2017 (Figure 4.12). In both 2009 and 2017, the median VMT per household member in the case study area was estimated to be less than half the median VMT per household member in the city These estimates are highly uncertain.

**Figure 4.12. Median VMT per Household Member in Fresno**




Source: NHTS and CHTS data; *City of Fresno without the case study area

#### 4.5.2.4 Mode Share – Trips by Residents

The estimated mode shares of trips made by residents of the case study area compared to residents of the city are shown in Table 4.12. Given small sample sizes, these estimates are highly uncertain.

The auto mode share for case study area households was estimated to be consistently lower than the auto mode share for households in the city. Estimates of auto mode share in the city varied only slightly over the four surveys, ranging between 81% and 87%. Estimated auto mode share in the case study area ranged from 49% to 81% over the same time period.

The bus mode share was estimated to be higher among households in the case study area than households in the city for two of the three survey years for which there was data. Estimates for bus mode share in the case study area were not available for 2001 but were over twice as high as the estimates for the city in 2009 and three times as high in 2012. Bus mode share in the case study area was estimated to have dropped to 1% in 2017, while rising to 4% in the comparison area. The apparent drop in transit ridership in the case study area likely reflects the small sample size and the high uncertainty of the estimates.

Estimates of the walk mode share of trips taken by residents of the case study area fluctuated significantly between the survey years. These wide fluctuations likely reflect small samples sizes as well as differences in methodology between the CHTS (2001, 2012) and the NHTS (2009, 2017). The estimates of walk mode share of trips taken by case study area residents was consistently higher than for city residents.

The estimates of bicycle mode share of trips taken by residents of the case study area decreased over the survey years The anomalous result in 2009 may reflect the small sample size. The estimated bicycle mode share of trips taken by residents of the city was generally lower than the estimates for the case study area.

**Table 4.12. Mode Share of Trips by Residents by Area in Fresno**

| | | 2001 | 2009 | 2012 | 2017 |
|---|---|---|---|---|---|
| Auto | Case Study Area | 62.4% | 73.7% | 48.7% | 80.7% |
| | City of Fresno* | 84.6% | 80.9% | 81.8% | 86.6% |
| Bus | Case Study Area | N/A | 7.9% | 10.7% | 1.0% |
| | City of Fresno* | 5.3% | 3.1% | 3.3% | 4.3% |
| Walk | Case Study Area | 37.6% | 9.4% | 37.7% | 15.4% |
| | City of Fresno* | 9.8% | 13.7% | 12.7% | 7.2% |
| Bike | Case Study Area | N/A | 9.1% | 2.3% | 2.9% |
| | City of Fresno* | 0.3% | 2.0% | 2.3% | 1.9% |

Source: NHTS and CHTS data; *City of Fresno without the case study area

#### 4.5.2.5 Mode Share – Trips Ending in the Area

The estimated mode shares of trips ending in the Fresno case study area compared to those ending in the city are shown in Table 4.13. Given small sample sizes, these estimates are highly uncertain.

The estimated auto mode share of trips ending in the Fresno case study area decreased from 73% in 2001 to 48% in 2009, then increased to 56% in 2012 and to 85% in 2017. The fluctuations could reflect both small sample sizes in the case study area as well as differences in survey methodologies. The estimated auto mode shares of trips ending in the city were relatively constant between 2001 and 2017. Estimated auto mode shares in the case study area were consistently lower than in the comparison area, though the gap nearly disappeared as of 2017.

The estimated bus mode share of trips ending in the Fresno case study area fluctuated between 2001 and 2017. These fluctuations may reflect small sample sizes as well as differences in survey methodology. The estimated bus mode share of trips ending in the city also fluctuated, first decreasing then increasing slightly. The bus mode share in the case study area appears to be similar to the bus mode share in the city, except for the anomalous result in 2012.

The estimated walking mode share of trips ending in the Fresno case study area fluctuated widely between 2001 and 2017. These fluctuations may reflect small sample sizes as well as differences in survey methodologies. The estimated walking mode share of trips ending in the city initially increased over the study timeframe before decreasing to 7% in 2017. Estimated walking mode share was consistently higher in the case study area than the city.

The estimated bicycle mode share of trips ending in the case study area fluctuated between 2001 and 2017, initially increasing from 2001 to 2009 then decreasing to just over 1% in 2012 and 2017. These fluctuations may reflect small sample sizes as well as differences in survey methodologies. The estimated bicycle mode share of trips ending in the city increased over the study timeframe. Estimated biking mode share was higher in the case study area than the city in 2001 and 2009 but lower in 2012 and 2017.

**Table 4.13. Mode Share for Trips Ending in Area in Fresno**

| | | 2001 | 2009 | 2012 | 2017 |
|---|---|---|---|---|---|
| Auto | Case Study Area | 73.0% | 47.9% | 56.0% | 84.6% |
| | City of Fresno* | 85.8% | 83.2% | 82.0% | 87.1% |
| Bus | Case Study Area | 3.1% | N/A | 7.2% | 3.5% |
| | City of Fresno* | 4.6% | 3.4% | 3.1% | 3.9% |
| Walk | Case Study Area | 21.8% | 48.4% | 35.1% | 9.9% |
| | City of Fresno* | 9.3% | 11.6% | 12.8% | 7.1% |
| Bike | Case Study Area | 2.0% | 3.7% | 1.3% | 1.2% |
| | City of Fresno* | 0.2% | 1.6% | 2.1% | 2.0% |

Source: NHTS and CHTS data; *City of Fresno without the case study area

#### 4.5.2.6 Mode Share – Trips Starting in Area

The estimated mode shares of trips starting in the Fresno case study area compared to those ending in the city are shown in Table 4.14. Given small sample sizes, these estimates are highly uncertain.

Estimated auto mode share of trips starting in the case study area initially decreased between 2001 and 2009, from 73% to 50%, then increased to 86% in 2017. These fluctuations may reflect small sample sizes and differences in survey methodologies. Estimated auto mode share of trips starting in the city were relatively constant between 2001 and 2017. Estimated auto mode share was consistently lower in the case study area than the city.

Estimated bus mode share of trips starting in the case study area was constant at around 3% in 2001, 2009, and 2017. Estimated bus mode shares of trips starting in the city were also relatively constant. Estimated bus mode shares were roughly comparable in the case study area and the city.

The estimated walking mode share of trips starting in the case study area fluctuated dramatically between 2001 and 2017. These fluctuations may reflect small sample sizes as well as differences in survey methodologies. The estimated walking mode share of trips starting in the city also fluctuated over the period. The estimated walking mode share in the case study area was consistently higher than in the city, though the gap narrowed in 2017.

Estimated bike mode share of trips starting in the case study area initially increased between 2001 and 2009 then decreased to 1% in 2017. These fluctuations may reflect small sample sizes as well as differences in survey methodologies. The estimated bike mode share of trips starting in the city increased between 2001 and 2017. As of 2017, estimated bike mode share was lower in the case study area than in the city.

**Table 4.14. Mode Share for Trips Starting in Area in Fresno**

| | | 2001 | 2009 | 2012 | 2017 |
|---|---|---|---|---|---|
| Auto | Case Study Area | 72.6% | 50.5% | N/A | 86.3% |
| | City of Fresno* | 86.4% | 81.4% | N/A | 87.0% |
| Bus | Case Study Area | 3.1% | 3.2% | N/A | 2.8% |
| | City of Fresno* | 4.2% | 3.2% | N/A | 3.9% |
| Walk | Case Study Area | 21.5% | 42.8% | N/A | 9.8% |
| | City of Fresno* | 9.1% | 12.9% | N/A | 7.2% |
| Bike | Case Study Area | 2.0% | 3.6% | N/A | 1.1% |
| | City of Fresno* | 0.3% | 2.2% | N/A | 2.0% |

Source: NHTS and CHTS data; *City of Fresno without the case study area

#### 4.5.2.7 Mode Share – Trips Internal to Area

The estimated mode shares of trips internal to (i.e., starting and ending) in the Fresno case study area compared to those internal to the city are shown in Table 4.15. Given small sample sizes, these estimates are highly uncertain. The surveys samples did not include internal trips by bus or by bike.

The estimated auto mode share of internal trips in the case study area fluctuated substantially over the study timeframe. These fluctuations may reflect small sample sizes as well as differences in survey methodologies. Estimated auto mode shares of internal trips in the city were relatively consistent across the study timeline. Estimated auto mode shares were consistently lower in the case study area than in the city, with a gap of over 20 percentage points in 2017.

The estimated walking mode share of internal trips in the case study area also fluctuate substantially over the study timeframe. These fluctuations may reflect small samples sizes as well as differences in survey methodologies. The estimated walking mode share of internal trips in the city was more consistent across the timeframe. The estimated walking mode share in the case study area was consistently higher than the walking mode share in the city, though the gap narrowed in 2017.

The far smaller geographic size of the case study area explains the large gaps in estimates of both auto and walk mode shares: the trips internal to the case study area are on average far shorter than the trips internal to the city, making walking a more viable mode for trips internal to the case study area.

**Table 4.15. Mode Share for Trips Internal to Area in Fresno**

| | | 2001 | 2009 | 2012 | 2017 |
|---|---|---|---|---|---|
| Auto | Case Study Area | 39.3% | 18.1% | N/A | 64.2% |
| | City of Fresno* | 84.5% | 76.2% | N/A | 84.5% |
| Bus | Case Study Area | N/A | N/A | N/A | N/A |
| | City of Fresno* | N/A | N/A | N/A | N/A |
| Walk | Case Study Area | 57.7% | 81.9% | N/A | 32.3% |
| | City of Fresno* | 11.1% | 17.1% | N/A | 8.6% |
| Bike | Case Study Area | N/A | N/A | N/A | N/A |
| | City of Fresno* | N/A | N/A | N/A | N/A |

Source: NHTS and CHTS data; *City of Fresno without the case study area

### 4.6 Assessment

The built environment in the Fresno case study area changed in significant ways over the study period, though many changes came late in the period. The city's primary goal was to revitalize downtown, with a priority on new housing, through the combination of the Downtown Neighborhoods Community Plan, Fulton Corridor Specific Plan, and the Downtown Development Code. The combination of these three policies helped to create the conditions that prompted developers to build more infill housing and otherwise create a livelier downtown area. Housing stock in the Fresno case study area did indeed increase at a substantially higher rate than in the surrounding City of Fresno and Fresno County.

Determining the impacts of these changes on VMT is challenging given the limited data sources that measure VMT, especially longitudinally. The Fresno case study relied exclusively on the NHTS and CHTS for measures of VMT. The sample sizes in these national and statewide surveys are too small in the case study area to provide confident estimates of travel behavior, in other words, estimates of VMT (as well as mode share) are highly uncertain. The small sample sizes explain, at least in part, why the estimated VMT of households in the case study area fluctuated significantly. Between 2009 and 2012 median VMT increased substantially among households in the case study area, then fell at almost the same rate between 2012 and 2017, resulting in an estimated net decrease in VMT of 38% (Table 4.16). Over the same timeframe, VMT of households in the city also had a net decrease but remained over twice as high as in the case study area.

**Table 4.16. Percent Change in Household VMT per Person in Fresno, NHTS & CHTS Data**

| | VMT in 2009 | VMT in 2012 | VMT in 2017 | 2009 to 2012 | 2012 to 2017 | 2009 to 2017 |
|---|---|---|---|---|---|---|
| Case Study Area | 4.3 | 8.0 | 2.7 | 86% | -67% | -38% |
| City of Fresno* | 10.3 | 12.0 | 6.7 | 16% | -44% | -35% |

Source: NHTS and CHTS data; *City of Fresno without case study area

Although the NHTS/CHTS data suggested that VMT declined in the case study area, estimated auto ownership increased slightly according to both the ACS data and the NHTS/CHTS data. Nevertheless, estimated auto ownership remained lower in the case study area than the comparison areas according to the ACS (0.52 cars per household member, versus 0.73 in the city and 0.77 in the county).

The data generally showed that travel was far more multimodal in the case study area than in the comparison areas. In both the ACS data and the NHTS/CHTS data, the case study had lower estimated shares of driving and higher shares of active travel (Table 4.17 and Table 4.18). The trends in estimated mode shares for the case study area versus the comparison areas are more difficult to interpret. According to the ACS data, the trends in estimated mode share for work trips were similar for the case study area and the comparison areas, so that the gap in estimated mode shares between them did not change significantly; the percentage point difference between the estimated mode shares in the case study area versus the comparison area remained about the same over the period.

**Table 4.17. Summary of Results of ACS Analysis of Mode Share for Commute Trips for Fresno**

| Trip Type | Mode | Case study area vs. comparison area | Case study 2010 to 2019 | Comparison 2010 to 2019 | Change in gap |
|---|---|---|---|---|---|
| Journey to work | Auto | Lower | Decrease | Stable | 0 |
| | Bus | Higher | Decrease | Decrease | 0 |
| | Walk/Bike | Higher | Decrease | Decrease | 0 |

The NHTS/CHTS data show a more complicated pattern. For trips made by residents, the estimated share of trips by car increased in the case study area but also in the comparison area, leaving the gap unchanged (Table 4.18). For trips ending in, originating in, or internal to the case study area, the estimated auto share increased faster than in the comparison area, thereby narrowing the gap in the driving share. The pattern for estimated walking share was similar: the estimated walking share increased and the gap widened for trips made by residents, but for trips originating or ending in the case study area, the estimated walking share decreased in the case study area to a greater degree than in the comparison area, thereby narrowing the gap. Estimated bus mode share in the case study area was higher than in the comparison area for trips ending in the area but lower for trips ending in the area; for trips made by residents, the bus share was higher than the comparison area in 2009 but lower in 2017. Estimated bike mode shares were higher for trips originating or ending in the case study area in 2009 but lower than the comparison area in 2017. Internal trips were the only trip type that were estimated to have become more multi-modal relative to the comparison area with a higher increase in the estimated walking share and a smaller decrease in the estimated biking share.

In sum, analysis of the available travel data suggests that while residents of the Fresno case study area tended to drive less and rely on other modes more than residents of the city and county, their dependence on driving did not appear to abate over the study period.

**Table 4.18. Summary of Results of NHTS/CHTS Analysis of Trips by Location for Fresno**

| Trip Type | Mode | Case study area vs. comparison area | Case study 2009 to 2017 | Comparison 2009 to 2017 | Change in gap |
|---|---|---|---|---|---|
| Residents of area | Auto | Lower | Increase | Increase | 0 |
| | Bus | Mixed | Decrease | Increase | * |
| | Walk | Higher | Increase | Decrease | + |
| | Bike | Higher | Decrease | Decrease | + |
| Ending in area | Auto | Lower | Increase | Increase | - |
| | Bus | Higher | Decrease | Increase | - |
| | Walk | Higher | Decrease | Decrease | - |
| | Bike | Higher | Decrease | Decrease | * |
| Originating in area | Auto | Lower | Increase | Increase | - |
| | Bus | Lower | Decrease | Increase | + |
| | Walk | Higher | Decrease | Decrease | - |
| | Bike | Higher | Decrease | Decrease | * |
| Internal to area | Auto | Lower | Increase | Increase | - |
| | Walk | Higher | Decrease | Decrease | - |

* Direction of gap between case study and comparison flipped; case study was lower than comparison in 2017.

## 5. Results: Santa Monica

### 5.1 Introduction

Santa Monica is a coastal city of 8.3 square miles situated on the western edge of Los Angeles County in Southern California. It is surrounded by the City of Los Angeles to its north, east, and south and bordered by the Pacific Ocean to the west. Santa Monica self-identifies as a "beachside" city (City of Santa Monica, n.d.). It has over three linear miles of beaches on its western border.

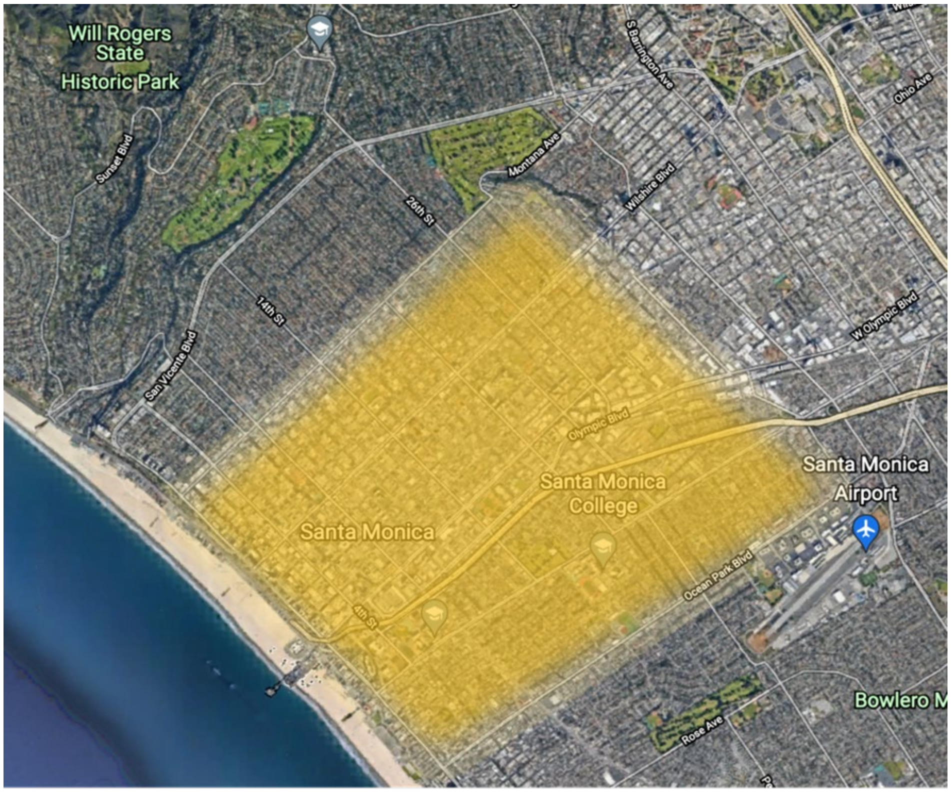
Santa Monica's population of 92,000 residents increases by about 250,000 people visiting the city every day for work, shopping, and tourism (City of Santa Monica n.d.). About 90,000 jobs are located in Santa Monica (Santa Monica, 2020) with major employers in the healthcare, education, and entertainment sectors. Auto dealerships, restaurants, and hotels are primary sources of sales tax revenues for the city (Santa Monica 2017a). Santa Monica's beaches, restaurants, hotels, and the iconic Santa Monica Pier, Pacific Park and the historic Looff Hippodrome Carousel, and the Marvin Braude Bike Trail attract an estimated 8 million tourists every year (Santa Monica Travel & Tourism n.d.).

**Major Employers**
UCLA Santa Monica Medical Center
City of Santa Monica
Santa Monica-Malibu Unified School District
Santa Monica College (a community college)
Snap Inc.
Providence St. John's Health Center
Activision Publishing
RAND Corporation
Hulu
Lionsgate Entertainment Corporation

The case study area is a subset of the City of Santa Monica (Figure 5.1). It covers roughly 5 square miles of the central part of the city bounded by the ocean to the west, Montana Avenue to the north, Centinela Avenue to the east, and Ocean Park Boulevard to the south. The case study area includes the as well as residential areas. The Metro E Line (the Expo line) and several light rail stations opened in the case study area 2016. The Expo lines connect downtown Los Angeles to Santa Monica with stations at popular destinations like the University of Southern California, Exposition Park, the Crenshaw District, Culver City, the Santa Monica Pier, and the Third Avenue Promenade (LA Metro 2022). Interstate 10 bisects the case study area, separating the Pico and Ocean Park neighborhoods from downtown Santa Monica.

The City of Santa Monica and the Santa Monica case study area are relatively wealthy compared to Los Angeles County as a whole. Median household incomes in 2019 were $91,648 in the case study area and $96,570 for the city, compared to $68,044 for the county (American Community Survey, 5-year estimates, table S2503).

**Figure 5.1. Santa Monica Case Study Area**




## 5.2. Key Policies and Plans

Santa Monica's sustainability efforts date back to at least 1994, when the city launched its Sustainable City Program (Table 5.1). This program was followed a decade later by the Sustainable City Plan, which was updated two times after that. The city's groundbreaking and award-winning Land Use and Circulation Element (LUCE) was adopted as a part of the city's 2010 General Plan update. The Bicycle Action Plan followed in 2011 and the Pedestrian Action Plan in 2016.

**Table 5.1. Key Plans & Policies**

| Plan/Policy | Year Adopted |
|---|---|
| Sustainable City Program | 1994 |
| Sustainable City Plan | 2003, 2006, 2014 |
| Land Use and Circulation Element | 2010 |
| Bicycle Action Plan | 2011 |
| Pedestrian Action Plan | 2016 |
| Downtown Community Plan | 2017 |

In 1994 Santa Monica adopted its first **Sustainable City Program**, a strategic plan to "ensure that Santa Monica can continue to meet its current environmental, economic, and social needs without compromising the ability of future generations to do the same" (City of Santa Monica 2014). The plan aimed to achieve results in several goal areas: (1) resource conservation, (2) transportation, (3) pollution prevention and public health protection, and (4) community and economic development (Sustainable City Plan 2014). The Plan set specific targets for the city to meet by 2000 and numerical indicators (i.e., performance measures) were created to measure the city's progress towards those goals.

The Sustainable City Program evolved over the 1990s and early 2000s. The city's Task Force on the Environment "recognized the need to update and expand the Sustainable City goals and indicators to provide a more complete picture of sustainability." The city began the update process in 2001 when the city formed the Sustainable City Working Group, comprised of elected and appointed officials, city staff, representatives of neighborhood organizations, schools, the business community, and other community groups. The group met for 15 months to discuss issues, evaluate the long-term sustainably of the city, propose changes to the original goals and indicators, and assist development of new indicator targets for 2010. The Sustainable City Working Group proposed a draft update, which was revised based on "a large amount" of public input. The result of this extensive process was the updated Santa Monica **Sustainable City Plan (SCP)**, adopted in 2003.

The Sustainable City Task Force, created by the city in 2003, oversaw implementation of the Sustainable City Plan until 2009. In 2006 the Sustainable City Plan was revised and in 2014 it was again updated. The "goal areas" of the Sustainable City Plan have been expanded since the first plan was adopted in 1994. The **2014 Sustainable City Plan** included nine goal areas: (1) resource conservation, (2) environmental and public health, (3) transportation, (4) sustainable local economy, (5) open space and land use, (6) housing, (7) community education and civic participation, (8) human dignity, and (9) arts and culture. The city used a data- and performance-based approach to measure progress in each goal area: for each goal area the city developed "specific indicators" to track progress toward goals and targets for 2020.

The SCP included transportation- and planning-related goals, indicators, and targets. Broadly, the SCP's transportation goals aimed to reduce automobile dependency and create a multi-modal transportation system. Specific goals included creating a multi-modal transportation system "that minimizes and, where possible, eliminates pollution and motor vehicle congestion while ensuring safe mobility and access for all" by minimizing car dependence and promoting alternative, more sustainable modes of travel. The SCP had one simple and ambitious goal in the housing area: "Achieve and maintain a mix of affordable, livable and green housing types throughout the city for people of all socioeconomic/ cultural/household groups (including seniors, families, singles, and disabled)" (page 17). Other transportation and land use-related goals appear in various parts of the 2014 SCP. For example, the Open Space and Land Use area aims to "implement land use and transportation planning and polices to create compact, mixed-use projects, forming urban villages designed to maximize affordable housing and encourage walking, bicycling, and the use of existing and future public transit systems" (page 16).

Along with the plan, the city developed two methods to track and report implementation of the Sustainable City Plan: the biennial **Sustainable City Progress Report** and the **Sustainable City Report Card.** The Progress Report is an online data portal that shows data for each indicator in the SCP. The Report Card is an overview document that summarizes progress in each goal area and assigns grades based on data in the progress report.

In the wake of California's Senate Bill 375, Santa Monica's city council adopted the groundbreaking **Land Use and Circulation Element (LUCE)** as part of its General Plan in 2010. Identified as a "model of progressive planning" and ultimately winning the "Outstanding Comprehensive Planning Award" from the California Chapter of the American Planning Association, LUCE aimed to be an integrated approach to housing and transportation planning that allowed for denser urban development and set ambitious transportation targets to reduce traffic congestion and auto dependence (Stephens 2010). Community engagement throughout the planning process was extensive, starting in 2004 and expanding in 2007 (City of Santa Monica 2017b). Preservation of the existing character and scale of Santa Monica's neighborhoods was the "highest priority of the community." Additional core values were managing traffic congestion, preserving the city's "unique character," and creating housing choices for all.

The LUCE outlined a series of policies to implement its core values and goals, with the aim of directing growth, development, and "intensive residential investment pressure" away from existing residential neighborhoods and toward boulevards and corridors served by transit (City of Santa Monica 2017b, p. 2.1-11). Policies also aimed to incentivize preservation of "historic structures and older buildings that add to the character of residential districts," require new infill development to be compatible with existing neighborhoods with regards to scale, mass, and character, and establish standards for transitioning down the building envelopes of new development toward adjacent residential structures. The plan proposed conservation policies such as neighborhood conservation overlay districts, demolition regulations, and development standards as disincentives to "act as a restraint on inappropriate investment" (p. 6). With only 1% of the city's land area vacant, these policies aimed to direct growth to seven areas served by transit. The plan put in place a new a discretionary review process with community input for projects above a base height (varying by land use), except for projects that contain 100% affordable housing.

The LUCE also made significant changes to the city's plans for jobs-housing balance and the commercial growth that was charted by the 1984 General Plan. Rather than focusing on commercial development, the 2010 LUCE reduced the amount of regional-serving commercial uses and created a "balanced policy" to require and incentivize construction of housing alongside smaller-scale, local-serving commercial land uses (p. 6). The plan redesignated some industrial and regional commercial land uses along the forthcoming Expo Light Rail Line into "transit villages" – clusters of housing, employment, local-serving retail, and services around Expo Light Rail stations that would create complete neighborhoods and support transit (p. 2.1-14). The new housing in these mixed-use transit villages along the Expo line was a key part of implementing the LUCE's goal to create new housing opportunities in the city. In total, LUCE planned to add about 5,100 to 5,600 new residents, 5,000 new housing units, and 8,000 new jobs by 2030 (p. 3.4-6). The housing targets far exceeded Santa Monica's historical trends, while the employment targets were far below the targets in previous plans.

The goal of reducing VMT was also apparent in policies about commercial development. The plan called for commercial and employment land use decisions that serve city residents by allowing residents' needs to be met locally, rather than requiring regional travel. It encouraged the preservation of existing neighborhood retail throughout the city (p. 3.4-19), as well as the addition of new retail uses in areas of the city that are "currently underserved, with particular emphasis that they can be accessible by means other than by automobile" (p. 3.4-20). It also called for the city to encourage the introduction of retail establishments in existing activity centers and in the forthcoming transit villages so as "to ensure their accessibility by foot, bicycle and bus as well as by automobile" (p. 3.4-20).

The LUCE also included policies for a “complete multi-modal transportation system,” integrating land use and transportation projects to create pedestrian-, bike-, and transit-friendly centers that aimed to reduce congestion and vehicle trips (page 9). The plan capitalized on the opportunity presented by the forthcoming Expo line, directing new growth to areas around future light rail stations and into transit corridors in order to create walkable centers served by high-quality transit. It also required implementation of transportation demand management (TDM) programs, parking management policies, and prioritization of investment for pedestrian, bicycle, and transit movement (p. 2.1-12 – 14).

Seven years after the adoption of the LUCE, after a six-year planning process, the city adopted the **Downtown Community Plan** (DCP) in 2017 to implement the goals and policies of the LUCE in the downtown area. In addition to articulating a vision for the future of the downtown area, developed with extensive public input, the DCP defined six different downtown land use districts and defined desired and allowed land uses within each district. Policies adopted with the plan were designed to maintain downtown’s “many roles as a thriving neighborhood, public gathering space, international visitor destination, and a regional business district” (Hall 2017). The city incentivized housing production through a streamlined administrative process for any projects meeting specified standards for size, height and design. It set an ambitious requirement that 20-30% of all new housing units be designated as affordable. And it eliminated minimum parking requirements so as to let the market dictate how much parking, if any, a developer would provide.

The City Council adopted the **Bicycle Action Plan** in 2011, on the heels of the 2010 LUCE and its bold vision and accolades. A key goal of the LUCE was minimizing traffic congestion, vehicle trips, and automobile travel demand in part by encouraging bicycling. The Bicycle Action Plan was a statement of community priorities – “equally bold and practical” – that guided implementation of bicycle programs and infrastructure with a “bold 20-year vision and a 5-year implementation strategy” (City of Santa Monica 2011, p. ES-1). Its goals, developed through an extensive public engagement process, build on those adopted in the LUCE in aiming to create a complete network of high-quality bicycle facilities to increase bicycling among people of all ages and experience levels.

At the time of adoption Santa Monica had a 37-mile bicycle network, including 18 miles of bike lanes or bike paths and 19 miles of bicycle routes. The plan proposed a “Priority Bicycle Network” that included 33 corridors. Priority actions in the plan were organized into two timelines: a 5-Year Implementation Plan and a 20-Year Vision. The city organized projects based on funding, cost, community-voiced priorities, and gaps in the bike network, though several “marquee” projects were included in the 5-Year Implementation Plan because the city considered them to be important demonstration projects (p. ES-10).

Similar to and borrowing from Santa Monica’s approach with its Sustainable City Plans and Report Cards, the Bicycle Action Plan created performance measures and targets to evaluate the city’s progress in implementing the Bicycle Action Plan. Indicators included measures of mode share (e.g., journey to work by bike, bike ownership, frequency of bike riding, bike mode share), safety (e.g., bicyclist crash rate, perception of safety when riding), and infrastructure, services, and connectivity (e.g., bike network completeness, bike parking, bike valet). The Bike Action Plan stated that the city would report annually on these performance measures to track implementation and inform the city’s investment decisions (p. 4-23).

Santa Monica adopted the **Pedestrian Action Plan** in 2016. It “recognize[d] and celebrate[d]” walking as a key part of the city’s identity and character and outlined a vision, standards, priority projects, and programs to guide the next 15 years of decision-making (City of Santa Monica 2016, p. 1). The plan followed a 2015 city council directive for “vision zero” – all city departments would have a goal of eliminating traffic fatalities and severe injuries. The city engaged with hundreds of community members in developing the plan’s goals, policies, and implementation actions (p. 2). In addition to the Vision Zero goal, the plan aimed to make walking “the first choice” for travel within the city.

The plan recommended an array of practices, programs, and projects to implement its goals. To make pedestrian safety part of the “everyday business” of city and city staff, the plan proposed changes to practices and procedures, including implementing speed reduction strategies, prioritizing pedestrians in the project development process, improving data collection, and expanding use of innovative traffic signal and street operation strategies. The plan also recommended outreach, encouragement, and educational activities, including a city Safe Routes to School program. The plan included a capital improvement program to improve pavement striping, maintain sidewalks, abate vegetation encroaching on pedestrian spaces, install street lighting, etc. Like the Bicycle Action Plan, infrastructure projects were proposed in phases – 5-year, 10-year, and 15-year implementation horizons, with project phasing dependent on funding availability.

Similar to Santa Monica’s other plans, monitoring and evaluation was a core part of the Pedestrian Action Plan. The plan called for monitoring and evaluation in four broad topic areas: (1) pedestrian safety, measured with crash data, (2) pedestrian activity, measured with pedestrian counts and surveys, (3) pedestrian perceptions of the built environment, collected through surveys and outreach events, and (4) implementation, which the city would track through the number of projects and programs delivered (p. 102). The plan committed the city to publishing a biannual “Pedestrian Report Card” using quantitative and qualitative data to show changes in walking, walking safety, and pedestrian facility quality. The results of the report card would be used to direct or redirect city efforts and resources. However, as of 2022, city staff had never presented a Pedestrian Report Card to council.

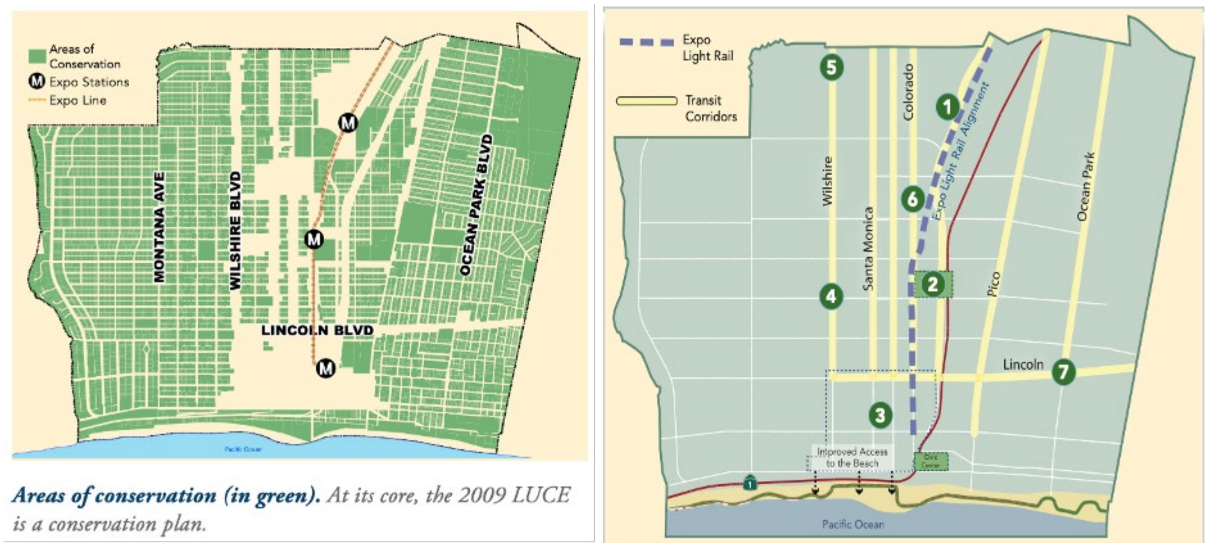
### 5.3 Significant Land Use Changes

Central Santa Monica has seen steady change in land use in the last 20 years. Eleven new mixed-use projects have added nearly 900 new housing units and 80,000 square feet of commercial primarily to the “boulevards” in the central city. Eight commercial projects created space for office jobs, educational opportunities, and expanded Santa Monica’s hospitality and automobile dealer sectors. Santa Monica’s award-winning 2010 Land Use and Circulation Element (LUCE) charted a course for the nature, location, and magnitude of these land use changes, which were planned with the intention of decreasing automobile demand and traffic congestion and to increase multimodal accessibility.

#### 5.3.1 Infill Housing Development

A primary goal of Santa Monica’s 2010 Land Use and Circulation Element (the “LUCE”) was “creating new housing opportunities throughout the city” that could be served by transit while also preserving the character and scale of the city’s existing neighborhoods. The city threaded this preservation-versus-development needle by emphasizing and encouraging new housing on its boulevards and commercial transit corridors – shown in Figure 5.2 below (City of Santa Monica 2010a, p. ES-9). The housing development that took place in the subsequent decade follows this policy emphasis: residential development projects were located overwhelmingly on the city’s major streets and boulevards (see Table 5.1 below). These corridors are served by the city's Big Blue Bus service, LA Metro's local and rapid bus lines, and the Expo Line light rail stations (City of Santa Monica 2010a).

**Figure 5.2. Santa Monica's "areas of conservation" (left) and "areas of significant change" (right), as identified in the 2010 LUCE**




Development of infill housing, encouraged by the city, has increased the housing stock in central Santa Monica since 2010 (Table 5.2). Between 2010 and 2019, eleven new housing projects added nearly 900 new housing units to the case study area (City of Santa Monica 2022a). Of those housing units, development agreements showed that about 620 units would be market rate and 270 would be deed-restricted affordable. Six additional residential projects were built after 2019. Those projects added another 741 housing units and more than 100,000 square feet of commercial space. With these more recent projects, Santa Monica has added a total of 1,630 housing units to its central area since 2010.

**Table 5.2. Residential Development in the Santa Monica Case Study Area**

| Project Name | Total Units | Market Rate Units | Affordable Units | Commercial Sq Feet | Year Filed/ Year Built |
|---|---|---|---|---|---|
| 1112 Pico Boulevard Residential | 32 | 28 | 4 | 0 | 2012/2019 |
| 1317 7th St Mixed-Use Residential/ Retail Apartments | 57 | 51 | 6 | 2,676 | 2011/2015 |
| 1318 2nd St Mixed-Use Residential/ Retail Project | 53 | 53 | 0 | 6,537 | 2012/2016 |
| 1626 Lincoln Blvd 100% Affordable Housing | 64 | 0 | 64 | 0 | 2015/2018 or 2019 |
| 2300 Wilshire Blvd Mixed Use | 30 | 30 | 0 | 24,983 | 2014/2019 |
| 2930 Colorado Ave – Mixed Use Creative Arts/ Residential/ Neighborhood Commercial | 374 | 336 | 38 | 24,893 | 2007/2019 |
| 3008 Santa Monica Blvd Mixed Use Residential/ Retail | 26 | 22 | 4 | 3,397 | 2015/2018 |
| 401 Broadway | 56 | 56 | 0 | 5,217 | 2012/2016 |
| 430 Pico Blvd – CCSM Affordable Housing Project | 32 | 0 | 32 | 0 | 2009/2013 |
| 702 Arizona Ave Mixed-Use Apartments | 49 | 44 | 5 | 6,276 | 2011/2015 |
| 829 Broadway | 116 | 0 | 116 | 2,390 | NA/2012 |
| **Total** | **889** | **620** | **269** | **76,369** | |

Source: "Current Development Project Tracking List" (City of Santa Monica 2022a, https://www.smgov.net/uploadedFiles/Departments/PCD/Projects/CurrentDevelopmentTrackingList.pdf)

### 5.3.2 Infill Commercial Development

The nature of commercial development and the jobs-housing balance in Santa Monica were key topics in the 2010 LUCE. The previous general plan, adopted in 1984, had a “strong commercial emphasis” that the 2010 LUCE sought to revise. The 2010 LUCE reduced the amount of regional-serving commercial uses and created a “balanced policy” to require and incentivize construction of housing alongside smaller-scale, local-serving commercial land uses (p. ES-6). This emphasis on locally-serving commercial may in part explain the number of mixed-use residential and commercial projects built after adoption of the LUCE – all but three of the 11 residential projects in the case study area included commercial space.

Santa Monica approved and added eight exclusively commercial developments with a total of nearly 800,000 square feet to the case study area between 2008 and 2019 (Table 5.2). These projects closely align with the policies and critical sectors outlined in the 2010 LUCE to augment the city’s hospitality sector, tax revenues, and creative office jobs. The city also approved two projects that provide educational opportunities in the city – the Pico Branch Library and the Crossroads School Science Building.

**Table 5.3. Constructed Commercial Projects**

| Project | Land Uses | Total Sq. Ft | Description | Year Filed/ Year Built |
|---|---|---|---|---|
| 1402 Santa Monica Blvd Mini Dealership | Auto dealership | 32,675 | Auto dealership | 2012/2017 |
| 1554 5th Street Courtyard by Marriott Hotel | Hotel | 78,750 | Hotel with 136 rooms | 2011/2017 |
| 1681 26th St AA Pen Factory | Office | 203,816 | Adding to and adaptive re-use of the existing building for creative office space | 2015/2017 |
| 1731 20th St Crossroads School Science Building | Education | 29,356 | Science learning center with 12 classrooms | 2012/2015 |
| 2200 Virginia Ave Pico Neighborhood Library | Public | 8,630 | Branch library | 2011/2014 |
| 2834 Colorado Ave/ Colorado Creative Studios | Office | 191,982 | Creative office and neighborhood serving use | 2008/2018 |

| Project | Land Uses | Total Sq. Ft | Description | Year Filed/ Year Built |
|---|---|---|---|---|
| 501 Colorado Ave – Hampton Inn | Hotel | 78,750 | Hotel with 143 rooms | 2011/2017 |
| 710 Wilshire Hotel | Hotel, Retail | 164,219 | Adaptive re-use of a landmark building | NA/2019 |
| **Total** | | **782,678** | | |

### 5.3.3 Pico Branch Library

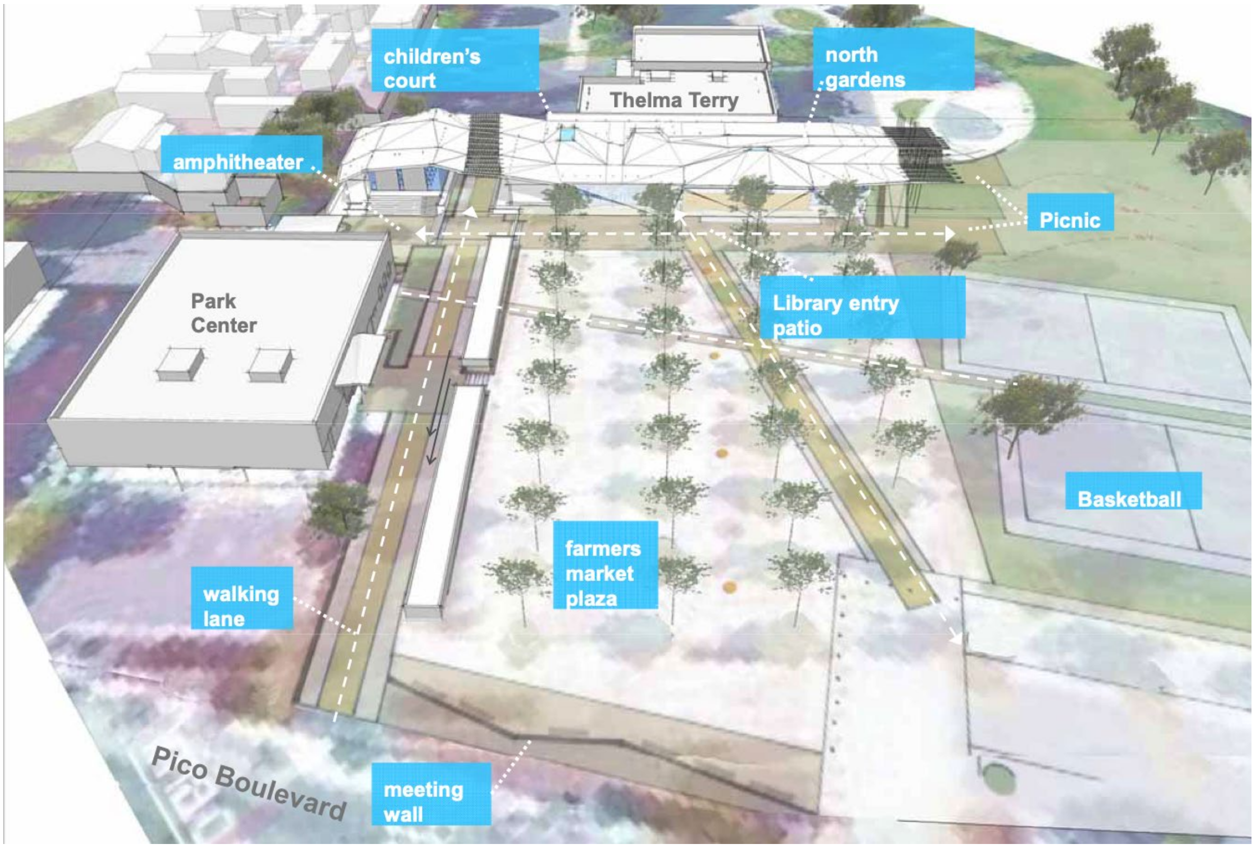
The Pico Branch Library and community room (The Annex) opened in 2014 and is located in Virginia Avenue Park, in the Pico neighborhood southeast of downtown Santa Monica and south of Interstate 10 (Santa Monica Public Library 2015). The new branch “fulfilled a neighborhood need” and was the result of extensive community input – a survey and a series of public meetings – that the city carried out between 2008 and 2011, with groundbreaking in the summer of 2012.

**Figure 5.3. Pico Branch Library at opening**

Credit: William Short 2014. Source: Santa Monica Public Library

The branch library’s location in Virginia Avenue Park locates the library on the 9.5-acre “community campus” (City of Santa Monica n.d.). Virginia Avenue Park serves as a “hub for community-based programs” and includes a large lawn area, basketball courts, two playgrounds, a splash pad, picnic areas, rental facilities, and a walking path (Santa Monica Travel & Tourism 2023). A weekly farmers market takes place in a plaza on the southern side of the park (ibid.). Several community centers are in Virginia Avenue Park. The Thelma Terry Building, a Teen Center, and the Park Center are home to a variety of academic, recreational, and cultural programs for youth and adults (City of Santa Monica n.d.). The city did not require the Pico Branch Library, situated among these community spaces and programs, to construct additional parking (Santa Monica Public Library 2015).

**Figure 5.4. Schematic design of the Pico Branch Library (center top) in the context of Virginia Avenue Park**



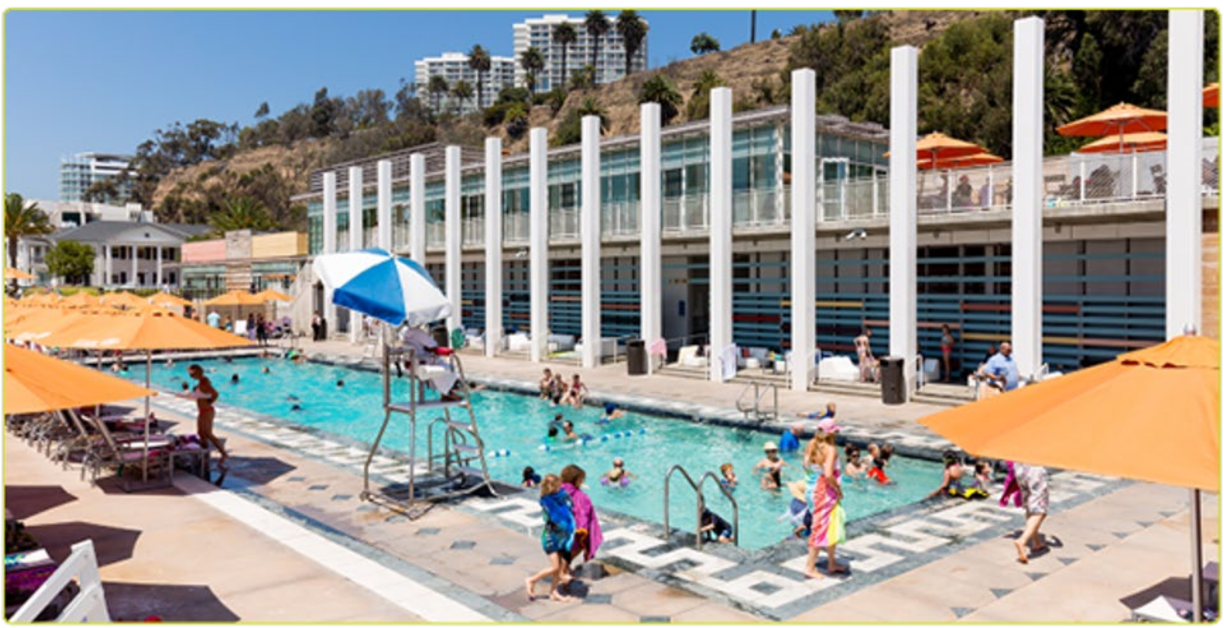

Source: Koning Eizenberg Architecture 2011.

### 5.3.4 Annenberg Community Beach House

The Annenberg Community Beach House sits on an oceanfront stretch of the City of Santa Monica deemed the "Gold Coast" in the 1920s because of its many wealthy and famous residents (City of Santa Monica 2022b). Originally built in the 1920s as an estate for the actress Marion Davies, the Annenberg Community Beach House is now publicly owned and operated as a community pool and recreation center. The City of Santa Monica calls it a "truly unique community destination" (City of Santa Monica 2022b).

The property changed ownership and operations several times over several decades. The State of California purchased it in 1959 and the City of Santa Monica took over operations of the beach club onsite in the 1990s (City of Santa Monica 2022b). The city considered it an "important public gathering place" and in 1998 adopted a plan for its adaptive reuse. In 2009, and with philanthropic funding, the renovated estate opened as the Annenberg Community Beach House. The 5-acre facility is open to the public and includes recreational amenities such as a historic pool and guest house (designed by Julia Morgan), volleyball and tennis courts, event and meeting space, classes, a café, an art gallery, historical tours, and a playground (City of Santa Monica 2022b). The Beach House is accessible by the Marvin Braude Bike Trail, which runs along the coastal side of the site (City of Santa Monica 2022b). Santa Monica's Big Blue Bus serves the Beach House with 30-minute headways.

**Figure 5.5. The Annenberg Community Beach House in 2009**



Credit: City of Santa Monica

### 5.3.5 Housing Units

The case study area in Santa Monica includes a larger share of city's housing units than in the other two case studies. Just over 60 percent of the housing units in the City of Santa Monica are located in the twelve census tracts that make up the case study area. These case study tracts experienced faster growth in housing units than both the City of Santa Monica and Los Angeles County over the 10 years of the case study timeframe (Table 5.4; Figure 5.6). Housing units in the case study area increased by 3 percent from 2010 to 2015, and by 4 percent from 2010 to 2019. Housing units in the entire City of Santa Monica increased by 2 percent over the same time period, and housing units in Los Angeles County increased by a total of 3 percent between 2010 and 2019. Population also increased at a faster rate in Santa Monica than the city and the county (Table 5.5). Median household income was lower in the case study area than in the city as a whole, but it increased at a faster rate, pointing to the possibility of gentrification (Table 5.6).

**Table 5.4. Housing Units by Year and Geography in Santa Monica Area**

| Housing Units | 2010 | 2015 | 2019 | Percent Change 2010-2019 |
|---|---|---|---|---|
| **Case Study Tracts** | 29,636 | 30,491 | 30,857 | +4% |
| **City of Santa Monica** | 50,015 | 50,934 | 51,124 | +2% |
| **Los Angeles County** | 3,425,736 | 3,476,718 | 3,542,800 | +3% |

Source: ACS 5-Year Estimates, Table B25001

**Figure 5.6. Housing Units by Year and Geography in Santa Monica Area**

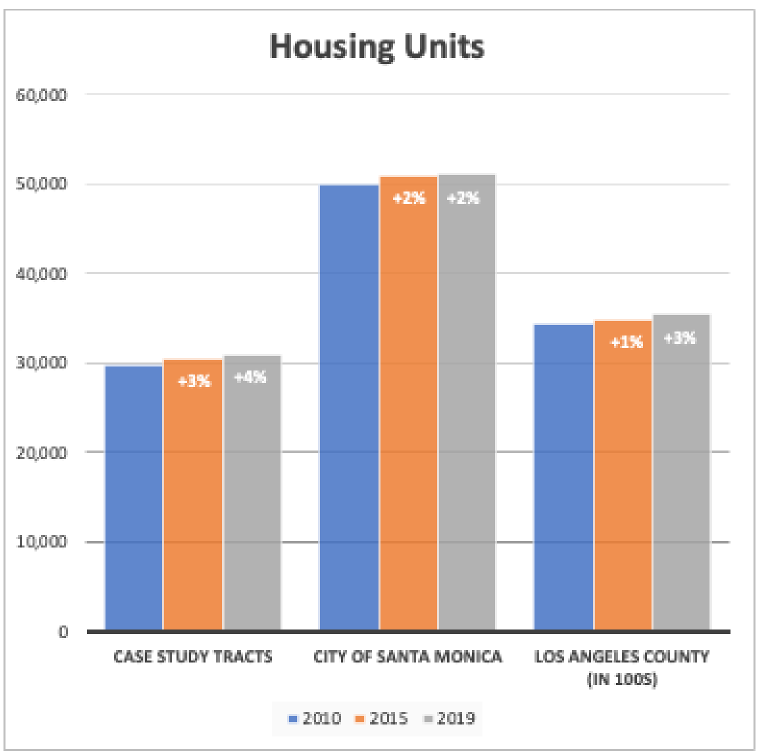


**Table 5.5. Total Population in Santa Monica, 2010, 2015, 2019**

| | 2010 | 2015 | 2019 | 2010-15 | 2010-19 |
|---|---|---|---|---|---|
| Case Study Tracts | 51,095 | 53,617 | 54,124 | 5% | 6% |
| City of Santa Monica | 88,679 | 92,169 | 91,577 | 4% | 3% |
| Los Angeles County | 9,758,256 | 10,038,388 | 10,081,570 | 3% | 3% |

Source: ACS 5-Year Estimates, Table DP05

**Table 5.6. Median Household Income in Santa Monica, 2010, 2015, 2019**

| | 2010 | 2015 | 2019 | 2010-15 | 2010-19 |
|---|---|---|---|---|---|
| Case Study Tracts | $62,648 | $72,000 | $91,648 | 15% | 46% |
| City of Santa Monica | $68,842 | $76,580 | $96,570 | 11% | 40% |
| Los Angeles County | $55,476 | $56,196 | $68,044 | 1% | 23% |

Source: ACS 5-Year Estimates, Tables S1901 and S2503; current dollars

### 5.4 Significant Transportation Changes

Traffic congestion has long been a concern for residents and thus planners in the City of Santa Monica. In 2005 the city's Sustainable City Report Card described traffic and parking as "intractable problems" for Santa Monica (City of Santa Monica 2005). The city gave itself a "C–" grade for its transportation system in 2005 (though a "B+" for its level of effort; Table 5.6). The city's ridesharing program and the Big Blue Bus were bright spots in mid-2000s.

As of 2005, Santa Monica's alternative transportation infrastructure was "mixed" (City of Santa Monica 2005). The city acknowledged that it needed to "rapidly enhance its currently inadequate network of bicycle paths and lanes." The city was indeed working to enhance its network of bike infrastructure – the city increased its local bike lanes by 11% between 2009 and 2010, and also saw a 13% increase in bike commuters over the same timeframe (City of Santa Monica 2010). Bicycling encouragement programs showed success in the mid-2000s. The city launched a bike valet parking program in 2007 that parked over 16,000 bikes in its inaugural year, over 20,000 bikes in its second year, and over 25,000 bikes in 2009 (City of Santa Monica 2007, 2008); the program continues to this day.

The city described itself as a "leading advocate" for the Metro Expo Line, which began construction in 2006. The Expo Line would introduce light rail to Santa Monica, with a planned completion in 2016 and projected ridership of 64,000 daily boardings (City of Santa Monica 2012). In the 2010s, the city repeatedly discussed the Expo Line as an important part of its strategy to enhance mobility and relieve traffic congestion (e.g., City of Santa Monica 2007, 2008).

**Table 5.7. Santa Monica's self-assessed transportation conditions**

| Year | Grade | Level of Effort | Comments |
|---|---|---|---|
| **2005** | C- | B+ | Traffic and parking remained “intractable problems”. The Big Blue Bus was one of the top bus systems in the country. The bicycle network was “inadequate” and needed to be “rapid enhance[d]”. City promotion of ridesharing was “very successful”. |
| **2006** | C | A | Ridership on the Big Blue Bus was “strong”, construction of the Expo Line had begun, and ridesharing had increased. The bicycle network was “inadequate to meet the city’s targets”. Traffic and congestion remained “significant issues”. The grade improvement driven by the city’s increasing use and testing of alternate fuels in its fleet and opening of a hydrogen fueling station. |
| **2007** | C+ | A | The grade improvement is reflective of increases in average vehicle ridership, use of alternative fuel in the municipal fleet, incentives programs for bicycle use, and “commitment to regional transportation solutions” (i.e., the Expo Line). |
| **2008** | C+ | A | The grade remains unchanged because the city was “far from reaching its transportation related goals”, despite its “strong commitment to local and regional transportation solutions”. |
| **2010** | C+ | A | The unchanged grade reflects the “continued improvement in average vehicle ridership and bicycling while recognizing the city is far from reaching its transportation goals”. |
| **2012** | B- | A | The grade improvement reflects increased average vehicle ridership (1.64 in 2010 to 1.67 to 2012) and a “strong commitment to local and regional transportation solutions”. |

Source: Santa Monica’s Sustainable City Report Cards

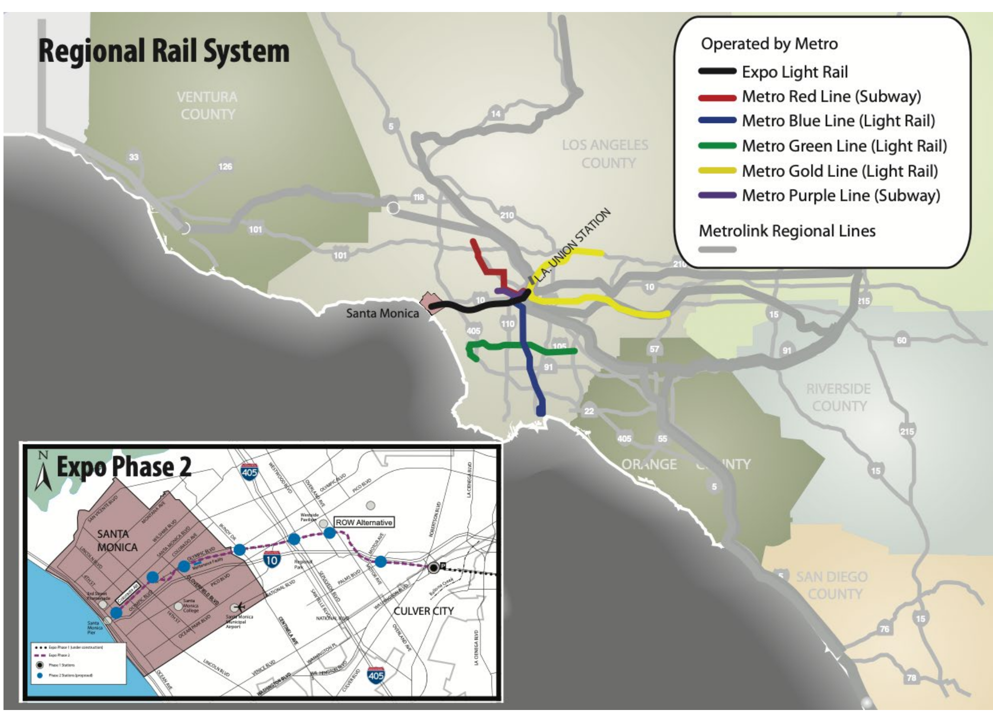
### 5.4.1 The Expo Line

The Metro E Line, or Expo Line, was the first mass transit line to connect downtown Los Angeles with downtown Santa Monica and the waterfront (LA Metro 2013). The 15.2-mile Expo Line runs south from downtown LA, then west along I-10 (the "Santa Monica Freeway") to Culver City, west LA, and ultimately the City of Santa Monica (Figure 5.7). Phase 1 of the Expo Line (8.6 miles between downtown LA to Culver City) opened in 2012; Phase 2 of the Expo Line (the 6.6-mile segment between Culver City and Santa Monica) opened in 2016 (LA Times 2016). These segments connect Santa Monica to LA Metro's county-wide light rail network (Figure 5.8). Three of the 19 stations on the Expo Line serve Santa Monica (Figure 5.9). Bergamot Station is located at 26th Street and Olympic Boulevard, Memorial Park at 17th Street and Colorado Avenue, and the Downtown station at 4thStreet and Colorado Avenue.

**Figure 5.7. The Metro Expo Line**


Source: LA Metro

**Figure 5.8. The Expo Line in Santa Monica and the LA Region**




Source: LUCE, 2017 Update

**Figure 5.9. Expo Line Light Rail Stations**


Source: LUCE, 2017 Update

Trains were planned to run as frequently as every five minutes and to allow travel between downtown LA and downtown Santa Monica in about 50 minutes, offering “a competitive alternative to driving a car on the highly congested Santa Monica Freeway” (City of Santa Monica 2017). Trains arrive and depart the three Santa Monica stations with 10- to 12-minute headways between 6 am and 9 pm on weekdays and on weekend afternoons (LA Metro 2022). Headways lengthen to 20 minutes in early morning periods (4:45 – 6:00 am) and at night (9:40 pm – 1 am) (LA Metro 2022).

The City of Santa Monica took a “leadership role” in advocating for the construction of the Expo Line (City of Santa Monica 2006). The 1984 General Plan Circulation Element and the 1996 Bayside Specific Plan had goals and policies to improve the city’s public transit system, including bringing light rail to Santa Monica. Policy 4.5.2 in the 1984 Circulation Element “endorse[d] the concept of rail rapid transit … serving the City of Santa Monica” and gave itself a more-binding directive: “[the city] shall promote. Locating a transit station in the Downtown area” (City of Santa Monica 1996, p. 41). The 2010 Land Use and Circulation Element also emphasized bringing the Expo Line to Santa Monica. Listed as its first transit goal was the “expan[sion] high-quality regional rapid transit, including rail service, to improve connections between Santa Monica and the region” (p. 4.0-48). This was accomplished in large part through policies aimed at building the Expo Line and its surrounding stations and infrastructure (p. 4.0-48).

The Los Angeles Metropolitan Transportation Authority (LA Metro) and the two agencies from which was formed in 1993 (the Los Angeles County Transportation Commission and the Southern California Rapid Transit District) was instrumental in the development of the Expo Line. LA Metro’s 2001 Long Range Transportation Plan (LRTP) identified several corridors for increased transit service, including the Exposition corridor, though it did not specify what form of transit would serve them (Seplow 2022). The 2009 LRTP furthered the vision of the Expo Line, specifically highlighting its future construction (Seplow 2022).

Citizen advocacy groups also played a role in the construction of the Expo Line. The Expo Line was “a glimmer in the eye of Santa Monica city officials as early as 1989,” at which time the city brought together a group of residents to advocate purchasing former streetcar right of way between downtown LA and Santa Monica (Streetsblog LA 2016). This grassroots resident’s group, “Committee to Preserve the Right-of-Way,” influenced the LA County transportation commission to purchase the right of way, which spurred more than a decade of planning.

In 2000 a few community organizers launched Friends 4 Expo Transit (F4E), which grew quickly in membership and promoted the social and environmental benefits of an Expo Line (Streetsblog LA 2016). F4E emphasized how it would “increase access for everyone – especially the disadvantaged and car-less – to the community’s valuable resources” as well as the “environmental benefit of clean, speedy, high-capacity light rail” (Streetsblog LA 2016). F4E organized politically and joined forces with other community coalitions, such as Move L.A and Light Rail for Cheviot. They presented at community centers and to community groups, gathered thousands of signatures, wrote letters, leafletted homes, held education events, conducted citizen science (e.g., noise studies), and lobbied city councils and the LA Metro board (Streetsblog LA 2016).

### 5.4.2 Santa Monica Bike Center

At the terminus of the Expo Line is the Santa Monica Bike Center (Figure 5.10), a city-owned facility that is privately operated (Islas 2013). The Bike Center opened in 2011 and offers a variety of bicycle-oriented goods and services such as bike rentals, bike and bike accessory sales, mechanics, secure bike parking, training and educational classes, tours, lockers, and showers (The Bike Center 2022). The city and private partner launched the Bike Center “to help change the way people live in cities” by providing services that aim to “increase freedom, independence and fun for the whole family” (The Bike Center 2022). Revenues from the bike rental program cover the operating costs of the Bike Center.

Its bike rentals, sales, and programs are geared toward “personal transportation, family cargo or micro goods movement” and include a range of city bikes, electric bikes, cargo bikes, tandems, and trikes (The Bike Center 2022). The Bike Center also offers programs to help people start and continue bike commuting. It runs a Commuter Bike Loan Program, which “aims to increase the number of people who commute by bicycle to work or school.” For two weeks, the Bike Center gives Santa Monica residents everything they would need to commute to work or school by bike – a standard or electric assist bike, basic accessories such as lights and a lock, a helmet, child seats, et cetera – and supports trial bike commuters with route planning and weather suggestions. The program is free and participants have the option to return or purchase their bike set-up at the end of the two-week trial. The Bike Center also runs a Family Cargo Bike Loaner Program through which it loans electric-assist cargo bikes to parents of kids at eligible schools in the City of Santa Monica for a one-week trial period. Participants can choose from several cargo bike options. The e-cargo bike loaner program is run as a collaboration between the Bike Center, the City of Santa Monica Safe Routes to School department, and Sustainable Streets (a local non-profit). The Bike Center also offers a bike commuter membership program that offers services and discounts to people who bike regularly in Santa Monica. The program offers access to secure bike parking, showers, lockers, discounted bike repairs, and discounted retail items (The Bike Center 2022). The membership costs range from $15 to $50 per month.

The Bike Center was successful from the start. In its first two years of business the Bike Center enrolled over 300 members, rented thousands of bikes a month, and offered more than 50 classes a year (Islas 2013).

**Figure 5.10. Santa Monica Bike Center**

Credit: Santa Monica Travel & Tourism

### 5.4.3 Colorado Pedestrian Esplanade

The Colorado Esplanade runs for a quarter of a mile along Colorado Avenue in central Santa Monica, from the Expo Line light rail station at 4th Street to Ocean Avenue. Completed in 2016, this streetscape project was designed to enhance the transit passenger and pedestrian experience and create a gateway from the new Downtown Santa Monica light rail station to downtown Santa Monica and the Santa Monica Pier (Atkins 2012).

The city had specific goals for this project. The "starting point" for the design was to transform Colorado Avenue from a vehicular corridor to a multi-modal hub (City of Santa Monica City Council Staff Report 2013). The planning and design intended to "enhance the passenger arrival and departure experience and to facilitate the flow of transit vehicles and pedestrians" (City of Santa Monica 2017b). Part of this goal included "resolv[ing] the complex circulation needs adjacent to the new Expo Light Rail station at 4th Street/Colorado Avenue", which includes increased flows of pedestrians and transit vehicles, and circulation of private vehicles to and from Interstate 10 (City of Santa Monica 2017b; PWP Landscape Architecture 2013). The city's 2010 LUCE specifically addressed the Colorado Esplanade: Goal D2 sought to "maximize placemaking opportunities associated with the Expo Light Rail station to create a vibrant Downtown gateway" (p. 2.6-11). Policy D2.1 was aimed at implementing this goal: "develop a pedestrian gateway at 4th Street and Colorado Avenue where riders are greeted, oriented and directed to their destinations" (PWP Landscape Architecture 2013).

The site plan included many new or enhanced streetscape elements. New and existing street trees and landscaping were central to the design, used to frame the views of and draw attention to the Santa Monica Pier, provide dappled shade, and "engage the spirit of Santa Monica as arboretum" (PWP Landscape Architecture 2013). The pedestrian right-of-way was widened and paved with custom accent pavers. The site plan included "pedestrian buffers" that were not built in the final implementation of the project. The right-of-way for the expanded sidewalk was made possible by making Colorado Avenue one-way for vehicle traffic and removing a turn lane on Ocean Avenue (City of Santa Monica City 2013). Other pedestrian elements along the Esplanade include a "scramble" intersection at Ocean and Colorado Avenues and wayfinding to key destinations in the downtown Santa Monica area (City of Santa Monica City 2013). The site plan included a protected bi-directional cycle track, which was the city's first separated cycle track when it was built (City of Santa Monica 2013). Bike boxes were also part of the site plan and installed at the intersection of Colorado Avenue and 4th Street (PWP Landscape Architecture 2013). Other elements such as public art, "sensibly festive" overhead string lights across the street (to echo the traditional pier lights), wayfinding, and unique crosswalk striping were part of the site plan and implemented along the Colorado Esplanade (City of Santa Monica City 2013).

### 5.4.4 Ocean Park Boulevard

Starting in 2008, the City of Santa Monica made a series of changes to Ocean Park Boulevard, one of the city's major boulevards with three commercial districts, four public schools, two libraries, and one city park. In 2008 the city redesigned the 1-mile section between Lincoln and Cloverfield Boulevards to include bike lanes, left turn pockets, and on-street parking (Kligier 2020). In 2014 the city redesigned the 0.7-mile section between the ocean and Lincoln Boulevard by adding new crosswalks, medians, bike lanes, and added green paint to the bike lanes along the entire corridor (Figure 5.11). The city added flashing pedestrian beacons at 29th and 30th Streets and retimed the traffic and pedestrian signals to create leading pedestrian intervals at the intersections of 17th, 20th, 25th, and 28th Streets.

Redesign and enhancement of Ocean Street Boulevard were called out in the 2010 LUCE, the 2011 Bicycle Action Plan, and the 2016 Pedestrian Action Plan. The LUCE set several goals for Ocean Park Boulevard aimed at creating local-serving neighborhood centers and a safe and attractive experience for pedestrians and bicyclists (p. 2.4-59 and 2.4-60). Implementation policies included a streetscape improvement plan with safe routes and crossings, to encourage walking and bicycling on and across Ocean Park Boulevard (p. 2.4-60).

**Figure 5.11. Rendering of Ocean Park Boulevard illustrating the landscaped median, street trees, walking facilities, and green bike lanes**


Source: 2010 Santa Monica LUCE.

The Bicycle Action Plan included various projects on and along Ocean Park Boulevard, most of which were in the plan's 20-year time horizon. The 20-year vision is for Ocean Park Boulevard to be a continuous bikeway for nearly its entire length (from the beach bike trail to Centinela

Avenue) and include wider and/or buffered bike lanes by narrowing vehicle travel and parking lanes (p. 3-54). Projects on Ocean Park Boulevard were also included in the 2016 Pedestrian Action Plan. The plan identified six intersections on Ocean Park Boulevard – from 16th to 23rd Streets – that are near key activity centers and have high numbers of vehicle collisions. The plan detailed interventions at these intersections such as curb extensions, high-visibility crosswalks, pedestrian beacons, and median refuge islands (Figure 5.12). Some of these planned interventions have been implemented – e.g., high-visibility crosswalks, curb extensions at 16th and 18thStreets, pedestrian flashing beacons. Other interventions – e.g., curb extensions at 20th, 21st, 22nd, and 23rd Streets – remain outstanding.

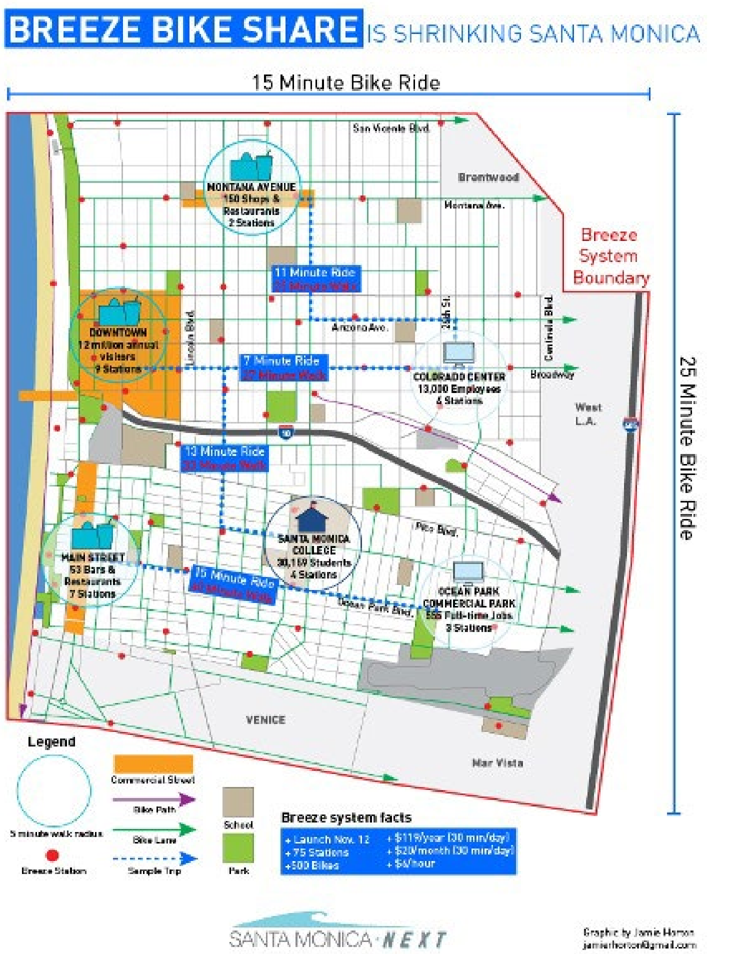
**Figure 5.12. Planned intersection investments on Ocean Park Boulevard in the 2016 Pedestrian Action Plan**


### 5.4.5 Bike Share and Micromobility

The City of Santa Monica identified a bike share system as a near-term priority in its 2011 Bicycle Action Plan and, in 2015, launched Breeze Bike Share. Breeze's 500-bike dockless fleet, owned by the City of Santa Monica and operated by CycleHop, was the first public bike share system in LA County (Islas 2015a). Funding for the system came from LA Metro, the South Coast Air Quality Management District, Caltrans, and an annual sponsorship of $675,000 from the Santa Monica-based entertainment company Hulu for the first five years (Better Bike Share Partnership 2023, Linton 2015). Bikes were available for rent by the hour, month, or year (Linton 2015, Islas 2015a). The boundaries of the service area included several major activity centers in the city (Figure 5.13).

One month after launch Breeze had 79 hubs, over 3,000 active members, and had served more than 14,000 trips for a total of 28,000 miles (Islas 2015b). In 2017, two years after its launch, Breeze had 80,000 active members and had served more than 628,000 trips and 1.3 million miles (Santa Monica Mirror 2017). In 2018 the City of Santa Monica entered an interoperability agreement to integrate Breeze with three other bike share systems – UCLA, Beverly Hills, and West Hollywood – which created a 700-bike sub-regional bike share system (Better Bike Share Partnership 2023). In 2020 the system had over 124,000 members and had served nearly 900,000 trips for over 2.1 million miles (Better Bike Share Partnership 2023).

**Figure 5.13. Breeze Bike Share Boundaries**




Source: Islas 2015a, https://la.streetsblog.org/2015/11/16/what-can-you-get-to-riding-the-breeze/

The first private, dockless electric scooters and electric bikes were “rogue launched” in Santa Monica in September 2017 (City of Santa Monica 2019). Santa Monica was in fact the first location of e-scooters in the US when Bird launched operations with no advance notice to the city (Linton 2018, Dickey 2018). City staff initially recommended limiting micromobility devices, but these regulations were voted down by the city council (Linton 2018, Linton 2019). Instead the city designed the Shared Mobility Pilot Program that regulated and monitored micromobility companies and their operations while allowing them to operate on city streets (City of Santa Monica 2019). This pilot program launched in 2018 and was shaped by Santa Monica’s transportation goals, such as diversifying mobility options in the city and protecting public safety.

The city launched a formal procurement process for shared mobility companies and released a call for applications in the summer of 2018 (City of Santa Monica 2019). The city selected four providers – Bird, Jump, Lime, and Lyft – for a 16-month permit with terms and conditions such as dynamic and performance-based fleet caps, data sharing and reporting, and device parking requirements. The initial fleet approved by the city included 2,000 electric scooters and 500 electric bikes, which increased to 3,250 total devices by September 2019 (Linton 2019). In November 2019 the city extended the 16-month pilot program through May 2020. Ridership numbers show that shared e-scooters and e-bikes were very popular, and that the rise in e-scooters correlated with declining ridership of the city's Breeze Bike Share (City of Santa Monica 2019).

The Covid-19 pandemic hit in early 2020. To increase access to the open-air public transportation option, the city continued operation of the full Breeze system and restructured its payment plans increased the number and duration of trips that annual members could take without incurring additional fees (Better Bike Share Partnership 2023). But the pandemic further cut into Breeze's ridership and, after five years of operation, the Breeze fleet needed substantial reinvestment and replacement. Funds for such reinvestment were not a priority of grant agencies at the time (Hall 2020). In late summer 2020, the city announced that Breeze would cease operations on November 11 and that the bikes would be sold, donated, or recycled (Hall 2020).

### 5.4.6 Bicycle & Pedestrian Network

The opening of the Expo Line, the transformation of auto-centric Colorado Avenue to the Colorado Esplanade, and the launch of a city bike share system were large, transformative projects for Santa Monica's transportation system. The city also implemented dozens of bicycle and pedestrian projects throughout the case study area to realize the vision and goals set out in the LUCE and the subsequent bicycle and pedestrian action plans – indeed, "adopted plans developed with community input generated the momentum behind these projects" (City of Santa Monica 2018). Bicycle and pedestrian projects completed in the case study area and timeframe are summarized in Table 5.8 and Table 5.9.

**Table 5.8. Completed pedestrian projects in the case study area, 2010-2019**

| Area | Project Summary | Corresponding Plan |
|---|---|---|
| Downtown | Add pedestrian scrambles at 12 intersections | Pedestrian Action Plan |
| Expo | In the Pico neighborhood, installation of 80-100 new pedestrian-oriented light fixtures | Pedestrian Action Plan |
| Main Street | Install up to two parklets on Main Street between Pico Boulevard and Marine Street | Pedestrian Action Plan |
| Around public K-12 schools | Upgrade signs and striping to enhance safety adding curb extensions, flashing beacons and crosswalks at four schools | Pedestrian Action Plan |
| Lincoln Boulevard | Widened sidewalks | Downtown Community Plan |

Source: City of Santa Monica, 2018, http://santamonicacityca.iqm2.com/Citizens/Detail_LegiFile.aspx?Frame=&MeetingID=1135&MediaPosition=&ID=2622&CssClass=

**Table 5.9. Completed pedestrian projects in the case study area, 2010-2019**

| Bikeway | Facility Type | Length (mi) |
|---|---|---|
| Montana Avenue Bikeway: Ocean Avenue to 26th St | Buffered bike lanes | 1.51 |
| Montana Avenue Bikeway: 21st St to Stanford Ave | Buffered bike lanes, shared lane markings, raised median crossing | 0.68 |
| California Avenue Bikeway: Pedestrian Bridge to Ocean | Bike path | 0.2 |
| California Avenue Bikeway: 17th Street to 26th Street | Climbing bike lanes, shared lane markings | 0.68 |
| Arizona Avenue Bikeway: | Bike climbing lane, shared lane markings | 0.52 |

| Bikeway | Facility Type | Length (mi) |
|---|---|---|
| 26th Street to Centinela Ave | | |
| Broadway Bikeway:<br>6th Street to Centinela Ave | Green buffered bike lanes | 2.04 |
| Colorado Esplanade:<br>Ocean Ave to 7th Street | Green buffered bike lanes, shared lane markings | 0.45 |
| Exposition Bike and Pedestrian Path | Bike path: 17th Street to Centinela Avenue | 1.36 |
| Ocean Park Blvd Bikeway:<br>Main Street to Lincoln Blvd | Green buffered bike lanes | 0.52 |
| Ocean Park Blvd Bikeway:<br>Cloverfield to Centinela Ave | Bike lanes, shared lane markings | 0.83 |
| Ocean/Barnard Way Bikeway:<br>Pico Blvd to Neilson Way | Bike lanes, bike climbing lanes, shared lane markings | 1.11 |
| 2nd/Main Bikeway:<br>Montana Ave to S. city limit | Green buffered bike lanes, intersection redesign | 1.02 |
| 6th/7th Street Bikeway:<br>N. city limit to Olympic Blvd | Buffered bike lanes, bike climbing lane, shared lane markings | 1.76 |
| 11th Street Bikeway:<br>San Vicente to Wilshire Blvd | Bike climbing lane, shared lane markings | 1.14 |
| 14th Street Bikeway:<br>San Vicente to Ashland Ave | Climbing bike lane, shared lane markings | 1.58 |
| 17th/16th Street Bikeway:<br>San Vicente to Wilshire Blvd | Bike climbing lane, shared lane markings | 1.20 |
| 17th/16th Street Bikeway:<br>Pico Blvd to Marine St | Bike climbing lane, shared land markings | 1.66 |
| 20th Street Bikeway:<br>Montana Ave to Ocean Park | Shared lane markings | 2.12 |
| 22nd & 21st Streets:<br>Virginia Ave to Dewey St | Bike climbing lane, shared lane markings | 1.02 |
| 23rd Street Bikeway:<br>Ocean Park to Dewey St | Buffered bike lane, climbing bike lane, shared lane markings | 0.19 |
| Ocean Park Blvd Bikeway: | Buffered bike lanes | 0.13 |

| Bikeway | Facility Type | Length (mi) |
|---|---|---|
| Barnard Way to Main St | | |
| Ocean Park Blvd Bikeway: Coverfield to Centinela | Buffered bike lanes, raised median extension | 1.22 |
| 2nd/Main Bikeway: Colorado Ave to S. city limit | Green buffered bike lanes | 1.27 |

Source: City of Santa Monica, 2018, http://santamonicacityca.iqm2.com/Citizens/Detail_LegiFile.aspx?Frame=&MeetingID=1135&MediaPosition=&ID=2622&CssClass=

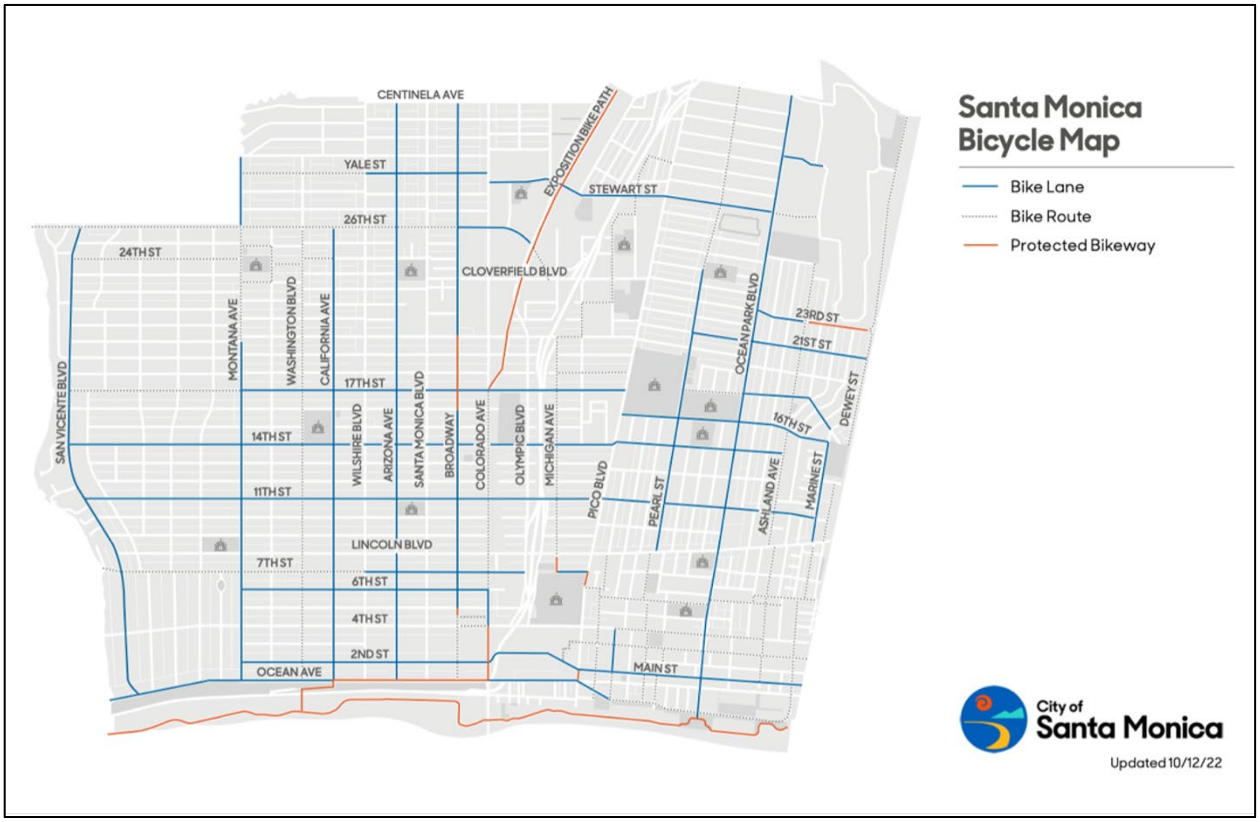
In 2011, when the Bicycle Action Plan was adopted, Santa Monica’s bicycle network covered 37 miles of the street network (City of Santa Monica Bicycle Action Plan 2011). It included only 18 miles of bike lanes and paths and 19 miles of bike routes (Figure 5.14). The Marvin Braude Beach Bicycle Trail ran (and still runs) for 20 miles along the continuous state beaches on Santa Monica’s coastline.

**Figure 5.14. Santa Monica's Bicycle Network in 2007**


Source: 2011 Bicycle Action Plan

The Bicycle Action Plan stated that the city strived to "transform itself into a world class bicycling city" and set a course of projects and programs that would realize the goals for bicycling set in the LUCE, making bicycling comfortable and attractive to people of all ages and abilities. The city implemented projects from its Bicycle Action Plan in the years immediately following its adoption, adding just over 24 miles of bicycle lanes, routes, and paths by 2018 – more than doubling the distance covered by bike lanes when the Action Plan was adopted (City of Santa Monica 2018). Santa Monica's bicycle network as of 2022 is illustrated in Figure 5.15. While the changes from the 2007 network can be hard to spot with the naked eye, careful examination shows that the city converted many of its bike routes (green in the 2007 map) to bike lanes and protected bikeways (blue and red in the 2022 map), offering more protection for bicyclists. The city increased the concentration of bikeways in the case study area, from Montana Avenue to Ocean Park Boulevard and from the beach to Centinela Avenue, further encouraging bicycling.

**Figure 5.15. Santa Monica's Bicycle Network in 2022**




Source: City of Santa Monica, 2022c, https://www.santamonica.gov/media/Mobility/Bike Map/21-0090_SMC_Bike Map_v4_existing.pdf

The city adopted the Pedestrian Action Plan in 2016, much later than the Bicycle Action Plan, but earlier plans and policy goals set a policy stage for the city to enhance and expand its pedestrian network. Santa Monica's Sustainable City Program and related plans from the 2000s emphasize active transportation as a key goal to reduce air pollution, greenhouse gas emissions, and traffic congestion in the city and set specific targets for pedestrian mode shares (along with targets for other modes) (City of Santa Monica 2014). The 2010 LUCE had ambitious goals for integrating the forthcoming light rail stations, reducing traffic congestion reduction, and increasing multi-modal travel – "aggressive requirements" for a high-quality pedestrian network were central to reaching those goals (City of Santa Monica 2017b). The Pedestrian Action Plan built on the policy foundation of the city's other plans. Many of the areas identified in the action plan were corridors and neighborhoods that the city had targeted through other plans, goals, and policy avenues – e.g., the Colorado Esplanade and the Exposition Bike Path.

### 5.5 Travel Behavior Changes

Several data sources provide evidence of changes in travel patterns in the Santa Monica case study area. Travel patterns and trends in those patterns in central Santa Monica are compared to those in the entire City of Santa Monica and Los Angeles County. These comparisons show the extent to which travel behavior trends were unique to the case study area or reflect changes that also occurred city- or county-wide.

#### 5.5.1 ACS Data Analysis

The American Community Survey (ACS), conducted by the U.S. Census Bureau, was a primary data source for identifying potential changes in commute mode share and auto ownership. Data were analyzed for the years 2010, 2015, and 2019 (thus ending before the Covid-19 pandemic). The case study area (consisting of 12 census tracts; see Table 2.1) is compared to the City of Santa Monica and Los Angeles County.

##### 5.5.1.1 Commute Mode Share

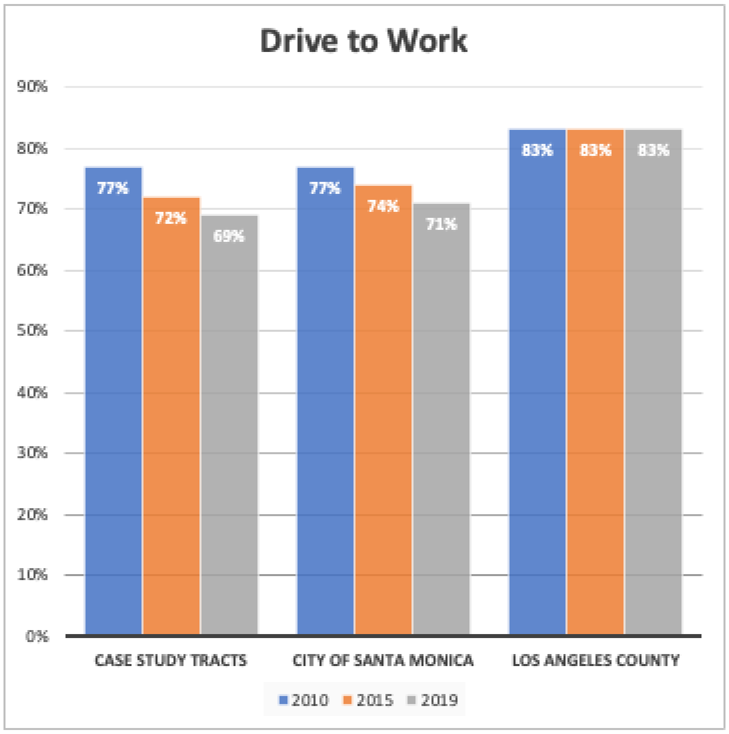
The ACS data for transportation mode to work show several distinct trends over the case study time period. Driving to work decreased among residents of the case study area over the 2010s, from 77 percent in 2010 to 69 percent in 2019 (Table 5.10; Figure 5.16). These changes are larger than the margins of error and can be interpreted as a significant decrease in the share of people in the case study area commuting by car. The share of City of Santa Monica residents commuting by car also decreased over the case study timeframe, albeit to a slightly lesser degree than in the case study area. The share of Los Angeles County residents driving to work was constant at 83 percent of residents over the case study time frame.

**Table 5.10. Driving to Work by Year and Geography in Santa Monica Area**

| Geography | 2010 | | 2015 | | 2019 | |
|---|---|---|---|---|---|---|
| | Estimate | MOE | Estimate | MOE | Estimate | MOE |
| **Case Study Tracts** | 77% | +/-2% | 72% | +/-2% | 69% | +/-2% |
| **City of Santa Monica** | 77% | +/-2% | 74% | +/-1% | 71% | +/-2% |
| **Los Angeles County** | 83% | +/-0% | 83% | +/-0% | 83% | +/-0% |

MOE = Margin of Error
Source: ACS 5-Year Estimates, Table B83001

**Figure 5.16. Driving to Work in the Santa Monica Area**




Source: ACS 5-Year Estimates, Table B08301

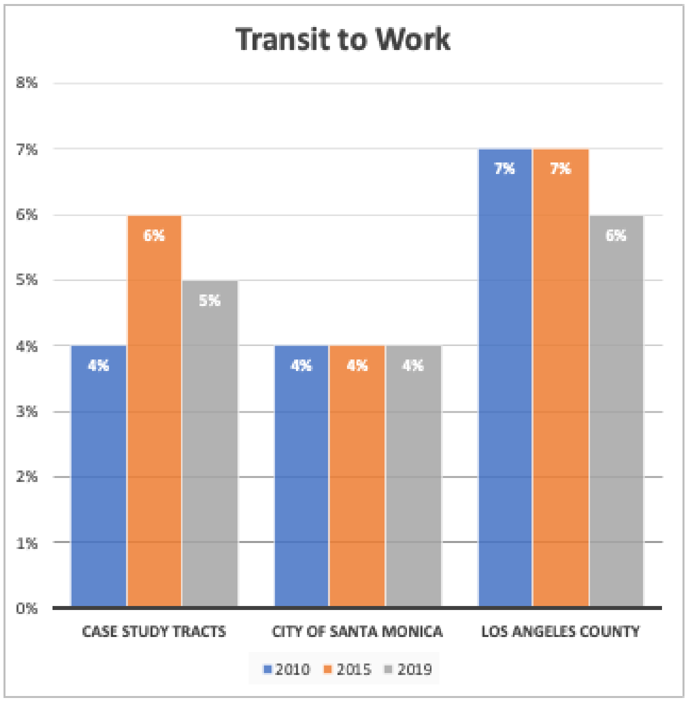
ACS data show that the share of people in the case study area commuting via transit increased over the case study timeframe – from about 4 percent in 2010 to nearly 6 percent in 2015, then decreasing to about 5 percent in 2019 (Table 5.11; Figure 5.17). However, the variation in estimates between survey years is within the margin of error. Transit commuting was relatively constant among City of Santa Monica residents – about 4 percent throughout the case study time frame. Transit commuting among Los Angeles County residents was higher than both of these geographies than both the case study area and the City of Santa Monica, consistent with the lower median incomes for the county.

**Table 5.11. Transit to Work by Year and Geography in Santa Monica Area**

| Geography | 2010 | | 2015 | | 2019 | |
|---|---|---|---|---|---|---|
| | Estimate | MOE | Estimate | MOE | Estimate | MOE |
| Case Study Tracts | 4.4% | +/-0.9% | 5.5% | +/-1.1% | 4.7% | +/-0.9% |
| City of Santa Monica | 3.7% | +/-0.6% | 4.2% | +/-0.8% | 4.1% | +/-0.6% |
| Los Angeles County | 7.1% | +/-0.1% | 6.8% | +/-0.1% | 5.8% | +/- |

Source: ACS 5-Year Estimates, Table B08301

**Figure 5.17. Transit to Work by Year and Geography in Santa Monica Area**




Source: ACS 5-Year Estimates, Table B08301

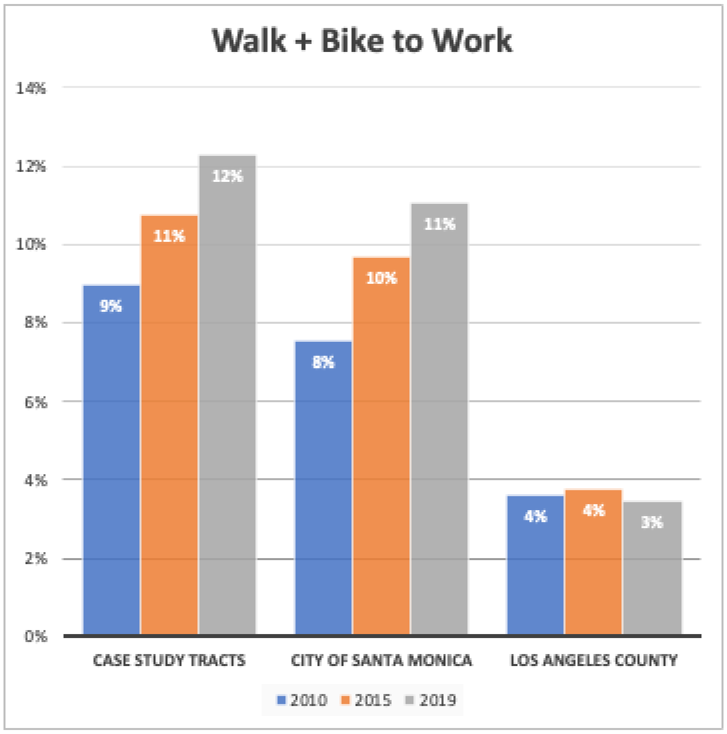
ACS data show a significant increase in active travel to work among residents of the case study area and City of Santa Monica as a whole (Table 5.12; Figure 5.18). Over the case study timeframe, active travel commutes increased from 9 percent in 2010 to 12 percent in 2019 among case study area residents and from 8 percent to 11 percent among City of Santa Monica residents. Active travel commutes are significantly less common among residents of Los Angeles County, with about 3.5 percent of county residents commuting by walking and biking over the case study timeframe.

**Table 5.12. Active Travel to Work by Year and Geography in Santa Monica**

| | 2010 | | 2015 | | 2019 | |
|---|---|---|---|---|---|---|
| **Resident Geography** | **Estimate** | **MOE** | **Estimate** | **MOE** | **Estimate** | **MOE** |
| **Case Study Area** | **9.0%** | **–** | **10.8%** | **–** | **12.3%** | **–** |
| Bike | 1.4% | +/-0.6% | 3.9% | +/-0.9% | 4.7% | +/-0.9% |
| Walk | 7.5% | +/-1.3% | 6.9% | +/-1.2% | 7.5% | +/-1.3% |
| **City of Santa Monica** | **7.6%** | **–** | **9.7%** | **–** | **11.1%** | **–** |
| Bike | 2.0% | +/-0.5% | 3.8% | +/-0.6% | 4.3% | +/-0.7% |
| Walk | 5.6% | +/-1.0% | 5.9% | +/-1.2% | 6.8% | +/-0.9% |
| **Los Angeles County** | **3.6%** | **–** | **3.7%** | **–** | **3.5%** | **–** |
| Bike | 0.7% | +/-0.0% | 0.9% | +/-0.0% | 0.8% | +/-0% |
| Walk | 2.9% | +/-0.1% | 2.8% | +/-0.1% | 2.7% | +/-0% |

MOE = Margin of Error
Source: ACS 5-Year Estimate, Table B08301

**Figure 5.18. Active Travel to Work by Year and Geography in Santa Monica**




Source: ACS 5-Year Estimates, Table B08301

#### 5.5.1.2 Auto Ownership

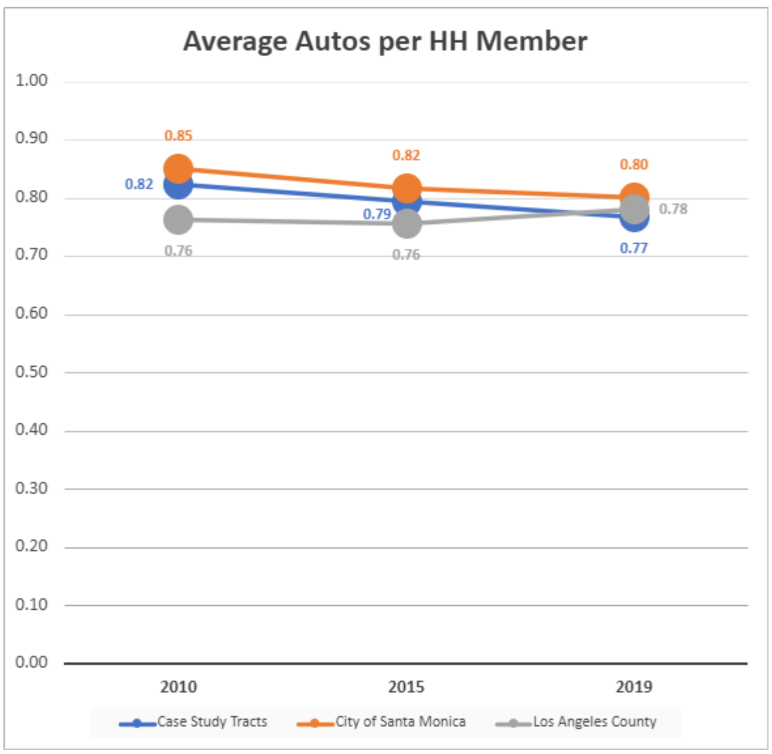
Auto ownership, measured as the average number of autos per household member, declined slightly in the case study area from 2010 to 2019 (Table 5.13; Figure 5.19). It similarly declined in the City of Santa Monica but grew slightly in the county.

**Table 5.13. Average Autos per Household Member in Santa Monica**

| | 2010 | 2015 | 2019 |
|---|---|---|---|
| Case Study Tracts | 0.82 | 0.79 | 0.77 |
| City of Santa Monica | 0.85 | 0.82 | 0.80 |
| Los Angeles County | 0.76 | 0.76 | 0.78 |

Source: ACS 5-Year Estimates, Table B08201

**Figure 5.19. Average Autos per Household Member in Santa Monica**




Source: ACS 5-Year Estimates, Table B08201

### 5.5.2 NHTS & CHTS Data Analysis

The National Household Travel Survey (NHTS) and the California Household Travel Survey (CHTS) were also primary data sources for identifying potential travel behavior changes in Santa Monica. The survey data include household vehicle miles traveled (VMT), auto availability per household driver, and mode share of all household trips. The survey data include household vehicle miles traveled (VMT), auto availability per household driver, and mode share for all household trips. The comparison area for this analysis is the City of Santa Monica leaving out the case study area. In this section, for simplicity, “the city” refers to the City of Santa Monica excluding the case study area.

#### 5.5.2.1 Sample Size

For household-based statistics (i.e., household VMT, automobile availability) the sample size is the number of households sampled in each geographic area. The sample size of households in the case study area is very small, particularly for the surveys administered in 2001, 2009, and 2017 (Table 5.14). Estimates produced from these small sample sizes will have large margins of error and wide confidence intervals, meaning that estimated changes over time are highly uncertain and not statistically significant. In the absence of other data on changes in travel patterns, the results of the analysis for households are presented in the subsequent sections but should be interpreted with extreme caution.

**Table 5.14. NHTS & CHTS Sample Size of Households in Santa Monica by Household Location**

| | 2001 | 2009 | 2012 | 2017 |
|---|---|---|---|---|
| Case Study Area | 8 | 15 | 75 | 30 |
| City of Santa Monica* | 17 | 110 | 287 | 80 |

*City of Santa Monica without case study area

For trip-based statistics (e.g., mode share of trips ending in the case study area) the sample size is the number of trips that meet the relevant criteria. Table 5.14 shows the number of trips generated by the households in the survey samples in that area, the number of trips originating in that area in the survey sample, the number of trips ending in that area, and the number of trips internal to that area (both originating and ending in that area) – in all three cases regardless of where the traveler lives. These sample sizes are large enough to provide some certainty in the values reported; this is more true for auto trips, which account for the majority of trips, than for transit, walking and bicycling trips, for which the sample sizes are much smaller. As discussed in Section 2, differences in survey methods may also affect the comparisons between years. The uncertainty stemming from both small sample sizes and differences in survey methods should be kept in mind when considering the results presented in the following sections.

**Table 5.15. NHTS & CHTS Sample Size of Trips by Type by Area in Santa Monica**

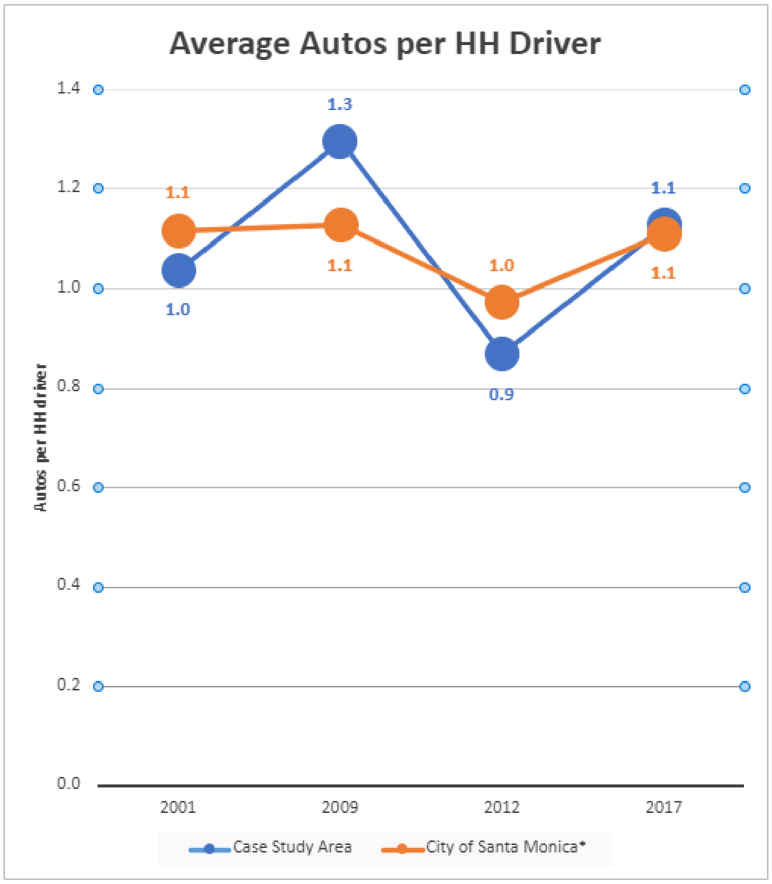
| | 2001 | 2009 | 2012 | 2017 |
|---|---|---|---|---|
| **Trips by households in…** | | | | |
| Case Study Area | 72 | 112 | 891 | 179 |
| City of Santa Monica* | 110 | 784 | 3669 | 562 |
| **Trips starting in…** | | | | |
| Case Study Area | 79 | 175 | 922 | 242 |
| City of Santa Monica* | 121 | 561 | 3658 | 602 |
| **Trips ending in…** | | | | |
| Case Study Area | 79 | 177 | 1227 | 243 |
| City of Santa Monica* | 122 | 569 | 3478 | 598 |
| **Trips internal to…** | | | | |
| Case Study Area | 32 | 70 | 693 | 115 |
| City of Santa Monica* | 67 | 274 | 2676 | 272 |

*City of Santa Monica without case study area

### 5.5.2.2 Average Automobile Availability per Licensed Driver

Trends in estimated household automobile available per licensed driver in Santa Monica are shown in Figure 5.20. Estimated auto availability per driver was close to one vehicle per driver for households in both the case study area and in the comparison area. Estimated auto availability per driver was also relatively consistent across the four survey years, particularly so in the city. Households in the case study area had larger variation than the in the city but estimates ranged between 0.9 and 1.3 autos per driver across all four surveys. Given small sample sizes, these estimates are highly uncertain.

**Figure 5.20. Autos per Household Driver in Santa Monica**

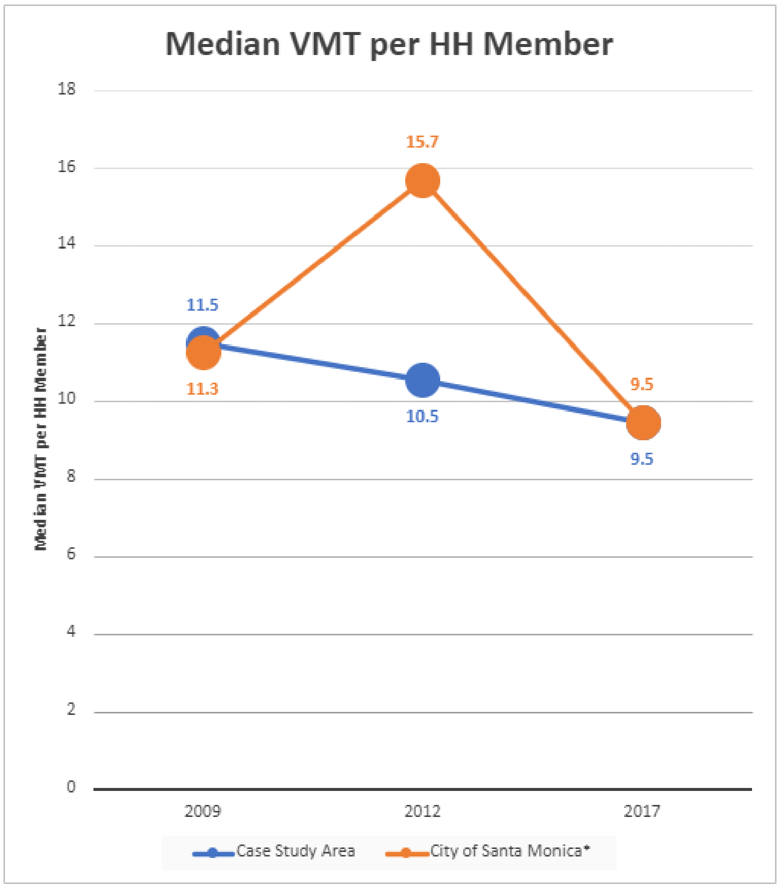



Source: NHTS and CHTS data; *City of Santa Monica without case study area

### 5.5.2.3 VMT per Household Member

Estimated median VMT per household member was lower in the case study area than the city in two of the three survey years (Figure 5.21). Estimated median VMT in the case study area decreased from 11.5 in 2009 to 9.5 in 2017. Over the same period, VMT in the city was roughly equivalent to VMT in the case study area and decreased by a similar amount. Given small sample sizes, these estimates are highly uncertain.

**Figure 5.21. Median VMT per Household Member in Santa Monica**




Source: NHTS and CHTS data; *City of Santa Monica without case study area

#### 5.5.2.4 Mode Share – Trips by Residents

The estimated mode shares of trips by residents of the Santa Monica case study area are compared to estimated mode shares for trips by residents of the City of Santa Monica and Los Angeles County in Table 5.16. Given small sample sizes, these estimates are highly uncertain.

Estimated auto mode share of trips made by residents of the case study area decreased substantially from 2001 to 2017. Estimated auto mode share of trips by residents of the city was slightly lower than the share for the case study area in 2001 but higher in each of the subsequent survey years, with a wider gap in 2017 than in 2009.

The estimated bus mode share of trips made by residents of the study area could be estimated only for 2009 and 2012 because of data limitations. Within that timeframe, the estimated bus mode share of case study residents increased from 1% in 2009 to 8% in 2012. The estimated bus mode share of residents of the city were relatively stable from 2011 to 2012 then decreased in 2017.

The estimated walk mode share of trips taken by residents of the case study area increased significantly from 2001 to 2012 before declining in 2017; the estimated walk mode shares in 2009 and 2017 were roughly equal. Estimated walking mode share was consistently higher in the case study area than in the city.

The estimated bicycle mode share of trips taken by residents of the case study area increased significantly from 2009 to 2017 (data limitations did not allow for a calculation of bicycle mode share for 2001), The estimated bike mode share of trips taken by city residents also increased over this period but remained below the estimated bike mode share for case study residents.

**Table 5.16. Mode Share for Trips by Households in Area in Santa Monica**

| | | 2001 | 2009 | 2012 | 2017 |
|---|---|---|---|---|---|
| Auto | Case Study Area | 88.5% | 67.4% | 47.4% | 61.9% |
| | City of Santa Monica* | 84.6% | 72.1% | 76.6% | 74.9% |
| Bus | Case Study Area | N/A | 0.6% | 8.4% | N/A |
| | City of Santa Monica* | 3.2% | 4.4% | 3.1% | 1.8% |
| Walk | Case Study Area | 11.5% | 26.5% | 40.7% | 24.5% |
| | City of Santa Monica* | 10.8% | 21.5% | 17.1% | 18.2% |
| Bike | Case Study Area | N/A | 5.5% | 3.0% | 13.7% |
| | City of Santa Monica* | 1.4% | 1.8% | 2.6% | 2.5% |

Source: NHTS and CHTS data; *City of Santa Monica without case study area

#### 5.5.2.5 Mode Share – Trips Ending in the Area

The estimated mode shares of trips ending in the Santa Monica case study area are compared to estimated mode shares for trips ending in the City of Santa Monica and Los Angeles County in Table 5.17. Given small sample sizes, the estimates are highly uncertain.

The estimated auto mode share of trips ending in the case study area decreased steadily and significantly over the study timeframe, from 87% in 2001 to 58% in 2017. Estimated auto mode shares of trips ending in the city were relatively constant between 2001 and 2017, initially decreasing from 81% in 2001 to 80% in 2009 before rising to 73% in 2012 and to 78% in 2017. Estimated auto mode share was considerably higher in the city than in the case study area in 2017.

The estimated bus mode share of trips ending in the Santa Monica case study area fluctuated from 2009 to 2017; bus mode share data were unavailable for the case study area for 2001. The estimated bus mode share of trips ending in the city decreased consistently over this period. In 2017, the estimated bus mode share for trips ending in the city was higher than for trips ending in the case study area.

The estimated walking mode share of trips ending in the case study area increased dramatically from 2001 to 2017. The estimated walk mode share of trips ending in city increased substantially between 2001 and 2009 then decreased in 2012 and 2017. The estimated walk mode share for trips ending in the case study area was over twice the estimated walk mode share for trips ending in the city.

The estimated bicycle mode share of trips ending in the case study area fluctuated but ultimately increased from 2009 to 2017; bike mode share data were unavailable for the case study area for 2001. The estimated bike mode share of trips ending in the city increased consistently over the period but remained below the estimated bike mode share for the case study area. In 2017, the estimated bike mode share for trips ending in the case study area was over twice the estimated bike mode share for trips ending in the city.

**Table 5.17. Mode Share for Trips Ending in Area in Santa Monica**

| | | 2001 | 2009 | 2012 | 2017 |
|---|---|---|---|---|---|
| Auto | Case Study Area | 87.0% | 69.3% | 61.1% | 57.8% |
| | City of Santa Monica* | 80.7% | 70.3% | 73.0% | 78.3% |
| Bus | Case Study Area | N/A | 2.4% | 6.0% | 1.2% |
| | City of Santa Monica* | 7.8% | 4.9% | 4.8% | 2.1% |
| Walk | Case Study Area | 13.0% | 24.4% | 29.9% | 31.2% |
| | City of Santa Monica* | 10.2% | 23.0% | 19.7% | 15.5% |
| Bike | Case Study Area | N/A | 3.9% | 3.0% | 7.2% |
| | City of Santa Monica* | 1.3% | 1.8% | 2.0% | 3.1% |

Source: NHTS and CHTS data; *City of Santa Monica without case study area

### 5.5.2.6 Mode Share – Trips Starting in Area

The estimated mode shares of trips starting in the Santa Monica case study area are compared to estimated mode shares for trips starting in the City of Santa Monica and Los Angeles County in Table 5.18. Given small sample sizes, these estimates are highly uncertain. Estimates for 2012 were not available.

The estimated auto mode share of trips starting in the case study area decreased steadily and substantially over the study timeframe, from 86% in 2001 to 57% in 2017. Estimated auto mode shares of trips starting in the city were relatively constant between 2001 and 2017. Although the estimated auto mode share for trips starting in the case study area was about the same as the estimated auto mode share for trips starting in the city in 2001 and 2009, it was substantially less in 2017.

The estimated bus mode share of trips starting in the case study area was relatively constant from 2001 to 2017. The estimated bus mode share of trips starting in the city was much higher than that of the case study area across all survey years, though its decreased substantially between 2001 and 2017.

The estimated walk mode share of trips starting in the case study area increased substantially from 2001 to 2017. The estimated walk mode share of trips starting in the city initially increased initially, then declined. In 2017, the estimated walk mode share for trips starting in the case study area was over twice the estimated walk mode share for trips starting in the city.

The estimated bicycle mode share of trips starting in the case study area increased over the two years for which data are available, from 4% in 2009 to 8% in 2017. The estimated bike mode share of trips starting in the city also increased somewhat over this period but remained substantially below the estimated bike mode share of trips starting in the case study area. In 2017, the estimated bike mode share for trips starting in the case study area was over twice the mode share of trips starting in the city.

**Table 5.18. Mode Share for Trips Starting in Area in Santa Monica**

| | | 2001 | 2009 | 2012 | 2017 |
|---|---|---|---|---|---|
| Auto | Case Study Area | 85.5% | 69.1% | N/A | 57.3% |
| | City of Santa Monica* | 83.5% | 70.3% | N/A | 78.9% |
| Bus | Case Study Area | 1.5% | 2.5% | N/A | 1.2% |
| | City of Santa Monica* | 5.7% | 4.8% | N/A | 1.9% |
| Walk | Case Study Area | 13.0% | 24.5% | N/A | 31.3% |
| | City of Santa Monica* | 9.5% | 23.3% | N/A | 15.2% |
| Bike | Case Study Area | N/A | 3.9% | N/A | 7.9% |
| | City of Santa Monica* | 1.3% | 1.8% | N/A | 2.0% |

Source: NHTS and CHTS data; *City of Santa Monica without case study area

### 5.4.2.7 Mode Share – Trips Internal to Area

The estimated mode shares of trips internal to (i.e., starting and ending in) the case study area are compared to estimated mode shares for trips internal to the City of Santa Monica and Los Angeles County in Table 5.19. Given small sample sizes, these estimates are highly uncertain. The sample size was not sufficient to estimate bus or bicycling mode share for trips internal to the case study area.

The estimated auto mode share of trips internal to the case study area decreased steadily and substantially over the study timeframe, from 77% in 2001 to 53% in 2009, then to 37% in 2017. Estimated auto mode share of trips internal to the city decreased initially but then increased, diverging from the trend in the case study area. The estimated auto mode share for trips internal to the case study area was substantially lower than the estimated auto mode share for trips internal to the comparison area in 2017.

The estimated walk mode share for trips internal to the case study area increased steadily and substantially to 2001 to 2017. The estimated walk mode share of trips internal to the comparison area also increased initially but then decreased, diverging from the trend in the case study area. In 2017, the estimated walk mode share for trips internal to the case study area was substantially higher than the walk mode share for trips internal to the city.

**Table 5.19. Mode Share for Trips Internal to Area in Santa Monica**

| | | 2001 | 2009 | 2012 | 2017 |
|---|---|---|---|---|---|
| Auto | Case Study Area | 77.2% | 53.3% | N/A | 37.5% |
| | City of Santa Monica* | 85.3% | 55.5% | N/A | 64.3% |
| | | | | N/A | |
| Bus | Case Study Area | N/A | N/A | N/A | N/A |
| | City of Santa Monica* | N/A | N/A | N/A | N/A |
| Walk | Case Study Area | 22.8% | 38.4% | N/A | 56.4% |
| | City of Santa Monica* | 11.6% | 42.0% | N/A | 33.9% |
| Bike | Case Study Area | N/A | N/A | N/A | N/A |
| | City of Santa Monica* | N/A | N/A | N/A | N/A |

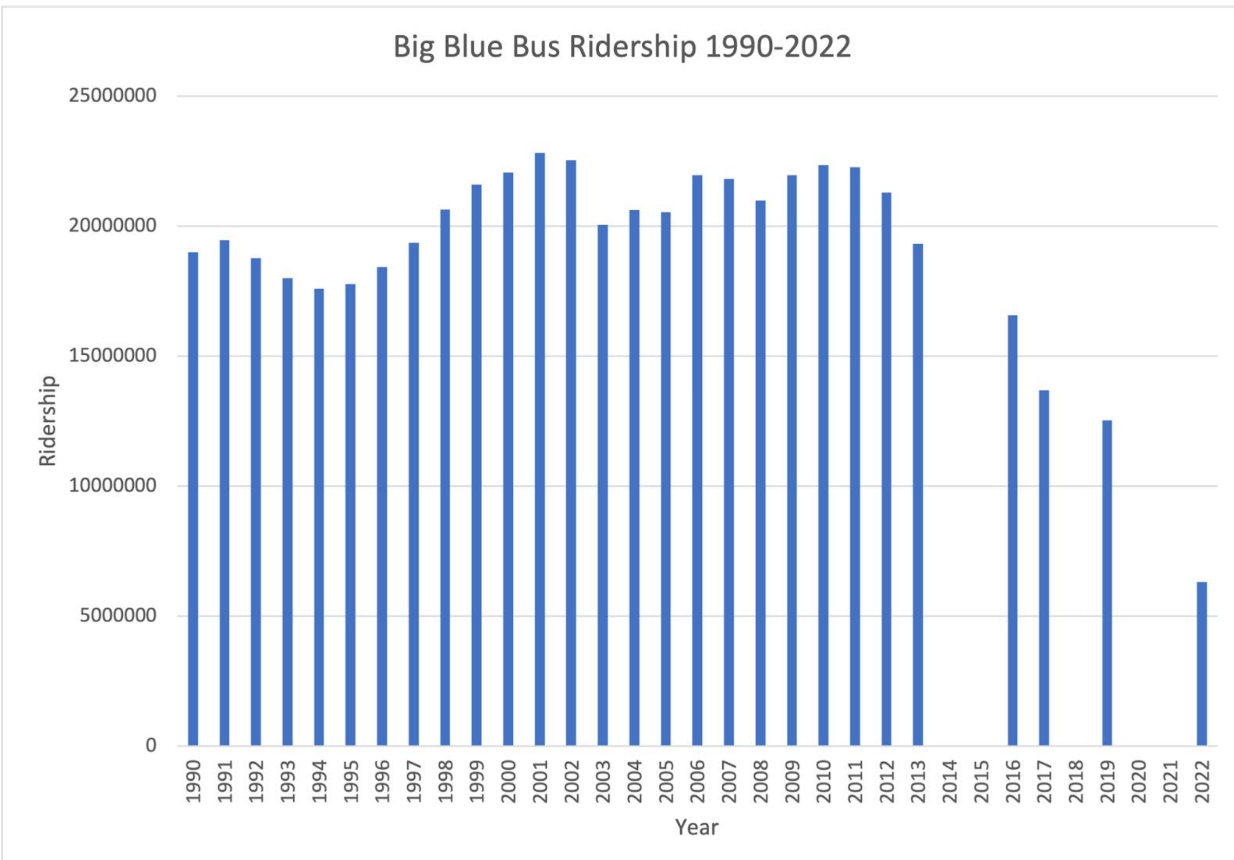
Source: NHTS and CHTS data; *City of Santa Monica without case study area

### 5.5.3 Other Data Sources

Other sources of data provide evidence of changes in travel patterns in Santa Monica, pointing to a decline in VMT and an increase in active travel.

It appears that transit ridership declined substantially in Santa Monica during the study period. In 2017, the Big Blue Bus reported a staggering drop in ridership, even in the context of steadily declining ridership since 2010 (Figure 5.22). This drop occurred in the wake of the redesign of Santa Monica's downtown pedestrian mall, the Third Street Promenade, which reopened in 2010 as a premier shopping and dining district.

**Figure 5.22. Big Blue Bus Ridership**




Source: City of Santa Monica, 2022d

Ridership data from the Interactive Estimated Ridership Stats were used to compare estimates of average weekday ridership data using 2010, 2017, and 2019 as basic trend data points (Table 5.20). The LA Metro's Line 4 runs from Downtown LA to Santa Monica via Santa Monica Boulevard. Line 4's ridership in 2010 saw average estimated weekday ridership numbers around 20,000 riders. By 2017, though, these estimated average weekday ridership numbers had dropped to around 16,000 riders, and stabilized at around 16,000 in 2019. The Metro's Line 20 runs from Downtown LA to Santa Monica via Wilshire Boulevard. Line 20's ridership in 2010 saw average estimated weekday ridership numbers around 17,000 riders, dropping to about 14,000 riders in 2017 and continued with 14,000 riders in 2019. The Metro's Line 33, whose numbers stayed stable, runs from Downtown LA to Santa Monica via Venice Boulevard. In

2010, the average estimated weekday ridership was around 12,000 riders. By 2017, this average dropped to around 11,000 estimated weekday riders, remaining at around 11,000 riders in 2019.

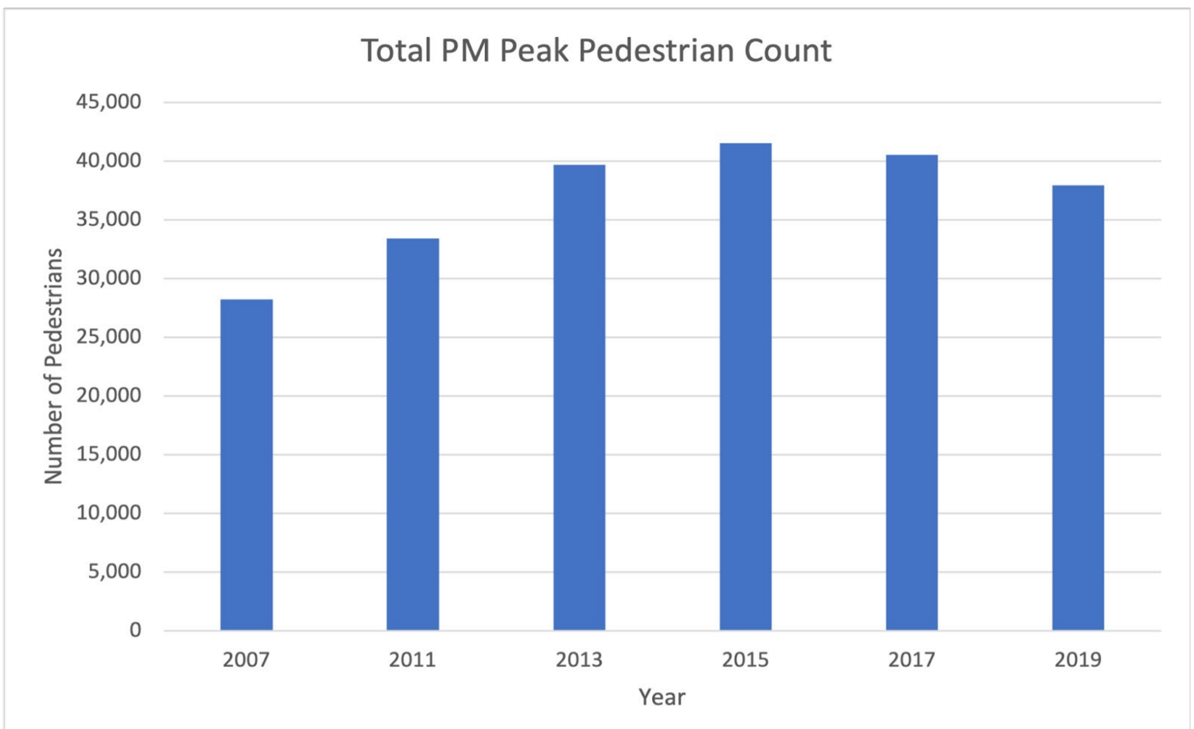
**Table 5.20. Ridership on LA Metro's Lines 4, 20, and 33**

| Year | Line 4 | Line 20 | Line 33 |
|---|---|---|---|
| 2010 | 19,548 | 16,812 | 11,430 |
| 2017 | 15,542 | 13,977 | 10,923 |
| 2019 | 15,619 | 13,634 | 11,066 |

Source: LA Metro, 2023

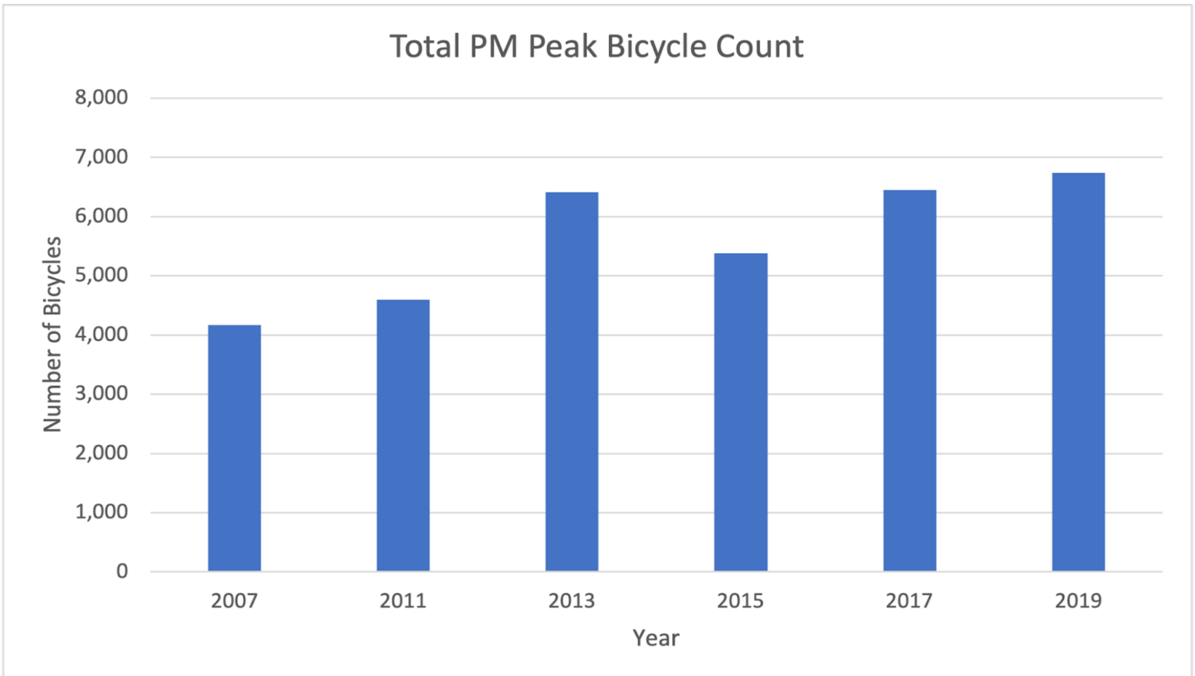
Data on active travel reveal a more encouraging trend. The City of Santa Monica conducts pedestrian and bike counts typically every two years during weekend and weekday peak hours. Weekday counts are conducted on a typical Tuesday, Wednesday, or Thursday, and PM peak hours are from 5:30-7:30pm. Figure 5.23 and Figure 5.24 show the total number of pedestrians and bikes counted at various intersections in Santa Monica from 2007 to 2019 and generally show an upward trend.

**Figure 5.23. Pedestrian Count in Santa Monica**




Source: City of Santa Monica, 2020a

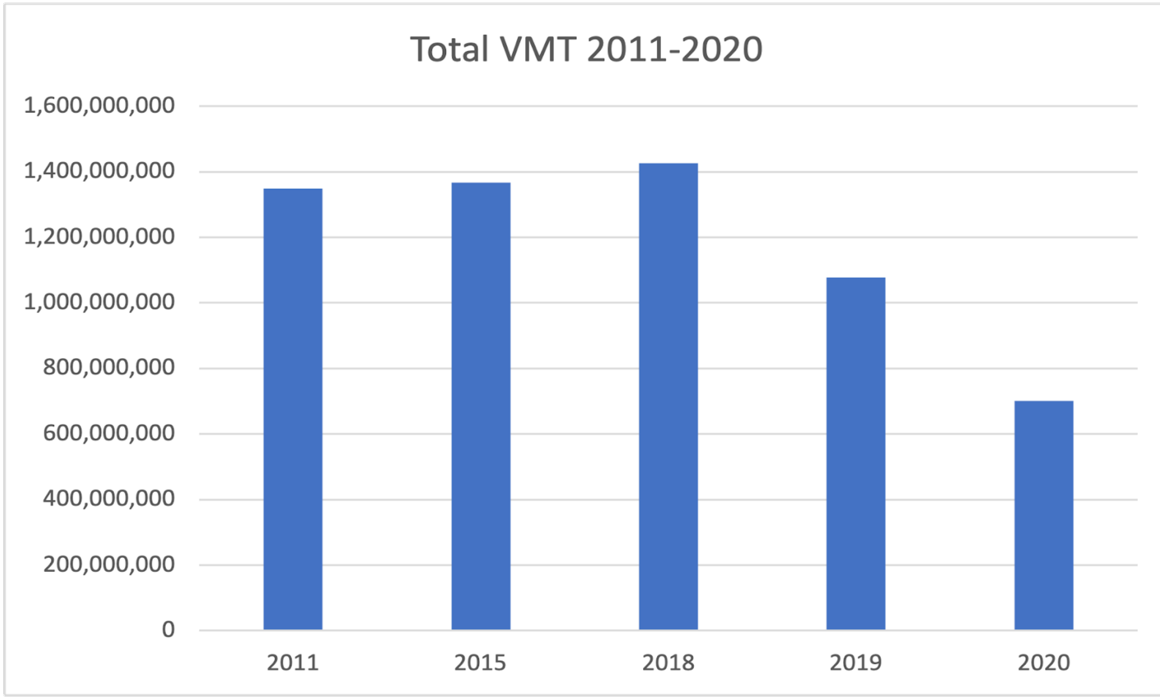
**Figure 5.24. Bicycle Count in Santa Monica**




Source: City of Santa Monica, 2020b

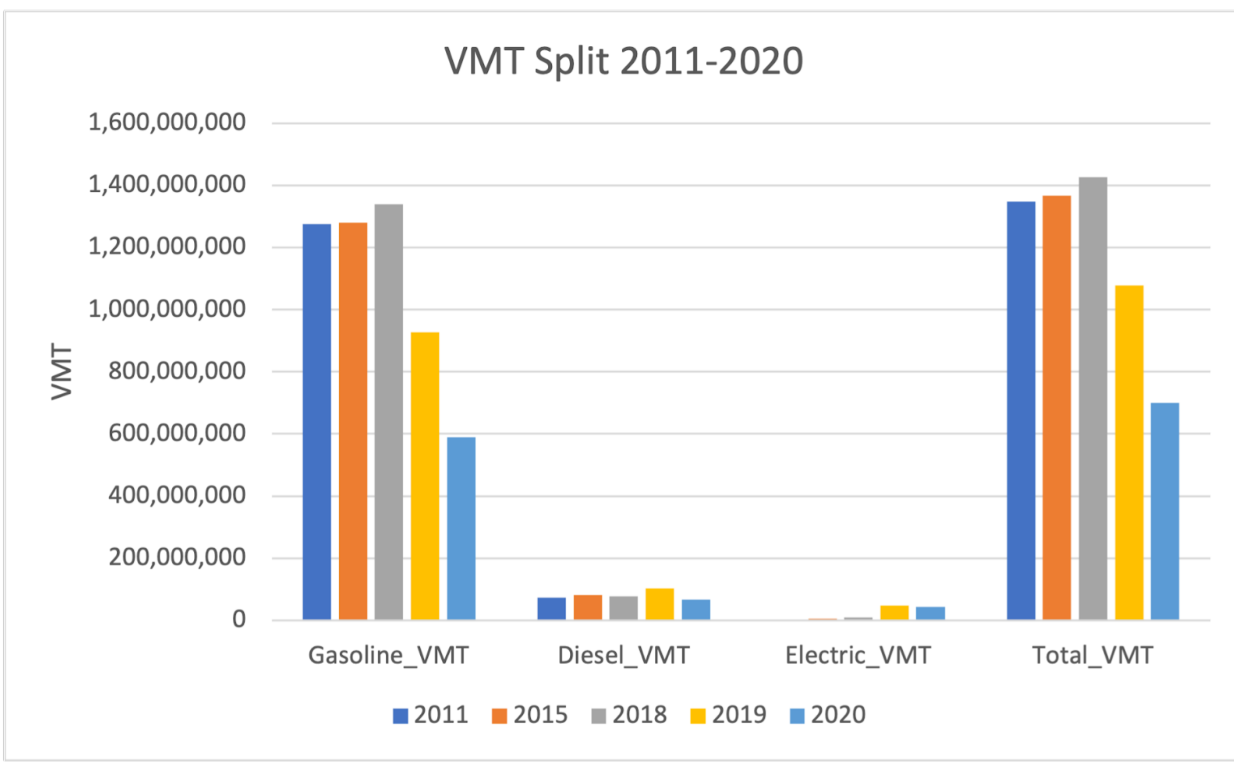
The City of Santa Monica also kept an inventory of VMT by vehicle type and in total from 2011 to 2020. These estimates are based on data on vehicle trips from Google's Environmental Insights Explorer and assume a mix of vehicle types based equivalent to the national average vehicle mix (City of Santa Monica 2021). These estimates represent VMT that occurs within the city's boundaries, regardless of who is traveling and are thus not directly comparable to the VMT estimates for residents of the city from the NHTS and CHTS (see Figure 5.21). Figure 5.25 and Figure 5.26 show that VMT increased from 2011 to 2018, then dropped in 2019 and 2020. Electric VMT rose during this time, and diesel VMT rose and fell year by year. Gasoline VMT follows the trend of total VMT.

**Figure 5.25. Total VMT Santa Monica**




Source: City of Santa Monica, 2022e

**Figure 5.26. VMT by Vehicle Type Santa Monica**




Source: City of Santa Monica, 2022e

### 5.6. Assessment

The built environment in Central Santa Monica changed in significant ways over the study period. Santa Monica's award-winning 2010 Land Use and Circulation Element (LUCE) charted a course for changes intended to decrease automobile demand and traffic congestion and to increase multimodal accessibility. Eleven new mixed-use projects added nearly 1,000 new housing units and 80,000 square feet of commercial space. Eight commercial projects created space for office jobs and educational opportunities. Projects like the Colorado Pedestrian Esplanade and the Ocean Park Boulevard redesign improved conditions for bicyclists and pedestrians. Other investments in the bicycle network along with the launching of a bike share system and the Santa Monica Bike Center helped to further promote active travel. The opening of the Expo Line provided a high-quality transit link from Santa Monica to other parts of the county.

Determining the impacts of these changes on VMT is challenging given the limited data sources that measure VMT, especially longitudinally. The 2001 CHTS, 2009 NHTS, 2012 CHTS, and 2017 NHTS have been implemented using somewhat different sampling and measurement methods. The sample sizes are small, especially for the case study area. The estimates of household VMT from the different surveys are highly uncertain and thus require careful interpretation and comparison. According to the NHTS data, VMT decreased by 18% in the Santa Monica case study area from 2009 to 2017, suggesting that changes in the built environment may have succeeded in reducing car dependence (Table 5.21). However, the trend in the comparison area (the City of Santa Monica excluding the case study area) was similar, suggesting either that larger forces were at play or that the changes within the case study area affected travel for residents throughout the city, not just within the case study area, or a combination of both. The city's own estimates of VMT show a downward trend.

**Table 5.21. Percent Change in Median Household VMT per Person in Santa Monica, NHTS & CHTS Data**

| | VMT in 2009 | 2009 to 2012 | 2012 to 2017 | 2009 to 2017 |
|---|---|---|---|---|
| Case Study Area | 11.5 | -8% | -10% | -18% |
| City of Santa Monica* | 11.3 | 39% | -40% | -16% |

Source: NHTS and CHTS data: *City of Santa Monica without case study area

Estimated auto ownership was similar in the case study area and the city as a whole. Estimated auto ownership appeared to decreased slightly in the case study area: from 1.3 vehicles per household driver in 2009 to 1.1 in 2017 according to the NHTS data; from 0.82 vehicles per household member in 2010 to 0.77 in 2019 according to the American Community Survey. In the comparison area, auto ownership stayed the same from 2009 to 2017 at 1.1 vehicles per household driver according to the NHTS, but dropped from 0.85 vehicles per household member in 2010 to 0.80 in 2019 according to the American Community Survey. Auto ownership thus may have declined slightly more in the case study area than in the comparison area.

Along with the decrease in VMT, the case study area appears to have become more multimodal over the course of the 2000s and 2010s. As a percent of all trips, case study households took fewer trips – including commute trips – by car and more trips by biking at the end of the study period than they did at the beginning, though the trends for walking and bus were less clear (Table 5.22; Table 5.23). The auto mode share in the case study area was lower and the active travel mode shares were higher than in the comparison area, and although the shares for the comparison area followed similar trends as in the case study area, the gaps between the case study area and the comparison area widened.

Trips starting and ending in the case study area also grew significantly more multimodal over the study period (Table 5.23). In particular, the case study area attracted a significantly higher and increasing share of trips by walking and biking than the comparison area over the case study timeframe. Trips starting in the case study area followed a similar trend: the percent of trips taken by car dropped while the percent of trips by biking and walking increased significantly. As a result, the gap between auto and bike mode shares between the case study area and the comparison area widened over the period, suggesting that the changes to the built environment may have inspired more multimodal travel behavior when people were traveling within, to, and from the case study area. Bicycle and pedestrian counts from the City of Santa Monica trended upward over the period.

The findings for transit are not as encouraging. The ACS showed an increase in bus mode share for commute trips in the case study area, compared to no change for the comparison area. But the sparse data available from the NHTS and CHTS point to a possible decline in bus mode share for trips to and from the case study area. Data available from the city also point to a decline in bus ridership over the period.

**Table 5.22. Summary of Results of ACS Analysis of Mode Share for Commute Trips for Santa Monica**

| Trip Type | Mode | Case study area vs. comparison area | Case study 2010 to 2019 | Comparison 2010 to 2019 | Change in gap |
|---|---|---|---|---|---|
| Journey to work | Auto | Lower | Decrease | Decrease | 0 |
| | Bus | Higher | Increase | Stable | + |
| | Walk/Bike | Higher | Increase | Increase | 0 |

**Table 5.23. Summary of Results of NHTS/CHTS Analysis of Trips by Location for Santa Monica**

| Trip Type | Mode | Case study area vs. comparison area | Case study 2009 to 2017 | Comparison 2009 to 2017 | Change in gap |
|---|---|---|---|---|---|
| Residents of case study area | Auto | Lower | Decrease | Increase | + |
| | Bus | n/a | n/a | Decrease | n/a |
| | Walk | Higher | Decrease | Decrease | 0 |
| | Bike | Higher | Increase | Increase | + |
| Ending in case study area | Auto | Lower | Decrease | Increase | + |
| | Bus | Lower | Decrease | Decrease | - |
| | Walk | Higher | Increase | Decrease | + |
| | Bike | Higher | Increase | Increase | + |
| Originating in case study area | Auto | Lower | Decrease | Increase | + |
| | Bus | Lower | Decrease | Decrease | - |
| | Walk | Higher | Increase | Decrease | + |
| | Bike | Higher | Increase | Increase | + |
| Internal to case study area | Auto | Lower | Decrease | Increase | + |
| | Walk | Lower | Increase | Decrease | * |

* Direction of gap between case study and comparison flipped; share in case study area ended higher than comparison area.

## 6. Summary and Discussion of Case Studies

In all three case studies, local governments were able to bring about significant changes in the built environment that created the potential for a reduction in driving. They succeeded through some combination of innovative local plans, strategic infrastructure investments, projects initiated by private developers, and support from the local community. Santa Monica arguably saw the most significant change in the built environment, having started earlier than the other cities, though Sacramento was a close second and was quicker to adopt code changes to implement its plan after adoption. Changes were more limited in Fresno, with its smaller and less vibrant real estate market, a focus on economic revitalization more so than environmental sustainability, and a later start on these efforts.

Favorable policy and investments in public infrastructure incentivized infill development in all three cases, but a willing and ready infill development industry was necessary to take advantage of those incentives and realize the cities' policy goals. Most notable among the land use changes was a substantial increase in housing within each of the case study areas: 2500 units in Sacramento, over 600 units in Fresno, and nearly 900 units in Santa Monica. Many of these projects included commercial uses in addition to residential, and a substantial number of commercial infill developments further transformed the case study areas. These changes make it possible for more people to live in closer proximity to the central business district, where jobs and services can often be found within walking distance. Key civic uses, including a basketball and entertainment arena in Sacramento and a baseball park in Fresno, were also important additions to these areas. Although events at these facilities bring more vehicle traffic at the time, the spill-over benefits to the surrounding commercial districts help to increase the number of nearby restaurants and other businesses for people living and/or working in the area.

Each city also made substantial investments in bicycling infrastructure as well as other street improvements. Sacramento added 30 miles of bikeways within the case study area, while adding 238 miles in other parts of the city. Fresno completed a number of traffic calming and pedestrian improvement projects in and around downtown. Santa Monica more than doubled its miles of bike facilities. The city's Colorado Esplanade project and a complete-street project on Ocean Park Boulevard helped to improve conditions for bicyclists and pedestrians. The case study areas in Fresno and Santa Monica benefited from new transit service: a new bus rapid transit line in the former, and the Expo Line extension in the latter.

These changes together, in all three areas, improved conditions for modes other than driving and might be expected to have both reduced VMT and produced a shift in mode shares. To test the effect of the built environment changes on travel patterns, VMT and mode share estimates for the case study areas were compared to estimates for comparison areas (i.e., the city (with or without the case study area) or the city and the county, depending on the data source). Although a comparison of estimates for the case study area to estimates for the comparison area gives an indication of the effect of the built environment on travel patterns, the impact of *changes* to the built environment can be assessed by examining changes in the gap between the case study area and the comparison area. A widening of gaps stemming from a greater decrease in VMT and auto mode share or a greater increase in walk, bike, and transit mode shares in the case study area relative to the comparison area provides evidence that supports the hypothesis that the changes to the built environment impacted travel patterns. It is important to note that changes in the socio-demographic characteristics of the residents of the case study areas could have dampened any apparent effect of built environment changes on travel patterns.

Estimates of VMT declined over the period, though the small sample sizes on which VMT estimates are based makes them highly uncertain. In two areas, estimated VMT for residents living in the area was lower in the case study area than the comparison area, but the gap between estimates for the areas did not always widen over the study period as expected. In Sacramento, according to one source, estimated VMT in the case study area decreased from 2009 to 2017 while it increased in the comparison area. According to a second source, estimated VMT in the case study area increased substantially from 2001 to 2019 and at a faster rate than it increased in the city or the county. In Fresno, estimated VMT per person in the case study area was less than half of that in the comparison area, but it decreased at similar rates in both areas from 2009 to 2017, meaning that the gap remained about the same. In Santa Monica, estimated VMT for residents was roughly equal in the case study and comparison areas, though it decreased at a slightly faster rate in the case study area than the comparison area from 2009 to 2017. These results are suggestive but inconclusive given the high degree of uncertainty in the estimates.

Estimates of driving mode share declined while estimates of the shares of other modes increased over the period, though the small sample sizes mean that the estimates highly uncertain. In Sacramento, three data sources point to a decline in auto mode share with an increase in walk, bike, and transit mode shares. Although the case study area had lower estimated auto mode shares and higher estimated shares of the alternative modes than the comparison areas at both the beginning and the ends of the period, trends were similar in the comparison areas, meaning that the estimated gap between the case study area and the comparison areas did not necessarily widen. In Fresno, estimated auto mode share for commute trips was lower in the case study area than the comparison area but decreased only slightly, so that the estimated gap did not widen over the period. Data for all trips shows that estimated auto mode share was lower in the case study area than the comparison area but that it increased from 2009 to 2017, leading to a narrowing of the gap between the areas.

In Santa Monica, estimated auto mode share for commute trips was lower in the case study area than the comparison area and estimated walk/bike mode share was higher, but the areas experienced similar trends so that the gap did not widen. For all trips, estimated auto mode share was also lower in the case study area than the comparison area, and it decreased in the former while it increased in the latter, leading to a wider estimated gap between the areas. Estimated walk and bike mode shares were mostly higher in the case study area than the comparison area and increased for most types of trips (defined by trip origin and destination) in the former while decreasing in the latter, leading to a widening of the estimated gap. Estimated bus mode share, however, was lower in the case study area than the comparison area, and it decreased in both areas.

Given the small sample sizes, these findings should not be taken as definitive or conclusive. Nevertheless, they provide some evidence of changes in travel patterns that may have resulted from the documented changes in the built environment. Santa Monica arguably achieved the most significant built environment changes during the period and also had the strongest evidence of an impact on travel patterns. That the evidence is not stronger across the case studies could reflect the fact that change is slow, both to the built environment and to travel patterns. Although these cities adopted ambitious plans that at least in part aimed to reduce car dependence up to two decades ago, the changes initiated by these plans can take decades to play out and are indeed continuing to play out. In Fresno, for example, many of the changes occurred too recently to be reflected in the available data on travel patterns. An analysis of travel patterns by mid-decade could reveal more significant changes. In other words, the absence of strong evidence at this point in time is not evidence of an absence of an eventual shift in travel patterns away from driving and towards more sustainable alternatives.

It is important to note that the fact that so much additional housing was constructed within these areas is itself a promising trend. On average, residents of the case study areas drive less and use other modes more than residents of other parts of these cities, according to the estimates presented here. New housing in the case study areas mean that more people have the opportunity to live a less car-dependent lifestyle. If some people are now choosing to live in one of the case study areas rather than elsewhere in the city, their VMT is likely to be lower than it otherwise would have been. Examining the change in VMT for households new to the area in comparison to where they would otherwise have lived would be another way to assess the impact of built environment changes on travel patterns.

## 7. Discussion: Scaling Up

Although the available evidence does not definitively or conclusively show that the changes to the built environment documented in the three case studies presented here led to a shift from driving to other modes of travel, it provides strong hints of this possibility, and the kinds of changes documented here are clearly a necessary step to reducing car dependence. For this reason, it is important for the state to consider the following questions:

- Where else could the strategies identified in these three case studies be adopted?
- What policies can the state adopt to foster or require changes to the built environment more widely?

All three case study areas are located in the center of cities, two of which are the central city for their regions (Sacramento, Fresno), and one that is a distinct city within a larger metropolitan area (Santa Monica). All three case study areas date from before wide-spread auto ownership and have historically been home to a mix of land uses, including residential, retail, and office. At the start of the study period, all three had well-established transit service, as well as extensive sidewalk networks and limited bicycle infrastructure. In other words, the cities' efforts described in previous sections added to and improved environments that were already less car-oriented than many communities in California, particularly those in suburban and rural areas. For that reason, the policies that successfully led to changes in these case study areas are most applicable to other communities in the state that are starting with similarly favorable conditions, or what one might call "traditional" communities, generally established before World War II. Indeed, many traditional communities have already been employing strategies similar to those described in the case study areas.

The wide-spread adoption of local policies that aim to reduce car dependence, at least among traditional communities, is in part explained by state policies that have been pushing changes to the built environment. These policies start with Senate Bill 375, which set targets for VMT reduction for the 18 Metropolitan Planning Organizations (MPOs) in the state. MPOs are required to adopt Sustainable Communities Strategies (SCSs) in conjunction with their federally-required long-range Regional Transportation Plans (RTPs) that demonstrate how the region will meet its targets for VMT reduction. Although MPOs have no power over land use planning, they can incentivize the adoption of local plans consistent with the SCS through their control over transportation funding. The Metropolitan Transportation Commission's Transit Oriented Communities (TOC) policy, for example, allocates discretionary funds to localities that have met requirements for minimum densities, affordable housing, and parking management in areas within a half-mile of existing and planned transit stations (Metropolitan Transportation Commission 2022). However, recent evaluation reports by CARB on SB 375 progress to-date indicate cause for concern about achieving regional plan goals for reducing VMT and GHGs (CARB 2018 and 2022) unless state, regional, and local agencies ramp up efforts to support MPOs in implementing plan goals under SB 375.

The state legislature has adopted a series of policies in recent years intended to promote housing construction, especially infill housing in "transit-rich" areas (Fulton, et al. 2023). Several pieces of state legislation have enabled and encouraged accessory dwelling units (ADUs). For example, in 2019 AB 881 limited the grounds on which cities could disallow ADUs; AB 68 reduced the time cities have to approve ADUs and eliminated parking replacement parking requirements for garage conversions; and SB 13 reduced impact fees. SB 9, passed in 2021, takes this idea a step farther in allowing for the construction of additional units and the splitting of lots within areas zoned for single-family homes. Although the effectiveness of this policy is not yet certain, it creates the potential to significantly increase infill housing development. Changes to parking requirements are an important part of the effort to increase infill development. In 2022, AB 2097 prohibited local governments from mandating minimum parking requirements for housing developments located within a half-mile of public transit, and a growing number of cities in the state have eliminated minimum parking requirements altogether. The state's recent strengthening of its oversight of the Regional Housing Needs Assessment (RHNA) process may also push local governments to enable and encourage infill housing.

The state has also adopted policies that encourage the redesign of streets to better accommodate bicyclists, pedestrians, and transit users. California's Complete Streets Act of 2008 requires cities and counties to include complete streets policies as part of their General Plans. Complete streets goals are achieved generally by adding traffic calming and user features to slow down vehicles and makes drivers more aware of their surroundings, particularly of other users such as pedestrian and cyclists (Smart Growth America n.d). In October 2021, Governor Newsom signed into law AB 773, authorizing "a local authority to adopt a rule or regulation by ordinance to implement a slow streets program, which may include closures to vehicular traffic or through vehicular traffic of neighborhood local streets with connections to citywide bicycle networks, destinations that are within walking distance, or green space" (California Legislature 2021a). Short of closing streets to vehicle traffic, many cities are reducing speed limits, especially on residential streets. The "slow streets" movement got some help in California with the passage of AB 43 in the Fall of 2021. This bill enables local governments to set speed limits not based on observed vehicle speeds but instead based on the needs of pedestrians, thereby doing away with the traditional "85$^{th}$ percentile rule" (California Legislature 2021b).

Funding is an important way that the state can encourage changes to the built environment. Passed in 2017, SB 1 directs $100 million annually toward projects that support walking, bicycling, and other active modes through the Active Transportation Program (ATP) (CTC 2023). The ATP provided funding that was critical for planning and launching the bike share system in the Sacramento, for example. Many other funding programs, including programs funded through the California Climate Investments program, funded by cap-and-trade proceeds, make funding available for active transportation projects. The state's Active Transportation Resource Center helps local governments develop project proposals and access state funding. But the magnitude of state funding programs dedicated to active transportation and climate-oriented investments are quite small in comparison to California's overall transportation budget (Sciara and Lee 2018), and an increasing share of transportation funding is from local sources (Agrawal et al. 2021). Revising transportation funding programs to provide an influx of state funds dedicated to active transportation can increase – and give the state more say about – the delivery active transportation projects and programs.

Policies and funding that support public transit are another way for the state to encourage changes to the built environment that reduce car dependence. In addition to funding, the state supports the efforts of transit agencies in various ways. For example, AB 2923, adopted in 2018, established a process whereby the Bay Area Rapid Transit (BART) system adopted standards for transit-oriented development (TOD) on BART-owned land within one-half mile of a station, and required that cities and counties with qualifying BART-owned sites adopt those standards into their zoning ordinances by 2020 (BART n.d.). BART released guidance in 2020 stipulating minimum allowable density at 75 housing units per acre, no minimum parking requirement, and height, FAR, and parking maximum standards that vary by community type. The state can also promote inter-agency integration as a way to improve transit service and increase ridership. An example of an integration strategy in California Is Seamless Bay Area, a not-for-profit coalition project with the mission of integrating and harmonizing the Bay Area's 27 distinct transit providers into a combined network with a single fare structure. The movement intends to create a system in which transit riders can take advantage of coordinated schedules as they ride city buses, light rail, and heavy commuter rail with a single fare payment (Seamless Bay Area n.d.). Two state bills intended to support this effort failed to pass the legislature: AB 629 in 2021, and SB 917 in 2022.

Changes to the environmental review process under the California Environmental Quality Act (CEQA) may also promote changes to the built environment that reduce car dependence. Passed in 2013, SB 743 has re-oriented the analysis of transportation impacts in the CEQA process away from a focus on reducing impacts on level of service (a measure of traffic delay) to a focus reducing VMT impacts instead. The impacts of land development projects as well as transportation infrastructure projects on VMT must be estimated and a plan for mitigating these impacts must be developed. Infill development projects will generally have low VMT impacts, meaning that they will move through the approval process more easily. Projects in high-VMT suburban areas, in contrast, will face more significant mitigation requirements. VMT impacts must also be assessed for transportation projects, including projects to expand highway capacity, and those impacts must be mitigated. Mitigation efforts could include investments in transit service as well as bicycle and pedestrian facilities and other approaches that encourage a shift from driving to more sustainable modes of travel.

The focus on VMT reduction is also leading to some rethinking of state policy on highway building. SB 1, the Road Repair and Accountability Act of 2017, generates as much as $5.4 billion annually for roadways in the state but employs a "fix-it-first" strategy that emphasizes fixing roads over expanding roads. The California State Transportation Agency's Climate Action Plan for Transportation Infrastructure (CAPTI), adopted in 2021, sets a framework for strategies and actions that "will advance more sustainable, equitable, and healthy mode of transportation, such as walking, biking, transit, and rail" (CalSTA 2021, p. 2). This framework also commits to a "fix-it-first" approach but leaves open the possibility of expansions to the existing roadway system if they are "strategic and thoughtful" (CalSTA 202, pg. 12). Across the state many freeway expansion projects are currently in the planning, design, or construction phase; most expansions in metropolitan areas take the form of "managed" lanes rather than general-purpose lanes. Even so, such projects represent increases in highway capacity that will induce additional VMT (Volker and Handy 2022). Although, under CEQA, the VMT increases must be mitigated to the extent feasible, capacity expansions work against the goal of VMT reduction, both directly through the induced travel effect and indirectly by disincentivizing changes to the built environment that improve alternatives to driving.

Other state transportation policies may also have an important influence on efforts to transform the built environment so as to reduce car dependence. The advent of autonomous vehicles (AVs) could radically change travel patterns depending on whether they are privately owned and operated, privately owned but operated on a for-hire basis, or publicly owned and operated as a new form of public transit. Through strategic policy making, the state can shape the role that AVs play within the transportation system and ensure that they support the goal of VMT reduction. Another important trend affecting VMT is the growth in on-line ordering with the deliveries they necessitate. Although on-line shopping has the potential to reduce VMT by eliminating shopping trips, it also has the potential to increase VMT depending on the efficiency of deliveries (Jaller and Pahwa 2020). Again, strategic policy making can help to ensure that on-line orders of all sorts lead to a net reduction in VMT. Depending on state and local policies, both of these technologies – AVs and on-line ordering – have the potential to contribute to VMT-reducing changes in the built environment at the local level and improve the viability of walking, biking, and transit.

In sum, the state has already put in place a comprehensive set of policies that foster built environment changes at the local level with the goal of promoting a shift toward modes other than driving. At this time, the state legislature is considering additional policies that would push change at the local level yet further and faster. Such policies may lead to substantial changes, not just in traditional communities but also in suburban and rural areas. Such changes are a necessary step towards reducing VMT. But they are also not likely to be a sufficient step. Demand-side policies such as various forms of pricing are likely to be necessary for changes to the built environment to achieve their full potential as a strategy for reducing VMT (Barbour and Sciara 2023).

## 8. Recommendations

The built environment is changing in communities throughout California in ways that can help to reduce VMT. Whether they have succeeded in doing so is difficult to determine at a local level given available data sources. Few longitudinal data sources on travel patterns are available, and those that are available have small sample sizes for all but the largest communities. Adding to the challenges of assessing the impact of built environment changes for small areas is the fact that changes to the built environment occur over time, sometimes over periods of many years. During that period, many other factors influencing travel patterns may also have changed.

To robustly assess the impact of built environment changes on VMT for small areas, data on travel patterns must be collected before the changes occur and a reasonable time after the changes occur, and it must be collected in the area affected by the changes (the "treatment" area) and the in a similar area not affected by the changes (the "control" area). This enables a "difference-in-difference" approach in which the *changes* in travel patterns in the treatment area are compared to *changes* in travel patterns in the control area. A bigger change in the treatment area than the control area supports a conclusion that the changes to the built environment within the treatment area had an effect on travel patterns.

One challenge is to define an appropriate control area. Ideally, this control area is identical to the case study area to begin with and differs over time only with respect to changes to the built environment. Although perfect "controls" are possible in a laboratory setting, they are not possible in the real world. No two communities are exactly alike. In this study, the case study areas were compared to the cities and counties where they are located. This approach accounts, to some degree, for larger-scale changes affecting residents throughout the region. But significant differences in the built environment as well as socio-demographic characteristics between the case study areas and these comparison areas at the outset of the study period mean that the comparison is not a perfect test of the effect of built environment changes. This limitation has no easy or ready fix.

Another significant challenge is to collect data over time with samples of sufficient size to support statistical analysis. The data analyzed in this study come from household surveys, in which a sample of households provide information about their daily travel as well as their socio-demographic characteristics. Such surveys provide rich information about travel but are expensive to implement, particularly given the increasingly difficult problem of recruiting households to participate. Given the expense, such surveys are rarely conducted by cities. Regional and national surveys are conducted with some regularity but while the sample sizes are ample for large area analysis, they are too small for small area analysis.

A promising alternative is travel data extracted from smartphone movements. Several private companies collect and process such data, making it available for a price to public agencies as well as researchers. These datasets include an unprecedented level of detail about trip making for a given area, though no information about the travelers themselves. Although the data come from a sample of travelers, the sample is large enough that VMT can be estimated at a good level of accuracy for relatively small areas. Or so it seems. An important caveat on the use of these data sources is that companies provide little insight into their methods for extrapolating from their sample to the population. Methods for determining modes of travel are also mysterious, and estimates of walking and bicycling trips may have a high level of uncertainty.

The other limitation of these datasets is that they are available for a relatively short period of time, i.e., starting around 2018. For the purposes of the case studies presented here, which examined changes in the built environment that occurred between 2000 and 2019, smartphone-based data are not an option. But such datasets can be a valuable tool for assessing the impact of changes to the built environment in the years to come. Given the vast scale of these datasets, some strategic thinking about the specific places and points of time of interest for which data will be retained will be important. Places where significant changes to the built environment are being planned would be a good starting point.

The goal of the case studies presented here was to assess the impact on travel patterns of a set of changes to the built environment within a small area. The kinds of changes identified in these case studies – infill housing, mixed-use development, street improvements, bicycle facilities, etc. – often occur together within a small area over a limited period of time. That makes it difficult to separate the effects of any specific changes from the overall effects of the set of changes, and indeed the overall effects may reflect synergies among the different built environment changes. Studies of changes in VMT for the area will reflect the combined effect of all changes to the built environment that occurred.

That said, it is important to also evaluate the effects of specific projects whenever possible. Such studies should also use a difference-in-difference approach, with before-and-after data collection. But defining the treatment and control groups can be challenging. For projects like a new bicycle facility, different methods are possible but they answer different questions. A place-based approach counts bicyclists on the route with the new facility as well as a parallel route and answers the question of whether bicycle activity increased. A person-based approach surveys residents in the vicinity of the new facility and in a similar area some distance from the facility and answers the question of whether the new facility increased the number of people bicycling. For each type of project, care must be taken to choose the most appropriate method to answer the question of interest.

In sum, our recommendations for evaluating the effect of changes in the built environment on VMT and other aspects of travel are to:

> **Develop a plan for preserving smartphone-based data at several points over time for a selection of small areas where significant changes to the built environment are planned.** The three case studies presented here will be interesting to track in future years as the policies adopted from 2000 continue to have an impact on private development and public investments in those areas. Case studies of suburban communities adopting aggressive policies around VMT-reduction will also be important to understand the effectiveness of the SB 375 approach. CARB-funded research currently underway to develop a system for monitoring land-use change statewide and to assess the potential of smartphone-based datasets for tracking VMT could enable a large-scale statistical analysis of the impacts of land use changes on travel patterns over time at the state-wide level.
>
> **Encourage or require before-and-after evaluations using of specific projects, particularly those funded by the state, using methods appropriate to that type of project.** The state is investing millions of dollars in improvements to transit service and active travel infrastructure but does not currently require evaluations of the effectiveness of these projects in reducing VMT. Although sophisticated evaluation studies are expensive and require a level of expertise not always found in city and county agencies, the state can provide guidance on relatively simple methods that can produce a reasonably accurate assessment of changes in travel patterns associated with these projects. For private

development projects, forecasts of changes in VMT are now required as a part of the environmental review under CEQA (with exceptions for projects located in low-VMT areas), but after-the-fact assessments of the accuracy of those forecasts are not currently required. For housing projects, surveys of residents before and after they move into the project are an effective way to assess changes in VMT for those most directly affected. For most types of projects, traffic counts in the vicinity of the project will not be an effective way to assess changes in VMT.

Under SB375, California is undergoing a grand experiment to transform the built environment with the goal of reducing VMT. Fully assessing the success of that experiment requires many different kinds of data and analyses. The case studies presented here provide a holistic and largely qualitative assessment of the degree to which policies have changed the built environment in targeted areas and the degree to which these changes to the built environment have been associated with reductions in VMT and other favorable changes in travel patterns. Although the results of the case studies are not definitive, given significant limitations in the longitudinal data available to estimate changes in travel behavior, they are promising: the available evidence suggests that VMT declined and multimodality increased in these areas. Improving data collection efforts now, as per the above recommendations, will ensure that California's grand experiment can be more rigorously evaluated as it plays out over the coming years.

## References

### General References


Agrawal, A., Lee, K., & Alexander, S. (2021). How Do California's Local Governments Fund Surface Transportation? A Guide to Revenue Sources. San Jose State Mineta Transportation Institute. Available: https://transweb.sjsu.edu/sites/default/files/1938A-Agrawal-California-Local-Transportation-Funding.pdf

Barbour, E., Jin, J., Goldsmith, E., Grover, S., Martinez, J., & Handy, S. (2021). Tensions and Trade-offs in Planning and Policymaking for Transit-Oriented Development, Transit, and Active Transport in California Cities. UC Davis: National Center for Sustainable Transportation. http://dx.doi.org/10.7922/G2RV0M06 . Available: https://escholarship.org/uc/item/49t729rc

Barbour, E., and Sciara, G. C. (2023). Chapter 18. Reducing motor vehicle GHG emissions via land-use and transport integration: Realistic expectations and essential strategies. In de Abreu e Silva, et al. (eds). *Handbook on Transport and Land Use: A Holistic Approach in an Age of Rapid Technological Change*. Edward Elgar.

BART (n.d.) AB 2923 implementation. Available: https://www.bart.gov/about/business/tod/ab2923

California Air Resources Board (CARB). (2018 and 2022). *2018 progress report: California's Sustainable Communities and Climate Protection Act*. And *2022 progress report: California's Sustainable Communities and Climate Protection Act*. Available: https://ww2.arb.ca.gov/resources/documents/tracking-progress .

California Legislature (2021a). Assembly Bill No. 773 - Street closures and designations. October 6. Retrieved November 23, 2021. Available: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220AB773

California Legislature (2021b). Assembly Bill No. 43 - Traffic Safety. October 8. Retrieved November 23, 2021. Available: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220AB43

California State Transportation Agency (CalSTA). (2021). *Climate Action Plan for Transportation Infrastructure*. Available: https://calsta.ca.gov/-/media/calsta-media/documents/capti-july-2021-a11y.pdf

California Transportation Commission. (2023). Active Transportation Program (ATP). Available: https://catc.ca.gov/programs/active-transportation-program

Fulton, B., Garcia, D., Metcalf, B., Reid, C., & Braslaw, T. (2023). New Pathways to Encourage Housing Production: A Review of California's Recent Housing Legislation. Terner Center for Housing Innovation, University of California, Berkeley.

Handy, S., Cao, X., & Mokhtarian, P. (2005). Correlation or causality between the built environment and travel behavior? Evidence from Northern California. *Transportation Research Part D: Transport and Environment*, *10*(6), 427-444.

Jaller, M., and Pahwa, A. (2020). Evaluating the environmental impacts of online shopping: A behavioral and transportation approach. *Transportation Research Part D: Transport and Environment, 80*, 102223. Available: https://www.sciencedirect.com/science/article/pii/S1361920919302639?via%3Dihub

Metropolitan Transportation Commission (MTC). (2022). *MTC Resolution No. 4530*. Available: https://mtc.ca.gov/sites/default/files/documents/2022-10/MTC_Resolution_4530.pdf

Monsere, C., Dill, J., McNeil, N., Clifton, K. J., Foster, N., Goddard, T., ... & Parks, J. (2014). Lessons from the Green Lanes: Evaluating protected bike lanes in the US. NITC-RR-583. Ortland, OR: Transportation Research and Education Center (TREC), http://dx.doi.org/10.15760/trec.115

Pike, S., & Handy, S. (2021). Modal Shifts in California from 2012-2017: Investigating Changes in Biking, Walking, and Transit from the 2012 CHTS and 2017 NHTS. UC Davis: National Center for Sustainable Transportation. Available: https://escholarship.org/content/qt8s35092p/qt8s35092p.pdf

Sciara, G. C., & Lee, A. E. (2018). Allocating Transportation Revenues to Support Climate Policies in California and Beyond. *California Journal of Politics and Policy*, *10*(1).

Seamless Bay Area. (n.d.). Seamless Bay Area. Available: https://www.seamlessbayarea.org/ .

Smart Growth America. (n.d.) Complete streets. Available: https://smartgrowthamerica.org/what-are-complete-streets/

Spears, S., Boarnet, M. G., & Houston, D. (2017). Driving reduction after the introduction of light rail transit: Evidence from an experimental-control group evaluation of the Los Angeles Expo Line. *Urban Studies*, *54*(12), 2780-2799.

Stevens, M. R. (2017). Does compact development make people drive less?. *Journal of the American Planning Association*, *83*(1), 7-18.

Volker, J. & Handy, S. (2022). Updating the Induced Travel Calculator. Institute of Transportation Studies, University of California, Davis, Research Report UCD-ITS-RR-22-86. Available: https://doi.org/10.7922/G2P55KTX

**Sacramento References**

Apartments.com. (2023). Ice House Midtown Apartments - 1710 R St Sacramento, CA. Available: https://www.apartments.com/ice-house-midtown-sacramento-ca/bhlwwm9/

Bizjak, T. (2012). "JMA Ventures takes reins at Downtown Plaza," *The Sacramento Bee*, August 15. Available: https://web.archive.org/web/20120819014742/http://www.sacbee.com/2012/08/15/4726598/jma-ventures-takes-reins-at-downtown.html

CADA. (n.d.). Completed projects archive. Available: https://www.cadanet.org/project-archive/completed/page/4

CADA. (n.d. 2). Fast Facts. Available: https://www.cadanet.org/resources-agendas/fast-facts

CADA. (n.d. 3). Completed Projects. Retrieved July 6, 2023, from https://www.cadanet.org/project-archive/completed

CADA. (2011). The CADA Story. Available: http://www.cadanet.org/wp-content/uploads/2011/06/onlineVersion.pdf

CADA. (2021). The Warehouse Artist Lofts (WAL). Available: https://www.cadanet.org/projects/thewal

City of Sacramento. (2009). *Sacramento 2030 General Plan*. Available: http://www.cityofsacramento.org/Community-Development/Planning/Long-Range/General-Plan/2030-General-Plan

City of Sacramento. (2011). *I-5 Riverfront Reconnection Project Initial Study/Mitigated Negative Declaration*. Available: https://www.cityofsacramento.org/~/media/Corporate/Files/CDD/Planning/Environmental%20Impact%20Reports/I-5%20Riverfront%20Reconnection%20MND%20with%20Errata.pdf

City of Sacramento. (2012). *Zoning Code Parking Update: Final Report*. Available: https://www.cityofsacramento.org/~/media/Corporate/Files/CDD/Planning/Zoning/Council_Report_1031121.pdf

City of Sacramento. (2013). *City Council Report*. Available: https://www.cityofsacramento.org/-/media/Corporate/Files/Public-Works/Forms/Parking/Parklets/Council-Agenda-10222013-Report201300759-Item-15Proposed-Parking2Parklets-Bike-Corrals-and-Bike-Sharing-Programs.pdf?la=en

City of Sacramento. (2015a). *Sacramento 2035 General Plan*. Available: http://www.cityofsacramento.org/Community-Development/Resources/Online-Library/2035--General-Plan

City of Sacramento. (2015b). *Central City Community Plan*. Available: https://www.cityofsacramento.org/-/media/Corporate/Files/CDD/Planning/Long-Range/Community-Plans/Central-City-CP.pdf?la=en

City of Sacramento. (2016a). *Sacramento Grid 3.0*. Available: http://www.cityofsacramento.org/-/media/Corporate/Files/Public-Works/Transportation/Sac-Grid/Grid30FinalReport080816.pdf?la=en

City of Sacramento. (2016b). *City of Sacramento Bicycle Master Plan*. Available: http://www.cityofsacramento.org/-/media/corporate/files/public-works/transportation/bicycle-master-plan/sacramento-2016-bicycle-master-plan.pdf

City of Sacramento. (2016c). *Transportation Management Plan for the Golden 1 Center*. Available: https://www.cityofsacramento.org/-/media/Corporate/Files/Arena/G1C-TMP.pdf?la=en

City of Sacramento. (2017a). *Sacramento Places: Smart Growth Projects in Sacramento*. Available: https://www.cityofsacramento.org/-/media/Corporate/Files/GIS/Sac-Places.pdf

City of Sacramento. (2017b). *Golden 1 Center Year One Travel Monitoring Report*. Available: https://www.cityofsacramento.org/-/media/Corporate/Files/Arena/YearOneTravelReport.pdf?la=en

City of Sacramento. (2018a). *Central City Specific Plan*. Available: https://www.cityofsacramento.org/-/media/Corporate/Files/CDD/Planning/Major-Projects/Central-City-Specific-Plan/CCSP-April2018-spread-layout.pdf?la=en

City of Sacramento. (2018b). *Vision Zero Sacramento Action Plan*. Available: https://www.cityofsacramento.org/-/media/Corporate/Files/Public-Works/Transportation/VisionZero/Vision-Zero-Action-Plan-Adopted-August-2018.pdf?la=en

City of Sacramento. (2019). *R Street Historic District Plan*. Available: https://www.cityofsacramento.org/-/media/Corporate/Files/CDD/Planning/Urban-Design/Preservation/Adopted-Historic-District-Plans/R-Street-HDP.pdf?la=en

City of Sacramento. (2020). Bicycling Program. City of Sacramento. Available: https://www.cityofsacramento.org/Public-Works/Transportation/Programs-and-Services/Bicycling-Program

City of Sacramento. (2022). Car share program. Available: https://www.cityofsacramento.org/Public-Works/Transportation/Programs-and-Services/Car-Share

City of Sacramento. (2023a). *Sacramento, California City Code*. Chapter 17.444 Central City Special Planning District. Available: https://library.qcode.us/lib/sacramento_ca/pub/city_code/item/title_17-division_iv-chapter_17_444?view=all

City of Sacramento. (2023b). Traffic counts - City of Sacramento. Available: https://www.cityofsacramento.org/Public-Works/Transportation/Traffic-Data-Maps/Traffic-Counts

City of Sacramento. (n.d.1). Bike Master Plan Facilities. ArcGIS web application. Available: https://saccity.maps.arcgis.com/apps/webappviewer/index.html?id=eef65d0ab1e04f8e997726d1a8c84ced

City of Sacramento. (n.d. 2). Central City Mobility Project. Available: http://www.cityofsacramento.org/Public-Works/Engineering-Services/Projects/Current-Projects/Downtown-Mobility-Project

City of Sacramento. (n.d.3). R street streetscape improvement project. Available: https://www.cityofsacramento.org/Public-Works/Engineering-Services/Projects/Completed-Projects/R-Street-Streetscape

City of Sacramento. (n.d. 4). *Zoning Code Parking Regulations Summary Sheet.* Available: https://www.cityofsacramento.org/~/media/Corporate/Files/CDD/Planning/Zoning/SummarySheetforNewZoningRequirementsforParking1.pdf

CYS Structural Engineers, Inc. (n.d.). R Street Market. Available: https://www.cyseng.com/project-spotlight/commercialretail/r-street-market/

David Baker Architects. (2023). La Valentina Station. La Valentina Station | David Baker Architects. Available: https://www.dbarchitect.com/projects/la-valentina-station

D and S Development. (2023). About: M&B Remodeling. Available: https://www.dandsdev.com/about

DOCO. (2023). DOCO. Available: https://www.docosacramento.com/directory/#Sports-and-Fitness

Downtown Sac. (2015). Neighborhoods. March 13. Available: https://www.godowntownsac.com/live-downtown/neighborhoods/

Downtown Sacramento Partnership. (2015). *Quarter 1 pedestrian counts 2015*. Available: https://www.downtownsac.org/about/reports/pedestrian-counts/attachment/dsp-feb-15-ped-survey-copy/

Downtown Sacramento Partnership. (2021). Emerging projects. Available: https://www.downtownsac.org/developments/emerging-projects/?download&search&status&type=office#038;search&status&type=office

Downtown Sacramento Partnership. (2022). Pedestrian counts. Available: https://www.downtownsac.org/about/reports/pedestrian-counts/

Fitch, D., Mohiuddin, H., & Handy, S. (2020). Investigating the influence of dockless electric bike-share on travel behavior, attitudes, health, and equity. Report No. UC-ITS-2019-03, Institute of Transportation Studies, University of California, Davis. Available: https://escholarship.org/content/qt2x53m37z/qt2x53m37z.pdf

Fukushige, T., Fitch, D. T., & Handy, S. (2021). Factors influencing dock-less E-bike-share mode substitution: Evidence from Sacramento, California. *Transportation Research Part D: Transport and Environment*, *99*, 102990.

Good Day Sacramento. (2019). “Jump bikes doubling their fleet in Sacramento,” CBS News, June 18. Available: https://www.cbsnews.com/gooddaysacramento/news/jump-bikes-doubling-their-fleet-in-sacramento/

Golden 1 Center. (n.d. 1). Kane Brown. Available: https://www.golden1center.com/events/detail/kane-brown

Golden 1 Center. (n.d. 2). Harry Styles: Love on tour 2021. Golden 1 Center. Available: https://www.golden1center.com/events/detail/harry-styles-2021

Grimes, K. (2013). Steinberg seeks CEQA changes to boost Sacto Arena. CalWatchdog.com. August. Available: https://calwatchdog.com/2013/08/20/steinberg-seeks-ceqa-changes-to-boost-sacto-arena/

Hall, P. (2015). “Sacramento plans 10,000 housing units in 10 years,” *National Mortgage Professional*, August 26. Available: https://nationalmortgageprofessional.com/news/55506/sacramento-plans-10000-housing-units-10-years

Kaiser Permanente. (2021). Downtown Commons Medical Offices. Available: https://healthy.kaiserpermanente.org/northern-california/facilities/downtown-commons-medical-offices-335081

Kasler, D. (2020). “Coronavirus shuts Sacramento CA jump bike, scooter service,” *The Sacramento Bee*, March 18. Available: https://www.sacbee.com/news/business/article241326756.html

Kasler, D., & Lillis, R. (2014). “City wins possession of old Macy’s building for new Kings arena,” *The Sacramento Bee*, March 20.

KCRA. (2019). “100 electric scooters arrive in Sacramento, West Sacramento,” KCRA, February 8. Available: https://www.kcra.com/article/first-electric-scooters-coming-to-sacramento-today/26253575

KCRA. (2017). “Under construction: New projects, retailers to join Downtown Sacramento ZIP code,” KCRA, October 8. Available: https://www.kcra.com/article/under-construction-new-projects-retailers-to-join-downtown-sacramento-zip-code/7162867#

Midtown Association. (2023). About the Midtown Association. Available: https://exploremidtown.org/about-the-midtown-association/

Newcomer, E. (2019). Uber lays out its plan for long-term self-disruption, Bloomberg.com, February 7. Available: https://www.bloomberg.com/news/articles/2019-02-07/uber-lays-out-its-plan-for-long-term-self-disruption?leadSource=uverify+wall

Ruppenstein, A. (2023). R street bridge. Historical Marker. Available: https://www.hmdb.org/m.asp?m=90220

Sacasingh. (2015). Sacramento Kings and JMA Ventures, LLC announce Downtown Commons, initial tenants. NBA.com, September 16. Available: https://www.nba.com/kings/news/09162015-release

Sacramento Area Council of Governments. (2004). *2004 Sacramento Region Blueprint.* Available: https://www.sacog.org/2004-sacramento-regional-blueprint

Sacramento Area Council of Governments. (2018). Approve JUMP Bike Share Contract Amendment. SACOG Transportation Committee. Available: https://www.sacog.org/sites/main/files/file-attachments/6-jump_bike_share_contract.pdf?1522454002

Sacramento Area Council of Governments. (2019). Electric scooters have arrived. Available: https://www.sacog.org/news/electric-scooters-have-arrived

Sacramento Regional Transit. (2017). Project R336.08.02: 16th Street Station Enhancements. Available: https://www.sacrt.com/aboutrt/documents/2017-08-22%20R336.08.02%20Project%20Summary.pdf

Sacramento Regional Transit District. (2021a). History of the Green Line to the Airport Project. Sacramento Regional Transit District. Available: https://www.sacrt.com/apps/history-of-the-green-line-to-the-airport-project/

Sacramento Regional Transit District. (2021b). New System Map. Available: http://www.sacrt.com/systemmap/

Sacramento Regional Transit District. (2019a). SacRT Forward Draft Network Approved. Available: https://www.sacrt.com/apps/sacrtforward/

Sacramento Regional Transit District. (2019b). SacRT's New Bus Network Launches September 8, 2019. Available: https://www.sacrt.com/apps/sacrt-forward-draft-networks/

Sacramento Regional Transit District. (2022). SacRT History. Available: http://www.sacrt.com/aboutrt/RTHistory.aspx

Steinberg, D. (2013). Bill Text - SB-731 Environment: California Environmental Quality Act. Available: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201320140SB731

Walker, J. (2018, April). *SacRT Forward Network Plan: Transit Choices Report*. Sacramento Regional Transit District. Retrieved February 2023, from http://www.sacrt.com/apps/wp-content/uploads/SacRT-Transit-Choices-Report-small-file.pdf

Wang, F. (2018). "Late developer's low, middle-income housing project approved by Sacramento City Council," ABC10.com, October 11. Available: https://www.abc10.com/article/news/local/sacramento/late-developers-low-middle-income-housing-project-approved-by-sacramento-city-council/103-603193935

### Fresno References

ABC30 Fresno. (2017). "Take a look back at the history of Fulton Street," ABC30 Fresno, October 15. Available: https://abc30.com/fulton-mall-street-transformation-fresno/2524729/

Amos, D. (2020). Understanding the legacy of pedestrian malls. *Journal of the American Planning Association*, *86*(1), 11-24.

Benjamin, M. (2016). "Fulton Mall groundbreaking raises hopes of revitalizing downtown Fresno," The Fresno Bee, February 28, p. 1A. Available from NewsBank: Access World News – Historical and Current: https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/15B547EA0F9BFCA8.

City of Fresno. (2002). *2001 Transit Long Range Master Plan*. Available: https://www.fresno.gov/transportation/wp-content/uploads/sites/13/2016/10/Long-Range-Plan-Final-Report.pdf

City of Fresno. (2008). *Bus Rapid Transit Master Plan*.

City of Fresno. (2009). *Fresno Green Handbook*. Available: https://www.fresno.gov/darm/wp-content/uploads/sites/10/2016/10/GreenFresnoHandbook.pdf

City of Fresno. (2013). Fresno General Plan Implementation & Infill Development Task *Force*. Available: https://www.fresno.gov/mayor/fresno-general-plan-implementation-infill-development-task-force/

City of Fresno. (2016a). *Fulton Corridor Specific Plan*. Available: https://cityoffresno.wpenginepowered.com/darm/wp-content/uploads/sites/10/2016/11/161020FCSPFinallowres1.pdf

City of Fresno. (2016b). *Downtown Neighborhoods Community Plan*. Available: https://www.fresno.gov/darm/wp-content/uploads/sites/10/2016/11/The-Downtown-Neighborhoods-Community-Plan.pdf

City of Fresno. (2016c). *Downtown Development Code*. Available: https://library.municode.com/ca/fresno/codes/code_of_ordinances?nodeId=MUCOFR_CH15CIDECOINRE

Fagerstrom Engineering. (2018). Chukchansi Park. Available: https://fagerstrom.engineering/?dt_portfolio=chukchansi-park-fire-emergency-evacuation-system-2

Fresno Department of Transportation. (n.d.). Q is Bus Rapid Transit. Available: https://www.fresno.gov/transportation/fax/fax-q/

Fresno Housing. (2023). Properties. Available: https://fresnohousing.org/residents/property-map/

Granville Reality. (2023). Welcome home. Available: https://rentgranville.com/

McEwen, B. (2016). “Fulton Mall plan will make history.” *The Fresno Bee*, March 3, p. 3A. Available from NewsBank: Access World News – Historical and Current: https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/15B63FB9F4B266F8

Milb.com. (2021). Fresno Grizzlies and Chukchansi Economic Development Authority announce 10-year naming agreement for Chukchansi Park. Available: https://www.milb.com/fresno/press-release/fresno-grizzlies-and-chukchansi-economic-development-authority-announce-10-year-

Sheehan, T. (2018). “Fresno's Fulton Street sits, waits for revival,” The Fresno Bee, April 29, p. 1A. Available from NewsBank: Access World News – Historical and Current: https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/16B9F6CE72F5B338.

The Business Journal Staff. (2020). Fresno Bus Rapid Transit ridership on the rise. Available: https://thebusinessjournal.com/fresno-bus-rapid-transit-ridership-on-the-rise/

Tokmakian, H., & McKnight, H. R. (2013). Eckbo’s Fulton Mall: The Case for Preservation. *Journal of the California Garden & Landscape History Society*, *16*(3), 1–6.

Wyoming History Day. (2023). *Victor Gruen papers, Collection No. 5809, Box 57, American Heritage Center, University of Wyoming*. Fulton Mall in Fresno, California, ca. 1966 | Wyoming History Day. Retrieved February 2023, from https://wyominghistoryday.org/index.php/theme-topics/collections/items/fulton-mall-fresno-california-ca-1966

**Santa Monica References**


Atkins. (2012). Colorado Avenue Esplanade Initial Study/Mitigated Negative Declaration. 30 June 2012. Available: https://www.smgov.net/uploadedFiles/Departments/PCD/Environmental-Reports/Colorado-Esplanade-Final-MND.pdf

City of Santa Monica. (1996). *Bayside District Specific Plan*. Adopted 23 January.

City of Santa Monica. (2005). *Sustainable City Report Card. First Annual*. September 20, 2005. Available: https://www.smgov.net/uploadedFiles/Departments/OSE/Categories/Sustainability/SCRC_ReportCard_2005.pdf

City of Santa Monica. (2006). *Sustainable City Report Card*. *Second Annual.* September 22, 2006. Available: https://www.smgov.net/uploadedFiles/Departments/OSE/Categories/Sustainability/SCRC_ReportCard_2006.pdf

City of Santa Monica. (2007). *Sustainable City Report Card*. *Third Annual*. September 20, 2007. Available: https://www.smgov.net/uploadedFiles/Departments/OSE/Categories/Sustainability/SCRC_ReportCard_2007.pdf

City of Santa Monica. (2008). *Sustainable City Report Card. Fourth Annual*. September 18, 2008. Available: https://www.smgov.net/uploadedFiles/Departments/OSE/Categories/Sustainability/SCRC_ReportCard_2008.pdf

City of Santa Monica. (2010). *Sustainable City Report Card*. September 21, 2010. Available: https://www.smgov.net/uploadedFiles/Departments/OSE/Categories/Sustainability/Sustainable_City_Report_Card_2010.pdf

City of Santa Monica. (2011). *Bicycle Action Plan*.

City of Santa Monica. (2012). 2012 *Sustainable City Report Card*. Available: https://www.smgov.net/uploadedFiles/Departments/OSE/Categories/Sustainability/Sustainable_City_Report_Card_2012.pdf

City of Santa Monica (2013). Council Staff Report, Colorado Esplanade Final Design and CCSP Amendment, Agenda Item 8-A, May 14. Available: https://www.smgov.net/departments/council/agendas/2013/20130514/s2013051408-A.htm

City of Santa Monica. (2014). *Sustainable City Plan*. Available: https://www.smgov.net/uploadedFiles/Departments/OSE/Categories/Sustainability/Sustainable-City-Plan.pdf

City of Santa Monica. (2016). *Pedestrian Action Plan*. Available: https://www.smgov.net/uploadedFiles/Departments/PCD/Plans/Pedestrian-Action-Plan/PAP%20Final%208-10-16%20optimized.pdf

City of Santa Monica. (2017a). *Snapshot of Santa Monica's Largest Employers.* Available: https://www.santamonica.gov/blog/snapshot-of-santa-monica-s-largest-employers-and-top-industries

City of Santa Monica. (2017b). Land Use and Circulation Element. Updated July 25. Available: https://santamonica.gov/media/Document%20Library/Topic%20Explainers/Planning%20Resources/Revised%20LUCE%20May%202023%20(6th%20Housing%20Element).pdf

City of Santa Monica. (2017c). *Downtown Community Plan: A City of Santa Monica Specific Plan.* Available: https://santamonica.gov/media/Document%20Library/Topic%20Explainers/Planning%20Resources/FINAL%20DCP_2023%20(6th%20Cycle%20HE).pdf

City of Santa Monica. (2018). Council Staff Report 2622: Mobility Strategic Goal Update and Discussion, February 27. Available: http://santamonicacityca.iqm2.com/Citizens/Detail_LegiFile.aspx?Frame=&MeetingID=1135&MediaPosition=&ID=2622&CssClass=

City of Santa Monica. (2019). *Shared Mobility Pilot Program Summary Report 2019*. Available: https://www.smgov.net/uploadedFiles/Departments/PCD/Transportation/SantaMonicaSharedMobilityEvaluation_Final_110419.pdf

City of Santa Monica. (2020a). *T10 PED volumes: Santa Monica Sustainable City*. https://data.sustainablesm.org/dataset/T10-Ped-Volumes/k2v7-vm6u

City of Santa Monica. (2020b). *T10 Bike volumes: Santa Monica Sustainable City*. https://data.sustainablesm.org/dataset/T10-Bike-Volumes/ceu7-cfp5

City of Santa Monica. (2021). *Greenhouse Gas Emissions Inventory Update 2019 & 2020*. https://www.smgov.net/uploadedFiles/Departments/OSE/Climate/Community%20GHG%20Inventory%20Report%202020%20v3.pdf

City of Santa Monica. (2022a). "Plans & Projects: Approved Projects". Available: https://www.smgov.net/departments/pcd/plans-projects/

City of Santa Monica. (2022b). "Annenberg Community Beach House. The Beach House Story." Available: https://www.annenbergbeachhouse.com/about/the-beach-house-story.aspx

City of Santa Monica. (2022c). Santa Monica Bicycle Map. Available: https://www.santamonica.gov/media/Mobility/Bike%20Map/21-0090_SMC_Bike%20Map_v4_existing.pdf

City of Santa Monica. (2022d). Big Blue Bus Ridership. City of Santa Monica Data. Available: https://data.sustainablesm.org/stories/s/Big-Blue-Bus-Ridership/gfg5-2e6t

City of Santa Monica. (2022e). VMT_GHG_Inventory: Santa Monica Sustainable City. https://data.sustainablesm.org/dataset/VMT_GHG_Inventory/v596-x4m7

City of Santa Monica. (n.d.) About Us. Available: https://www.santamonica.gov/about

Dickey, Megan. (2018). "The electric scooter wars of 2018". *TechCrunch*. 23 December 2018. Available: https://techcrunch.com/2018/12/23/the-electric-scooter-wars-of-2018

Hall, Matthew. (2017). "Santa Monica City Council Approves Downtown Community Plan," *Santa Monica Daily Press*, July 26. Available: https://smdp.com/2017/07/26/santa-monica-city-council-approves-downtown-community-plan/

Hall, Matthew. 2020. "Breeze bikeshare to end in November," *Santa Monica Daily Press*, August 15. Available: https://smdp.com/2020/08/15/breeze-bikeshare-to-end-in-november/

Islas, Jason. (2013). “Two Years Later, Santa Monica Bike Center is ‘Huge Success,’” *Santa Monica Lookout*. Available: https://thebikecenter.com/two-years-later-santa-monica-bike-center-is-huge-success

Islas, Jason. 2015a. "What Can You Get to Riding the Breeze," Streetsblog LA. November 16. Available: https://la.streetsblog.org/2015/11/16/what-can-you-get-to-riding-the-breeze

Islas, Jason. 2015b. "Breeze Bike Share Still Booming a Month After Opening," Santa Monica Next. December 17. Available: https://www.santamonicanext.org/2015/12/breeze-bike-share-still-booming-a-month-after-opening/

Kligier, Jason. 2020. Severe Injury Collision Reductions on Ocean Park Boulevard. City of Santa Monica, January 6. Available: https://www.santamonica.gov/blog/71-decrease-in-severe-injury-collisions-on-ocean-park-boulevard

Koning Eizenberg Architecture. (2011). *Pico Branch Project*. Available: smpl.org/uploadedFiles/Library/Pico_Branch_Project/WORKSHOP-5.pdf

LA Metro. (2013). *Expo Light Rail Line*. Available: https://web.archive.org/web/20130708125744/http://www.buildexpo.org/wp-content/uploads/2013/02/Expo-One-Sheet-January-2013.pdf

LA Metro. 2022. Maps & Schedules: E Line. Available: https://www.metro.net/riding/schedules/?line=804

LA Metro. (2023). Interactive Estimated Ridership Stats. Metro Ridership. Available: http://opa.metro.net/MetroRidership/

Linton, Joe. 2015. "Bike-Share Has Arrived: Santa Monica Breeze Opens!" Streetsblog LA, November 12. Available: https://la.streetsblog.org/2015/11/12/bike-share-has-arrived-santa-monica-breeze-opens

*Los Angeles Times*. (2016). “Live updates: Metro Expo Line to Santa Monica opens,” May 20. Available: https://www.latimes.com/local/lanow/la-me-ln-expo-line-opens-santa-monica-20160519-htmlstory.html

PWP Landscape Architecture. (2013). Colorado Esplanade – Council Information Package. May 14.

*Santa Monica Mirror*. 2017. "Two Years of Breeze Bike Share with 1.3 Million Miles Covered," November 8. Available: https://smmirror.com/2017/11/two-years-breeze-bike-share-1-3-million-miles-covered/

Santa Monica Public Library. (2015). Pico Branch Project. Available: https://smpl.org/picobranchproject.aspx

Santa Monica Travel & Tourism. (n.d.) Available: https://www.santamonica.com/about

Seplow, Danny. (2022). “Long Range Transportation Plans: A Historical Guide to Los Angeles LRTPs,” March 24, LA Metro Dorothy Peyton Gray Transportation Library and Archive. Available: https://metroprimaryresources.info/long-range-transportation-plans-a-historical-guide-to-los-angeles-lrtps/15331

Stephens, Josh. (2010). “Santa Monica General Plan Anticipates SB 375,” *California Planning & Development Report*, September 13. Available: https://www.cp-dr.com/articles/node-2773

Streetsblog LA. (2016). “Community Organizing Wins the Day: Skills and Enthusiasm of Many to Build Expo for All,” May 4. Available: https://la.streetsblog.org/2016/05/04/community-organizing-wins-the-day-skills-and-enthusiasm-of-many-to-build-expo-for-all

The Bike Center. 2022. The Bike Center. Available: https://thebikecenter.com

## Appendices

**Table A-1. Traffic Analysis Zones for 2000 Sacramento Household Travel Survey**

| Area | TAZ IDs |
|---|---|
| Study area | 763-778, 784-812, 1075, 1077 |
| City of Sacramento | 40-41, 43, 49-50, 60-63, 73, 226-268, 270-280, 284, 287-288, 299-300, 303, 310-313, 329-331, 334-335, 338-344, 349, 367, 376, 378-381, 384-385, 466-498, 500, 503, 505-508, 511-527, 589, 592, 610, 618, 631-632, 655-704, 715-720, 727-728, 748-753, 763-812, 876-879, 885, 893-897, 904, 914-917, 919-928, 1042, 1062-1077, 1104-1106, 1109-1110, 1131-1132, 1134, 1140, 1159, 1161-1162, 1167, 1170-1182, 1201, 1206-1207, 1210, 1234, 1237, 1316-1324, 1399-1401, 1403, 1433, 1518, 1527-1528, 1531 |
| Sacramento County | 226-812, 832-834, 863, 876-928, 959, 1041-1043, 1062-1077, 1104-1136, 1138, 1140, 1145-1146, 1154-1156, 1159-1163, 1171-1172, 1174-1182, 1184-1238, 1316-1324, 1399-1414, 1429-1430, 1433, 1473, 1491-1497, 1508-1509, 1512-1513, 1516-1525, 1527-1528, 1531-1533 |

**Table A-2. Traffic Analysis Zones for 2018 Sacramento Household Travel Survey**

| Area | TAZ IDs |
|---|---|
| Study area | 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 1075, 1077 |
| City of Sacramento | 40, 41, 43, 49, 50, 60, 61, 62, 63, 73, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 284, 287, 288, 299, 300, 303, 310, 311, 312, 313, 329, 330, 331, 334, 335, 338, 339, 340, 341, 342, 343, 344, 349, 367, 376, 378, 379, 380, 381, 384, 385, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 500, 503, 505, 506, 507, 508, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 589, 592, 610, 618, 631, 632, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, |

| Area | TAZ IDs |
|---|---|
| | 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 715, 716, 717, 718, 719, 720, 727, 728, 748, 749, 750, 751, 752, 753, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 876, 877, 878, 879, 885, 893, 894, 895, 896, 897, 904, 914, 915, 916, 917, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 1042, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1104, 1105, 1106, 1109, 1110, 1131, 1132, 1134, 1140, 1159, 1161, 1162, 1167, 1170, 1171, 1172, 1173, 1174, 1175, 1176, 1177, 1178, 1179, 1180, 1181, 1182, 1201, 1206, 1207, 1210, 1234, 1237, 1316, 1317, 1318, 1319, 1320, 1321, 1322, 1323, 1324, 1399, 1400, 1401, 1403, 1433, 1518, 1527, 1528, 1531 |
| Sacramento County | 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, |

| Area | TAZ IDs |
| --- | --- |
| | 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 832, 833, 834, 863, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 959, 1041, 1042, 1043, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1138, 1140, 1145, 1146, 1154, 1155, 1156, 1159, 1160, 1161, 1162, 1163, 1171, 1172, 1174, 1175, 1176, 1177, 1178, 1179, 1180, 1181, 1182, 1184, 1185, 1186, 1187, 1188, 1189, 1190, 1191, 1192, 1193, 1194, 1195, 1196, 1197, 1198, 1199, 1200, 1201, 1202, 1203, 1204, 1205, 1206, 1207, 1208, 1209, 1210, 1211, 1212, 1213, 1214, 1215, 1216, 1217, 1218, 1219, 1220, 1221, 1222, 1223, 1224, 1225, 1226, 1227, 1228, 1229, 1230, 1231, 1232, 1233, 1234, 1235, 1236, 1237, 1238, 1316, 1317, 1318, 1319, 1320, 1321, 1322, 1323, 1324, 1399, 1400, 1401, 1402, 1403, 1404, 1405, 1406, 1407, 1408, 1409, 1410, 1411, 1412, 1413, 1414, 1429, 1430, 1433, 1473, 1491, 1492, 1493, 1494, 1495, 1496, 1497, 1508, 1509, 1512, 1513, 1516, 1517, 1518, 1519, 1520, 1521, 1522, 1523, 1524, 1525, 1527, 1528, 1531, 1532, 1533 |