AVENUE 9 41

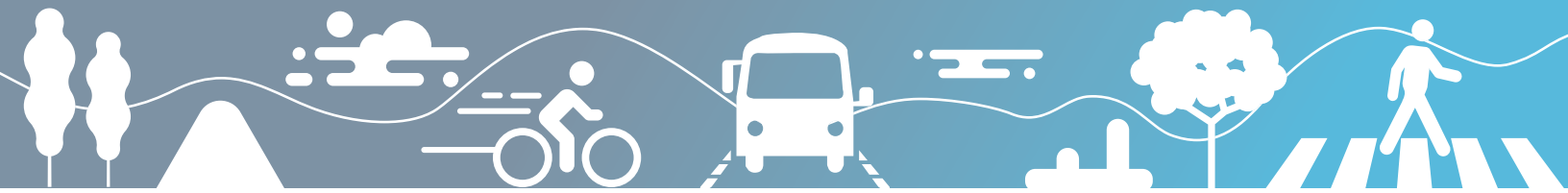
Fresno-Madera

State Route 41

and **Avenue 9**

Sustainable Corridors Study

Final Report - Draft



Fresno Council of Governments

MADERA CTC
Madera County Transportation Commission

IBI

In association with: RSG, Inc. and BluePoint Planning

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1.
Introduction and Background

The Fresno Council of Governments (Fresno COG) and the Madera County Transportation Commission (MCTC) have partnered together to develop this sustainable corridor study to identify future mobility improvements in the State Route 41 (SR-41) and Avenue 9 corridors in Fresno and Madera Counties. These two corridors play a central role in the region's mobility network, connecting commuters to several national parks, as well as supporting local and regional employment and education centers. The region is also expected to change significantly once the new California High-Speed Rail project is completed, bringing new mobility options to workers throughout California. The SR-41/Avenue 9 Sustainable Corridors Study looks at existing and future transportation projects in the region, as well as existing and future land uses, setting in place sustainable mobility strategies that will seamlessly integrate transportation infrastructure within the local fabric and support resiliency over time. Together, these strategies will help Fresno and Madera Counties achieve their air quality goals and support a healthy, sustainable and equitable mobility environment for residents.

1.1 What is a Sustainable Corridor?

Caltrans identifies a sustainable corridor as one that is "planned, designed, operated, and maintained to include stewardship of economic, environmental and social resources and has the greatest number of sustainable benefits now and for future generations".[1] This definition and the Sustainable Corridor Framework Document provided by Caltrans served as a guiding document throughout the development of the SR-41/Avenue 9 Sustainable Corridor Study.

The Sustainable Corridor Framework provides insight into which statewide planning documents should be considered throughout the study and clear criteria which should be followed throughout the project's duration. Moreover, the guide identifies several goals including engaging with all community members throughout a project's entire planning process, identifying specific corridors which will most directly benefit from the introduction of multimodal transportation, identifying and prioritizing projects and strategies to meet future corridor improvements, and considering climate change adaptation and resiliency to minimize future disruptions. The five goals outlined by the Sustainable Corridor Framework include:

- Safety and Health
- Stewardship and Efficiency
- Sustainability, Livability & Economy
- System Performance
- Organization Excellence

[1] *Corridor Planning Process Guide (2020) Caltrans Division of Transportation Planning*

Using the sustainable corridor framework created by Caltrans as a guide, the following steps were taken before drafting the proposed sustainable corridor strategies:

- An assessment of existing conditions to identify where potential gaps and challenges existed within the study area.
- A review of existing plans and documents to help better focus project efforts on an approach that encouraged collaboration among the various study components.
- An assessment of planned improvements and projects that are either underway, funded, approved, or in the planning process
- The development of project goals and objectives in consultation with Fresno COG and MCTC, with input from the Steering Committee.
- The development and execution of a public outreach plan that allowed for multiple touchpoints and channels to gather input and provide information and education about the project.
- The development of a bi-county travel demand model that extended the existing Fresno Activity-Based Model (FresnoABM) to include Madera County, which in turn allowed the team to prepare a horizon year scenario for future-year alternatives analysis.

1.2 Document Overview

The following sections provide an overview of the demographic conditions within the study area, existing and forecasted traffic conditions and ongoing projects along the study corridors. This preliminary assessment helped to define the guiding principles and goals that guided the development of the SR-41/Avenue 9 Sustainable Corridors Study. These guiding principles led to the identification of strategies and projects to be implemented over the near-, mid- and long-term horizons. These proposed improvements were then modeled and analyzed to determine the expected impacts on equity, sustainability, and mobility.

Community engagement was conducted throughout the development of the project. The various activities completed, and the main takeaways collected from these discussions, are presented in Section 4.

2.
Study Area

2.1 Description of Study Area

SR-41 runs north-south through Fresno County and Madera County, and serves as a major corridor for regional travel and as a connection to SR-180 and SR-99. While SR-41 runs through more urbanized environments, Avenue 9 is lined primarily with agricultural lands and is heavily utilized for transport of farming equipment. Due to the diverse characteristics of the study corridors, the study area was divided into three segments: State Route 41 Southern Corridor (Fresno County), State Route 41 Northern Corridor (Madera County), and Avenue 9. By segmenting the study corridors, project goals and objectives can be adjusted to fit the specific requirements of each segment. A brief discussion highlighting key features along each segment is provided below. This is accompanied by Figure 2.1, which illustrates how the segments have been divided within the study area.

SR-41 Southern Corridor

SR-41 Southern Corridor runs through the City of Fresno and is surrounded by commercial and residential land uses. While this segment of SR-41 is already heavily urbanized, development along this portion of the study corridor is expected to grow with the introduction of the California High-Speed Rail (HSR) in 2029. Traffic congestion and the need for sustainable transportation alternatives are forecasted to increase along this segment as a result.

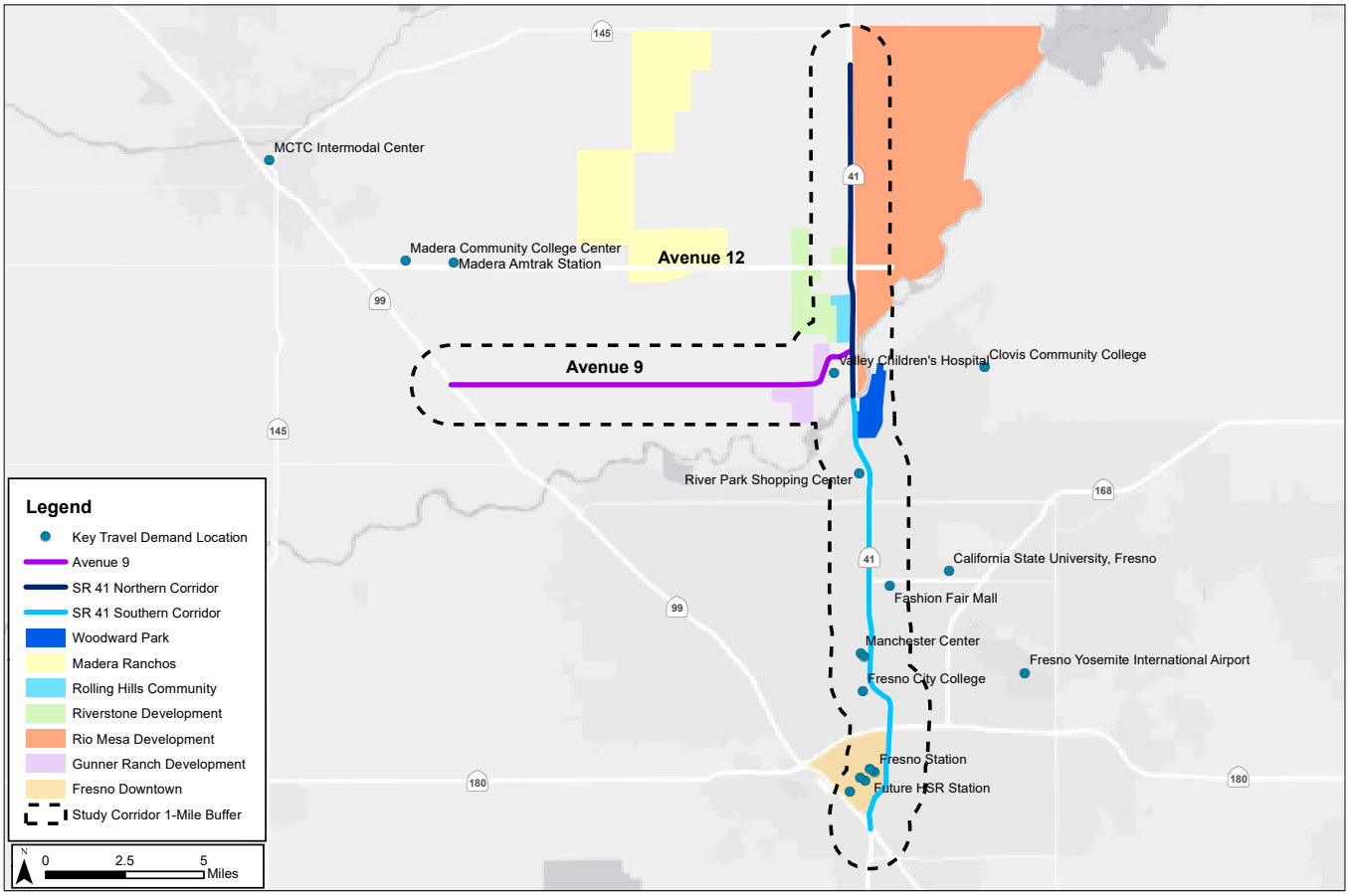
State Route 41 Northern Corridor

State Route 41 Northern Corridor is located just north of the Fresno-Madera County line and is currently surrounded by agricultural lands. Several new mixed-use developments are planned along this portion of SR-41, which will significantly change the landscape of this area. Planned projects include the Gunner Ranch West Development, Rio Mesa Development, and Riverstone Development. These developments will include residential, commercial, and open space land uses. The population and traffic generation along this segment are expected to increase in the future because of these projects.

Avenue 9

Avenue 9 in Madera County is a key east-west connection between SR-99 and SR-41 and is surrounded primarily by agricultural lands. The eastern portions of this corridor are forecast to see additional mixed-use development and the expansion of the Valley Children's Hospital. These developments are expected to impact travel demand and patterns along the corridor. Additionally, representatives and residents from Madera County have expressed a concern for traffic congestion and roadway safety, as the corridor is currently used by personal vehicles as well as for transporting farming equipment. The current traffic volumes along Avenue 9 are higher and travel at greater speeds than the roadway was designed to accommodate and have led to further concerns over accessibility, safety, and air quality.

Figure 2.1: Study Corridor Segments



2.2 Socioeconomic Conditions

The Fresno-Madera region is growing rapidly and seeing increased development along the SR-41 corridor and within the Fresno Downtown. Using 2018 American Community Survey (ACS) 5-Year Estimates, the highest population densities per census tract are located along the southern portion of SR-41 in Downtown Fresno and in the City of Madera. The population is projected to grow by 19% in Fresno County by 2050 and by 34% in Madera County by 2050. Existing population density is reflected in Figure 2.2. These rates are roughly double the forecasted population growth rate in California between 2020 and 2050 of 10.7%.[2]

Communities located in and around the study area also include a wide variety of socioeconomic and cultural backgrounds. The majority of Fresno County and Madera County residents self-identified as a minority community. Approximately 50% and 54% of Fresno and Madera County residents respectively identify as ethnically Hispanic. Minority communities are heavily concentrated around both corridors, and particularly near the southern end of SR-41. Figure 2.3 shows the concentration of minority communities in and around the study area.

Low-income communities also represent a significant proportion of Fresno County and Madera County residents. Over 25% and 22% of Fresno and Madera County residents respectively live under the poverty line. Low-income communities include households who fall below 80% of the statewide median income and households who have a housing burden exceeding 30% of their income. Low-income communities are widespread throughout both

[2] *State of California, Department of Finance. 2019. State Population Projections (2010-2060)*

counties but are particularly concentrated along SR-41. Additionally, the census tracts with employment rates below 50% are located at the northernmost point of the study area, in the center along Nees Avenue and west of Blackstone between Herndon Avenue and Nees Avenue, and just south of where the SR-41 intersects with SR-99. Figure 2.4 reflects the density of low-income households in and around the study area, while Figure 2.5 reflects the employment density within the study area.

Figure 2.2: Existing Population Density in Fresno and Madera Counties

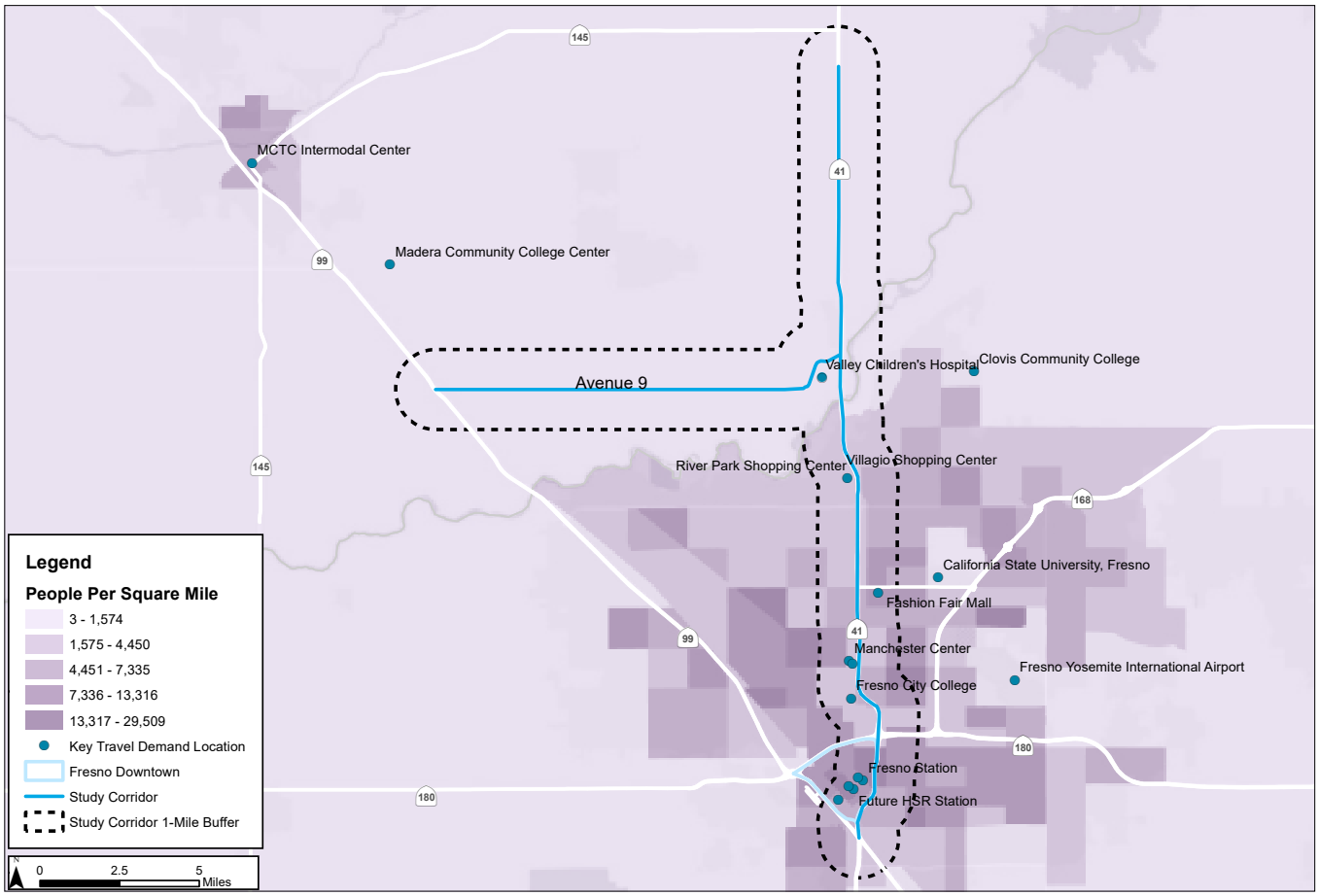


Figure 2.3: Minority Population

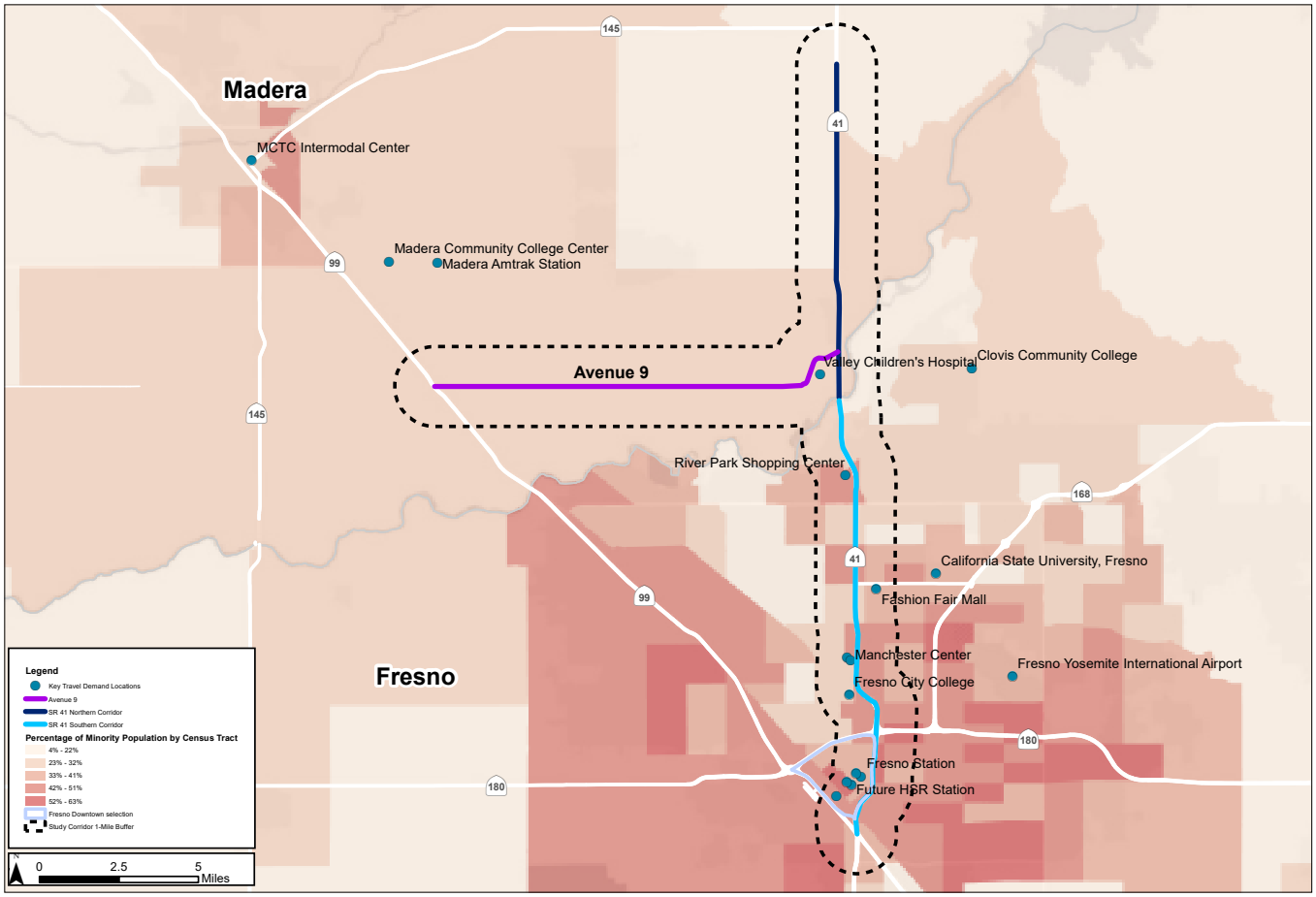


Figure 2.4: Low Income Population

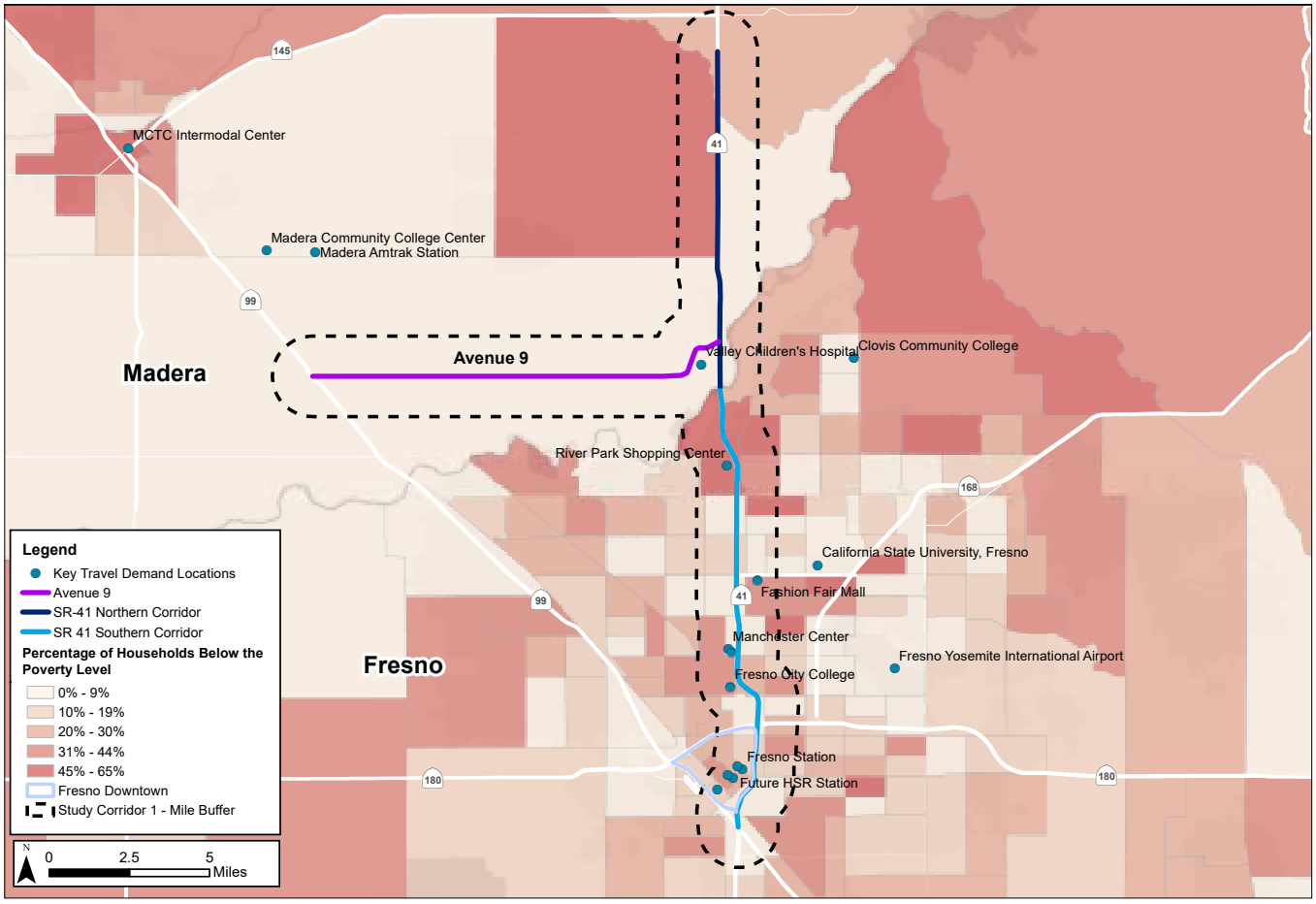
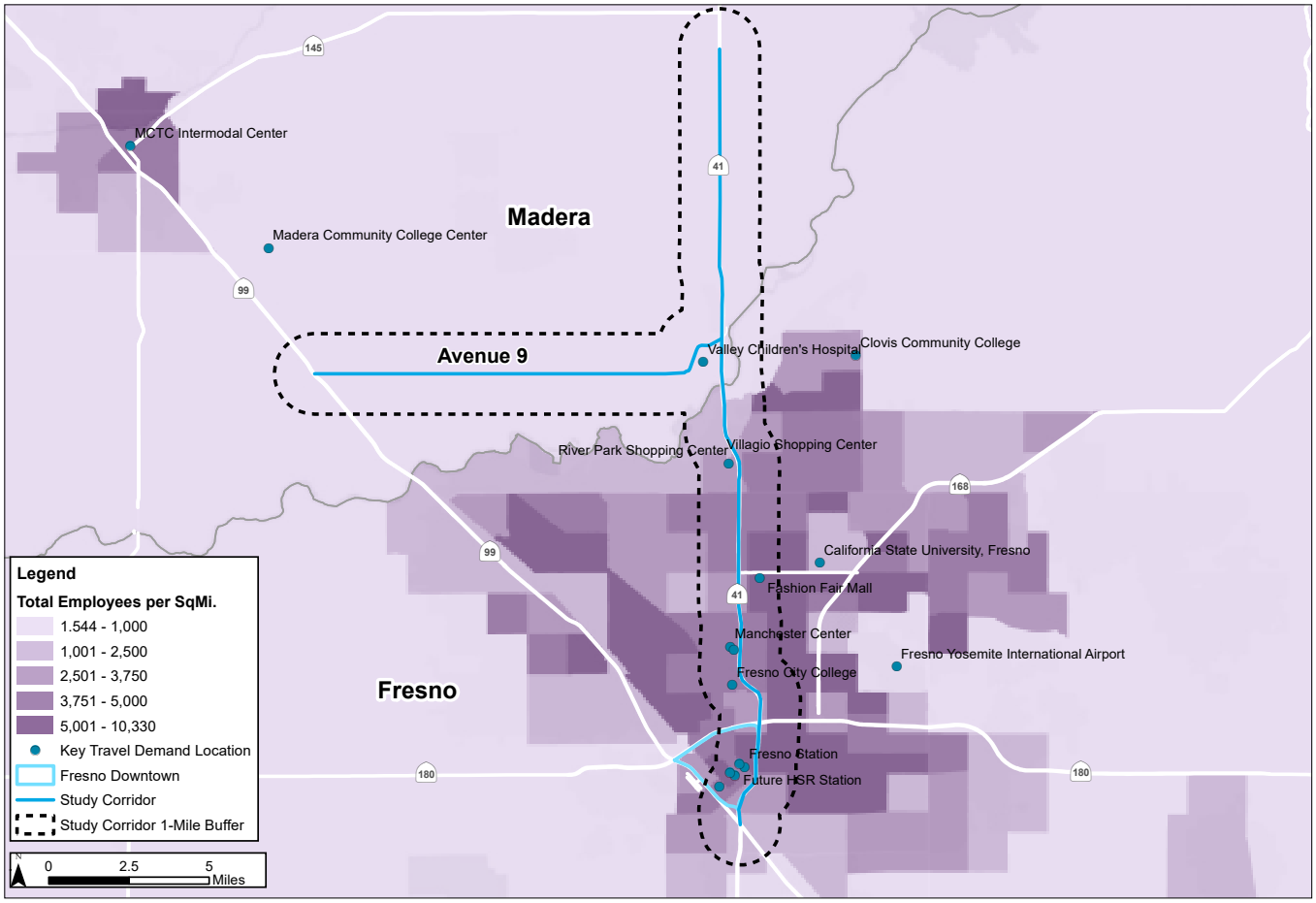
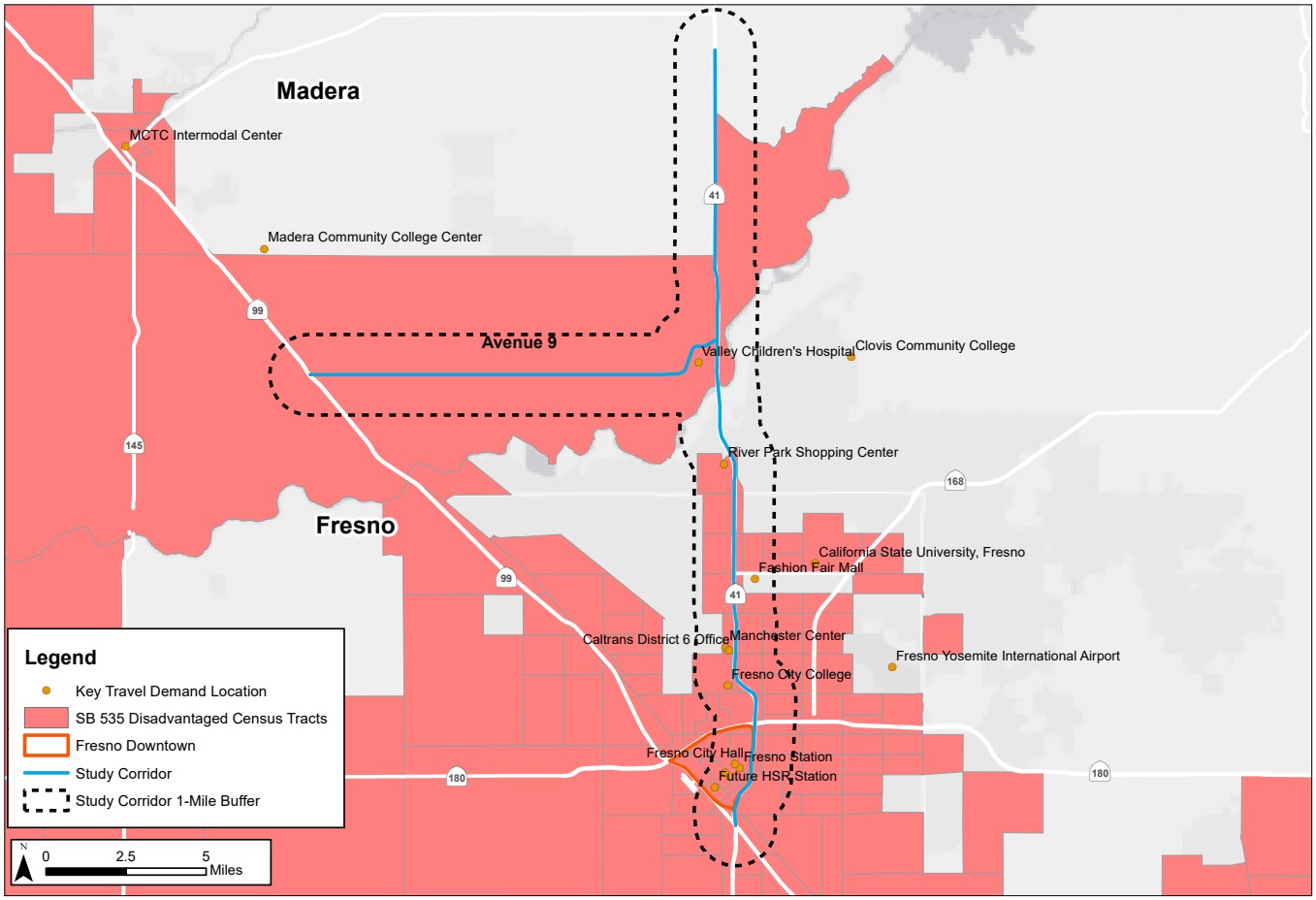


Figure 2.5: Percentage of Population Employed



Sustainability, and minimizing exposure of communities to environmental risk factors is a key component of this study. Figure 2.6 presents the census tracts in Fresno and Madera Counties designated as disadvantaged according to the CalEnviroScreen3.0. The CalEnviroScreen disadvantaged community designation is based on a wide range of indicators, including exposure indicators, environmental effect indicators, sensitive population indicators, and socioeconomic factor indicators. Of the 50 census tracts in the study area, a total of 38 census tracts are designated as disadvantaged. Several neighboring communities in the region are also designated as disadvantaged. Moreover, the spatial distribution of minority and low-income populations along SR-41 Southern Corridor, SR-41 Northern Corridor, and Avenue 9, is further highlighted by the fact that many of those census tracts are also designated as disadvantaged by the CalEnviroScreen metric.

Figure 2.6: Disadvantaged Communities in Fresno and Madera Counties based on CalEnviroScreen



2.3 Traffic Conditions

The existing Fresno Activity-Based Model (FresnoABM) was extended to include Madera County to build a comprehensive, practical and well-calibrated Fresno Madera Bi-County activity-based model. The updated model utilizes 2019 as a base year and forecasts demographic and travel conditions for the 2046 horizon year. The horizon year output reflects forecasted conditions first under a "no-build" scenario. This is a scenario where only transportation projects that are already planned and funded are considered. The future and existing conditions assessment supported the development of a list of recommended sustainable improvements to address current issues. These proposed improvements and their anticipated impacts on future mobility trends will be discussed further in Section 6.

2.3.1 Traffic Volumes and Observed Speeds

Under no-build conditions, a slight increase in traffic congestion is expected to occur as a result of the increase in traffic volumes along the study corridors and surrounding arterials. Congestion can be measured by looking at observed speeds on the road. Vehicles traveling at speeds well below the posted speed limit indicate congestion on these particular roadways. The maps below show segments where cars traveled 30 mph or slower for arterials (where posted speed limits are 50 mph), and 45 mph and under for freeways (where posted speed limits are 65 mph). Speeds reflected in the figures are from the AM and PM Peak Hours. The time frame used as the AM Peak Hour was 7 AM to 8 AM and the time frame used as the PM Peak Hour was 5 PM to 6 PM.

Figure 2.7: 2019 Base Year: Speed in AM Peak Hour

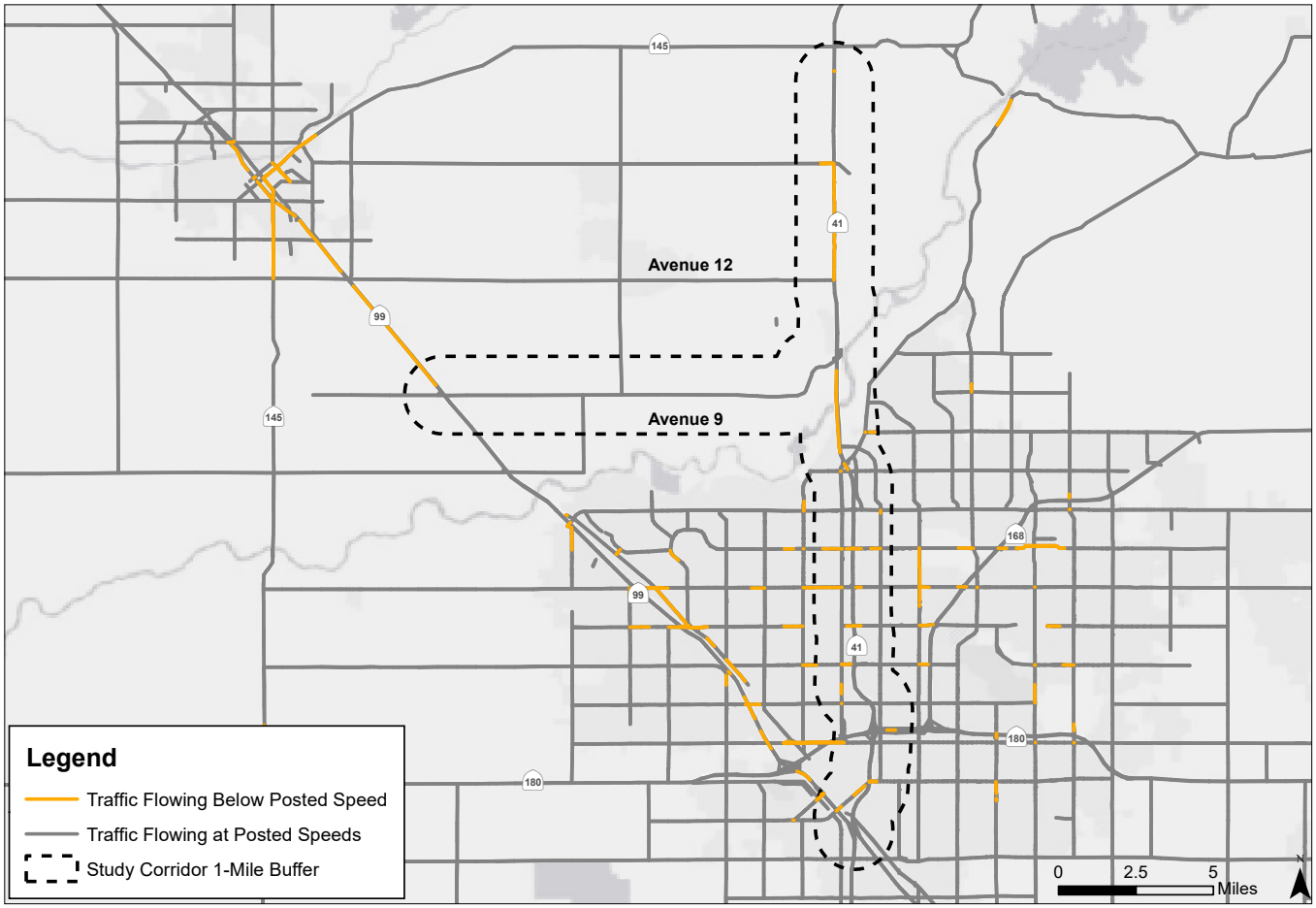


Figure 2.8: 2046 Horizon Year: Speed in AM Peak Hour

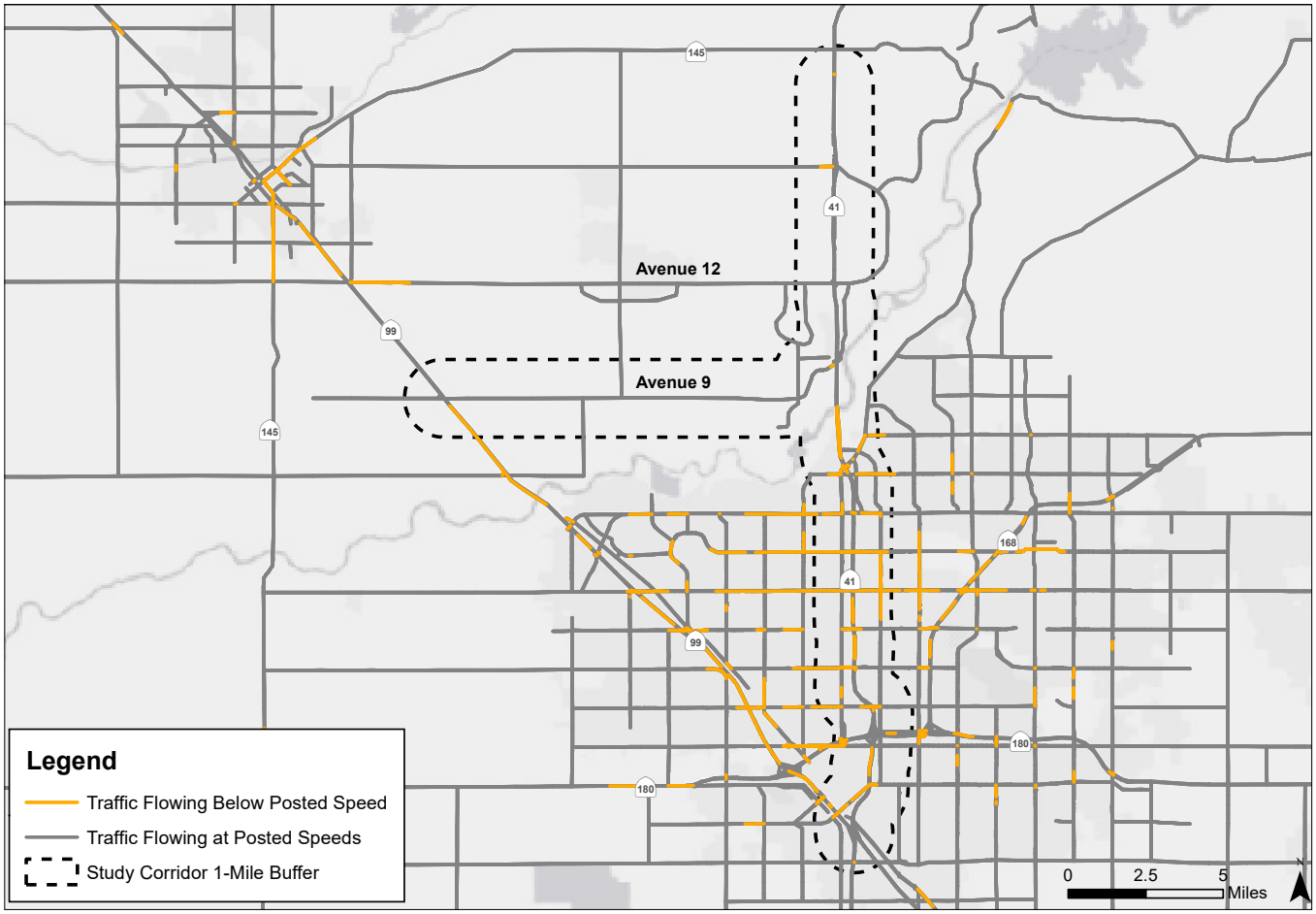


Figure 2.9: 2019 Base Year: Speed in PM Peak Hour

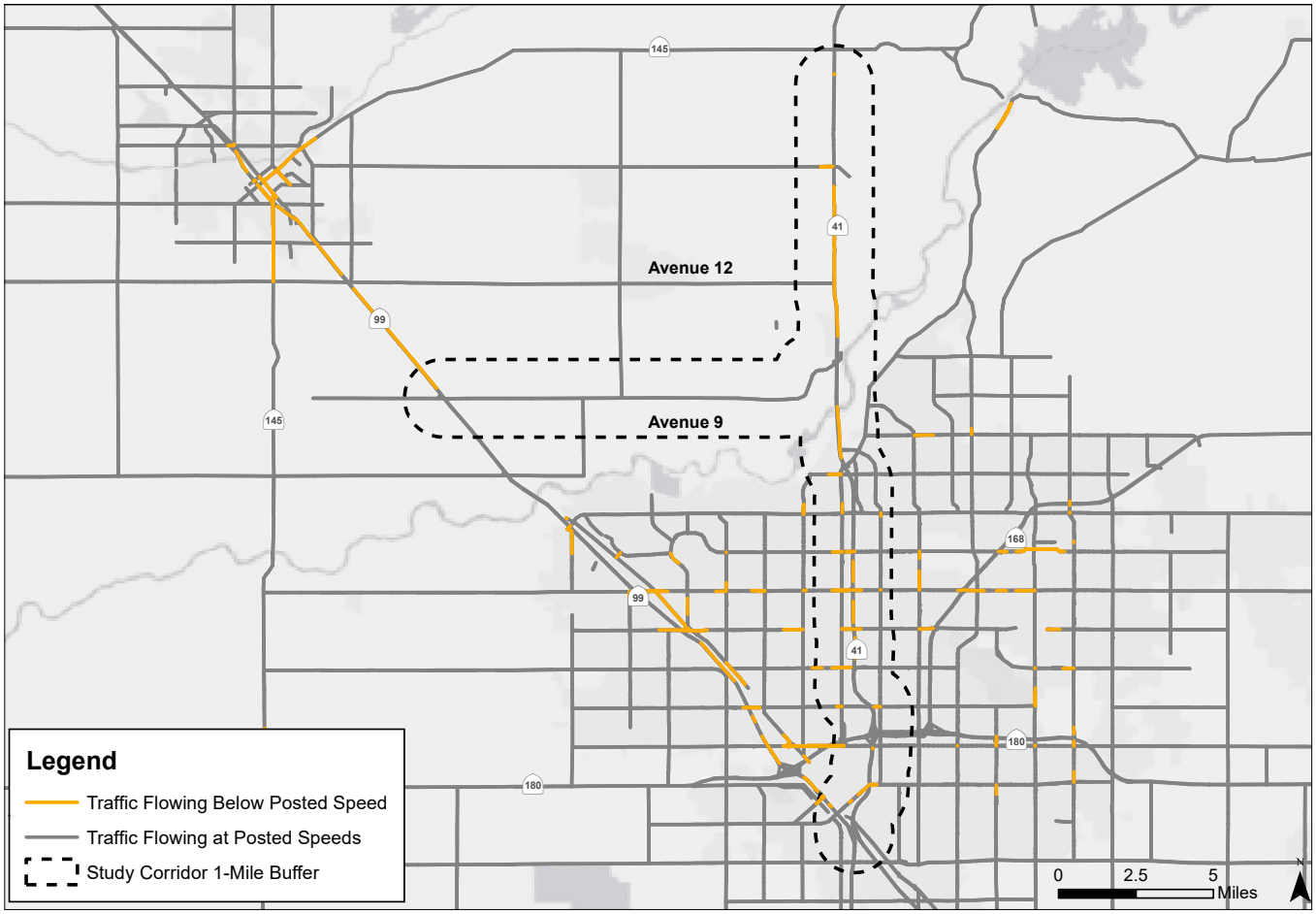
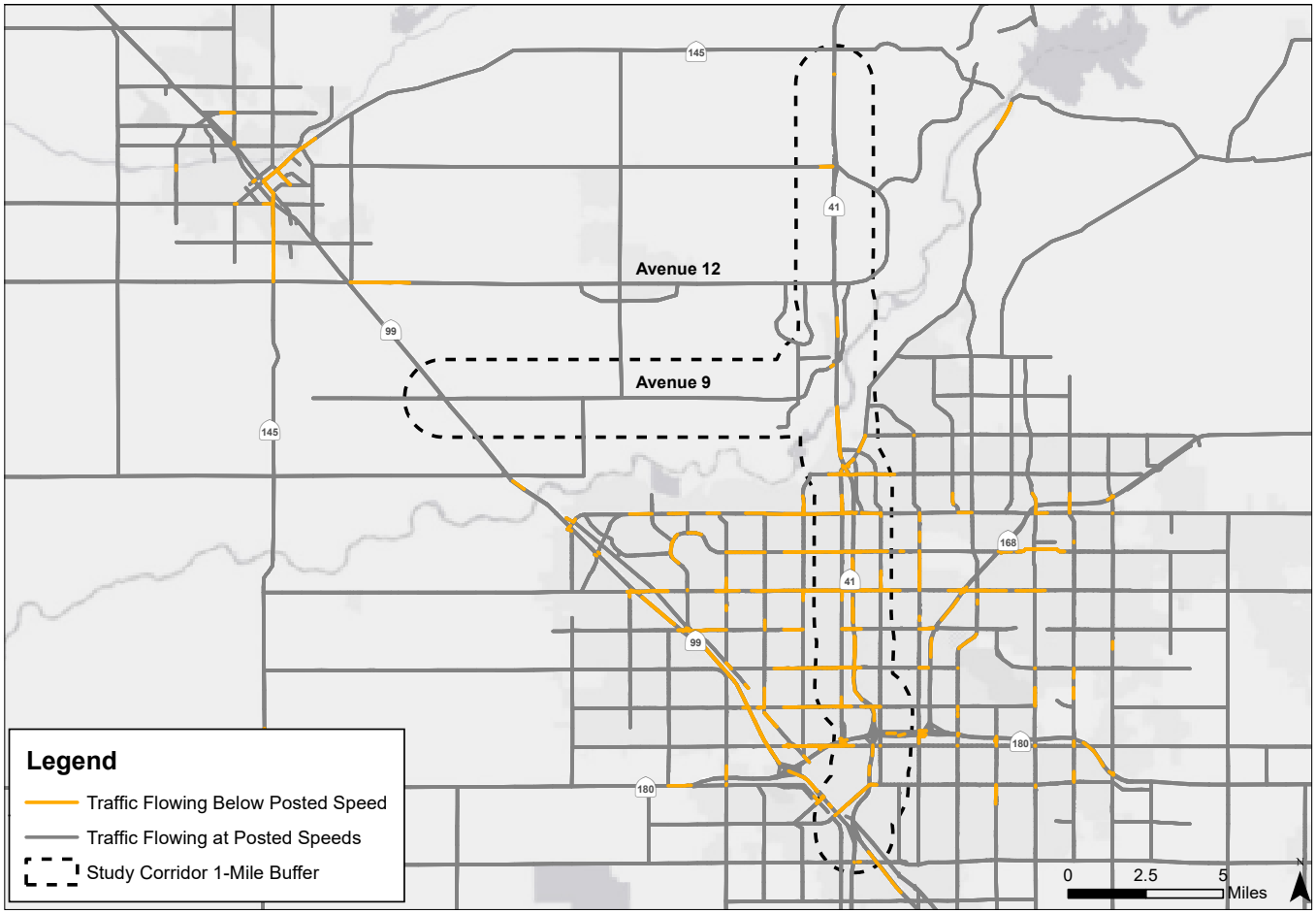


Figure 2.10: 2046 Horizon Year: Speed in PM Peak Hour



2.3.2 Congestion and Road Capacity

Congestion can also be looked at by performing a volume over capacity ratio calculation, which looks at the number of vehicles along a particular roadway compared to the number of vehicles it was designed to accommodate. The following maps show the Baseline and no-build condition for the Volume-Capacity Ratio, showing segments of the roads within the study area that are either at capacity (at a number of 0.9 to 1), or over capacity (at numbers above 1).

Figure 2.11: 2019 Base Year: Volume to Capacity AM Peak Period

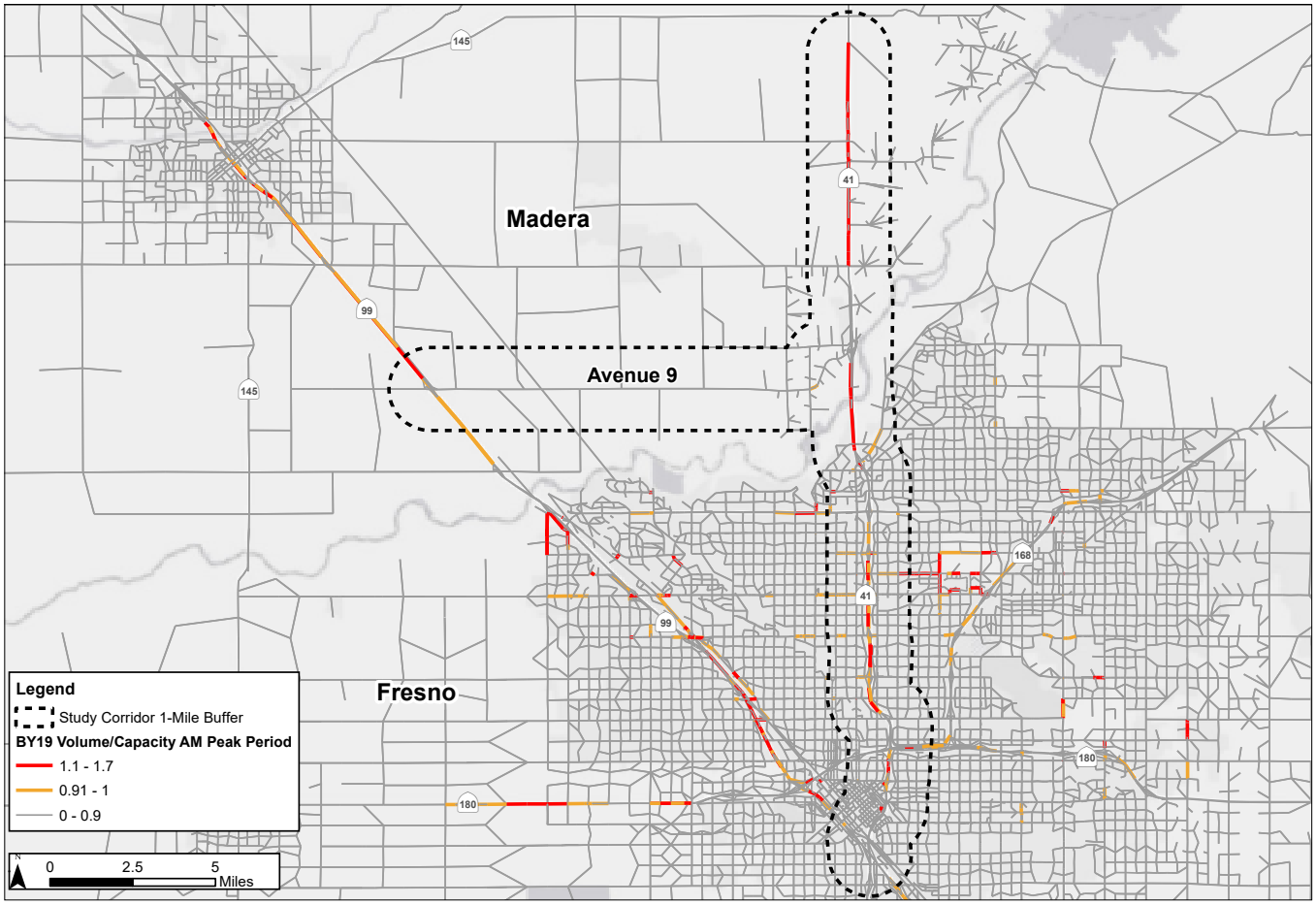
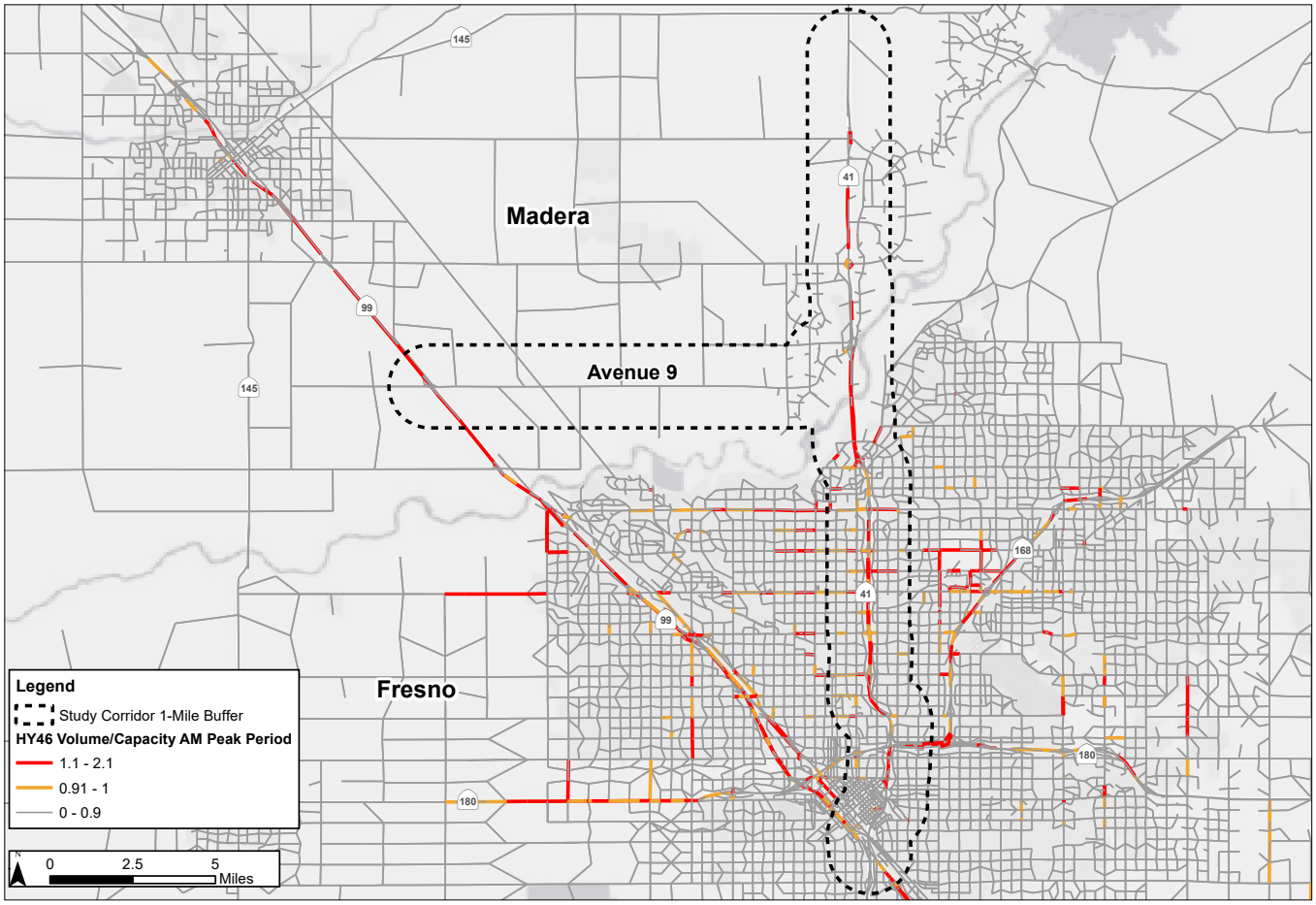


Figure 2.12: 2046 Horizon Year: Volume to Capacity AM Peak Period



2.3.2.1 VMT as an Indicator for GHG Emissions

VMT can be used as a guiding metric for understanding GHG emissions along a corridor and within its adjacent communities. As VMT reflects the number of miles being traveled by vehicle, it can also be assumed that as a driver travels more miles a higher density of pollutants contributing to GHG are also emitted. For this reason, the State of California has decided to use VMT as the required metric for assessing the sustainability of transportation related projects. Agencies reviewing proposed transportation projects are required to assess if the projects would result in an increase in VMT and thus GHG emissions. VMT per capita was thus used to portray the impacts of proposed transportation projects on emissions. However, this can be misleading, as some regions with lower density of populations would show a very high VMT/capita ratio. To address this issue, the map below presents the percent of change in VMT per capita within the study area between the 2019 existing conditions and the 2046 no-build scenario. In Section 6, the VMT per capita analysis continues to show the benefit of the proposed projects in comparison to the no-build scenario.[3]

[3] VMT per Capita is calculated using auto vehicle miles traveled by residents within the taz, divided by the number of residents. Only internal travel is included. External travel is excluded.

Figure 2.13: VMT Per Capita 2046 No Build

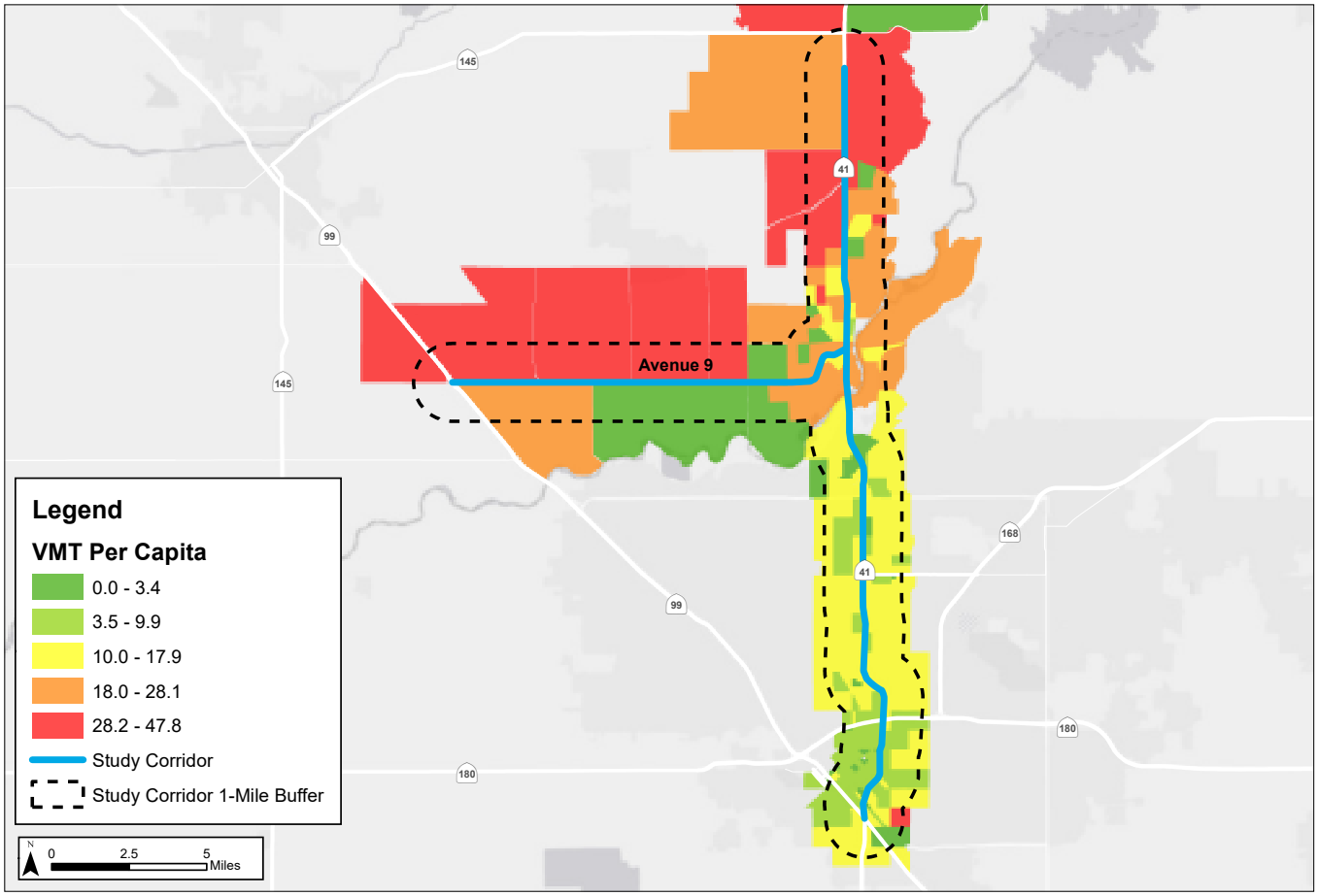
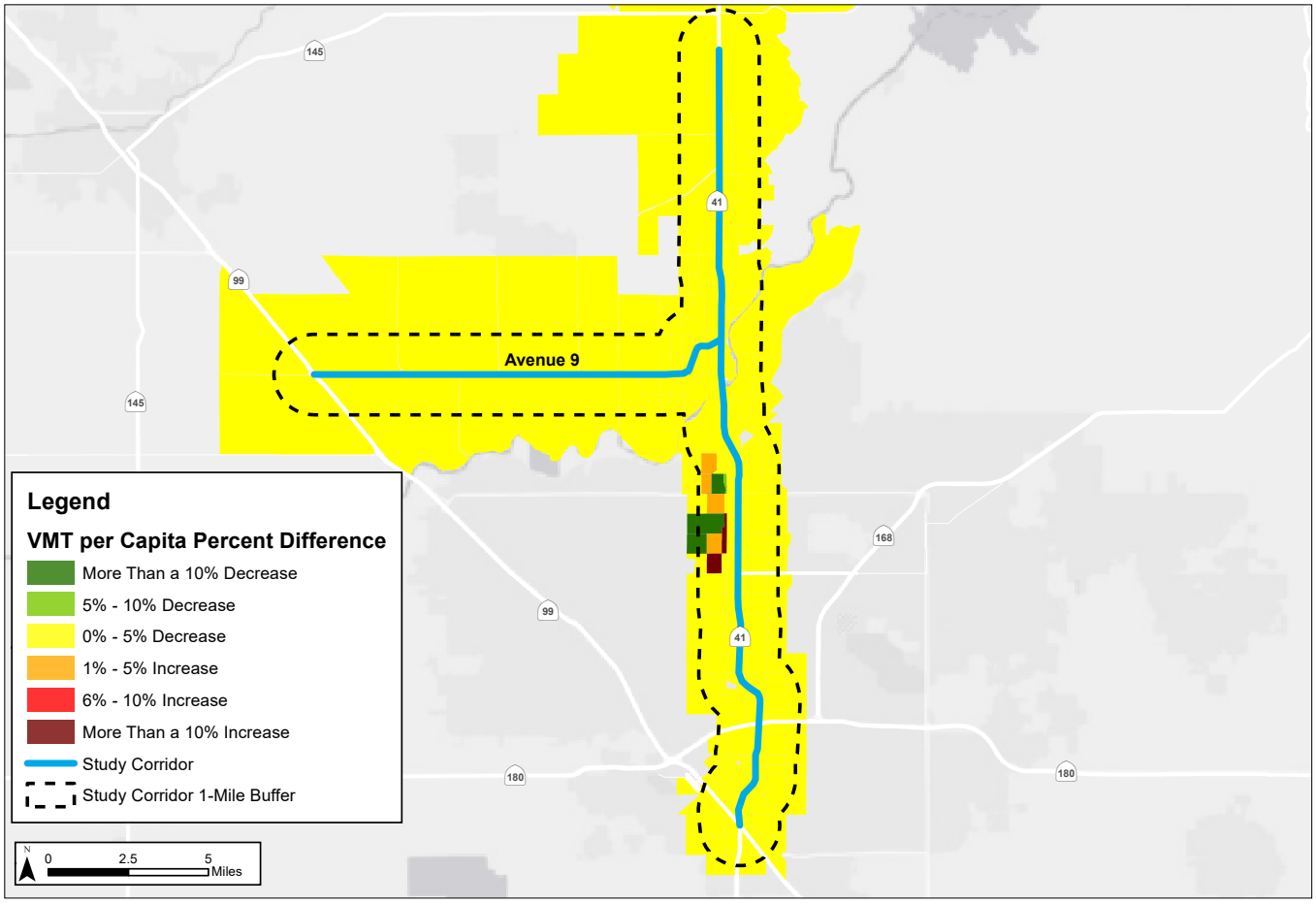


Figure 2.14: VMT Per Capita % Difference Between 2019 Base Year and 2046 Horizon Year No-Build



2.4 Plans and Projects Review

In addition to the existing conditions assessment, a review of twenty-seven transportation projects related to active transportation, public transit, land use, and roadways was conducted to create a comprehensive assessment of anticipated change within Fresno and Madera Counties. Moreover, the projects identified through this analysis helped define future baseline conditions in the two study corridors. The documents reviewed included plans related to future transportation and land use projects that would have an impact on travel demand within the study area. A table of the documents reviewed with details related to each project can be found in Appendix A.

Notable projects which will bring significant change to the region include the Gunner Ranch West, Riverstone, and Rio Mesa developments along the SR-41 Northern Corridor which will provide thousands of low to medium density housing units and mixed-use development. Additionally, roadway improvements along he SR-41 Southern Corridort and the introduction of the California High-Speed Rail (CAHSR) will also contribute significant change to the study area leading up to the 2046 Horizon Year.

The Plan and project review also identified opportunities within the multimodal transportation network for improvement, particularly in the transit and bikeway network and in first-last mile connections. More specifically, there is an opportunity to introduce new protected bikeway infrastructure along busy arterials to enhance bicyclist safety. Key corridors identified for improvement include Blackstone Avenue, Palm Avenue, First Street, and Herndon Avenue. Additionally, there is an opportunity to expand the transit network by introducing high-frequency transit (HFT) and bus rapid transit (BRT) service. Corridors that would benefit from increased transit frequency or HFT or BRT service include the SR-41 Northern and Southern Corridors, Blackstone Avenue, and Avenue 9.

Improvements proposed to the bikeway and transit networks could be further enhanced through first-last-mile connections to transit centers or to key travel demand locations via micro-mobility and micro-transit connections. These improvements could be implemented through multi-modal mobility hubs in high travel demand areas, including the River Park Shopping Center, Fresno City College, Downtown Fresno, and the Valley Children's Hospital. Addressing these areas of needs could potentially play a significant role in improving access to transit.

This study also has a particular focus on sustainability and equity along the corridors. Fresno COG and Madera County are both leading efforts to prepare for the deployment of plug-in electric vehicles (PEVs). An expansion to the electric grid and electric vehicle charging network would support both agencies in achieving their PEV readiness goals. As electric vehicles provide a more sustainable travel option, supporting additional charging stations at key travel demand locations and multi-modal mobility hubs would help the region to reach its air quality and climate change goals. These opportunities guided the development of proposed improvements presented further in this document.

Sustainability along the corridor is directly correlated to the equity focus along the corridor, as disadvantaged communities in Fresno and Madera Counties are disproportionately impacted by poor air quality and GHG emissions from transportation sources. Therefore, future projects must consider the current and future implications of climate change and attempt to mitigate these effects. Lastly, as disadvantaged communities are those who typically rely more heavily on alternative forms of transportation, projects proposed as part of the sustainable corridor management strategies must ensure that all travelers experience increased and equitable access to transportation, regardless of mode or ability.

3.
Goals and Objectives of the Study

The project goals provide a high-level description of what future mobility improvements are intended to accomplish and will assist with assessing how these improvements would provide benefits related to equity, sustainability, and resiliency along the study corridors.

The goals proposed for the SR-41/Avenue 9 Sustainable Corridors Study are informed by those previously outlined by Fresno COG 2022 Regional Transportation Plan (RTP)/ Sustainable Communities Strategy (SCS) and the MCTC updated RTP/ Sustainable Communities Strategy (SCS). Proposed goals and objectives are also made in alignment with those mentioned by the California Transportation Commission (CTC) under the "Solutions for Congested Corridors Program" and the Caltrans Corridor Planning Guidebook. This will better position Fresno COG and MCTC to receive grant funding which would support the development of sustainable mobility enhancements along these two corridors.

A comprehensive set of performance metrics has also been identified to determine the success of each goal. Performance metrics are specific to each objective and will provide a framework for measuring progress toward the project's overarching guiding principles. This approach will also help to identify any potential opportunities for improvement depending on the varying levels of success measured by the implemented performance metrics. The project's guiding principles, goals, and performance metrics were all presented to stakeholders for review and approval.

The clear articulation of project goals and performance metrics is an essential exercise to accurately assess the impacts of the strategies proposed as part of this study and to position Fresno County and Madera County to receive grant funding for the development of sustainable transportation solutions in the future.

Table 3.1 presents the guiding principles, goals, and performance metrics identified for the SR-41/Avenue 9 Sustainable Corridor Study.

Figure 3.1: Goals and Objectives Summary Table

GUIDING PRINCIPLE	GOAL	PERFORMANCE METRICS
Equity	Improve infrastructure for walking, biking, and rolling.	• Percentage of sidewalk and bike path coverage • Additional miles of protected and separated bike facilities
	Increase access to transit services and non-automobile mobility opportunities.	• Percentage of disadvantaged communities located within 0.25 miles of a transit stop
	Increase connections to between residential areas and key employment, education, and recreation opportunities.	• Percent of the urban population are within 0.25 miles of a transit stop • Average commute time to employment and education centers
	Improve safety for pedestrians, cyclists, and vehicular traffic.	• Number of fatalities and serious injuries reported in annual SWITRS data • Crash reduction factors summary by alternative
Sustainability	Reduce congestion and travel delay through traffic management and operational improvements.	• Mode Share • Transit On-Time Performance • Vehicular Delay • Vehicle Miles Traveled (total) • Vehicle Miles Traveled (per capita)
	Reduce air pollution and greenhouse gas emissions from transportation sources along the corridors.	• CalEnviroScreen data reflecting percentiles of census tracts exposed to high Ozone and PM2.5 concentrations within the study area • Number of charging stations along the two study corridors • Expansion of electric bus fleet
	Manage transportation demand, vehicle miles traveled.	• VMT (total and per capita) • Vehicle occupancy rates • Vehicle Hours Delay
Resiliency	Support local businesses through improved access and placemaking.	• Percent of residents within a 30 – 40-minute trip to commercial streets/areas.
	Support active and healthy lifestyles within the community.	• CalEnviroScreen data reflecting percentiles of census tracts with Asthma and Cardiovascular disease within the study area • Percent of residents within 0.25 miles of urban green space, urban trails or community parks

4.
Community Engagement

Community engagement plays a pivotal role in designing strategies and solutions that will make an impact in providing sustainable mobility options for users of the study corridors and support behavioral changes in mobility that would improve their quality of life and health. Residents and daily commuters of the area have a unique understanding of the physical and social limitations of the corridors, and clear mobility preferences and needs. These considerations are what make the proposed strategies in this report uniquely adapted to the local context. The Study included three general phases of community engagement - Phase I: Investigation, Phase II: Assessment, Phase III: Draft Corridor Plan. Throughout each phase, multiple touchpoints for community engagement were used. The Online Engagement Center was an online tool that hosted information that was routinely updated, surveys, comment cards, and online community workshops for the community to interact with, presented in English and Spanish. To receive input about each phase, five total small group meetings were hosted with local community and transportation experts. These meetings provided a space for colleagues to provide input on what has been done, what can be improved, and provide direction to the next steps.

4.1 Outreach Goals

The following goals informed the approaches and engagement strategies developed for the Sustainable Corridors Study.

Goals:

- Engage with residents and businesses along the study corridors as well as commuters traveling from outside of the study area
- Collaborate with historically underserved communities and maximize equity
- Educate stakeholders and the community about the benefits of multimodal transportation and the components of various mobility options
- Define regional transportation needs
- Generate buy-in from the community
- Gather “local expertise” from the residents and users of the corridor

The public engagement for this project was designed to be interwoven with all major deliverables of this project, supporting community buy-in and the development of collaboration and partnerships. At the same time, these goals, during COVID-19, were to some extent aspirational. While the project was able to utilize a broad spectrum of digital tools to reach community members, there was a challenge to meet all of these goals due to in person engagement restrictions and the lack of interest, ability, or resources for community members to be engaged online. Over 150 people were engaged throughout the project.

All community engagement events were advertised using Social Media Outreach Toolkits. The toolkits provided a schedule of social media posts in English and Spanish and was also shared out with community partners.

A more detailed explanation of each engagement phase can be found below.

4.2 Phase I: Investigation

During Phase I, community members were able to share their experiences on the corridors as well as their needs, opportunities, and challenges. This phase took place from October 21st to December 15th (2020). To engage the community, three surveys were shared with the community and four small group meetings were hosted with community leaders in different sectors.

Details on these engagement activities can be found below.

Info Center Surveys

Three survey activities were presented in English and Spanish, including a Gains and Pains Exercise, a Corridor Issues & Challenges Map, and a Corridor Vision map. The Online Engagement Center had 543 unique page views. 189 surveys were started, and 82 were completed. It is important to note that most site visitors came from Fresno (44%), while only 8% came from Madera. The remaining site visits came from community members that do not live in either county. 67 total responses were provided to the four survey questions explained below.

The **Gains and Pains** exercise aimed to determine current and future needs and aspirations to ensure these corridors support a growing and thriving community. It asked:

- What existing issues need fixing?
- What would you like to see in the future?
- What aspects should be addressed?

Some gains shared by the community include:

- “a need for a direct road to the new master plan communities and to Yosemite”
- “Most efficient way to get from North Fresno to Highway 99. No stop lights on Avenue 9 make it faster to get to and from Highway 99”

Some Pains include:

- “too narrow, no shoulders on the escape route”
- “dark at night, a deterrent to late evening/overnight travel”

Figure 4.1: Sample Gains and Pains Exercise

A **Corridor Issues and Challenges Map** was also uploaded to the Online Engagement Center. Participants were asked to drop a pin on a map of the study area to where they have experienced issues or challenges as users. The most pressing issues include:

- High traffic volumes/speed on Avenue 9
- Congestion near SR-41/ SR-180
- Lane reductions on the SR-41 Northern Corridor
- Other localized areas of congestion

Figure 4.2: Sample Corridor Vision Map

Corridor Vision: We asked participants "What is your vision for the State Route-41/Avenue 9 Corridors in your community? Please help by letting us know how important each of our vision elements are to YOU. This will help us establish community priorities, develop strategies, and craft solutions to reflect your preferences." No responses were received for this question.

4.2.1 Small Group Meetings

BluePoint Planning conducted five hour-long Small Group Meetings to obtain feedback from key community stakeholders including businesses and developers, environmental groups, cycling groups, agricultural groups, community groups, and large institutional stakeholders. Each meeting contained five to eight people per meeting. These small group meetings allowed for in depth conversations and feedback on a range of concerns and issues for sectors of the community. A full list of the entities that were present during the meetings can be found in Appendix B.

Below is a summary of the main takeaways:

Challenges

- Avenue 9 and SR-41 are unsafe for active transportation and vehicular traffic
- Traffic congestion is bad and will be getting worse
- Some roads and areas near SR-41 and Avenue 9 are run down and unsightly
- Avenue 9 roads have to cater to current and future needs of residents, truckers, commuters, agricultural groups, and pedestrians and cyclists
- Pollution from traffic affects neighboring communities
- Funding opportunities and responsibilities should be clearly established and agreed on
- Planned development near and along Avenue 9 includes approximately 2 million sf of commercial space and 3,500 new homes that will impact future use and travel patterns

Opportunities

- Develop a protected bike lane with access from SR-41 to Avenue 9
- Create safe routes for active transportation and vehicular traffic
- Create spaces on SR-41 and Avenue 9 for economic opportunity and community amenities
- Add beautification measures for residents, workers, and to attract tourists
- Increase greenery and trees to reduce pollution, create cooling shelters, and potential buffers for active transportation
- Align development with other ongoing and future project
- Better address and manage land use and transportation
- Mitigate the impacts of continued growth in Madera County
- Reduce congestion and improve traffic flow to help reduce emissions and pollution
- Incorporate the planning for the San Joaquin River and area near Avenue 9 into the project
- Learn from mistakes and successes of Avenue 12

4.2.2 Steering Committee

The Steering Committee played a central role in providing input on priorities, challenges, and opportunities related to land use, mobility, sustainability, and health in Fresno and Madera Counties, specifically along the two corridors. Committee members included representatives of: Government staff, Health and Public Health representatives, mobility, economic development/tourism, equity, and safety. Appendix (C) includes complete information on the committee members.

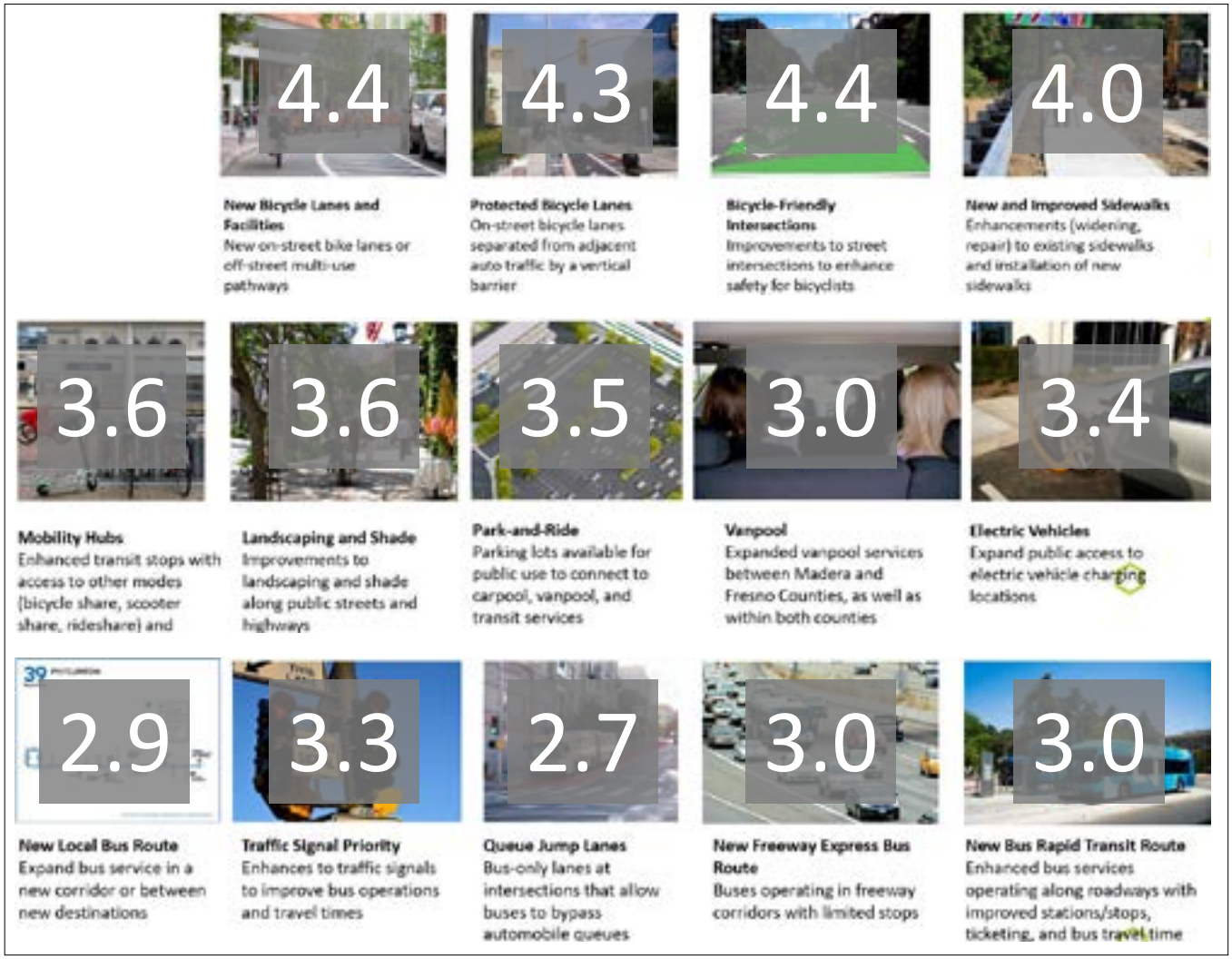
Four steering committee meetings were hosted to date. On August 27th, 2020, the team hosted the first committee meeting to provide an overview about the project, committee member responsibilities and the public outreach plan. The second meeting was hosted on November 18th, 2020; the meeting discussed project goals and objectives, a summary of the first round of outreach and engagement, as well as a discussion around the second phase of outreach and engagement. The January 28th, 2021 meeting discussed the draft mobility strategies that were created based on community feedback and the existing conditions study. Finally, on April 26th, committee members discussed the final strategies for the plan and the community workshop goals for the second round of engagement.

4.3 Phase II: Assessment

Phase II consisted of generating ideas and alternatives for corridor improvements. During this phase, the team hosted an online open house workshop on February 17th. The workshop provided a Spanish interpretation room to allow Spanish-speaking community members to participate, however, no one requested this feature. Over 40 community members joined the workshop. The workshop agenda allowed for attendees to learn about the priorities for the study, then community members had the opportunity to share their ideas on what projects should be prioritized when it comes to highway, roadway, transit, active transportation, and multi-modal/climate resiliency improvements. The Zoom recording was posted on the Online Engagement Center for community members that did not have the capacity to join the live workshop to watch on their own time. Below is a summary of the community input that was gathered during the workshop. Improvements were rated on a scale of one to five, with five indicating the highest preference.

Figure 4.3: Roadway Improvement Community Input Summary

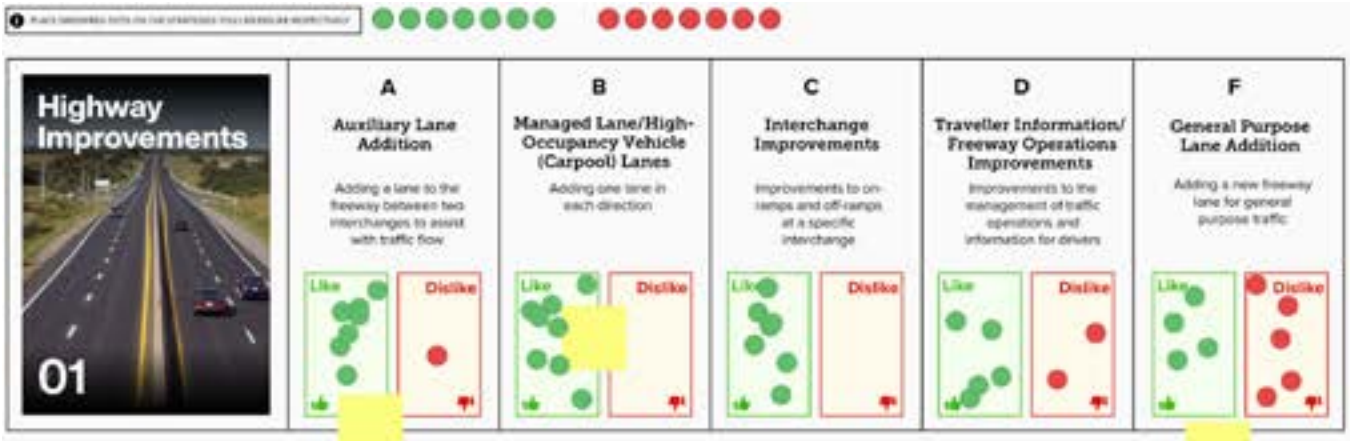
Figure 4.4: Active Mode Community Input Summary



Highway improvements

- Generally, the community wants effective traffic management, including better information for drivers and adding High Occupancy Vehicle Lanes
- Interchange improvements, including on- and off-ramp enhancements are a priority for the community
- Adding new freeway lanes to mitigate traffic is not necessary

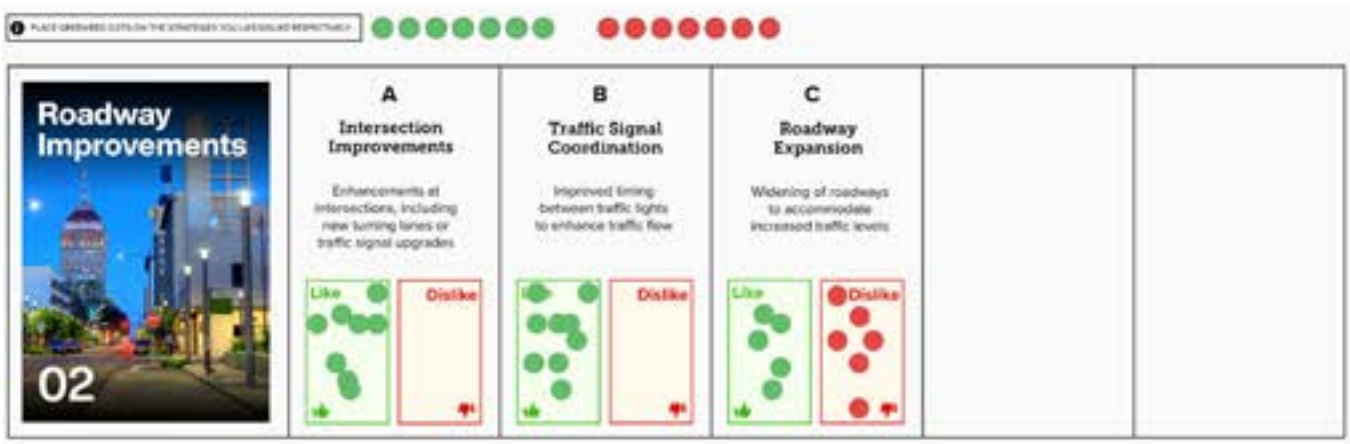
Figure 4.5: Highway Improvements Feedback



Roadway improvements

- Intersection improvements (including new turning lanes and traffic signal upgrades) and traffic signal coordination are important upgrades that will increase safety
- Roadway expansions are not necessary for better experiences on the road

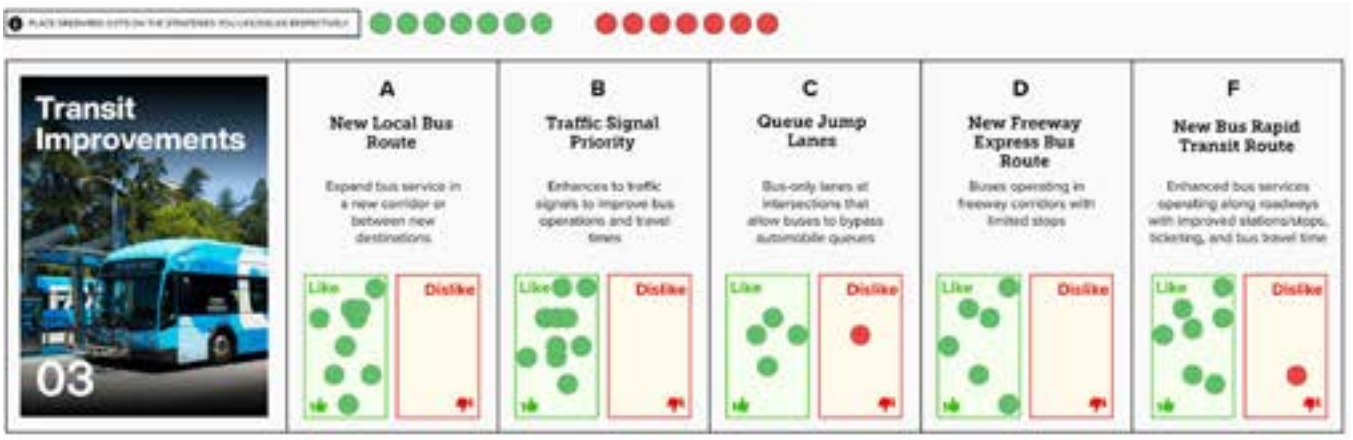
Figure 4.6: Highway Improvements Feedback



Transit Improvements

- The community welcomes new local bus routes, express bus routes, rapid bus transit routes, and enhanced traffic signals for bus operations as an effective alternative to driving.

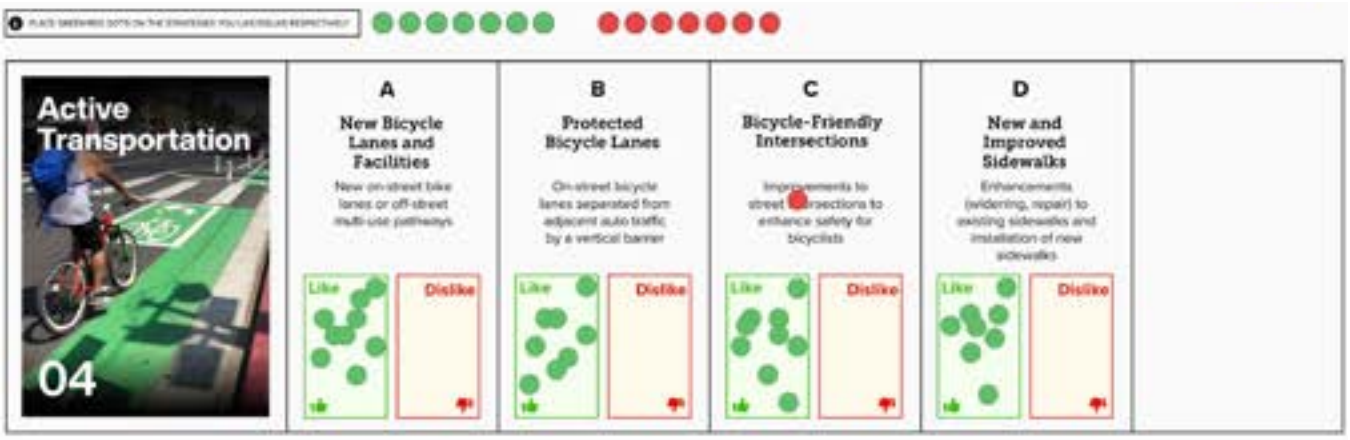
Figure 4.7: Transit Improvements Feedback



Active Transportation

- Bike safety is a huge issue on the corridors and new bicycle lanes and infrastructure, such as protected lanes, as well as bike intersections are key to improving safety. It is not enough to paint streets. Barriers that separate adjacent auto traffic should be implemented.
- Improvements should be made to existing sidewalks; new sidewalk installations should be placed in roads that do not have pedestrian access.

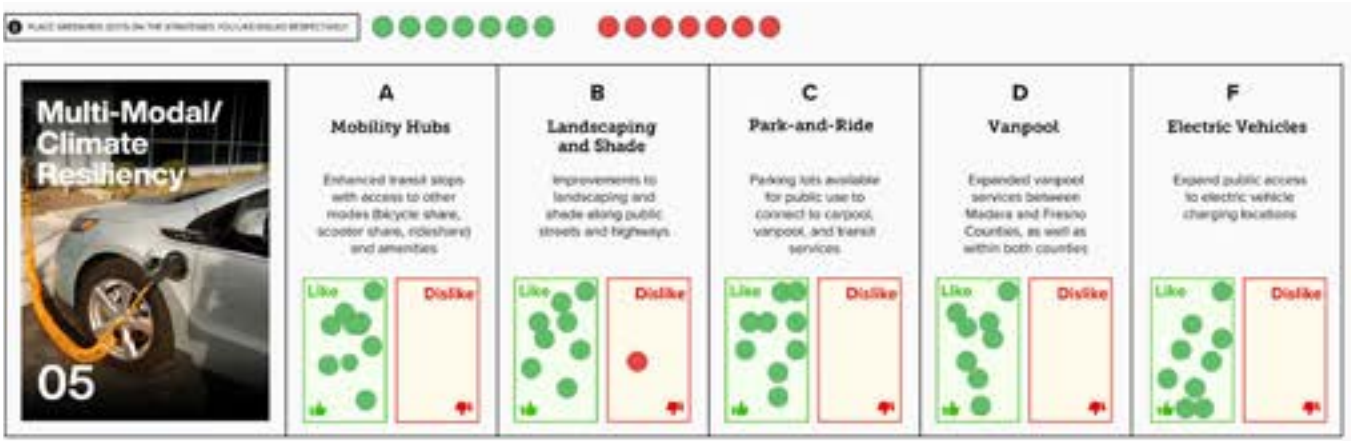
Figure 4.8: Active Transportation Improvements Feedback



Multi-Modal Climate Resilience

- Mobility hubs, park-and-rides, vanpool, electric vehicle access, and improvements to landscaping and shade along public streets and highways can help mitigate traffic and provide alternate transportation options for those that cannot or do not want to drive.

Figure 4.9: Multi-Modal/ Climate Resiliency Improvements Feedback



Throughout both Phase I and Phase II, there has been a lack of participation from the Spanish speaking community. Towards the end of Phase II, the team attempted one final outreach push to reach voices that were not represented throughout prior community engagement opportunities. A PSA in Spanish was distributed to local Spanish radio stations to play during their shows and include on their website, newsletter, or any other form of media outreach.

4.4 Phase III: Draft Corridor Plan

The last phase involves engaging the community on the Draft Sustainable Corridors Study. The document is a tool that recommends certain strategies based on community input gathered from Phase I and Phase II as well the technical modeling that has been done. The document will be submitted for review by the community as part of a 30-day review opportunity.

4.5 Community Engagement Gap Analysis

Fresno and Madera Counties have a total population of over one million people with a large number of people living or working near the study area. Over 85% of the corridors' users are from the local study area. For the entirety of the engagement process, the COVID-19 pandemic and resulting stay-at-home orders issued in California impacted the project team's ability to conduct in person engagement and to utilize tools and practices that would have the best ability to reach a diverse and broad sample of the population. To address this challenge, the team attempted to create a range of bilingual, interactive digital engagement opportunities and outreach tools as discussed above.

Overall, the study engaged over 150 community participants and stakeholder groups, representing a range of interests, including businesses, education leaders, health care community, and residents. While it is likely that many voices were still unheard, community representatives and local stakeholders played a significant role in the development of the recommendations and strategies presented in this report.

4.6 Equity Lens and Engagement

The goals of community engagement included collaborating with historically underserved communities, maximize equity as well as gather local expertise from residents and users of the corridors. By understanding the local issues and visions, projects that come out of this study can be mindful of community concerns. According to Figures 2.3-2.4, a significant portion of the study area consists of minority communities, or communities of color, households living below the poverty line, and are considered SB 535 census tract communities. Moreover, approximately 50% and 54% of Fresno and Madera County residents respectively identify as Hispanic.

Spanish Language Outreach and Engagement

To cater specifically to the local communities, there was a particular emphasis on trying to engage with Spanish-speaking communities, as over 34% of families in Fresno County speak Spanish at home and 44% of Madera County residents speak another language at home. Every engagement effort and tool provided in the Online Engagement Center was provided in both English and Spanish. Outreach tools such as social media posts advertising the community outreach opportunities were also translated to Spanish. The February 17, 2021 community event had a Spanish interpreter available to participants.

Throughout Phase I and Phase II of the community events, Spanish speaking community members did not provide input. As a result, the team shifted gear. In an attempt to reach out to the Spanish speaking community, a PSA was shared with local Spanish radio stations to capture vision and concerns from community members that have not been participating.

Listening Sessions

The small group conversations hosted in Phase I provided an important role in understanding a diverse spectrum of interests and needs. The participation of community-based organizations representing disadvantaged and vulnerable groups provided insight into the specific concerns of these hard to reach members of the community. The conversations were deliberately hosted without the presence of local government staff to provide attendees the opportunity to have candid conversations on local concerns and needs.

5.
Sustainable Corridor Management Strategies

After a thorough review of existing planning documents and conditions and a review of relevant planned and ongoing projects related to transportation within Fresno and Madera Counties, opportunities for improvement were identified for sustainability, equity, and accessibility within the transportation network. In addition, the bi-county travel demand model pinpointed specific locations in need of improvement along the study corridors and within the study area. Once the initial model output was analyzed, a draft project list of potential future policies, studies, and projects was developed in alignment with the three guiding principles of the SR-41/Avenue 9 Sustainable Corridor Study: Sustainability, Equity, and Resiliency.

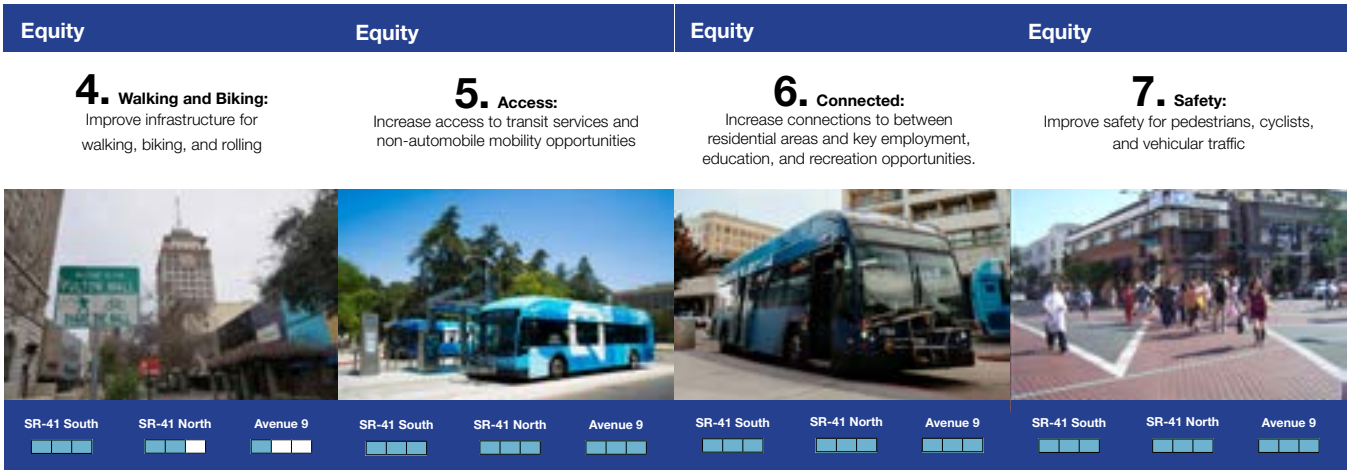
5.1 Equity Best Practices

The recommended projects and strategies were developed in an effort to follow equity best practices. Historically, transportation improvements have not served disadvantaged communities well and have often led to greater disparities, increased health issues, and the isolation of low-income communities. It is crucial to integrate equity concerns into this study and future transportation project recommendations to improve overall outcomes for low-income communities, communities of color, and the community as a whole. As discussed in the engagement section, approximately 50% and 54% of Fresno and Madera County residents respectively identify as ethnically Hispanic. Minority communities, or communities of color, are heavily concentrated surrounding the SR-41 and Avenue 9 study corridors, and particularly near the southern end of SR-41. Low-income communities also represent a significant portion of Fresno and Madera County. Over 25% and 22% of Fresno and Madera County residents, respectively, live in poverty. Low-income communities include households who fall below 80% of the statewide median income and households who have a housing burden exceeding 30% of their income. Low-income communities are widespread throughout both counties, but are particularly concentrated along SR-41.

Given that Fresno and Madera Counties are home to communities that have been historically neglected or harmed, it is important for this study and future projects to proactively address equity and avoid perpetuating injustice. By engaging with diverse communities and communities that have not been previously engaged, future projects can benefit from local knowledge and lived expertise to solve current and future transportation issues. Additionally, if projects create solutions for those who would benefit the most, they will work for everyone. This is especially important because marginalized communities are disproportionately affected by adverse health or environmental effects and are often less prepared to face the hazards. In addition, improvements made to the transportation network should ensure ADA accessibility and that no technological barriers are created.

The study itself aims to understand existing conditions and provide recommendations on what types of transportation projects should be pursued. In the first phase, the team established three primary project principles: Sustainable; Equitable; and Resilient. For the purpose of this study, equity is defined as the ability to have reliable transportation options for all. The equitable goals illustrated below strive to embed the concept of equity into each element of the project. These goals were used as a filter and touchstone for creation of the recommendations and were also implemented into the equity evaluation metrics discussed in Section 5.1.2.

Figure 5.1: Equity Focused Goals



5.1.1 Including Equity Influencing Factors into Future Transportation Projects

While the study itself does not implement transportation projects, the project recommendations have been thought out through an equity lens. Equity does not have a one-size-fits-all approach, but it is important for all local transportation projects to lead with equity. The following are recommendations on incorporating this practice into future projects.

When projects are scoped out, they need to include factors that create a quality equitable outcome. The following factors were recommended by the Urban Sustainability Directors Network (USDN) Guide to Applying an Equity Lens[4]:

- **Clarity and specificity –** Good projects are easily described and understood. They provide specific, concrete goals and progress indicators for both communitywide impacts and reducing racial inequities. This is important because one project cannot solve all equity issues, by making goals that are unique to the specific project areas, projects are more likely to achieve their goals.
- **Ability to impact racial equity –** Good projects identify and address specific racial inequities, whether through the adoption of racial and social impact criteria in decision-making processes, by producing specific benefits and/or mitigating burdens for communities of color, and/or through more authentic, long-term engagement of communities of color in program design and implementation.
- **Capacity building –** Good projects include specific strategies for building the capacity of your team to advance racial equity. You should have internal and/or external partners identified that will support development and implementation of the project. If you do not have current partners, expanding capacity and engagement should be a key part of your strategy.
- **Institutionalizing –** Good projects will aim to institutionalize equity on a long-term basis so that the project doesn't become a "one-off." This can be done by embedding in institutional policy a decision-criteria to promote equity or a requirement to use a racial equity lens in program development. While opportunities to institutionalize equity will likely emerge throughout the course of implementation, if you are thinking about it from the beginning, the likelihood for success will increase. Ultimately, the more you can embed consideration of equity into operations, the more influence you will have.

[4] *Urban Sustainability Director's Network. 2019. "Guide to Applying an Equity Lens a*

The factors above are important in creating a comprehensive equity project; however, it is also recommended that all future project managers and implementers take the Government Equity Assets and Readiness Self-Assessment created by KAPWA Consulting and USDN (Appendix D). This self-assessment allows project managers to better understand where Fresno and Madera Counties are in their readiness and ability to engage with the community and what strategies to implement based on their readiness score. This assessment is not only important for self-awareness but can also guide some of the decision-making on the quality factors mentioned above.[5]

5.1.2 Evaluating Equity in Transportation Solutions

To counter the effects of previous harmful transportation improvements and to actively address them, future transportation recommendations and projects should be evaluated through a clear and specific equity lens. The following is adapted from the City of Austin's Climate & Energy Equity Tool[6] and identifies six areas to measure equity in transportation recommendations for the Corridor Study recommendations. If a proposed recommendation does not fulfil more than half of the themes, it should be revised to stay consistent with equity commitments.

- **Theme 1:** Health Recommendation improves health (physical and mental) outcomes for low-income communities and communities of color. The strategy upholds the right to clean, safe and adequate transportation that does not increase health disparities such as asthma, obesity, and heart disease.
- **Theme 2:** Affordability Recommendation lowers and stabilizes costs related to basic transportation needs for low-income communities and communities of color.
- **Theme 3:** Accessibility Recommendation increases access and connectivity to critical destinations including jobs, health care, education, and food for low-income communities and communities of color. Strategy provides increased opportunities for walking, biking, and transit through improved city transportation infrastructure, policy, and investments.
- **Theme 4:** Just Transition Recommendation ensures economic justice so that low-income communities and communities of color are prioritized in the benefits of the strategy and are protected from any potential negative consequences.
- **Theme 5:** Accountability The proposed recommendation should help foster long-term relationships between low-income communities and local governments. Recommendation ensures that low-income communities and communities of color can hold governments and institutions accountable for equitable implementation.
- **Theme 6:** Community Recommendation supports a vibrant and thriving community and neighborhoods that are comfortable and welcoming for low-income communities and communities of color. The strategy offers shelter from extreme weather and climate impacts, enhances natural and green infrastructure, and supports overall social cohesion (engagement and connection within/to the community). The proposed action address local values in order to support implementation.

[5] *KAPWA Consulting and Urban Sustainability Directors Network. 2019. "Government Equity Assets and Readiness Self-Assessment"*
[6] *City of Austin. 2020. "Austin Community Climate Plan (ACCP) Update Equity Tool Process"*

5.2 Sustainability Best Practices

The recommended projects and strategies were also developed following sustainability best practices. Traditionally, transportation projects have had a negative impact on the air quality and environmental health within minority and low-income communities. This has historically led to larger resiliency and health challenges within these same communities. Therefore, it is crucial to consider sustainability concerns into this study and future project recommendations to improve current environmental conditions and mitigate future climate change impacts within disadvantaged communities and the region as a whole.

5.2.1 Including Sustainability into Future Transportation Projects

The project recommendations have been made with the long-term sustainability of the region in mind. Given that community members each have a unique set of transportation needs, sustainable transportation alternatives should take a multi-modal approach. This ensures that there are a multitude of transportation alternatives available to the public and ensures that access to sustainable alternatives is distributed equitably throughout the community as well. The following are recommendations on incorporating this practice into future projects.

- **Energy Efficiency –** Proposed improvements should minimize the amount of energy needed to power their use. Additionally, improvements should be powered by renewable energy sources, including solar energy, whenever possible. Encouraging energy efficient facilities will have positive impacts on regional air quality and climate goals.
- **Less Dependence on Cars –** Proposed improvements should both create new sustainable alternatives to cars and improve existing transit service and active transportation infrastructure to encourage higher use. Encouraging a community culture that depends less on cars will also have a positive impact on air quality, as less GHG will be emitted from vehicles.
- **Electrification –** Electrification should be encouraged for personal vehicles, bus fleets, and multi-modal mobility hubs. In addition, new charging facilities that do not require significant amounts of curb space should be implemented, including wireless charging facilities wherever possible.
- **Greener Areas –** Green areas, such as pocket parks or urban greening programs, can provide more shade on extreme heat days, reduce the impacts of the urban heat island effect, and provide community meeting spaces.
- **Accessibility –** Access to sustainable transportation alternatives must be distributed equally throughout all communities, but in priority within low-income and minority communities. Moreover, sustainable transportation alternatives must meet the specific needs of the communities that they are in to ensure that travelers can reach their destination safely, efficiently, and comfortably.

5.3 Sustainable Corridor Management Strategies List

The draft project list of policies, studies, and projects was further classified by bundling projects by improvement area. Categories included highway, roadway/arterial, transit, active transportation, and climate resiliency and multimodal improvements. Moreover, projects were further classified into near, mid, and long-term projects. Near-term projects were those anticipated to be initiated within 5 years, Mid-term projects were those anticipated to be initiated within 5-15 years, and Long-term projects were those anticipated to be initiated after 15 years.

Once the draft project list had been finalized, it was then presented to the public for their input and to gather their local expertise. This was done through two stakeholder meetings, a public workshop, and through ongoing surveys and access to the project's information center. Feedback from each round of community engagement was then integrated into the final list of sustainable corridor management strategies presented in Table 5.1 below.

Figure 5.1: Sustainable Corridor Management Strategies – SR-41 Southern Corridor

SR-41 Southern Corridor					
Project Goals to Address	**Highway** • Congestion • Air Quality • Traffic Management • Local economy	**Arterial** • Congestion • Air Quality • Traffic Management • Local economy	**Public Transit** • Access • Connected • Local Economy	**Active Transportation** • Walking & Biking • Access • Connected • Safety	**Multi-Modal/Climate Resiliency** • Air Quality • Traffic Management • Access • Resilience
Policies	Actively mitigate negative air quality impacts when implementing new highway infrastructure Prioritize highway improvement projects that would reduce emissions and improve air quality	Pursue roadway improvements which support transit and complete streets, as well as connectivity between modes	Develop a well-integrated multi-modal transportation environment on highways and local corridors which supports the expansion of local public transit, micro-mobility, high-speed rail, park & ride facilities	Promote the construction of a safe, efficient, and well-connected bicycle network	Provide commuters and travelers with convenient alternatives to single occupant vehicle travel
	Promote highway improvements that facilitate the movement of goods to SR-99	Encourage the use of sustainable building materials and green infrastructure in transportation improvement projects	Ensure that access to public transit is achieved equitably, particularly in communities of concern including low-income communities, senior or disabled communities, and minority communities along the entire corridor	Create an active transportation network that is well integrated with the public transit network	Provide for reliable, affordable, and efficient travel, particularly for transit and Active Transportation
	Capitalize on existing and future technology to support traffic management	Actively mitigate negative air quality impacts when implementing new roadway infrastructure	Provide high-frequency and efficient public transit that connects passengers to key travel demand locations or to other transit connections	Promote multi-jurisdictional collaboration to ensure connectivity of the active transportation network	Transition to 100 percent zero emission bus and vanpool fleets by 2030 (Innovative Clean Transit Regulation)
		Capitalize on existing and future technology to support traffic management and manage congestion	Capitalize on existing and future technology to support travel time reliability and increase transit competitiveness	Support technology upgrades that increase safety for pedestrians and cyclists.	Capitalize on existing and future technology to support integration of modes and improve information sharing with all users of the road
		Support roadway improvement projects and policies that improve safety for all users	Promote a multi-jurisdictional collaboration between Fresno and Madera Counties and YARTS for transit services to ensure connectivity and seamless transfers on long distance trips	Adopt enhanced bicycle parking requirements at residential, commercial, transit stations, and recreational locations	Promote strategies to increase the urban tree canopy and landscape cover through incorporation in roadway and transit projects

SR-41 Southern Corridor					
Project Goals to Address	**Highway** • Congestion • Air Quality • Traffic Management • Local economy	**Arterial** • Congestion • Air Quality • Traffic Management • Local economy	**Public Transit** • Access • Connected • Local Economy	**Active Transportation** • Walking & Biking • Access • Connected • Safety	**Multi-Modal/Climate Resiliency** • Air Quality • Traffic Management • Access • Resilience
Policies	Modeling the creation of on-street throughways for local traffic and development of substantial bike infrastructure.	Promote roadway improvements that facilitate the movement of goods to SR-99	Designate Transit Priority Areas where there are high densities of transit and employment, commercial, and residential uses to increase transit ridership	Provide incentives to increase travel by active modes and that supports an active & healthy lifestyle	Provide shade, cooling measures, etc. to support walking and the use of public transportation
		Support deployment of private and public electric vehicles as well as EV supportive infrastructure to reduce the impacts of greenhouse gas emissions from transportation sources		Encourage walking through improved sidewalks, safe intersections, and treatments that shorten the perceived walking distances through architectural features, landscaping features, or building-to-street design	Support resilient design of transportation infrastructure to better withstand extreme weather events
		Support deployment of private and public electric vehicles as well as EV supportive infrastructure to reduce the impacts of greenhouse gas emissions from transportation sources		Support transportation improvement projects that address the needs of the most vulnerable groups of the population	Coordinate with Fresno COG and FAX to incorporate future High-Frequency Transit, local bus service, micro-mobility, and future micro-transit services with a mobility hub into transit priority areas to create a strong transit connection
Studies			Transit accessibility study - analyze the time it takes for residents along SR-41 N to use transit to reach economic and educational opportunity centers, commercial centers, etc. This data can then be used to calculate a "regional access score" for comparison between residential areas.	Safe routes to school program that utilizes collision data and community engagement to identify key locations for analysis/ improvement (Blackstone Avenue, N Fresno Street, N Palm Avenue)	Evacuation traffic study/ Community Evacuation Route Studies. Information gathered through this assessment will be critical as climate change increases the intensity and frequency of natural disaster.
			Consider future Freeway Express Bus Concept study; build on existing Route 1 BRT and study the possibility of an expanded network, which could incorporate a route along SR- 41.	Class IV bikeway connectivity study along the entire southern portion of SR-41	Evacuation traffic study/ Community Evacuation Route Studies. Information gathered through this assessment will be critical as climate change increases the intensity and frequency of natural disaster.

SR-41 Southern Corridor						
Project Goals to Address		**Highway** • Congestion • Air Quality • Traffic Management • Local economy	**Arterial** • Congestion • Air Quality • Traffic Management • Local economy	**Public Transit** • Access • Connected • Local Economy	**Active Transportation** • Walking & Biking • Access • Connected • Safety	**Multi-Modal/Climate Resiliency** • Air Quality • Traffic Management • Access • Resilience
Near (<5 years)	**Projects**	Implement HOV lanes along SR- 41 N between Van Ness Ave and SR- 180	Facilitate freeway access and safety with auxiliary lane along SR- 41 from Ashlan Ave to Shaw Avenue; FCOG expected completion date Dec 2023	Traffic signal coordination along corridors with high vehicular volumes including Palm Ave & Sierra Ave, Palm Ave & Barstow Ave, Palm Ave & Gettysburg Ave, Palm Ave & Olive Ave	Enhance bus operations with strategies that include bus queue jumps, traffic signal priority, mobile ticketing, and sections with bus only lanes.	AQ sensors on bus fleets; provides an opportunity to monitor the air quality in neighborhoods along FAX fleet route and can assist the region in monitoring/ meeting emission reductions efforts; this is being introduced within other transit agencies in the US and could be beneficial in Fresno/ Madera County given air quality concerns in the region
		Add an auxiliary lane to NB SR-41 between Ashlan Avenue to Shaw Avenue	Intersection improvements, to include dashed pavement markings to delineate vehicles turning, marked advanced stop lines, and protected right turn lanes to improve safety such as at Shaw Avenue & Blackstone Avenue, Palm Avenue & Clinton Avenue, Ashlan Avenue & Fresno Street, Blackstone Avenue & Shaw Avenue, Shaw Avenue & Fresno Street, Blackstone Avenue & Bullard, Blackstone Avenue & Herndon Avenue, Palm Avenue & Herndon Avenue, McKinley Avenue & Van Ness Avenue	Administer a traveler information program which consolidates multi-modal transportation/ commute alternative options into a singular app-interface which reflects time/cost savings per mode. Also include active transportation modes within this interface	Upgrade current planned Class II and III bikeways to separated bikeways: Maple Avenue, Wishon Avenue, Blackstone Avenue, Abby Avenue, First Street, P Street, Palm Avenue, Belmont Avenue, Van Ness Avenue	Pursue an Urban Greening program throughout this segment of the study corridor which expands the urban tree canopy and invests in green infrastructure including community gardens and vegetative buffers alongside the corridor and surrounding roadways
		Add an auxiliary lane to SB SR-41 between Bullard Ave to Herndon Avenue		Extend the Vanpool network and offer incentives to employers and employees to increase participation		Identify locations for EV charging stations (multimodal mobility hubs amongst others)
		Add an auxiliary lane to NB SR-41 between Bullard Ave to Herndon Avenue		Explore the possibility of a High-Frequency Transit (HFT) route from Madera County to Downtown Fresno. An HFT route could use HOV lanes from Van Ness Ave to SR 180 to better connect new Madera County Communities to Downtown Fresno and other key destinations.	Bike facilities improvements identified in the FCOG 2018 RTP Constrained Project List	Designate "multi-modal corridors": Blackstone Ave (from W Nees Avenue - Divisadero Street), N Fresno St (from N Friant Road - E Clinton Avenue)
				Introduce micro-transit, "flexible fleet" pilot program in Downtown Fresno and SE Fresno (where population density is high, but transit ridership is low) for neighborhood trips and for connections to fixed route lines for longer trips	Wayfinding signage to direct active transportation users to major destinations, transit, key routes, etc.	Introduce shade structures at bus stops and in areas with high pedestrian traffic downtown, including Fulton Street (Mariposa Street - Kern Street), H Street (Tulare Street - Mono Street)
				Improve bus stop conditions along the FAX service route to include landscaping & shade, street furniture, improved lighting, and real time travel information & other ITS benefits including occupancy levels for an approaching bus	Downtown protected bikeways near future CAHSR station: H Street, Fulton Street, Blackstone Avenue	

SR-41 Southern Corridor						
Project Goals to Address		**Highway**	**Arterial**	**Public Transit**	**Active Transportation**	**Multi-Modal/Climate Resiliency**
		• Congestion • Air Quality • Traffic Management • Local economy	• Congestion • Air Quality • Traffic Management • Local economy	• Access • Connected • Local Economy	• Walking & Biking • Access • Connected • Safety	• Air Quality • Traffic Management • Access • Resilience
Mid (5-15 years)	**Projects**	Implement HOV lanes along SR-41 between SR-180 and the Madera County Line	Increase landscaping in medians and include bioswales along major arterials including First Ave (McKinley Avenue - E Magill Avenue), Blackstone Avenue (McKinley Avenue - W Nees Avenue), Shields Avenue (N Fruit Avenue - N Cedar Avenue), Herndon Avenue (W Van Ness Boulevard - N Cedar Avenue), Shaw Avenue (N Fruit Avenue - N Cedar Avenue)	Introduce multimodal mobility hubs which includes scooter/bike/ride/car share, Delivery Pick Up-Drop Off locations, Bus, Micro transit services at locations such as: Fresno Station (Tulare Street & P Street), Fresno CC (Blackstone Avenue & E Weldon Avenue), RiverPark Shopping Center (Blackstone Avenue & W Nees Avenue), Kaiser Permanente Medical Center (N Fresno Street & N Howard Street), VA Medical Offices (N Fresno Street & E Clinton Avenue), CRMC (Fresno Street & Divisadero Street), CSU Fresno (E Shaw Avenue & N Maple Avenue)	Bike share near transit stations, major activity and em-ployment centers, and educational uses	LoNo Emission Vehicle Program; this is a program introduced by the FTA that is seeking to introduce Low to No emission bus fleet vehicles
			Increase landscaping in medians and include bioswales along major arterials including First Ave (McKinley Avenue - E Magill Avenue), Blackstone Avenue (McKinley Avenue - W Nees Avenue), Shields Avenue (N Fruit Avenue - N Cedar Ave-nue), Herndon Avenue (W Van Ness Boulevard - N Cedar Avenue), Shaw Avenue (N Fruit Avenue - N Cedar Avenue)	Micro-transit connections to key travel demand loca-tions such as CSU Fresno, Kaiser Permanente Fresno Medical Center, Fashion Fair Mall, and the River Park Shopping Center.	Downtown environment provides opportunity for landscaping and amenities for active transportation users.	Implement/Expand solar program for street lighting and signs
			Implement Complete Streets improvements on surrounding corridors near future CAHSR station (H street)	Explore Freeway Express Bus/High Frequency Transit (HFT) route along SR-41, connecting new Madera County communities to Downtown Fresno and other key destinations in Fresno County for routes including 32 and 34.		Introduce “cool pavements” in communities surrounding SR-41, such as reflective paving, water retentive permeable pavement to reduce the urban heat island effect
				Extend weekend service hours and increase the frequency of FAX routes to every 10-15 minutes.	Extend Class I bike path on Kearney Boulevard going west to Goldenrod Elementary	Use reclaimed asphalt pavements (RAP) or recycled material components (RMCs) in pavement treatments when road repairs are needed. RMCs are generated from industrial by-products and can reduce GHG emissions.

SR-41 Southern Corridor						
Project Goals to Address		**Highway**	**Arterial**	**Public Transit**	**Active Transportation**	**Multi-Modal/Climate Resiliency**
		• Congestion • Air Quality • Traffic Management • Local economy	• Congestion • Air Quality • Traffic Management • Local economy	• Access • Connected • Local Economy	• Walking & Biking • Access • Connected • Safety	• Air Quality • Traffic Management • Access • Resilience
Mid (5-15 years)	**Projects**	Implement HOV lanes along SR-41 between SR-180 and the Madera County Line	Implement Complete Streets improvements on surrounding corridors near future CAHSR station (H street)	Extend weekend service hours and Increase the frequency of FAX routes to every 10 minutes	Crosswalk improvements including curb extensions, raised intersections, high visibility crosswalks, and pedestrian crossing beacons at locations such as Blackstone Avenue & Herndon Avenue, Blackstone Avenue & Shaw Avenue, Palm Avenue & Herndon Avenue, Shaw Avenue & N First Street, Tulare Street & Van Ness Avenue, Tulare Street & H Street, and G Street & Tulare Street	Introduce bioswales and porous pavement on landscaping surrounding corridors or in landscaped medians Develop cooling station program that provides an efficient and environmentally-friendly way to cool multiple buildings. This will become increasingly important as the Fresno area begins to experience more extreme heat days in response to climate change.
					Bicycle intersection improvements (i.e. green transition lanes) where SR-41 meets new bicycle facilities	Develop parklets at key locations along corridor including at Fresno CC and at H Street & Tulare Street

SR-41 Southern Corridor						
Project Goals to Address		**Highway**	**Arterial**	**Public Transit**	**Active Transportation**	**Multi-Modal/Climate Resiliency**
		• Congestion • Air Quality • Traffic Management • Local economy	• Congestion • Air Quality • Traffic Management • Local economy	• Access • Connected • Local Economy	• Walking & Biking • Access • Connected • Safety	• Air Quality • Traffic Management • Access • Resilience
Long (15+ years)	**Projects**	Shields Avenue Interchange Improvement: Expand the NB off ramp to 2 lanes for the full length			Bicycle intersection improvements (i.e. green transition lanes) where SR-41 meets new bicycle facilities	Deploy Microgrid systems to optimize energy consumption in communities along SR-41 S
		Ashlan Avenue Interchange Improvement - Reconfigure interchange to either a Single Point Urban Interchange (SPUI) or a Diverging Diamond configuration. Additional study required				
		Shaw Avenue Interchange Improvement – Add a 3rd lane to the SB on ramp for ramp meter queuing and a 3rd lane to the SB off-ramp at the terminus				
		Bullard Avenue Interchange Improvement - Re-configure interchange to either a Single Point Urban Interchange (SPUI) or a Diverging Diamond configuration. Additional study required to determine the appropriate design.				

Figure 5:2: Sustainable Corridor Strategies – SR-41 Northern Corridor

SR-41 Northern Corridor					
Project Goals to Address	**Highway**	**Arterial**	**Public Transit**	**Active Transportation**	**Multi-Modal/Climate Resiliency**
	• Congestion • Air Quality • Traffic Management • Local economy	• Congestion • Air Quality • Traffic Management • Local economy	• Access • Connected • Local Economy	• Walking & Biking • Access • Connected • Safety	• Air Quality • Traffic Management • Access • Resilience
Policies	Create multiple paths of travel that alleviate congestion on the highway and redirect local traffic to transit, carpool and other alternative modes	Pursue roadway improvements which will promote sustainable development of new roadways and rehabilitation of existing roadways	Promote a multi-jurisdictional collaboration for transit services to ensure connectivity and seamless transfers on long distance trips	Adopt bicycle parking requirements at residential, commercial, transit stations, and recreational locations	Provide commuters and travelers with convenient alternatives to single occupant vehicle travel
	Actively mitigate negative air quality impacts when implementing new highway infrastructure Prioritize highway improvement projects that would reduce emissions and improve air quality	Create EV supportive infrastructure utilizing state and regional funding incentives.	Develop a well-integrated multi-modal transportation environment on highways and local corridors which support the expansion of public transit	Provide incentives to increase travel by active modes and that supports an active & healthy lifestyle	Provide for reliable, affordable, and efficient travel, particularly for transit and Active Transportation
	Capitalize on existing and future technology to support traffic management and manage congestion	Encourage the use of sustainable building materials for new roadways and green infrastructure for treatments surrounding the corridor	Provide high-frequency and efficient public transit that connects passengers to key travel demand locations or to other transit connections	Support technology upgrade that will increase safety for pedestrians and cyclists.	Coordinate with Fresno COG and FAX to incorporate future High-Frequency Transit, local bus service, micro-mobility, and future micro-transit services with a mobility hub into transit priority areas to create a strong transit connection
		support deployment of private and public electric vehicles to reduce the impacts of greenhouse gas emissions from transportation sources	Capitalize on existing and future technology to support travel time reliability and increase transit competitiveness	Encourage walking through improved sidewalks, safe intersections, and treatments that shorten the perceived walking distances through architectural features, landscaping features, or building-to-street design	Capitalize on existing and future technology to support integration of modes and improve information sharing with all users of the road
		Capitalize on existing and future technology to support traffic management and manage congestion	Designate Transit Priority Areas where there are high densities of transit and employment, commercial, and residential uses to increase transit ridership	Support transportation improvement projects that address the needs of the most vulnerable groups of the population	Provide shade, cooling measures, etc. to support walking and the use of public transportation

SR-41 Northern Corridor					
Project Goals to Address	**Highway**	**Arterial**	**Public Transit**	**Active Transportation**	**Multi-Modal/Climate Resiliency**
	• Congestion • Air Quality • Traffic Management • Local economy	• Congestion • Air Quality • Traffic Management • Local economy	• Access • Connected • Local Economy	• Walking & Biking • Access • Connected • Safety	• Air Quality • Traffic Management • Access • Resilience
Policies		Support roadway improvement projects and policies that improve safety for all users	Ensure that new neighborhoods include transit stops that connect to the countywide transit system, and that are within a quarter mile from all dwelling units	Support transportation improvement projects that address the needs of the most vulnerable groups of the population	Support resilient design of transportation infrastructure to better withstand extreme weather events
Studies			Freeway express bus concept study	San Joaquin River bikeway feasibility study; San Joaquin River Conservancy has expressed an interest in contributing funding toward enhanced recreational trails along the periphery of SR- 41. These trails could also be utilized as vital active transportation connections along the corridor.	Coordinate with Fresno COG and FAX to incorporate future high-frequency transit, local bus service, micro-mobility, and future micro-transit services with a mobility hub into transit priority areas to create a strong transit connection
			Transit accessibility study - analyze the time it takes for residents along SR- 41 N to use transit to reach economic and educational opportunity centers, commercial centers, etc. This data can then be used to calculate a "regional access score" for comparison between residential areas.	Bikeway connectivity study; study potential bikeway connections throughout new developments and bikeways surrounding SR- 41 N	
			Introduce a traffic signal at the intersection of Road 40 1/2 and Children's Boulevard, at Road 40 1/2 and Avenue 10, at Lanes Bridges Dr and Ave 10, and at SR-41-B and Avenue 12.	Safe routes to school program that utilizes collision data and community engagement to identify key locations for analysis/ improvement	

SR-41 Northern Corridor						
Project Goals to Address		**Highway**	**Arterial**	**Public Transit**	**Active Transportation**	**Multi-Modal/Climate Resiliency**
		• Congestion • Air Quality • Traffic Management • Local economy	• Congestion • Air Quality • Traffic Management • Local economy	• Access • Connected • Local Economy	• Walking & Biking • Access • Connected • Safety	• Air Quality • Traffic Management • Access • Resilience
Near (<5 Years)	**Projects**	Expand SB off ramp at Children's Boulevard from 1 lane to 2 lanes	Introduce a traffic signal at the intersection of Road 40 1/2 and Children's Boulevard, at Road 40 1/2 and Avenue 10, at Lanes Bridges Drive and Avenue 10, and at SR-41B and Avenue 12.	Implement express bus/freeway-based BRT alignment along SR-41 to better connect new communities to destinations in Fresno County	Bikeway connections between western side of SR-41 to eastern side of the corridor along San Joaquin river as proposed in the River West-Madera Master Plan. The multi-use path proposed by this plan will eventually extend from SR-99 to Friant Dam, located to the east of SR-41. The first 2.7-mile segment of this trail will extend from near the Madera County Line to Avenue 9.	Identify location for park-and-ride facility in Madera County between Avenue 15 and Children's Blvd
		New freeway on/off ramps at Avenue 12/ SR-41.		Introduce a student bus pass program with Madera CC students/faculty	Separated bikeway along SR-41 from the Madera County Line	Develop partnership linking transit and first-last mile service such as bike shares
				Introduce a new MCC route that travels along SR-41 N from the Madera County line, along W Avenue 15, and toward the Madera Metro Transit Center SR-41	Separated bikeway along SR-145 from SR-99 to Road 206 (east of SR-41)	AQ sensors on bus fleets; provides an opportunity to monitor the air quality in neighborhoods along FAX fleet route and can assist the region in monitoring/ meeting emission reductions efforts; this is being introduced within other transit agencies in the US and could be beneficial in Fresno/ Madera County given air quality concerns in the region
				Introduce a micro transit pilot program in the Rio Mesa Community and other areas underserved by transit areas	Separated bikeway along Avenue 15 from SR-145 to SR-41	Pursue an Urban Greening program throughout this segment of the study corridor which expands the urban tree canopy and invests in green infrastructure including community gardens and vegetative buffers alongside the corridor and surrounding roadways
				Introduce "multimodal mobility hubs" which includes scooter/bike/ride/car share, Delivery Pick Up-Drop Off locations, Bus, Micro transit services at: Valley Children's Hospital (Children's Blvd & Goodwin Way), Madera Ranchos (Avenue 12 1/2 & Rd 36, Riverstone Development (SR-41& Avenue 12)	Bike lane along Rd 36 from SR-145 to Avenue 9	Identify locations for EV charging stations (multimodal mobility hubs amongst others)

SR-41 Northern Corridor						
Project Goals to Address		**Highway** • Congestion • Air Quality • Traffic Management • Local economy	**Arterial** • Congestion • Air Quality • Traffic Management • Local economy	**Public Transit** • Access • Connected • Local Economy	**Active Transportation** • Walking & Biking • Access • Connected • Safety	**Multi-Modal/Climate Resiliency** • Air Quality • Traffic Management • Access • Resilience
Near (<5 Years)	**Projects**	New freeway on/off ramps at Avenue 12.	Introduce a traffic signal at the intersection of Road 40 1/2 and Children's Boulevard, at Road 40 1/2 and Avenue 10, at Lanes Bridges Drive and Avenue 10, and at SR-41B and Avenue 12.	Improve bus stop conditions along the MCC service route to include landscaping & shade, street furniture, improved lighting, and real time travel information	Bicycle intersection improvements (i.e. green transition lanes) where SR-41 meets new bicycle facilities: SR-145, Avenue 15, Riverstone Trails, Tesoro Viejo Trails)	Administer a traveler information program which consolidates multi-modal transportation/ commute alternative options into a singular app-interface which reflects time/cost savings per mode
				Extend the Vanpool network and offer incentives to employers and employees to increase participation	Introduce sidewalks along Children's Blvd from SR-41 - Peck Boulevard, and along Avenue 12 from SR-41 N - Riverstone Boulevard	Introduce shade structures at bus stops and at waiting areas at Valley Children's Hospital
				Introduce a micro transit pilot program in the Rio Mesa development to connect travelers to MCC VCH Route	Introduce pedestrian crossing and pedestrian crossing beacons at Children's Blvd and Peck Blvd intersection	
				Introduce a micro transit pilot program in the Rio Mesa development to connect travelers to MCC VCH Route		
Mid (5-15 years)	**Projects**	Widen SR-41 N from 2 lanes to 4 lanes from Avenue 10 to SR-145	Widen Road 40 1/2 from 2 lanes to 4 lanes from Avenue 10 to Avenue 9	Increased bus service hours on Saturdays to Clovis Community College campus, as well as a connection from Fresno.	Multi-use path along San Joaquin river	LoNo Emission Vehicle Program; this is a program introduced by the FTA that is seeking to introduce Low to No emission bus fleet vehicles
				Additional YARTS stops along SR-41 at Avenue 9 and Avenue 10.	Multi-use paths throughout planned developments along SR-41 N (Gunner Ranch West, Tesoro Viejo, Riverstone)	Develop parklets at key locations along corridor
				Introduce a multi-jurisdictional BRT line that connects Valley Children's Hospital to workers living in Fresno County.	Multi-use path along Friant Road from SR-41 to Millerton Road	
Long (15+ years)	**Projects**	Implement HOV lanes along SR-41 between the Madera County Line and Children's Boulevard				Deploy Microgrid systems to optimize energy consumption in communities along SR-41 S
						Introduce Solar Roads on collector/ local roads to power traffic signs, dynamic wayfinding signage, street lights, etc.

Table 5.3: Sustainable Corridor Management Strategies – Avenue 9

Avenue 9					
	Highway	**Roadway**	**Public Transit**	**Active Transportation**	**Multi-Modal/Climate Resiliency**
Project Goals to Address	• Traffic Management • Reduce Congestion • Local Economy • Safety	• Traffic Management • Reduce Congestion • Local Economy • Safety	• Connected • Access • Air Quality	• Walking and Biking • Safety • Access • Connected • Healthy and Well	• Walking and Biking • Safety • Access • Resilience
Policies	N/A	Support roadway reconfiguration that reduce conflicts between freight, agricultural machinery, and private vehicles.	Introduce public transit options along the corridor that better connects passengers to major transportation corridors or transit stations, especially as development along Avenue 9 increases.	Promote the construction of a safe, efficient, and well-connected bicycle network	Prepare for new residential growth surrounding the corridor by planning and creating additional multimodal transportation connections
		Support deployment of private and public electric vehicles to reduce the impacts of greenhouse gas emissions	Capitalize on existing and future technology to support travel time reliability and increase transit competitiveness	Create equitable access to active transportation network by increasing transit frequency, access locations, safety and affordability for neighboring communities	Capitalize on existing and future technology to support integration of modes and improve information sharing with all users of the road
		Capitalize on existing and future technology to support traffic management and manage congestion	Ensure that new neighborhoods include transit stops that connect to the countywide transit system, and that are within a quarter mile from all dwelling units	Support technology upgrade that increase safety for pedestrians and cyclists.	Support resilient design of transportation infrastructure to better withstand extreme weather events
		Actively mitigate negative air quality impacts when implementing new roadway infrastructure		Build on the pedestrian network to support safe walking as development increases along Avenue 9	
		Support deployment of private and public electric vehicles as well as EV supportive infrastructure to reduce the impacts of greenhouse gas emissions from transportation sources			
Studies		Identify potential alternative routes for truck traffic currently traveling along Avenue 9	Freeway bus rapid transit concept study to consider a potential new route that runs along SR-41 N and Avenue 9, offering a connection to SR-99 as well	Class IV bikeway implementation plan along Avenue 9 and for appropriate connections	
		Study to identify the volume and travel patterns of farming equipment along Avenue 9. Also include crash data between farming equipment and other roadway users	Transit accessibility study - analyze the time it takes for residents along SR-41 N to use transit to reach economic and educational opportunity centers, commercial centers, etc. This data can then be used to calculate a "regional access score" for comparison between residential areas.	Build off of the proposed bikeways in the Madera County 2018 Active Transportation Plan	

Avenue 9						
		Highway	**Roadway**	**Public Transit**	**Active Transportation**	**Multi-Modal/Climate Resiliency**
Project Goals to Address		• Traffic Management • Reduce Congestion • Local Economy • Safety	• Traffic Management • Reduce Congestion • Local Economy • Safety	• Connected • Access • Air Quality	• Walking and Biking • Safety • Access • Connected • Healthy and Well	• Walking and Biking • Safety • Access • Resilience
Near (<5 years)	**Projects**	N/A	Introduce speed feedback displays along the corridor at regular intervals	Add additional bus stops in Gunner Ranch West development and in commercial areas	A lane expansion is proposed on Children's Boulevard, thus this is a good opportunity to also include a buffered bikeway from the intersection of Children's Boulevard and the SR-41 N On/Off ramps until the corridor's intersection with Road 40 1/2.	Pursue an Urban Greening program throughout this segment of the study corridor which expands the urban tree canopy, invests in green infrastructure alongside the corridor, and connects to the San Joaquin River Master Parkway Plan
			Widen Children's Avenue from 4 lanes to 6 lanes & include roadway shoulders between SR-41 and Road 40 1/2		Separated bikeway along Avenue 9 from Children's Boulevard to SR-99	Use reclaimed asphalt pavements (RAP) or recycled material components (RMCs) in pavement treatments when road repairs are needed. RMCs are generated from industrial by-products and can reduce GHG emissions.
			Additional wayfinding signage at Lane Bridge Drive, SR-41 On/Off Ramps		Bicycle intersection improvements (i.e. green transition lanes) at Avenue 9 and SR-99	
			Additional lighting along the corridor from Road 40 1/2 to SR-98		Add lighting along new bike facilities on Avenue 9 for bicyclist safety	
			Introduce roadway improvements which facilitate efficient movement for agricultural machinery, such as reversible lanes or shoulder lanes for agricultural use		Introduce sidewalks along Children's Boulevard from SR-41 to Road 40 1/1	
					Improve the bikeway connection between Avenue 9 and the SR-41 Northern Corridor. Green transition lanes can be implemented through the intersection of Children's Blvd and the on/Off ramps of SR-41.	
Mid (5-15 years)	**Projects**		Install roadway shoulders along Avenue 9 from SR-99 to Road 40 1/2	New MCC route along Avenue 9 to provide a better connection for residential developments along SR-41 N. The addition of a dedicated bus lane/ bus treatments could also have indirect traffic calming benefits	A lane expansion is proposed along Avenue 9, which would increase this roadway's capacity from 2 lanes to 4. Thus, there is opportunity to include a Class IV bikeway to ensure bicyclist safety and comfort.	Introduce bioswales and porous pavement on landscaping surrounding corridors and on roadway shoulders
Long (15+ years	**Projects**			Widen Avenue 9 from 2 lanes to 4 lanes from Road 39 to SR-99		Madera County should collaborate with CalFire to identify the most resilient vegetative species which would also enhance the biodiversity of native species along the corridor.
						Incorporate "leisure space" or pocket parks along Children's Boulevard for workers, patients, and visitors

Figures 5.2 through 5.5 reflect the proposed locations for the sustainable corridor management strategies. The maps are categorized by mode, including roadway strategies, transit projects, active transportation strategies, and sustainability projects.

Figure 5.2: Proposed Roadway Strategies

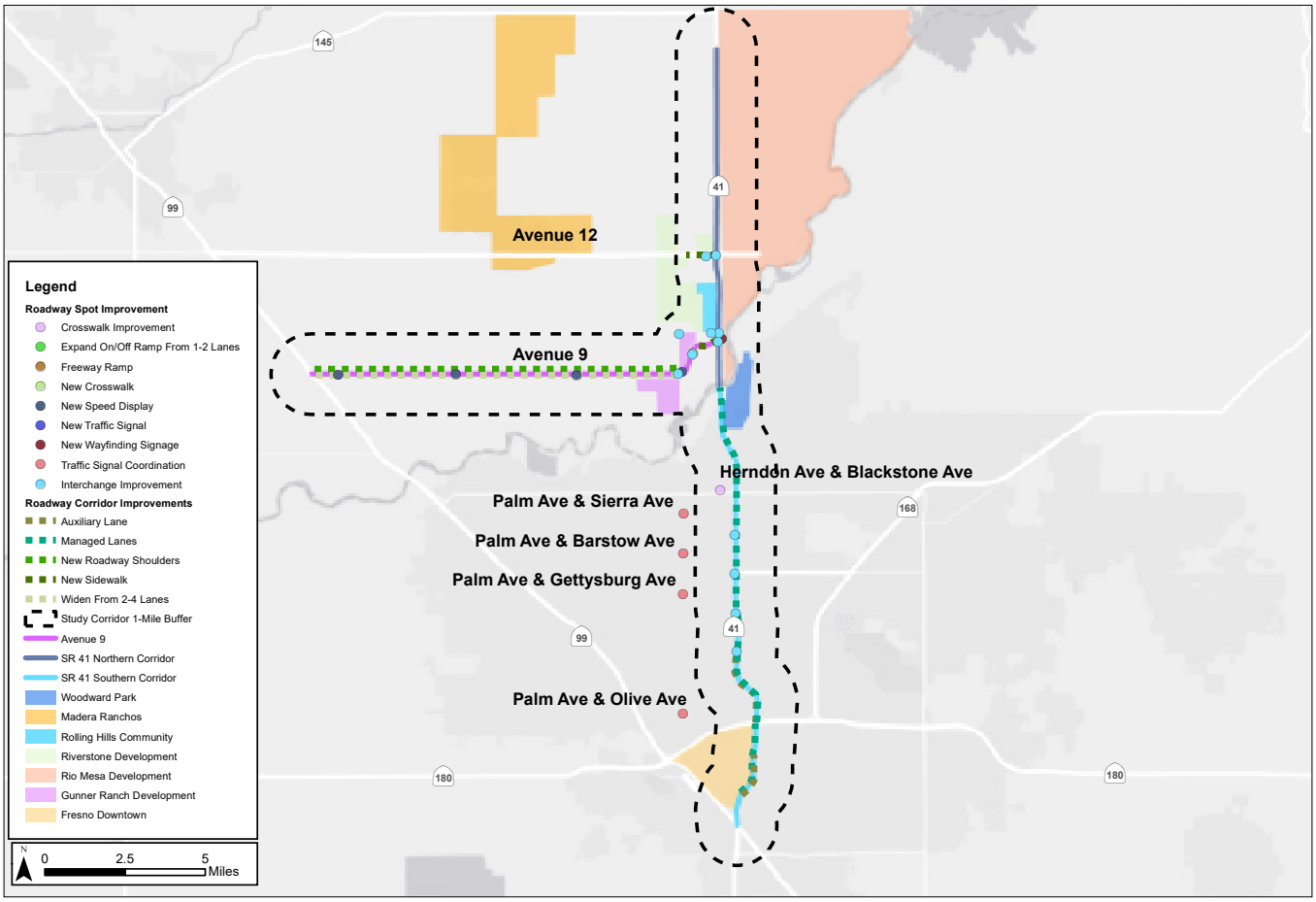


Figure 5.3: Proposed Transit Strategies

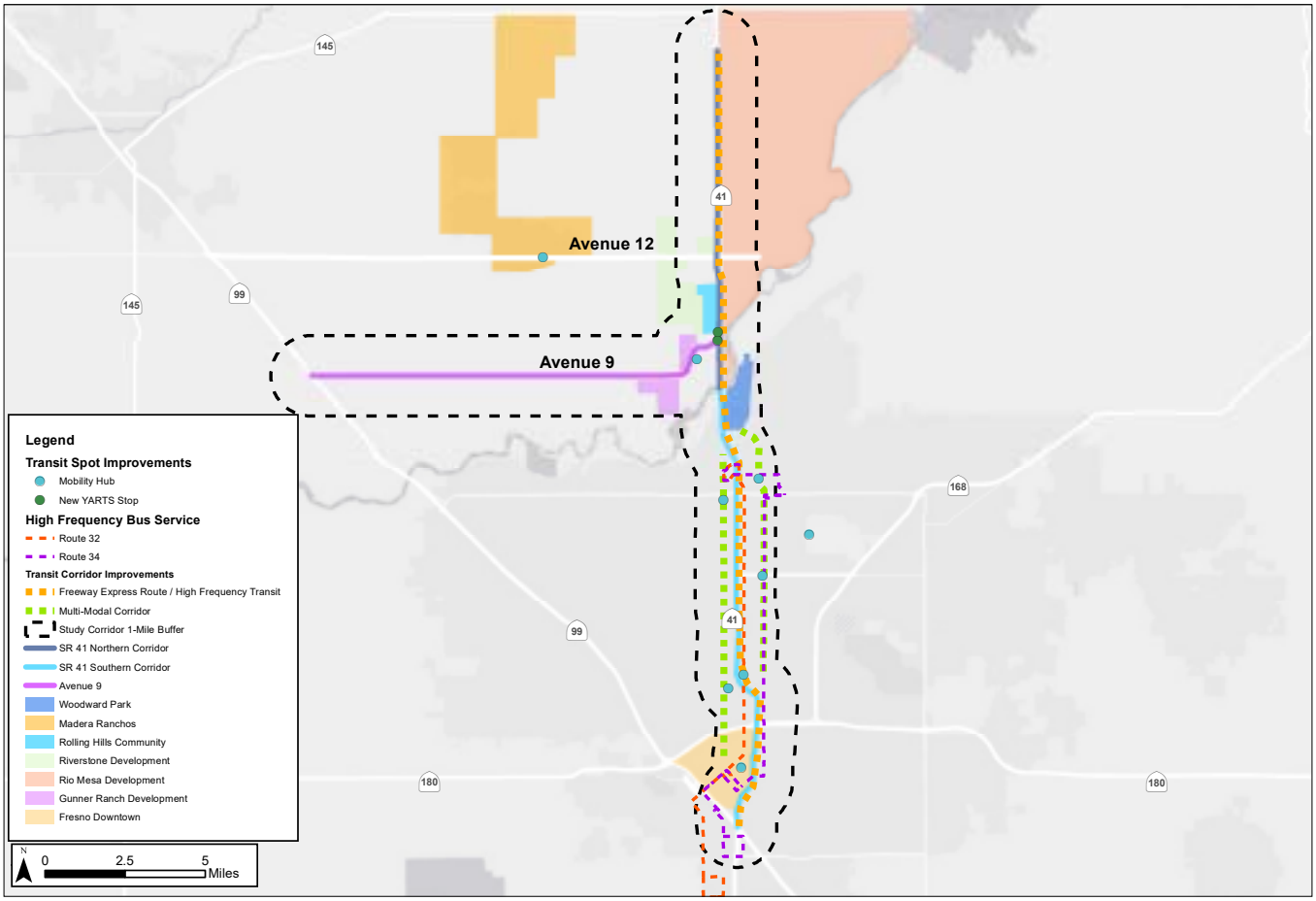


Figure 5.4: Proposed Active Transportation Strategies

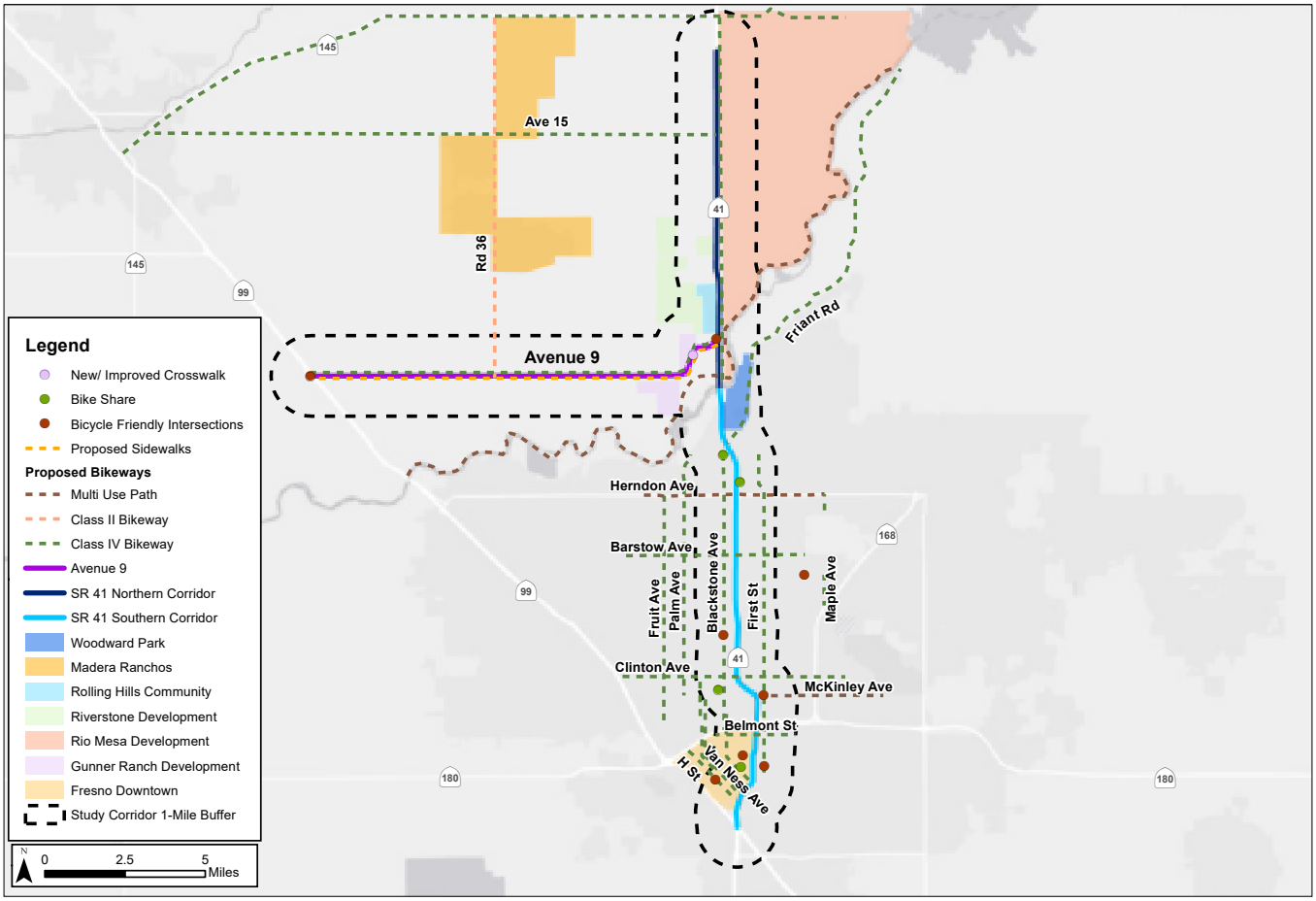
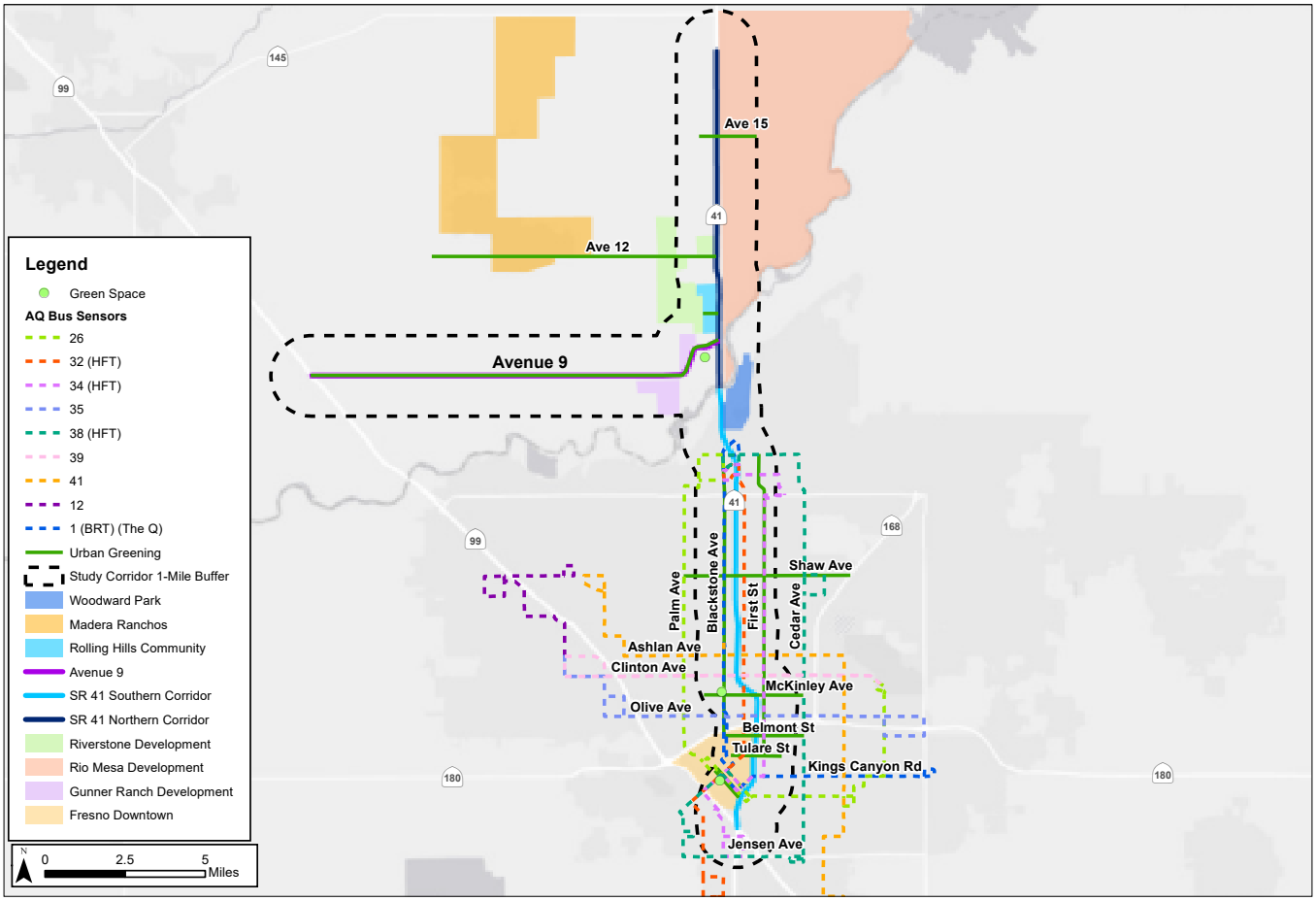


Figure 5.5: Proposed Sustainability Strategies



Figures 5.6 to 5.12 depict key improvement projects proposed along the study corridors, notably:

- The addition of an HOV lane along SR-41, which could eventually be utilized for a freeway BRT service
- The addition of active transportation amenities along Blackstone Avenue to support alternative modes and improve safety
- The implementation of a mobility hub around Fresno City College, including micro transit services and technology
- The design of a multimodal path connecting with existing bike infrastructure along San Joaquin River.
- The widening of Avenue 9 and the addition of a shoulder and protected bike path to reduce conflicts between users and improve safety.

Figure 5.6: High Occupancy Vehicle Lanes Along SR-41

Figure 5.7: Express Bus Service along SR-41

Figure 5.8: Active Transportation Amenities Along Blackstone Avenue

Figure 5.9: San Joaquin River Multi-Modal Path

Figure 5.10: San Joaquin River Multi-Modal Path

Figure 5.11: Avenue 9 Widening and Protected Bicycle Lane

Figure 5.12: Multi-Modal Mobility Hub Near Fresno City College

6.
Alternatives Analysis

The analysis of the proposed alternatives includes the analysis of the model run scenarios provided by the Bi-County ABM, spatial and demographic data, and qualitative factors. Table 6.1 summarizes the guiding principles, goals, objectives, and performance metrics that were used to perform the alternatives analysis. The table also summarizes the approach taken to achieve each of the nine goals and corresponding performance metrics. A more detailed analysis is provided in the following sections.

Table 6.1: Evaluation Approach Summary

GUIDING PRINCIPLE	SR-41/Avenue 9 GOAL	SR-41/Avenue 9 OBJECTIVES	PERFORMANCE METRIC	APPROACH
Sustainability	**Congestion:** Reduce congestion through alternative transportation and technology	• Increase availability of sustainable transportation alternatives • Introduce technology which can streamline multi-modal operation	• Mode Share • Transit On-Time Performance	• Bi-County ABM Model • Transit on-time performance to be monitored by FAX following implementation of new BRT service
	Air Quality: Reduce air pollution from transportation sources along the corridors	• Support the deployment of private and public electric vehicles. • Reduce the use of carbon-based fuels, vehicle miles traveled, and greenhouse gases	• CalEnviroScreen data reflecting percentiles of census tracts exposed to high Ozone and PM2.5 concentrations within the study area • Number of charging stations along the two study corridors • Expansion of electric bus fleet • VMT per capita	• Review of CalEnviroScreen data • Manual counts of charging stations or deployment of wireless charging technology • Percent of Bus fleet being electric • GIS Analysis
	Traffic Management: Manage transportation demand, vehicle miles traveled, and traffic speeds	• Implement traffic management strategies and technologies that increase safety and reduce delays that stem from conflicts between commuters and local users.	• Vehicle Miles Traveled (VMT) • HOV lane person throughput and vehicle occupancy rates • Vehicle Hours Delay (VHD)	• Bi-County ABM Model
	Walking + Biking: Improve infrastructure for walking, biking, and rolling	• Increased development of the regional bikeway and pedestrian networks	• Percentage of sidewalk and bike path coverage • Additional miles of protected and separated bike facilities	• GIS Analysis
Equity	**Access:** Improve access to transit services and non-automobile mobility opportunities	• Support accessible and effective transportation options for vulnerable and transit-dependent populations.	• Percentage of disadvantaged communities located within 0.25 miles of a transit stop	• GIS Analysis
	Connected: Increase connections to residential areas and key employment, education, and recreation opportunities	• Maximize connections to key activity centers and transit priority areas	• Percent of the urban population within 0.25 miles of a transit stop • Average commute time to employment and education centers	• GIS Analysis
	Safety: improve safety for pedestrians, cyclists, and vehicular traffic	• Support the design of infrastructure that improve safety for all users of the road.	• Number of fatalities and serious injuries reported in annual SWITRS data • Crash modification factors by alternative	• Review of SWITRS data Crash Reduction Factor Analysis developed based on the Desktop Reference for Crash Reduction Factors provided by the U.S. DOT FHWA.[7]
Resiliency	**Local Economy:** Support local businesses through improved access and placemaking	• Create opportunities for residents and visitors to frequent local businesses	• Percent of residents within a mile of a commercial street/ area	• GIS Analysis
	Healthy & Well: Support active and healthy lifestyles within the community	• Support the development of infrastructure that support physical activity	• Data reflecting percentiles of census tracts with Asthma and Cardiovascular disease within the study area • Percent of residents within 0.25 miles of urban green space, urban trails or community parks	• Review of CalEnviroScreen data • GIS Analysis.

[7] *US DOT FHWA. 2007. "Desktop Reference for Crash Reduction Factors".*

Table 6.2 summarizes the model run scenarios from the Bi-County ABM used to understand how the proposed sustainable corridor management strategies would impact travel patterns in the study area. The runs isolate some key projects to determine their specific impacts. They however all include transit and active transportation improvements, as these are key elements of a sustainable and equity approach, and to capture the added benefits of multimodal synergies. Finally, Scenario 5 combines all the projects to assess the overall impacts of the plan. A complete list of projects run through the model is provided in Appendix E.

Table 6.2: Model Run Scenarios Summary

RUN	PROJECT	HIGHWAY	TRANSIT	ACTIVE TRANSPORTATION
SN1	SR-41 highway (auxiliary lanes) + transit + Active Transportation (AT)	3 projects	6 projects	15 projects
SN2	SR-41 highway (HOV lane) + transit + AT	3 projects	6 projects	15 projects
SN3	SR-41 highway (new ramp, expanded ramp capacity, and road widening) + transit + AT	4 projects	6 projects	15 projects
SN4	Avenue 9 (widen roadway) + transit + AT	3 projects	6 projects	15 projects
SN5	All highway in previous 4 runs + transit + AT	13 projects	6 projects	15 projects

6.1 Congestion

6.1.1 Congestion Performance Metrics

- Mode Share
- Transit On-Time Performance

6.1.2 Analysis

The improvements proposed through the SR-41/Avenue 9 Sustainable Corridors Study aim to reduce congestion both along the study corridors and within the region. However, considering the low levels of congestion recorded, the focus is on promoting alternative modes of transportation as opposed to capacity increases. Changes in mode share are a good indicator in projects' ability to offer a competitive alternative to single-occupancy vehicles.

The Fresno-Madera Bi-County ABM provides an output reflecting mode share within Transportation Analysis Zones (TAZ). However, the model has some limitations in its ability to measure the impact active transportation projects. Projects that could not be modeled are listed below:

HIGHWAY PROJECTS	TRANSIT PROJECTS	ACTIVE TRANSPORTATION PROJECTS
Complete street improvements	Improved bus stop amenities	Bicycle intersection improvements
Install traffic signals	YARTS stops	Bike share
Interchange/ intersection improvements	Extend weekend service and increase frequency	Crosswalk improvements
Add street lights	Micro-transit connections	Landscaping & amenities
Add raised/ landscaped medians	Multi-modal mobility hub	Lighting
Reversible HOV lanes	Operational improvements (signal priority, queue jumps)	Multi-use path
Reversible lane/ shoulder lanes	Traveler information app	Pedestrian crossing and beacons
Roadway shoulders	Vanpool program and participation incentives	Sidewalk
Speed displays	Improved bus stop amenities	Wayfinding signage
Traffic signal coordination		
Wayfinding signage		

**Note: Sustainability projects cannot be modeled*

Figures 6.1 and 6.2 reflect segments where traffic is flowing slower than the posted speed limit. This is used to indicate traffic congestion. The figures below reflect the traffic speeds under model scenario SN5, as this scenario includes all proposed sustainable corridor management strategies. When compared to figures 2.11 through 2.15, pockets of traffic congestion along the arterials surrounding SR-41 are relieved. This indicates that the proposed sustainable corridor management strategies had a positive impact on traffic efficiency and congestion.

Figure 6.1: Scenario 5: Traffic Speeds During AM Peak Hour

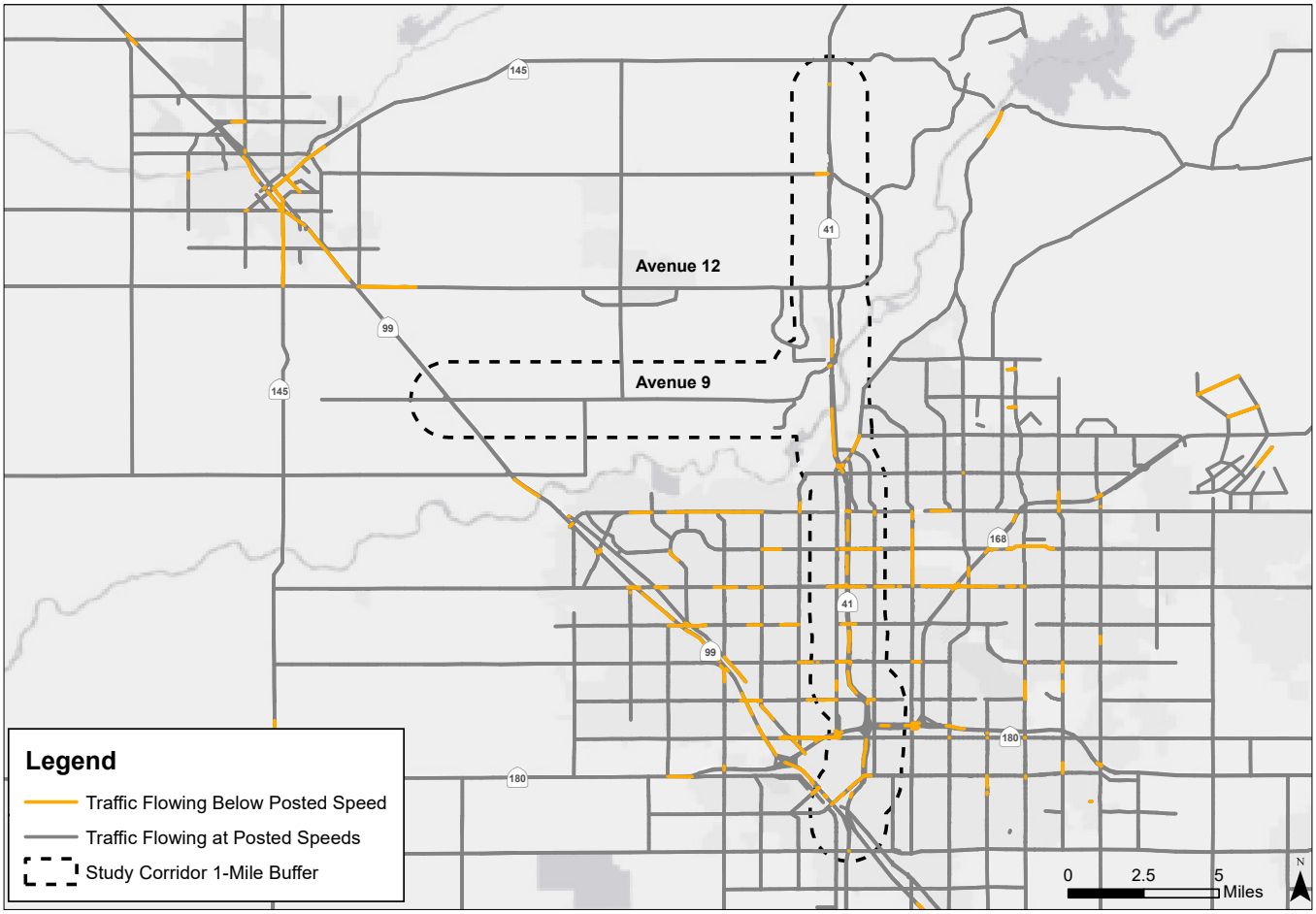
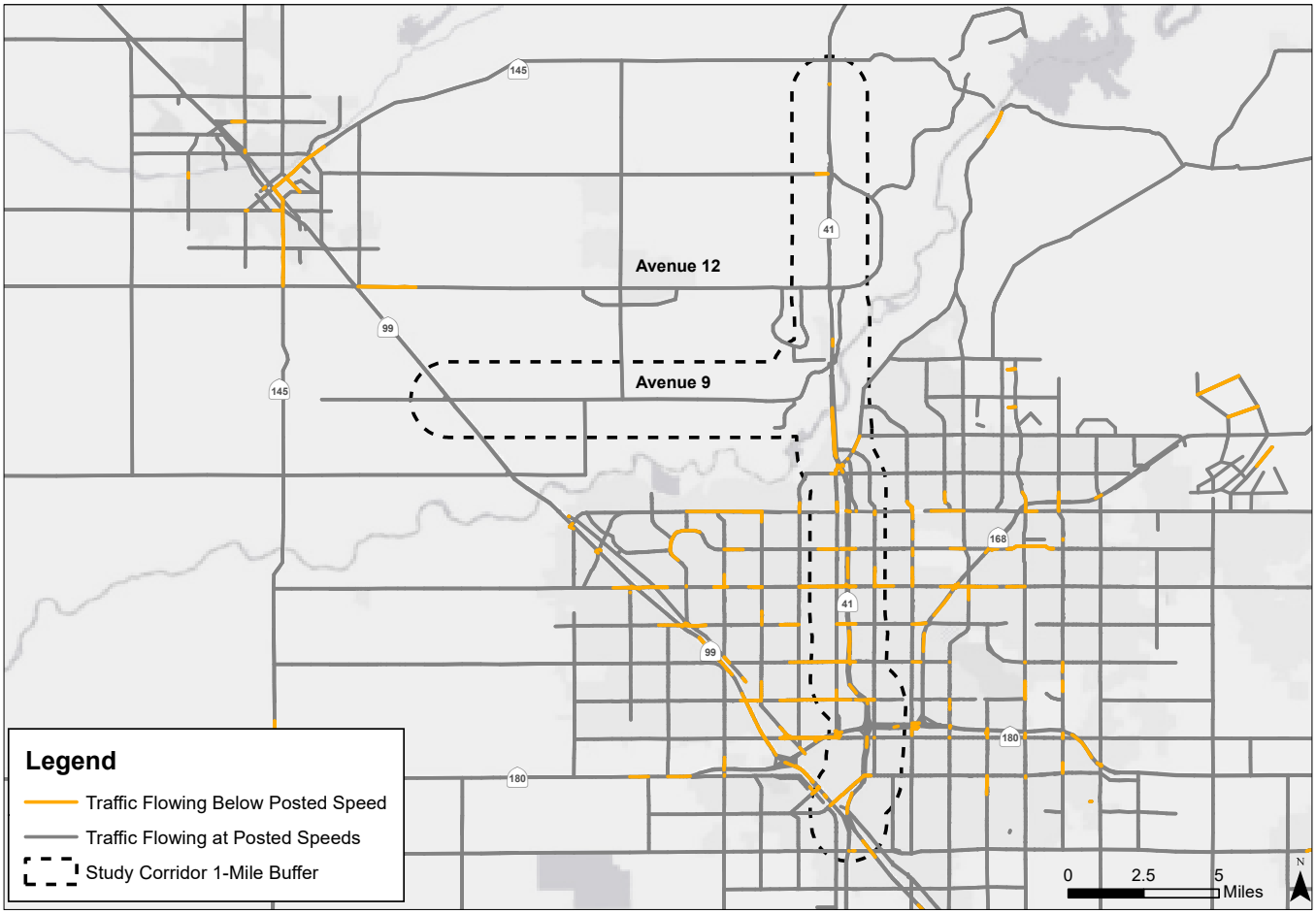


Figure 6.2: Scenario 5: Traffic Speeds During PM Peak Hour



Additionally, the Volume over Capacity Ratio Analysis shows that roadway infrastructure under Scenario 5 are under less strain than under the No-Build scenario. This suggests that commuters are using alternative modes of transportation and reducing the numbers of cars on the road at key periods such as during peak times. The following maps show significant relief on not only highway systems in the Study area but also on local roadways.

Figure 6.3: Horizon Year 2046: Volume to Capacity AM Peak Period

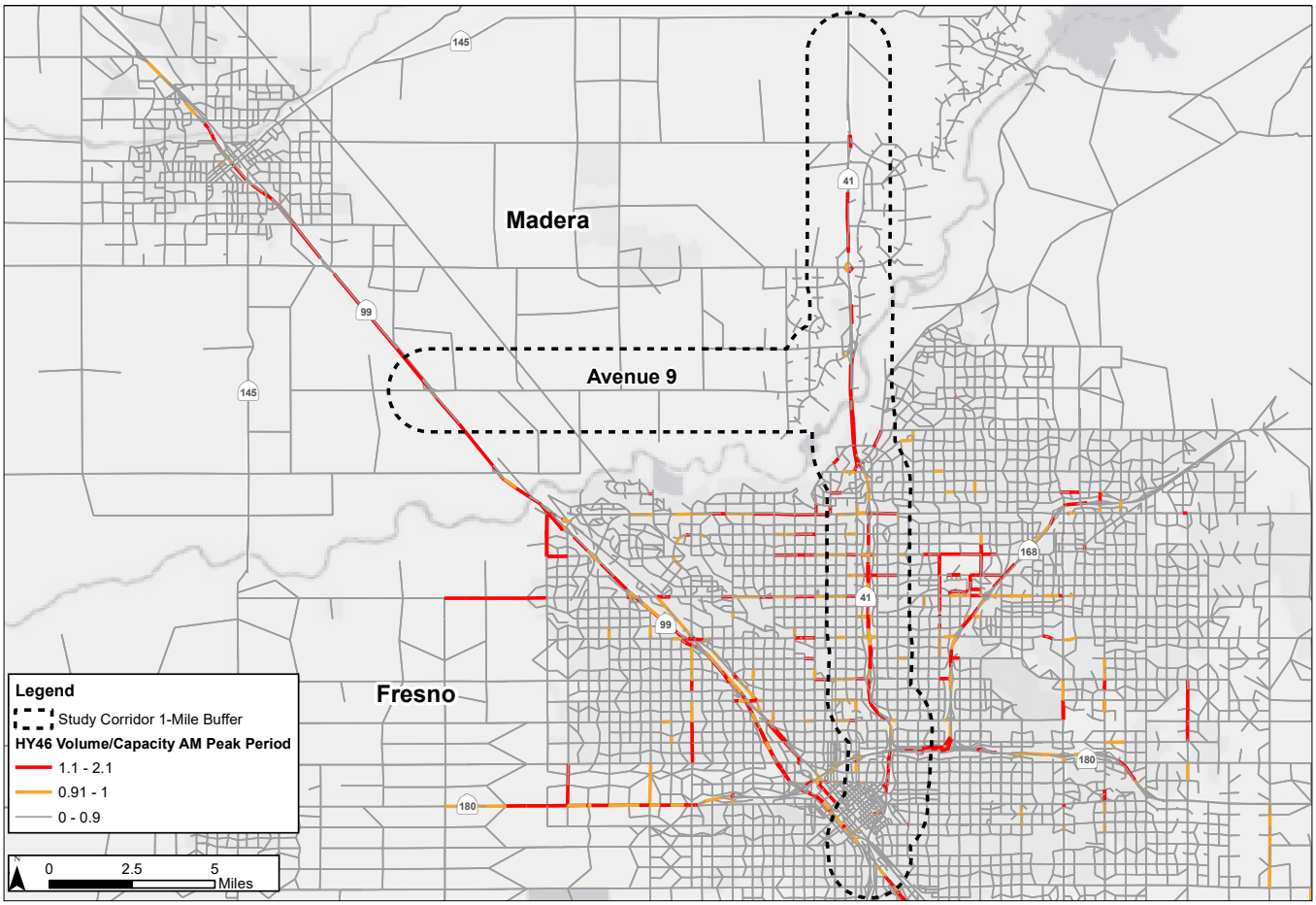


Figure 6.4: Horizon Year 2046: Scenario 5 Volume to Capacity AM Peak Period

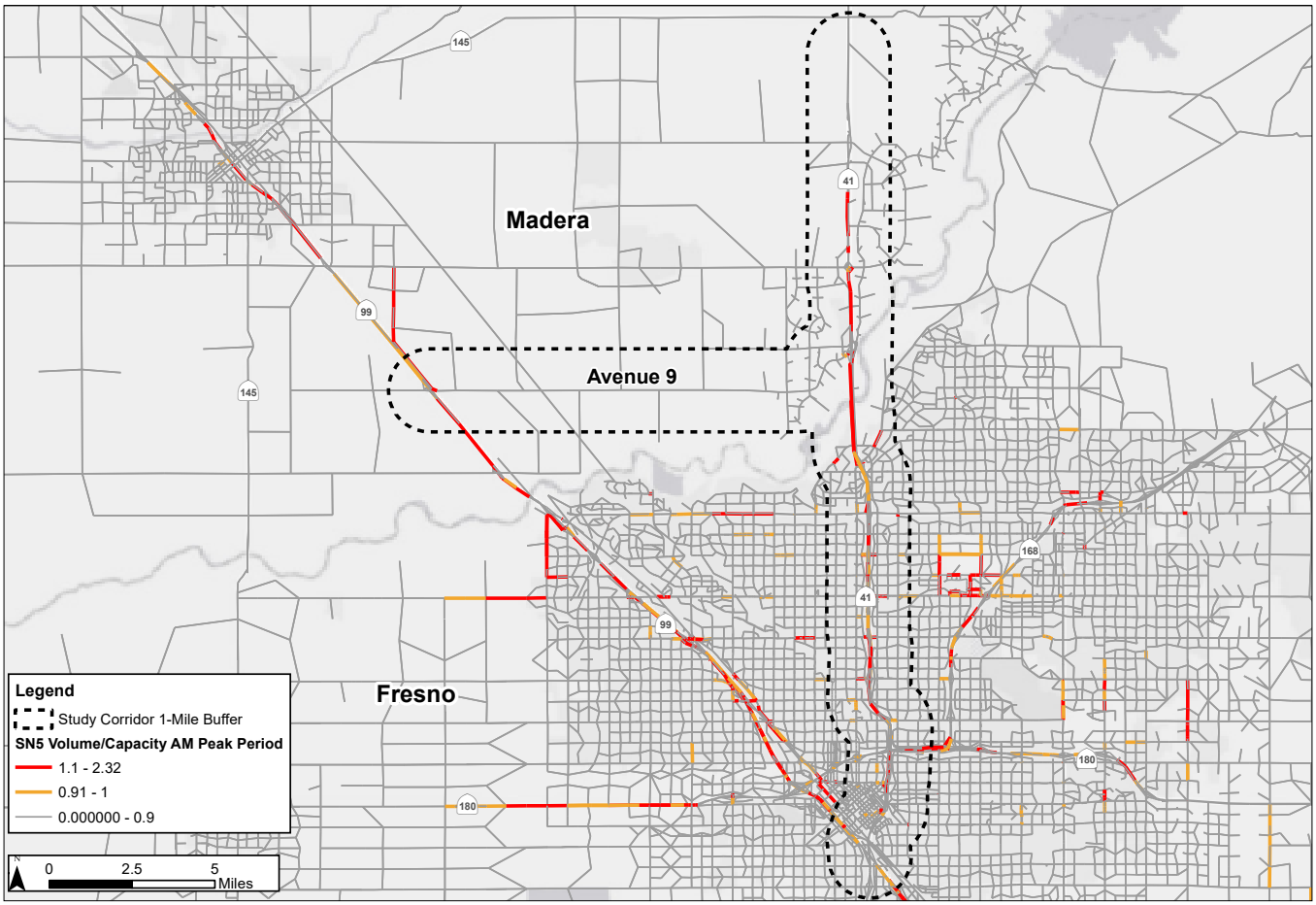


Table 6.3: % Mode Share Across All Model Run Scenarios

MODE	SCENARIO					
	No build	SN1	SN2	SN3	SN4	SN5
Walk	7.6%	7.6%	7.6%	7.6%	7.6%	7.6%
Bike	2.0%	2.2%	2.2%	2.3%	2.2%	2.2%
SOV	45.2%	45.0%	45.1%	45.1%	45.1%	45.0%
Transit	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%

Figure 6.5: Electric Vehicle Charging Stations and Proposed Electric Bus Routes

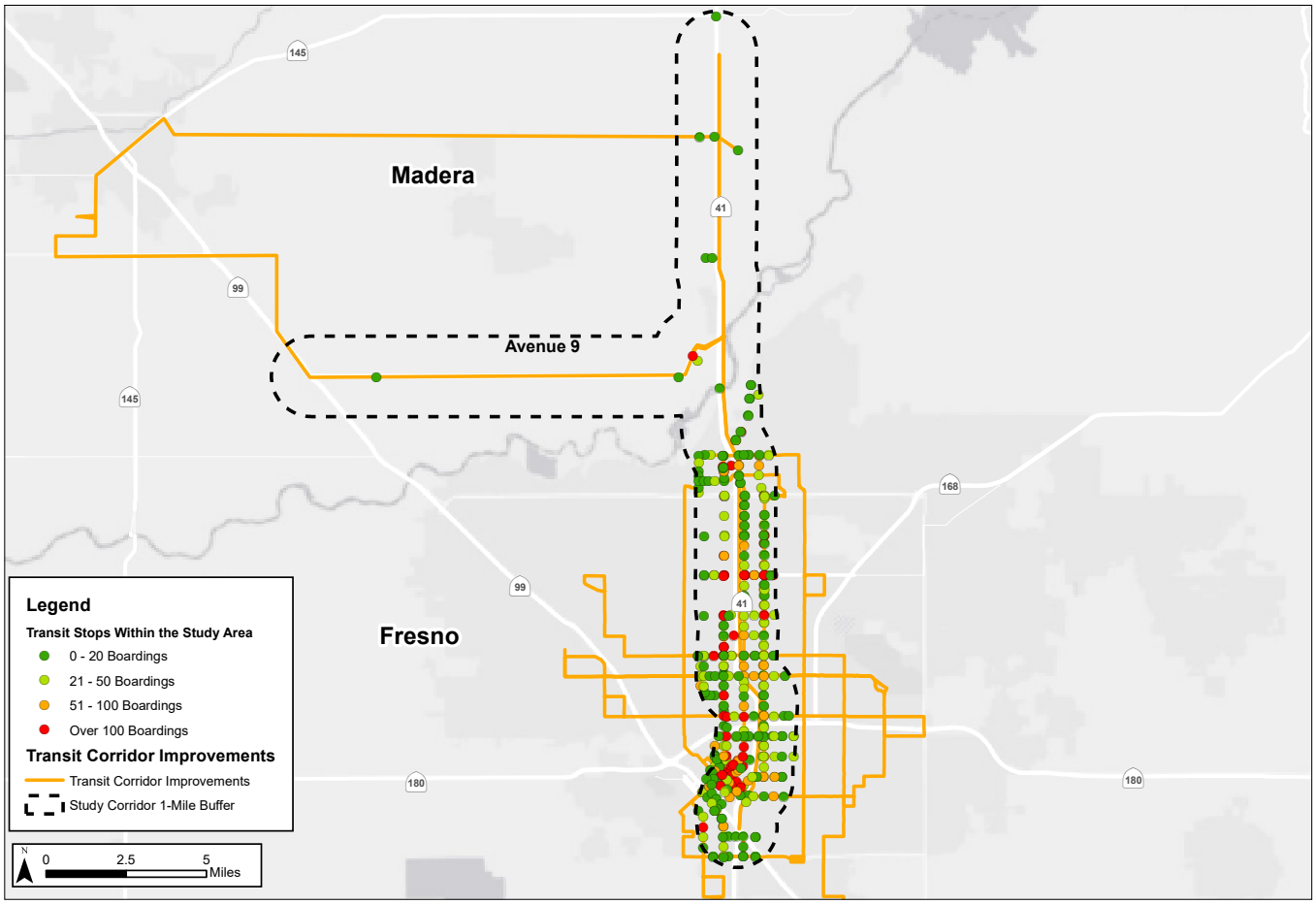


Table 6.4: Transit Boardings Across Model Run Scenarios

	MODEL RUN SCENARIO				
	SN1	SN2	SN3	SN4	SN5
Total # Of Boardings	27717	27624	27447	27837	27462
% Difference From 2046 No Build Scenario	- 0.33%	-0.97%	0.44%	-0.92%	-0.334%

Table 6.5: % Mode Share Across All Model Run Scenarios

MODE	SCENARIO				
	SN1	SN2	SN3	SN4	SN5
Walk	-0.3%	-0.6%	-0.4%	-0.5%	-0.5%
Bike	10.8%	9.7%	11.4%	10.9%	10.9%
SOV	-0.3%	-0.1%	-0.1%	0.0%	-0.4%
Transit	-1.6%	-2.8%	-2.0%	-2.5%	-1.8%

The percentage of trips made via single-occupancy-vehicle (SOV), transit, walking or biking under the model run scenarios is provided in Table 6.3. Values presented in the table are derived from regional trips made to and from the 1-mile study area buffer. In addition, the percent difference in mode share for the same modes between the "no build" and the five different scenarios is summarized in Table 6.4. The model analysis shows increase in bike trips compared to the No-build scenarios, as well as slight decrease in SOV trips. The slight increase in bike trips is likely in response to the additional bikeway improvement projects proposed in the sustainable corridor management strategies. Currently, most bike trips are made for recreational purposes. However, with the proposed improvements, commuter trips made by bicycle are expected to increase. Similarly, trips made via SOV likely decreased due to improvements made to the HOV facilities. Trips made via HOV have also increased as a result, as discussed in section 6.3.

While the modeled data is only showing some incremental changes, it is expected that a shift to more sustainable modes would be much more prominent as a result of the local jurisdiction's efforts to develop Transit-Oriented Development projects, which would bring residents closer to alternative modes of transportation and make these modes more attractive. The noted decrease in transit ridership likely stems from improvements made to the other modes, including HOV lane, auxiliary lane, roadway widening, and bike facility improvements. Although transit projects were added, improvements made to the other modes likely took absorbed some transit ridership, resulting in an overall decrease in transit trips. Transit ridership is reflected by stop for SN 5 in figure 6.3 below and the percent difference between the total number of boardings between each model run scenario and the 2046 Transit on-time performance measures how often a transit vehicle arrives at its stop within roughly five minutes of its scheduled arrival. Since the BRT project being proposed does not exist yet, it cannot be measured at this time. However, the utilization of managed lanes and transit signal priorities is expected to improve transit time performance for this service, providing a more interesting alternative to single-occupancy vehicles.

6.2 Air Quality

6.2.1 Air Quality Performance Metrics

- CalEnviroScreen data reflecting percentiles of census tracts exposed to high Ozone and PM2.5 concentrations within the study area
- Number of charging stations along the two study corridors
- Expansion of electric bus fleet
- VMT per capita

6.2.2 Analysis

The SR-41/Avenue 9 Sustainable Corridors Study has a particular focus on sustainability and environmental justice. Emissions from transportation vehicles is one of the greatest contributors to GHG emissions, which have historically disproportionately impacted disadvantaged communities. Therefore, improvements proposed through the study should minimize vehicle emissions in an effort to improve regional air quality. A review of CalEnviroScreen data reflecting percentiles of census tracts exposed to high ozone and PM2.5 concentrations within the study area will be provided to identify the communities which will be most impacted by the proposed improvements. These communities are reflected in Figures 6.6 and 6.7. Since CalEnviroScreen is a tool providing historical data, it is impossible to determine the impacts of the proposed improvements on air quality. In addition, proposed active transportation and HOV infrastructure will reduce trips made via SOV. This will have a positive impact on air quality, as GHG emissions will be reduced as a result.

Figure 6.6: Ozone Percentiles

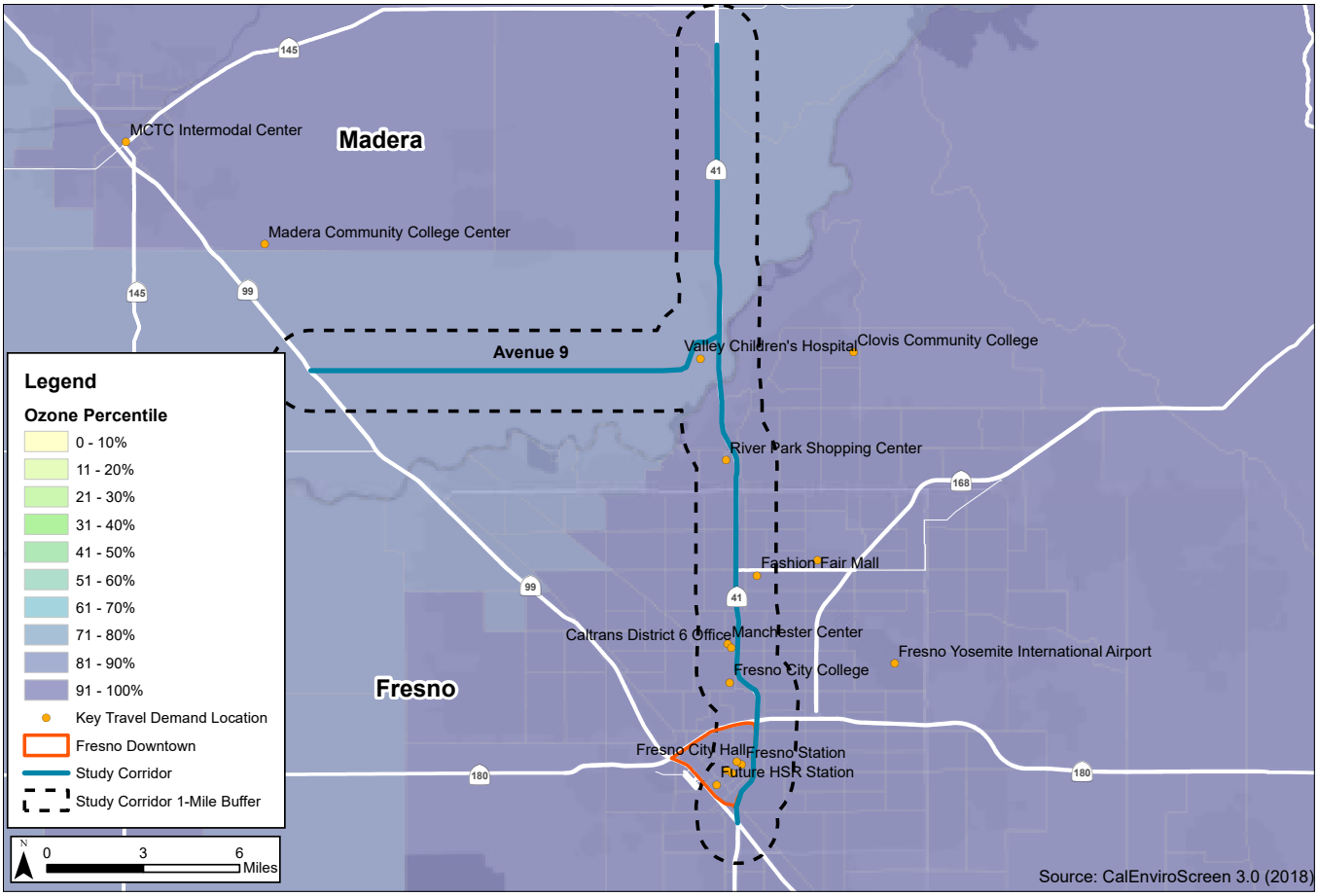


Figure 6.7: PM2.5 Percentiles

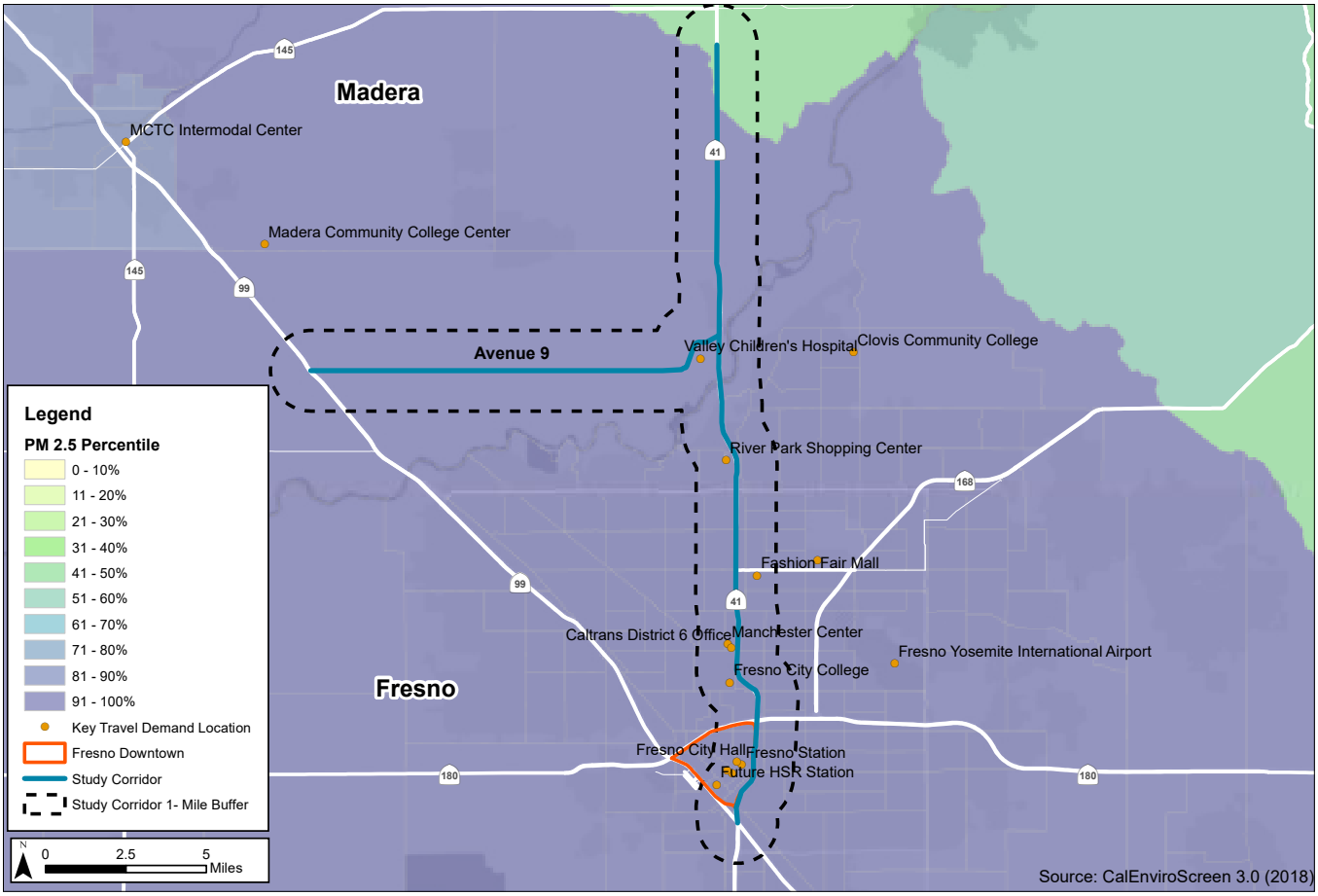
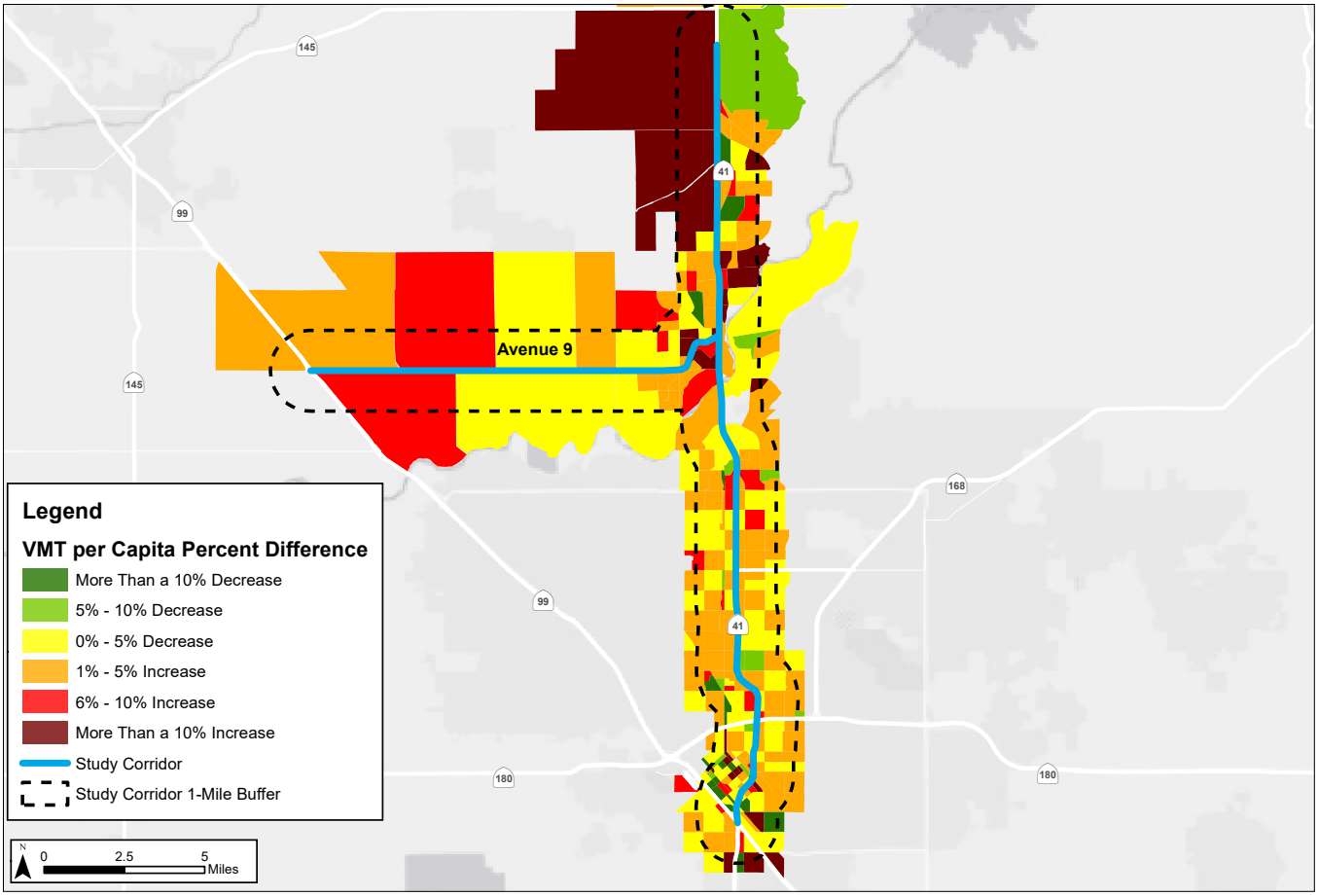


Figure 6.8 shows the percent difference in VMT per Capita between model scenario 5 and the 2046 No-Build Horizon Year scenario. Scenario 5 was chosen to calculate the percent difference between the model run scenarios and the no-build, as scenario 5 includes all proposed projects and thus would result in the most significant changes in VMT per Capita. It should be noted that some TAZ zones reflected in the figure below have significantly lower populations than neighboring TAZ zones, resulting in higher VMT per Capita. This also results in some TAZ zones appearing to have higher percent differences in VMT per Capita as opposed to neighboring TAZ zones.

A decrease in VMT resulting from the proposed sustainable corridor management strategies also indicates a decrease in GHG emissions resulting from transportation vehicles. Although some localized areas experienced an increase in VMT, this did not result in a regional increase in VMT per Capita and therefore will also not contribute significantly toward regional GHG emissions.

Figure 6.8: VMT Per Capita % Difference Between SN 5 and 2046 No-Build Scenario

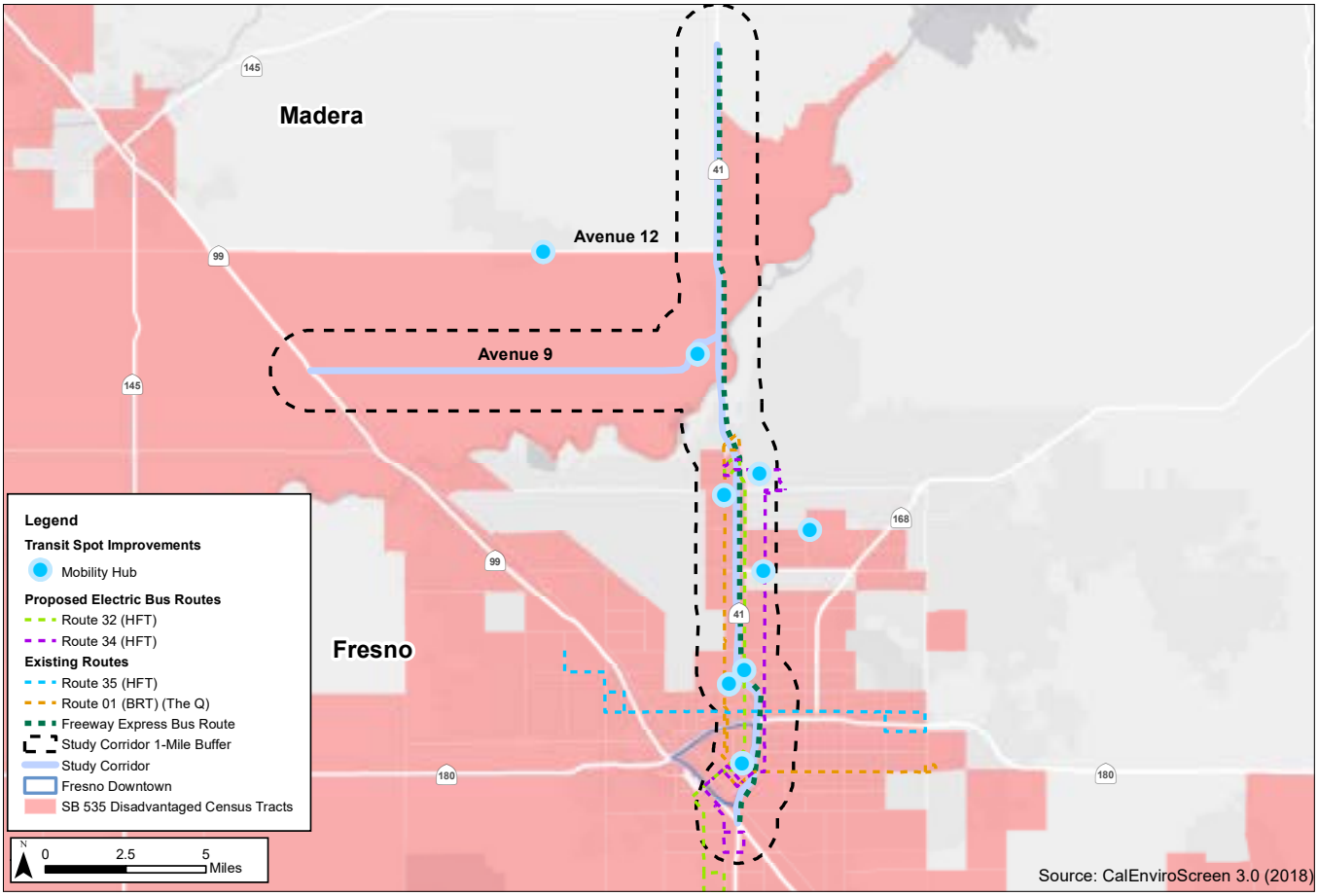


A number of EV charging stations along the two study corridors have been proposed to increase accessibility to PEV charging infrastructure throughout all communities. Manual counts of new charging station will need to be conducted over time to determine the fulfillment of this measure. EV charging stations are proposed at each of the nine multi-modal mobility hubs throughout the study area. These locations are highlighted in Figure 6.9 below. Additionally, new wireless charging stations could also be implemented to minimize space requirements and support further deployment of public and private EV vehicles.

Expanding the PEV Charging network at the proposed multi-modal mobility hub locations will help Fresno and Madera Counties meet the goals and objectives listed in the San Joaquin Valley Air Pollution Control District's Plug-In Electric Vehicle Readiness Plan, including:

- Educating low-income and rural communities on the benefits of PEVs with a focus on the relative low total cost of ownership using multilingual methods and materials
- Shape the perception of PEVs as a viable transportation method and as a reliable primary household vehicle for all Valley residents, not one specific socioeconomic group
- Target consumers in environmental justice communities with specific resources necessary to promote the viability of PEVs

Figure 6.9: Electric Vehicle Charging Stations and Proposed Electric Bus Routes



6.3 Traffic Management

6.3.1 Performance Metrics

- Vehicle Miles Traveled (VMT)
- HOV lane person throughput and vehicle occupancy rates
- Vehicle Hours Delay (VHD)

6.3.2 Analysis

Vehicle occupancy rates and Vehicle Hours of Delay (VHD) are all key indicators of traffic management along the study corridors and along the surrounding major arterials. These indicators provide insight into traffic congestion along the study corridors, as VHD reflects the cumulative number of hours that travelers spent traveling below 35 mph in a day. Vehicles traveling below 35 mph on roadways indicates that travelers are experiencing some level of traffic congestion. By pinpointing these locations, the proposed sustainable corridor management strategies aim to relieve these localized points of congestion.

HOV flows indicate whether travelers are shifting from SOV to high occupancy vehicle s(HOVs), including transit or carpooling. As the number of trips made via HOV increases, the overall number of vehicles on the road decreases. This would result in reduced traffic congestion. The Bi-County ABM provides an output for each of these key performance indicators.

The model presents significant transfers from general purpose (GP) lanes to HOV lanes as shown under Scenario 2 of the model analysis. Scenario 5 depicts even more changes, as a result of synergies and cumulative benefits of all the projects combined. Table 6.5 and 6.6 show two locations along SR-41, one on the northern segment (between Copper Avenue and Shepherd Avenue) and one on the southern segment (just south of Sequoia Kings Canyon Freeway), and the impacts of the addition of the HOV lanes on overall traffic flows. Although the volume, or number of vehicles remain relatively the same, the fact that the HOV lanes are in use suggest additional commuters on the road, whom may otherwise have traveled by themselves.

Table 6-5: Impacts of HOV Lanes on Traffic Flows along the SR-41 Northern Corridor

Location	Direction	Segment type	No Build	SN 2	SN 5
SR-41 Northern Corridor	Northbound	GP	39,833	31,786	32,300
		HOV	-	8,640	8,875
	Southbound	GP	40,247	31,759	32,269
		HOV	-	9,384	9,687

Table 6.6: Impacts of HOV Lanes on Traffic Flows along the SR-41 Southern Corridor

Location	Direction	Segment type	No Build	SN 2	SN 5
SR-41 Southern Corridor	Northbound	GP	56,176	46,296	46,715
		HOV	-	10,995	11,076
	Southbound	GP	64,175	53,807	53,567
		HOV	-	13,383	13,579

VHD is a key indicator for traffic flows along major corridors. It refers to the additional time people spend for their daily commute, compared to conditions with no traffic. Lower VHD indicates less congestion along major corridors. The model output indicated significant changes in VHD between the 2046 horizon year "no-build" scenario and the model run scenarios. Significant reductions in VHD were noted along major arterials including Herndon Avenue, Bullard Avenue, Shaw Avenue, Shields Avenue, and Ashlan Avenue. Variation in VHD was also noted along Avenue 9, Fresno Street, and First Street. A reduction in VHD was reflected along the SR-41 Southern Corridor, however some variation in VHD was noted along the northern segment.

It should also be noted that improvements made to HOV facilities also contributed toward some variation in the VHD values reflected in the table below. For example, it was found that the HOV in SN 2 and the auxiliary lane additions in SN 1 created some pockets of congestion along Avenue 9. However, delays were still reduced across all model run scenarios when compared to the 2046 No-Build Scenario, indicating that the proposed strategies have a positive impact on traffic congestion.

Table 6.8: Projected Daily VHD Along Major Corridors in the Study Area

CORRIDOR	DAILY VHD					
	SN 1	SN 2	SN 3	SN 4	SN 5	2046 NO BUILD
SR-41 Southern Corridor	179,198	82,916	231,641	212,330	82,414	235,903
SR-41 Northern Corridor	29,722	32,807	5,010	28,384	5,275	13,604
Avenue 9	95	47	7	8	26	12
Palm Avenue	7,058	5,963	6,908	7,505	5,989	12,303
Blackstone Avenue	19,075	16,038	19,743	19,502	15,849	22,861
Fresno Street	7,204	6,172	7,464	7,998	6,316	8,430
First Street	4,706	3,530	5,189	5,450	3,674	4,942
Herndon Avenue	0	0	0	0	0	34,213
Bullard Avenue	8,587	10,277	8,556	8,650	10,286	23,675
Shaw Avenue	24,569	24,917	23,305	22,579	22,992	36,072
Shields Avenue	12,410	14,416	12,340	11,444	15,268	17,504
Ashlan Avenue	10,286	10,823	10,022	10,928	11,150	15,064

6.4 Walking and Biking

6.4.1 Performance Metrics

- Percentage of sidewalk and bike path coverage
- Additional miles of protected and separated bike facilities

6.4.2 Analysis

Improvements to the walking and biking network play a critical role to accomplishing the study's guiding principle of equity. The Study proposes the addition of bike paths and sidewalks to close gaps within the existing network and to improve safety along key corridors within the study area. While it is challenging to quantitatively measure the impact that improved walking and biking infrastructure has on the larger transportation network, it plays a significant role in creating sustainable and equitable travel alternatives for community members.

A GIS analysis was performed to identify the total percentage of bike path coverage over the total distance of roadways within the study area. Total bike path coverage was found to cover 32 percent of roadways within the study area,

A summary table has been provided to detail the total number of new miles of walking and biking infrastructure proposed to be added through the sustainable corridor management strategies. The results are displayed in Table 6.9. A total of 2.25 miles of new sidewalks, 17.7 miles of new Class I bikeways, 9 miles of Class II bikeways, and 39.85 miles of Class IV bikeways are proposed to be added.

Table 6.9: New Miles of Walking & Biking Infrastructure Added "SR-41 Northern Corridor" and "SR-41 Southern Corridor"

IMPROVEMENT TYPE	CORRIDOR SEGMENT	EXTENTS	# OF NEW MILES ADDED	TOTAL # OF MILES
Sidewalk	SR-41 North	Avenue 12: SR-41 N – Riverstone Road	0.75 miles	2.25 miles
	Avenue 9	Children's Boulevard: SR-41 – Road 40 1/2	1.5 miles	
Class I Bikeway	SR-41 South	McKinley Ave: First Street – N Clovis Avenue	4 miles	17.7 miles
		Friant Road: SR-41 – Millerton Road	11.2 miles	
	SR-41 North	San Joaquin River Trail Extension: Road 40 & Avenue 7 ½ - SR-41 & Avenue 9	2.5 miles	
Class II Bikeway	SR-41 North	Road 36: SR-145 – Avenue 9	9 miles	9 miles
Class IV Bikeway	SR-41 South	First Street: Friant Road – E Kings Canyon Road	7.5 miles	39.85
		Palm Avenue: Bullard Avenue – Ashlan Avenue	2 miles	
		Maple Avenue: Copper Avenue – Sierra Avenue	4.5 miles	
		Wishon Avenue: Shields Avenue – Olive Avenue	1.5 miles	
		Barstow Avenue: N Fruit Avenue – N Clovis Avenue	6.5 miles	
		Belmont Avenue: Wishon Avenue – Clovis Avenue	5.6 miles	
		Fruit Avenue: Herndon Avenue – Olive Avenue	5.5 miles	
		Clinton Avenue: Fruit Avenue – First Street	2.5 miles	
		P Street: Abbey Street – Ventura Street	0.80 miles	
		H Street: Ventura Street – Tuolumne Street	0.5 miles	
		Van Ness Avenue: Divisadero Street – Los Angeles Street	1.2 miles	
		Fulton Street: Ventura Street – Fresno Street	0.75 miles	
		Blackstone Avenue: Herndon Avenue – McKinley Avenue	5 miles	
		Blackstone Avenue: Divisadero Street – McKinley Avenue	1.5 miles	
	SR-41 North	SR-41B: Avenue 10 & Lane Bridges Drive – Avenue 12	2.2 miles	3.7 miles
		Children's Boulevard: SR-41 – Avenue 9	1.5 miles	
	Avenue 9	Avenue 9: Children's Boulevard to SR 99	7 miles	7 miles

6.5 Access

6.5.1 Performance Metrics

- Percentage of disadvantaged communities located within 0.25 miles of a transit stop

6.5.2 Analysis

Improving access to transportation connections is a central component of the SR-41/Avenue 9 Sustainable Corridors Study. More specifically, this study aims to improve access to sustainable transportation alternatives to car travel. Although this effort applied to all communities, it had a special focus on improving access within disadvantaged communities which have historically been underserved by transit and critical transportation infrastructure. The new route proposed along SR-41 is expected to add additional transit options to underserved communities. A spatial analysis was performed to identify the percent of disadvantaged communities located within 0.25 miles of a transit stop to assess the impact that the proposed improvements have on access to transportation. A summary table reflecting the total count and percentage of disadvantaged communities within 0.25 miles of a transit stop is provided in table 6.10.

Table 6.10 indicates that over 50 percent of the population is located within 0.25 miles of a transit stop. There is an incremental increase in the percentage of households and population that are located within a transit stop when new stops are added. Additionally, the implementation of a new BRT route would further support transit-reliant communities in accessing opportunities through more efficient and comfortable mobility options.

Table 6.10: Disadvantaged Communities Within A Quarter Mile of a Transit Stop

VARIABLE	TOTAL	SCENARIO		
			No Build	No Build + New Stops
Population	**830,190**	Total Population	442,428	443,931
		% of Population	53.3 %	53.8 %

6.6 Connected

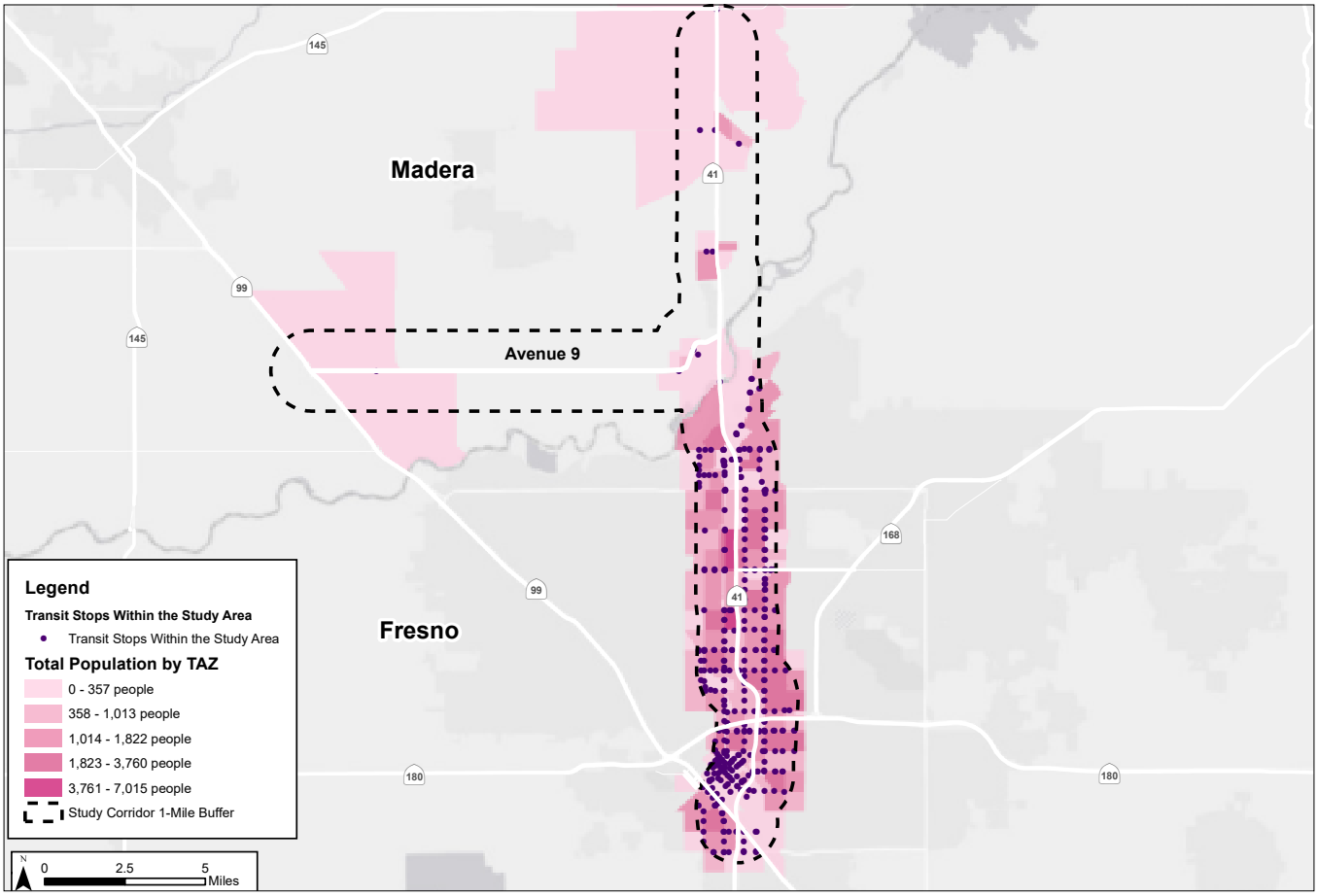
6.6.1 Performance Metrics

- Percent of the urban population within 0.25 miles of a transit stop
- Average commute time to employment and education centers

6.6.2 Analysis

Improvements to the transportation network should improve connectivity between residential areas and key employment, education and recreation opportunities. Connectivity to these key activity centers and transit priority areas can be enhanced by increased access to transit. A GIS analysis was performed to identify the percent of the urban population within 0.25 miles of a transit stop to ensure that a transit stop has been placed within a walkable distance of most travelers. As reflected in Figure 6.10, a total of 93% of the urban population is located within a quarter mile of a transit stop within the study area across all model run scenarios. This shows great potential for conversion of SOV trips to transit, provided that service and access to transit stop is adequate. This should be further enhanced by the proposed BRT line and pedestrian improvements.

Figure 6.10: TAZ Within a Quarter Mile of a Transit Stop



6.7 Safety

6.7.1 Performance Metrics

- Number of fatalities and serious injuries reported in annual SWITRS data
- Crash modification factors by alternative

6.7.2 Analysis

The proposed sustainable corridor strategies aim to improve safety for pedestrians, cyclists, and all motorists. Safety improvements can be assessed by reviewing collision and crash reductions. Although forecasted collision data is not available, SWITRS data can provide historical data and will be reviewed by Fresno COG and MCTC as part of their respective Regional Plan Updates. In addition, crash reduction factors by alternatives is summarized in table 6.11 by improvement type. A crash reduction factor refers to the percentage of reduction in fatal/ injury crashes expected after an improvement is installed. The table below provides a high-level overview of the anticipated reduction in collisions resulting from proposed roadway and active transportation improvements. Crash reduction factors were sourced from the FHWA Desktop Reference for Crash Reduction Factors and from the Crash Modification Factor Clearinghouse. [8]

Key findings reflected that the proposed improvements would have a positive impact on the safety of all roadway users, reducing the likelihood of all collision types across all improvement types. Most specifically, the implementation of Class IV protected bikeways, sidewalks and enforcement for speed reduction would drastically reduce the likelihood of collisions.

[8] *https://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa1304/resources/CRF%20Desktop%20Reference.pdf*

Table 6.11: Crash Reduction Factors

MODE	IMPROVEMENT	CRASH REDUCTION FACTOR
Highway	Auxiliary lanes	26 %
	Increase number of lanes for on/off ramps (>5,000 vehicles/ lane/ day)	31 %
	Interchange improvement: Lane widening	31 %
	Interchange improvement: Single Point Urban Interchange (SPUI	Not available
	Interchange improvement: Diverging diamond	33 %
Arterial	Traffic Signal Coordination	17 %
	Install traffic signal	28 %
	Install raised median	20 %
	Change shoulder type and/or width	100 %
	Add roadway shoulders	9%
	Increase number of lanes (<5,000 daily vehicles/day)	31 %
Active Transportation	Install pedestrian crossing (signed and marked with curb ramps and extensions)	37 %
	Install flashing beacons as advance warning	30 %
	Improve pedestrian crossing	25 %
	Bicycle friendly intersection	35 %
	Green transition lanes	41%
	Class II bike lanes	42 %
	Class IV bikeways[9]	74%
	Install lighting	30 %
	Improve lighting	20-25 %
	Increase enforcement to reduce speed	70 %
	Install Sidewalk	88 %

[9] *Fresno COG. 2017. "Fresno-Clovis Class IV Bikeway Design Guide".*

6.8 Local Economy

6.8.1 Performance Metrics

- Percent of residents within a mile of a commercial street/ area

6.8.2 Analysis

Supporting local businesses is essential to maintaining the resiliency of Fresno and Madera Counties. As recently demontrated with the COVID-19 pandemic, unforeseen circumstances can have drastic impacts on local businesses. By improving placemaking and public access to local businesses, they will be more equipped to adapt to future changes in technology, mobility or employment trends. A spatial analysis was performed to identify the percentage of residents within a 15-minute commute of a commercial area. This analysis was performed for trips made via walking, biking, or via car travel. A ¾-mile radius was used to simulate a 15-minute commute for trips made by foot, a 3-mile radius for trips made by bike, and a 10-mile radius for trips made by car. The proposed sustainable corridor management strategies include roadway, transit, pedestrian, and bikeway network improvements that will reduce travel times by offering improved and more efficient connections. These improvements therefore can provide more direct connections between residential areas and commercial streets and centers.

In addition, this analysis is in alignment with Fresno and Madera Counties' Transit Oriented Development (TOD) goals. It will help Fresno and Madera Counties to identify which communities would most benefit from TOD development. This analysis is provided in in Table 6.12.

Table 6.12: Summary of Urban Population within a 15 – Minute Commute of a Major Commercial Street or Area Across All Model Run Scenarios

COMMERCIAL AREA	% OF URBAN POPULATION WITHIN A 15-MINUTE COMMUTE OF A COMMERCIAL STREET/ AREA		
	By Foot (3/4 miles)	By Bike (3-miles)	By Car (10-miles)
Riverpark shopping center	7 %	32 %	92 %
Fashion Fair Mall	9 %	48%	94 %
Manchester Center	12 %	52 %	92 %
Downtown Fresno	24 %	51 %	89 %
Blackstone Avenue: Herndon Avenue – Olive Avenue	47 %	85 %	98 %
Shields Ave: First Street – Millbrook Avenue	9 %	47 %	91 %
Shaw Ave: First Street – SR-168	7 %	44 %	95 %
Herndon Avenue: First Street – Cedar Avenue	6 %	34 %	95 %
SR-41B: Avenue 10 – Avenue 11	2 %	13 %	60 %
Total Study Area Population			**207,461**

6.9 Healthy and Well

6.9.1 Performance Metrics

- Data reflecting percentiles of census tracts with asthma and cardiovascular disease within the study area
- Percent of residents within 0.25 miles of urban green space, urban trails or community parks

6.9.2 Analysis

The improvements proposed through this study aim to support active and healthy lifestyles in the communities surrounding SR-41 and Avenue 9. In achieving this aim, the impacts of adverse health conditions caused by a lack of physical activity can be minimized. Although it is not within the scope of this study to identify specific locations for pocket parks, green spaces, and other types of places that support physical activity, these types of locations should be prioritized in disadvantaged communities. Furthermore, health data can be monitored by Fresno CGO and Madera CTC over time.

7.
Recommended Improvements

A rough order of magnitude costing matrix for projects is presented in Table 7.1. Projects are divided by corridor segment, project category, and timeline. In addition, a summary table presenting potential funding sources is provided in Table 7.2. Funding sources are divided based on mode and agency level, including federal, state, or local/ regional level.

Table 7.1: Rough Order of Magnitude Cost Estimates by Project – SR-41 Southern Corridor

PROJECT CATEGORY	PROJECT	TIMELINE	ESTIMATED COST
Highway	Auxiliary Lanes along SR-41: Ashlan Ave to Shaw Ave (1 mile)	Near	$2.2 million - $3 million/mile
	Auxiliary Lanes along SR-41: Shields Ave to SR 180 (2 miles)	Mid	
	Auxiliary Lanes along SR-41: Bullard Ave to Herndon Ave (1 mile)		
	Shields Ave Interchange Improvement: Expand the NB off ramp to 2 lanes for the full length	Long	$4.4 million - $6 million
	Ashlan Ave - Reconfigure interchange to either a Single Point Urban Interchange (SPUI) or a Diverging Diamond configuration. Additional study required to determine the appropriate design.		$2.2 million - $3 million
	Shaw Ave Interchange Improvement: • Add 3rd lane for the SB on ramp • Add 3rd lane to the SB off-ramp		$5.25 million
	Shaw Ave Interchange Improvement: • Add 3rd lane for the SB on ramp (.25 miles) • Add 3rd lane to the SB off-ramp (.25 miles)		$10 million - $13 million
Arterial	Traffic signal coordination	Near	$35,000 - $43,400
	Raised and landscaped medians (23.5 miles)		~ $1.9 million - $3.7 million
	Complete streets improvements, including high-visibility crosswalks, curb extensions, and new landscaping	Mid	~ $11.7 million
Transit	Implement Express bus/ BRT service	Near	$4-$23 million/mile
	Regional traveler information program/app		~$250,000 in development and maintenance costs/year
	Increase vanpool program and participation incentives		
	Micro-transit demonstration project		$30 million over 5 years
	Traffic signal priority, queue jumps, and other bus/ BRT operational improvements		TSP: ~ $80,000 Queue jumps: ~$1.6 million
	Improve bus stop conditions	Mid	~$16.6 million
	Introduce multimodal mobility hubs		$35 million - $70 million
	Implement express bus/ freeway BRT service		$60 million - $345 million

PROJECT CATEGORY	PROJECT	TIMELINE	ESTIMATED COST
Active Transportation	Class IV Bikeways	Near	~ $9 million - $24 million
	Upgrade current planned Class II and III bikeways to separated bikeways (30 miles)		
	Bike facilities improvements identified in the FCOG 2018 RTP Constrained Project List		$63,000 - $6 million depending on the facility type and length
	Wayfinding signage to direct active transportation users		$30,000
	Class IV Bikeways (2.8 miles)	Mid	~ $840,000 - $2.24 million
	Bike share		$79,000 launch cost, $62,000/ station capital costs, $90,000 operating costs
	Landscaping and amenities for active transportation users		$920,000 for a project to plant 500 trees ($1900/tree in Berkeley) or $900/tree for materials + installation from safe routes document
	Class I Bikeways		$3 million - $5 million
	Crosswalk improvements including curb extensions, raised intersections, and pedestrian crossing	Long	$2.3 million
Multi-modal/ Sustainability	AQ sensors on bus fleets	Near	$20,000/sensor (regulatory agency quality), $2,000/sensor (low cost)
	Expand the urban tree canopy and green infrastructure		Estimated at $900/tree for materials + installation
	EV charging stations (multimodal mobility hubs amongst others)		$90,000
	Designate "multi-modal corridors"		N/A
	Shade structures at bus stops		~ $16.6 million

PROJECT CATEGORY	PROJECT	TIMELINE	ESTIMATED COST
Multi-modal/ Sustainability	solar program for street lighting and signs	Mid	$1,393 - $2,571 per sign
	"cool pavements", including concrete, white cement concrete, concrete pavers, or titanium dioxide cement		$4-$12/sqft
	Reclaimed asphalt pavements (RAP) or recycled material components (RMCs) in pavement treatments		Total cost of recycling and overlaying (1-in overlay) by two-pass method is approximately $2.64/sqyd
	bioswales and porous pavement		Total cost includes site preparation, stormwater management, and landscaped development $2,700,650/mile
	Develop parklets	Long	$375,000/location
	Expand shade infrastructure		$15,000- $50,000 dependent on area size
	Solar Roads		$4,055,040/mile

Table 7.2: Rough Order of Magnitude Cost Estimates by Project – SR-41 Northern Corridor

PROJECT CATEGORY	PROJECT	TIMELINE	ESTIMATED COST
Highway	New freeway interchange ramps	Near	~ $60million -$70million
	Expand on/off ramps from 1 lane to 2 lanes		~ $5m-$10m /interchange
	Widening, auxiliary lane addition (6 miles)	Mid	~ $120 million - $150 million
	HOV lane and/or reversible HOV lane (2.25 miles)	Long	~ $50m/mile
Arterial	Install traffic signals at intersections	Near	~ $1 million - $2 million
	Widen road from 2 lanes to 4 lanes (1 mile)	Mid	~ $10.5 million
Transit	Introduce a student bus pass program with Madera CC students/faculty	Near	
	Introduce a new MCC route		$1 million - $1.4 million
	a micro transit pilot program		~ $30m over 5 years
	Regional Multimodal Mobility hubs	Mid	$10 million
	Improve bus stop conditions		$44,000/stop
	Introduce express bus/freeway BRT service		$40 million - $230 million
	increased bus service hours on Saturdays (5 additional hours of service)	Long	~ $1,920
	YARTS stops		~ $88,000
Active Transportation	Class I multi-use path (2.75 miles)	Near	~ $3.85 million - $6.05 million
	Class IV bikeway (2.20 miles)		$300,000-$800,000/mile ~ $825,000 - $2.2 million
	Bike lane along Rd 36 from SR 145 to Avenue 9 (9 miles)		~ $999,000
	Bicycle intersection improvements (i.e. green transition lanes)		~ $400,000
	New sidewalks (1.55 miles)		~ $169,000
	Pedestrian crossing and pedestrian crossing beacons		~ $114,000
	Extend Class I bike path (7.7 miles)	Mid	$1.4m-$2.2m/mile ~ $10.7 million - $16.9 million
	Multi-use paths (11.25 miles)		$1.4m-$2.2m/mile ~ $15.7 million - $24.7 million

PROJECT CATEGORY	PROJECT	TIMELINE	ESTIMATED COST
Multi-Modal/ Sustainability	location for park-and-ride facility	Near	$2.8m for 200 spaces (surface parking)
	partnership linking transit and first-last mile service such as bike shares		$79,000 launch cost, $62,000/station capital costs, $90,000 operating costs
	AQ sensors on bus fleets		$20,000/sensor (regulatory agency quality), $2,000/ sensor (low cost)
	an Urban Greening program		Estimated at $900/tree for materials + installation
	EV charging stations (multimodal mobility hubs amongst others)		$20,000
	shade structures at bus stops and at waiting areas (7 new stops)		~ $308,000
	Develop parklets	Mid	$375,000
	Solar Roads	Long	$4,055,040 per mile

Table 7.3: Rough Order of Magnitude Cost Estimates by Project – Avenue 9

PROJECT CATEGORY	PROJECT	TIMELINE	ESTIMATED COST
Arterial	Speed feedback displays (every 3 miles)	Near	~ $15,000 - $18,000
	Widen from 4 lanes to 6 lanes & include roadway shoulders (1.3 miles)		~ $13.6 million
	Additional wayfinding signage		~ $560
	Additional lighting		$5,500/streetlight
	Reversible lanes or shoulder lanes for agricultural use		$1.4 million per mile ~ $13 million
	Install roadway shoulders		~ $18 million
	Widen from 2 lanes to 4 lanes	Mid	~ $98.7 million
	Widen from 2 lanes to 4 lanes	Long	$15.5 million/mile/lane for major arterial in larger urbanized area $10.5 million/mile/lane for minor arterial in large urbanized area
Transit	Add safe bus stops	Near	$44,000/stop
	New MCC Route	Mid	~ $1 million - $1.4 million
Active Transportation	Class IV bikeway along Avenue 9 from Road 40 1/2 to SR-99 (9.4 miles)	Near	~ $2.8 million - $7.5 million
	Bicycle intersection improvements (i.e. green transition lanes)		~ $320,000 - $560,000
	Add lighting along new bike facilities on Avenue 9 for bicyclist safety		~ $267.2 million
	Install sidewalks (1.5 miles)		~ $253,440
	Class IV bikeway	Mid	~ $2.8 million - $7.5 million
Multi-Modal/ Sustainability	Pursue an Urban Greening Program that includes local/ native species	Near	Estimated at $900/tree for materials + installation
	Recycled asphalt pavements (RAP) or recycled material components (RMCs)		Total cost of recycling and overlaying (1-in overlay) by two-pass method is approximately $2.64/sqyd
	Introduce bioswales and porous pavement	Mid	Total cost includes site preparation, stormwater management, and landscaped development $2,700,650
	“leisure space” or pocket parks	Long	$375,000

Potential funding sources for the projects identified in Tables 7.1 through 7.3 are listed in Table 7.4. Funding sources are divided by funding source agency, federal, state, or regional/ local. In addition, the eligible project types for each funding source is identified.

Table 7.4: Potential Funding Sources for Sustainable Corridor Management Strategies

FUNDING SOURCE AGENCY	FUNDING SOURCE	ELIGIBLE PROJECT TYPE				
		HIGHWAY	ARTERIAL	TRANSIT	ACTIVE TRANSPORTATION	MULTI-MODAL/ SUSTAINABILITY
Federal	Recreational Trails Program				✓	
	BUILD Discretionary Grant	✓	✓	✓		
	Highway Safety Improvement Program (HSIP)	✓	✓		✓	
	Surface Transportation Block Grant (STBG)	✓	✓	✓	✓	
	INFRA	✓	✓			
	RAISE					✓
	New Starts and Small Starts (FTA Section 5309)			✓		
	Congestion Mitigation & Air Quality Improvement(CMAQ)				✓	✓

FUNDING SOURCE AGENCY	FUNDING SOURCE	ELIGIBLE PROJECT TYPE				
		HIGHWAY	ARTERIAL	TRANSIT	ACTIVE TRANSPORTATION	MULTI-MODAL/ SUSTAINABILITY
Federal	EPA Clean Water State Revolving Fund (CWSRF)					✓
	EPA Brownfields Grant Program					✓
	EPA Environmental Justice Small Grants Program					✓
	EPA Office of Sustainable Communities Greening America's Communities Program					✓
	DOI Rivers, Trails, and Conservation Assistance (RTCA) Program					✓
State	Active Transportation Program			✓	✓	
	Cap & Trade: Low Carbon Transit Operations Program				✓	
	Cap & Trade: Low Carbon Transit Operations Program				✓	
	Regional Improvement Program (STIP)				✓	

FUNDING SOURCE AGENCY	FUNDING SOURCE	ELIGIBLE PROJECT TYPE				
		HIGHWAY	ARTERIAL	TRANSIT	ACTIVE TRANSPORTATION	MULTI-MODAL/ SUSTAINABILITY
State	State Highway Operations Protection Program (SHOPP)		✓	✓		
	SB 1 - Local Streets & Roads		✓		✓	✓
	Trade Corridor Enhancement (TCEP)	✓				
	Local Partnership Program (LPP)		✓	✓	✓	
	Transit and Intercity Rail Capital Program			✓		
	State Water Resources Control Board Stormwater Grant Program					✓

FUNDING SOURCE AGENCY	FUNDING SOURCE	ELIGIBLE PROJECT TYPE				
		HIGHWAY	ARTERIAL	TRANSIT	ACTIVE TRANSPORTATION	MULTI-MODAL/ SUSTAINABILITY
Regional & Local	Measure C – FCRTA Primary Program			✓		
	Measure C – Advanced Transportation Technologies			✓		✓
	Measure P – Parks Tax					✓
	San Joaquin Valley Air Quality District - Public Benefit Grant Program					✓
	San Joaquin Valley Air Quality District – Bike Paths Grant				✓	
	San Joaquin Valley Air Quality District – Charge Up! Electric Vehicle Charger Incentive Program					✓
	Public-Private Partnership	✓	✓	✓	✓	✓

8.
Conclusion

The sustainable corridor management strategies proposed through the SR-41/Avenue 9 Sustainable Corridor Study aim to address the current and future needs of residents and commuters traveling through the Fresno-Madera region. They were developed after a thorough review of existing conditions, planned improvements, community engagement, and travel forecasts. Lastly, the final package of recommended improvements was developed after an alternatives analysis which considered the unique needs of Fresno and Madera Counties. The improvements proposed through this study will prepare the region for the rapid urbanization that is already underway and also leave room for growth to accommodate future growth.

Additionally, the projects and initiatives discussed through this study aim to improve accessibility and equity within all communities along the study corridors. Improvements will improve access to sustainable transportation alternatives, including transit and active transportation connections, thus improving access to opportunity hubs including employment and education centers. This will also have a positive impact on greenhouse gas emissions, regional air quality, and climate change impacts.

Appendix (A) –
Project Review Matrix

Appendix (A) Project Review Matrix

PROJECT	PROJECT INFO	
Fresno Station District Development	Source Document	Fresno Station District Master Plan
	Jurisdiction	California High Speed Rail Authority & City of Fresno
	Cost	
	Timeline	Completion expected in 2027
	Funding Source	
	Status	
	Expected Outcomes	Regional hub for economic and environmental innovation that will improve access to affordable housing and support sustainable development
Gunner Ranch West Development	Source Document	Gunner Ranch West Area Plan
	Jurisdiction	Madera County
	Cost	
	Timeline	Project approved by Madera County Board of Supervisors in 2014
	Funding Source	Private development
	Status	Construction not initiated due to disputes over groundwater
	Expected Outcomes	Mixed-use development which will accommodate housing, commercial, community facilities, office space, and the expansion of the Valley Children's Hospital
Riverstone Development	Source Document	Community and Economic Development Planning Division - Riverstone Specific Plan
	Jurisdiction	Madera County
	Cost	
	Timeline	Partially completed
	Funding Source	Private development
	Status	• Portion of development completed • Riverstone development underway • Additional homes to be added
	Expected Outcomes	Master planned community which will accommodate housing, retail, mixed-use development, and open space
Rio Mesa Development	Source Document	Rio Mesa Area Plan
	Jurisdiction	Madera County
	Cost	
	Timeline	Development is estimated to be completed within 15 years
	Funding Source	
	Status	• Tesoro Viejo subdivision open to the public • Construction continues
	Expected Outcomes	Creation of a development hub which will include high- and low-density housing, commercial, employment, and public land uses

PROJECT	PROJECT INFO	
Blackstone & McKinley Transit Oriented Development	Source Document	Blackstone Corridor Transportation + Housing Study
	Jurisdiction	City of Fresno & Fresno County Transportation Authority (FCTA)
	Cost	$40,715,056
	Timeline	• Environmental documentation December 2018• • Engineering August 2019 • Construction expected completion May 2021
	Funding Source	$478,000 in Measure C Funding, private funding
	Status	Construction began February 2020
	Expected Outcomes	Construction of high quality, high density, affordable housing in close proximity to public transit and major employment centers; Plan includes additional sidewalks & Class IV Bikeways
Elm Avenue Revitalization	Source Document	Elm Avenue
	Jurisdiction	City of Fresno
	Cost	
	Timeline	• Phase 1: project initiation + Background analysis • Phase 2: Site reuse scenarios + Corridor vision • Phase 3: Brownfields Area-Wide Plan + Implementation strategy
	Funding Source	$175,000 in funding from the Environmental Protection Agency Brownfields Area-Wide Planning Grant Program
	Status	Final strategy published
	Expected Outcomes	Transformation of Elm Avenue into an economically viable corridor which protects public health and the environment and reflects the community's vision for the area
Parc West Development Project	Source Document	Parc West Development Project Initial Study
	Jurisdiction	City of Fresno
	Cost	Private development
	Timeline	Phase 1: construction of 84 units
	Funding Source	Private development
	Status	Under Construction
	Expected Outcomes	Construction of 844 single family homes, park, and trail system that will connect to the City's existing and planned trail network
Central Southeast Specific Plan	Source Document	Central Southeast Area Specific Plan
	Jurisdiction	City of Fresno
	Cost	
	Timeline	Plan initiated in March 2019
	Funding Source	
	Status	Public engagement efforts underway

PROJECT	PROJECT INFO	
South Central Specific Plan	Source Document	South Industrial Priority Area Specific Plan
	Jurisdiction	City of Fresno
	Cost	
	Timeline	Plan initiated in March 2019
	Funding Source	
	Status	Public engagement efforts underway
Roadway Improvements		
Tulare Street Undercrossing	Source Document	California High Speed Rail Website
	Jurisdiction	California High Speed Rail Authority
	Cost	
	Timeline	Construction began in October 2017
	Funding Source	
	Status	Construction in progress between G and H Streets in downtown Fresno
	Expected Outcomes	Will eliminate at-grade crossings at HSR
Ongoing Maintenance and rehabilitation of raods and local streets	Source Document	SB 1 Road Repair and Accountability Act of 2018
	Jurisdiction	State of California
	Cost	$18.3 million over the next decade
	Timeline	Funding approved in 2017
	Funding Source	(SB 1): Gasoline Excise Tax, Diesel Excise Tax, Diesel Sales Tax, Transportation Improvement Fee, Gasoline Price-Based Excise Tax, Zero Emission Vehicle Fee
	Status	Ongoing
	Expected Outcomes	Will create a properly functioning, well maintained local street and road system to ensure safety/mobility of the traveling public, emergency responders, law enforcement, and commerce
Lane Expansion on Avenue 9 (Phase 1)	Source Document	Madera County 2018 RTP/SCS
	Jurisdiction	Madera County
	Cost	$8,100,000
	Timeline	Projected Opening Year: 2023
	Funding Source	Local TIF/other
	Status	Not initiated
	Expected Outcomes	Expansion from 2 lanes to 4 lanes

PROJECT	PROJECT INFO	
Lane Expansion on Avenue 9 (Phase 2)	Source Document	Madera County 2018 RTP/SCS
	Jurisdiction	Madera County
	Cost	$9,730,000
	Timeline	Project Opening Year: 2025
	Funding Source	Local TIF/ other
	Status	Not initiated
	Expected Outcomes	Expansion from 2 lanes to 4 lanes
Lane Expansion on SR-41	Source Document	Madera County 2018 RTP/SCS
	Jurisdiction	Madera County
	Cost	$5,800,000
	Timeline	Projected Opening Year: 2025
	Funding Source	Local TIF/other
	Status	Not initiated; Planned
	Expected Outcomes	Expansion from 4 lanes to 6 lanes beginning at the Madera County Line until Avenue 10
Lane expansion on Children's BLVD	Source Document	Madera County 2018 RTP/SCS
	Jurisdiction	Madera County
	Cost	$6,600,000
	Timeline	Projected Opening Year: 2040
	Funding Source	Future Measure T & Local TIF/other
	Status	Not initiated
	Expected Outcomes	Expansion from 4 lanes to 6 lanes
State Route 41 Ashlan to Shaw Auxiliary Lane	Source Document	Fresno COG 2014 RTP/ SCS
	Jurisdiction	Fresno Council of Governments
	Cost	$14,700,000
	Timeline	• Environmental document to be completed: October 2019 • Right of way acquisition to be completed: August 2021 • Design to be completed: September 2021 • Advertise: January 2022 • Construction to begin: April 2022 • Expected to be completed: December 2024
State Route 41 Ashlan to Shaw Auxiliary Lane	Funding Source	Future Measure T & Local TIF/other
	Status	Initial study with mitigated negative declaration completed in 2019
	Expected Outcomes	The project would relieve congestion and improve safety for this segment of northbound State Route 41. The addition of the auxiliary lane within the project limits would improve traffic operations on mainline State Route 41 and the northbound State Route 41 off-ramp to Shaw Avenue.

PROJECT	PROJECT INFO	
Interchange Improvements	Source Document	Fehr & Peers Freeway Deficiency Study
	Jurisdiction	CALTRANS
	Cost	
	Timeline	Project identified; no completion date assigned as of yet
	Funding Source	SB 1
	Status	Project not initiated; Planned
	Expected Outcomes	Interchange improvements along SR-41 at Shields Ave, Ashlan Ave, Shaw Ave, and Bullard Ave
Bridge Seismic Retrofit	Source Document	Transportation Concept Report, SR-41
	Jurisdiction	CALTRANS
	Cost	
	Timeline	Completion year expected 2020
	Funding Source	• State Highway Operation and Protection Program • National Highway Performance Program (NHPP)
	Status	Project not initiated; Planned
	Expected Outcomes	Retrofit bridge on old SR-41 in Fresno and Madera Counties for seismic impacts
Add NB on-ramp	Source Document	Madera County 2014 RTP/SCS
	Jurisdiction	CALTRANS
	Cost	$6,600,000
	Timeline	No completion date given
	Funding Source	Future Measure T, Local TIF/other
	Status	Project not initiated; Planned
	Expected Outcomes	Add a NB on-ramp to SR-41 at Children's Boulevard
4 Lane Expressway	Source Document	Madera County 2018 RTP/SCS
	Jurisdiction	CALTRANS
	Cost	$39,000,000
	Timeline	Completion year expected 2022
	Funding Source	SB 1
	Status	• Environmental Impact Report found no significant impacts April 2020 • Construction initiated
	Expected Outcomes	Construct a 4-lane expressway in Madera County near Avenue 11

PROJECT	PROJECT INFO	
Widen 4 Lanes	Source Document	Madera County 2014 RTP/SCS
	Jurisdiction	CALTRANS
	Cost	$56,000,000
	Timeline	No completion date given
	Funding Source	Local TIF/other
	Status	Project not initiated; Proposed
	Expected Outcomes	Widen SR-41 to 4 lanes from Avenue 10 to SR-145
Transit Projects		
HSR	Source Document	CHSRA 2020 Business Plan
	Jurisdiction	California High Speed Rail Authority
	Cost	$45 billion to begin construction of Phase 1 of the HSR
	Timeline	Completion 2029 (Merced to Fresno Section)
	Funding Source	Proposition 1A (American Recovery and Reinvestment Act) bond measure, Federal Housing and Urban Development grant, Cap and Trade Program
	Status	Construction in Progress
	Expected Outcomes	Enhanced interregional mobility
Bus Improvement Project - Buffer Median Islands	Source Document	https://www.fresno.gov/transportation/the-fax-bus-stop-improvement-project/
	Jurisdiction	City of Fresno
	Cost	$2.2 million
	Timeline	Project completed
	Funding Source	federal, state, and local funds
	Status	Project completed
	Expected Outcomes	Will provide an accessible location to wait for the bus and an accessible pathway for passengers to get to and from the sidewalk to a median bus island bus stop. Improvements include adding or enlarging concrete bus stop landings, curb cuts and new bus stop amenities such as shelters, benches and trash receptacles.
Public Transit Agencies Subprogram	Source Document	Measure T ½ Cent Transportation Sales Tax Program – 2017 Strategic Plan
	Jurisdiction	Madera County Transportation Authority
	Cost	$3.94 million total • Madera County ($1.81 million) • City of Chowchilla ($280,000) • City of Madera ($1.52 million)
	Timeline	Over the course of 20 years through 2027
	Funding Source	Measure T
	Status	Ongoing
	Expected Outcomes	The goal of this program is to expand or enhance public transit programs that address transit dependent populations, have a demonstrated ability to get people out of their cars and improve air quality.

PROJECT	PROJECT INFO	
Madera Metro Transit Center	Source Document	Madera County Short-Range Transit Development Plan
	Jurisdiction	City of Madera
	Cost	$5 million
	Timeline	Construction initiated in 2018
	Funding Source	• Public Transportation Modernization, Improvement, and Service Enhancement Account Program • Federal Transit Administration (FTA)
	Status	Completed June 2020
	Expected Outcomes	This new mobility hub will improve local mobility through increased access to the Madera Metro, operated by the city of Madera
Madera Amtrak Station	Source Document	Madera Station Relocation
	Jurisdiction	San Joaquin Joint Powers Authority
	Cost	$26 million
	Timeline	• Contract for development was approved May 2019 • Funding for development approved in August 2019 • Construction to begin in 2023 • Anticipated opening date in 2024
	Funding Source	• Transit and Intercity Rail Capital Program (TIRCP) • California State Transportation Agency (CalSTA) • SB1
	Status	Construction to begin in 2021
	Expected Outcomes	Will relocate the existing Madera Amtrak Station to Avenue 12 to improve visitor access and ridership
Active Transportation Projects		
Tuolomne Street Bridge Construction	Source Document	https://hsr.ca.gov/high_speed_rail/maps/construction.aspx?style=text
	Jurisdiction	California High Speed Rail Authority
	Cost	
	Timeline	Demolition began January 2015 and opened to traffic Summer 2017.
	Funding Source	
	Status	Completed
	Expected Outcomes	The new bridge better accommodates two-way traffic; supports the revitalization of downtown Fresno's city core and features wider pedestrian walkways and bike paths.

PROJECT	PROJECT INFO	
Development of new trail connections	Source Document	Fresno County Regional Transportation Plan
	Jurisdiction	Fresno Council of Governments
	Cost	$465,693,000
	Timeline	• Phase 1: Information Gatherin (March - May 2020) • Phase 2: Drafting the Recommendations (May - July 2020) • Phase 3:
	Funding Source	Surface Transportation Block Grant Program (STBGP), Local Transportation Fund (LTF), California State Recreational Trails Program (RTP), Land and Water Conservation Fund (LWCP), Active Transportation Program (ATP), Transportation Development Act (TDA), FCTA Measure C, JSVAPCD Bikeway Incentive Program
	Status	
	Expected Outcomes	This Plan will create a vision and recommendations for the ongoing development of new trail connections that create a safe, comfortable, and connected network for walking/hiking, off-road biking, and horseback riding.
Bicycle and Trail Improvements (2018-2027)	Source Document	Madera County 2018 RTP/SCS
	Jurisdiction	MCTC
	Cost	$6,720,000
	Timeline	2018-2027
	Funding Source	Congestion Mitigation and Air Quality Improvement (CMAQ) Program/ Local
	Status	
	Expected Outcomes	Development of Class I, II, III Bicycle Facilities
Bicycle and Trail Improvements (2018-2027)	Source Document	Madera County 2018 RTP/SCS
	Jurisdiction	MCTC
	Cost	$31,250,000
	Timeline	2028-2042
	Funding Source	CMAQ Program/Local
	Status	
	Expected Outcomes	Development of Class I, II, III Bicycle Facilities

Appendix (B) –
Small Group Meeting Attendees

Appendix (B) Small Group Meeting Attendees

BluePoint Planning conducted five hour-long Small Group Meetings to obtain feedback from key community stakeholders. Six small group meetings were planned, including: Agriculture, Businesses and Developers, Community, Developers, Environmental, and Large Institutions. However, based on the availability of each individual guest, only five meetings were hosted and some guests shifted into different meetings slots. The final meeting list included: Businesses and Developers, Environmental and Cycling, Community, Institutions, and Ranchos. The entities that attended the meetings can be found below.

Businesses and Developers – December 1, 2020 - 11am

- Buidling Industry Association of Fresno and Madera
- Downtown Fresno
- Riverstone
- Gunner Ranch

Environmental and Cycling Groups – **December 2, 2020 - 1 pm**

- Central Valley Air Quality Coalition
- Farm Bureau
- Central California Asthma Collaboration
- Fresno Cycling Club

Community Groups – December 1, 2020 - 3 pm

- Madera Chamber of Commerce
- Fresno Metro Ministry
- Tree Fresno

Institutions – December 4, 2020 - 1 pm

- San Joaquin River Conservancy
- Madera City College
- Yosemite Area Regional Transportation System (YARTS)

Ranchos – January 27, 2021 - 10 am

- 14 Ranchos Community Members

Appendix (C) –
Steering Committee Members

Appendix (C) Steering Committee Members

The Steering Committee is represented by members from many backgrounds. They can be found below:

Category	Group/ Agency	Name	Email
Government	Fresno Council of Governments	Braden Duran	bduran@fresnocog.org
		Kai Han	khan@fresnocog.org
		Krisine Cai	kcai@fresnocog.org
	Madera County Transportation Commission	Dylan Stone	dylan@maderactc.org
		Patricia Taylor	patricia@maderactc.org
	Fresno County	Brian Spaunhurst	bspaunhurst@fresnocountyca.gov
	Madera County	Jared Carter	jcarter@maderacountyca.gov
	City of Fresno	Gregory Barfield	Gregory.barfield@fresno.gov
		Jill Gormley	Jill.gormley@fresno.gov
		Joe Vargas	Joe.vargas@fresno.gov
	Caltrans	Jamaica Gentry	Jamaica.gentry@dot.ca.gov
		Michael Navarro	Michael.navarro@dot.ca.gov
Health/ Public Health	Valley Childrens Hospital	Leonard Garoupa	plgaroupa@yahoo.com
Mobility	Fresno Bicycling Club	Tina Summer	Tinasumner@sbcglobal.net
	FAX	Carolina Ilic	Carolina.ilic@fresno.gov
Economic Development/Tourism	BIA of Fresno/ Madera Counties	Michael Prandini	Mikep@biafm.org
Equity	Leadership Counsel for Justice and Accountability	Leslie Martinez (Fresno County representative)	Lmartinez@leadershipcounsel.org
		Madeline Harris (Madera County representative)	mharris@leadershipcounsel.org
Safety	California Highway Patrol (CHP)	Lieutenant Commander Hector Madrigal	hmadrigal@chp.ca.gov
Education	Fresno City College	George Cummings	not available

Appendix (D) –
Guide to Applying an Equity Lens

Appendix (D) Guide to Applying an Equity Lens

Using an equity lens for a project is a means to actively insert racial equity into your decision-making process from project design through project evaluation. The steps include finding shared language to talk about race and institutional inequities; analyzing data about who will benefit or be burdened by an initiative; setting a concrete goal for a specific improvement in racial equity; engaging internally and with the community, especially those most impacted, in developing strategies to spread benefits or mitigate burdens; staying focused on equity throughout implementation; making communication and evaluation of progress in advancing equity a priority throughout the initiative; and taking the time to figure out how to institutionalize what has worked in your process to advance equity.

1. What makes a good project?

Projects should focus on putting ideas into action. This can be done via a brand new project or it can be via an intentional shifting of work you currently have underway. Factors that will influence the quality of a project are as follows:

1. **Clarity and specificity –** Good projects are easily described and understood. They specific, concrete goals and progress indicators for both communitywide impacts and reducing racial inequities.
2. **Ability to impact racial equity –** Good projects identify and address specific racial inequities, whether through the adoption of racial and social impact criteria in decision-making processes, by producing specific benefits and/or mitigating burdens for communities of color, and/or through more authentic, long-term engagement of communities of color in program design and implementation.
3. **Capacity building –** Good projects include specific strategies for building the capacity of your team to advance racial equity. You should have internal and/or external partners identified that will support development and implementation of the project. If you do not have current partners, expanding capacity and engagement should be a key part of your strategy.
4. **Institutionalizing –** Good projects will aim to institutionalize equity on a long-term basis so that the project doesn't become a "one-off." This can be done by embedding in institutional policy a decision-criteria to promote equity or a requirement to use a racial equity lens in program development. While opportunities to institutionalize equity will likely emerge throughout the course of implementation, if you are thinking about it from the beginning, the likelihood for success will increase. Ultimately, the more you can embed consideration of equity into operations, the more influence you will have.

What are examples of good projects?

Good projects will vary in scope and scale, depending on local conditions. The following list of examples of types of projects is intended to reflect the variation we expect to see.

- Developing and adopting an overall racial equity strategy for a planning or environmental department -- Some cities start down this path by adopting a racial equity policy, including goals, decision criteria, and progress metrics for advancing racial equity that all projects and programs must meet. This process needs to begin with a shared understanding of the history and persistence of racial inequity and shared language for talking about a new approach. The overarching policy can be continually refined using lessons learned in applying it to new projects.

- Undertaking a neighborhood planning process that is inclusive of communities of color – Too often city-led planning has not included the voices or priorities of communities of color. For example, engaging people most affected by growth and potential displacement provides the opportunity to develop anti-gentrification strategies so that people currently living in a neighborhood benefit from anticipated growth and reinvestment. Likewise, community-targeted climate resilience or adaptation planning efforts will be more successful if it includes the long-term engagement of residents from all neighborhoods.
- Integrating equity into an existing effort, such as a program that encourages city residents to walk or bike – Some existing sustainability programs may unintentionally better meet the needs of white residents. Conducting an assessment of program objectives, gaps and opportunities could allow teams to expand or re-design an existing program to make programs work for everyone and actually advance racial equity.
- Developing a new sustainability or climate action plan using an equity lens – As equity has become more prominent in sustainability and climate action, cities have begun to apply an equity lens to the development and, as important, the implementation of these plans. With capacity building, the equity lens can be more rigorously applied and is more likely to open up opportunities for institutionalizing equity into core city government operations and work plans.
- Bringing equity into implementation of an existing sustainability or climate action plan – A city may already have a rigorous sustainability or climate action plan that it is actively implementing and want to bring a stronger equity lens to its implementation by undertaking an equity self-evaluation and bringing an equity lens to program implementation for each program.

2. Desired Results, Outcomes, and Data Evidence

- It will be easier to build support (and counter opposition) if you have a clear, simple, measurable and easily understood goal for the project and for how the project will advance racial equity.
- Data disaggregated by race and neighborhood related to your project will help you to find equity gaps.
- Both quantitative and qualitative data should be used to assess and track community conditions over time.
- A general outcome of “increase racial equity” is harder to explain or achieve than a specific change in opportunity for people of color. A specific change could be increased access to a program, reduced burdens from a policy change, a program design that is tailored to work for a community, and/or a greater voice in the decisions about the program.
- USDN Member Example: Reuse vacant and abandoned properties throughout the city in a way that involves residents in reuse decisions, doesn’t displace neighbors, and allows existing residents to participate in investment programs and local hiring.

3. Collaboration and Engagement

- Community engagement is often designed for those who have historically had access. You will need to be intentional to engage diverse communities that have not historically been well-served by government
- Too often, inclusion and engagement efforts don’t support long-term relationships. Too often community members have been repeatedly consulted, but not heard. Success depends upon committing to long-term engagement that builds capacity and trust.

- Trust is built by approaching each neighborhood with an open mind; accepting that you may not understand community concerns and may be surprised to find what they are; recognizing that what community members care about may not be what you want to work on; trying to find the connection, but being prepared to meet community members where they are; finding ways for community members to take the lead; and following through on commitments.
- USDN Member Example: Work with residents in three neighborhoods to figure out what city programs could help increase access to health care and active living, energy efficiency, and affordable quality housing.

4. Strategies

- We tend to think about projects in isolation, aka, a transactional approach. For us to maximize impact, we need to consider opportunities to use our projects to address structural barriers to opportunity within our institutions.
- We typically have the greatest influence within our own institutions, but racially inequitable outcomes are perpetuated through systems and structures. Think about how you can work cross-sectors to enhance your ability to target structural racism.
- USDN Member Example: Develop a model Transit Oriented Development (TOD) or Community Benefit Agreement policy that includes decision criteria for the allocation of benefits and burdens to communities of color.

5. Communication, Education, and Capacity Building

- Review Video 2. Communicating about Equity and Video 3. Building Shared Understanding of Equity.
- Your team will need continuous training and capacity building on what racial equity is and how to use an equity lens.
- Include education about the history of how your community arrived at current conditions related to your goal and what past choices may be contributing to racial inequities.
- Be aware of the tendency of many people to want to focus on individuals. This awareness can help you to make clear connections between individual experiences and institutional and structural barriers and opportunities.
- USDN Member Example: Will identify a project that involves multiple departments so all can learn together how to make sure programs work well for all residents. For example, community gardening on public land where residents are expected to purchase their own equipment doesn't work for low-income neighborhoods.

6. Evaluation

- Evaluation is a key part of accountability.
- Make sure you take time to share lessons learned. This will not only facilitate mid-course corrections, but also help to create more opportunities to advance equity.
- This work can be hard. Make small wins. Think about how you can you take time to celebrate success and recognize progress.
- USDN Member Example: For a project to bring an equity lens to the update of a climate action plan, there will be an equity goal for each action for each neighborhood, not just citywide. Every neighborhood will have a target for improvement that will be tracked and shared.

Appendix (E) –
Model Run Project Lists

Appendix (E) Model Run Project Lists

Improvement	Included in Model
Highway/ Roadway Projects	
New HOV lane	x
widen from 2 lanes to 4 lanes	x
widen from 4 lanes to 6 lanes	x
new auxiliary lane	x
new freeway interchange ramp	x
complete street improvements	
install traffic signals	
interchange\intersection improvements	
lighting	
raised and landscaped medians	
reversible HOV lane	
reversible lane or shoulder lane	
roadway shoulders	
speed displays	
traffic signal coordination	
wayfinding signage	
Transit Projects	
student bus pass program	x
express bus\BRT service	x
a new MCC route	x
safe bus stops (improved amenities)	
YARTS stops	
extend weekend service and increase frequency	
improve bus stop conditions	
micro-transit	
multimodal mobility hub	
service operational improvements (signal priority, queue jumps etc.)	
traveler information app	
vanpool program and participation incentives	

Improvement	Included in Model
Active Transportation Projects	
bike facility improvements	x
bike lane	x
buffered bikeway	x
class I bike path	x
class I bikeways	x
class I multi-use path	x
class IV bikeways	x
protected bikeways	x
separated bikeways	x
upgrade class II to class III bikeways	x
bicycle intersection improvement	
bike share	
crosswalk improvements	
landscaping and amenities	
lighting	
multi-use path	
pedestrian crossing and beacons (just improved intersection for safety)	
sidewalk	
wayfinding signage	

Appendix (F) –
Study Area Maps

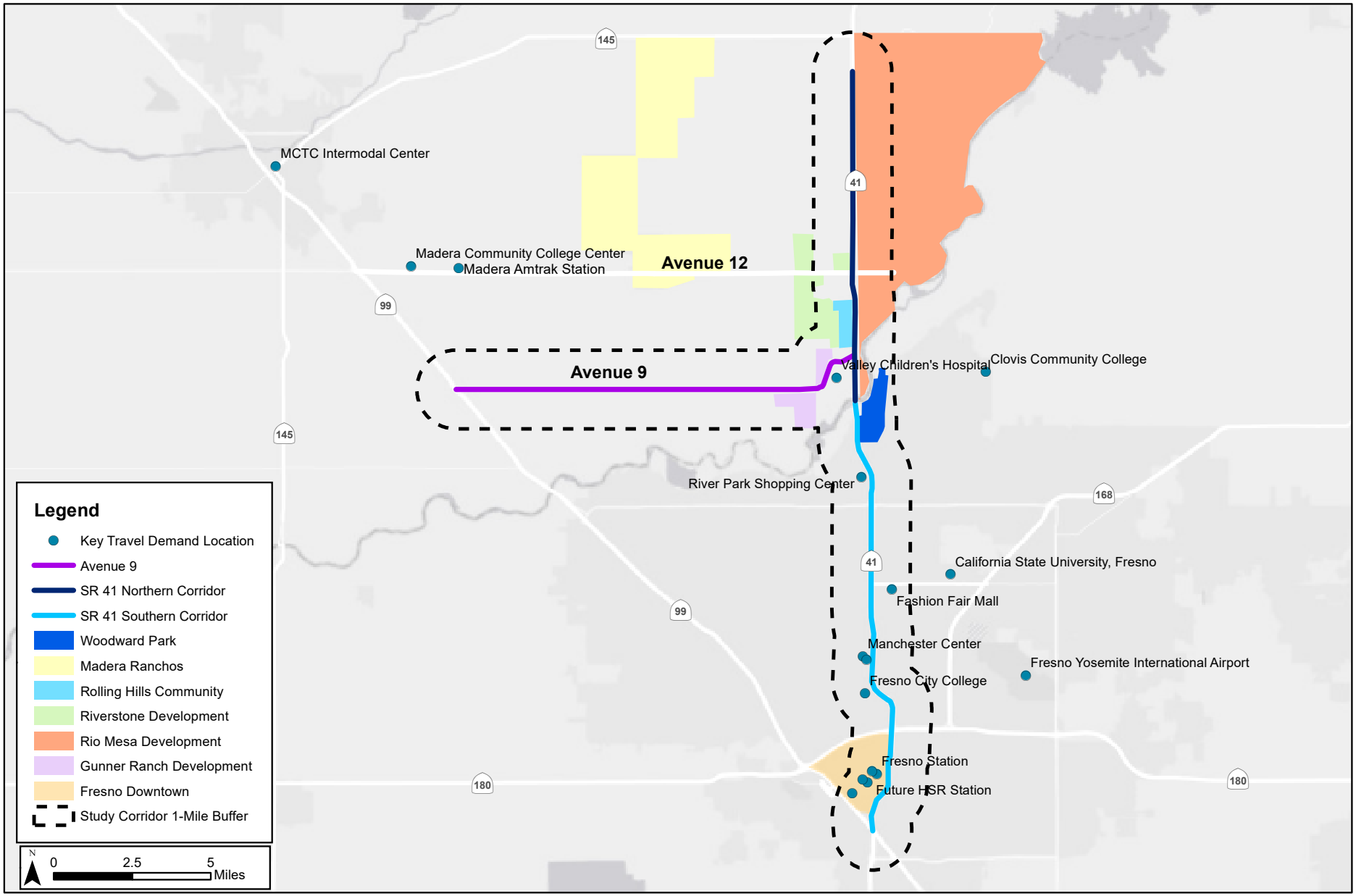
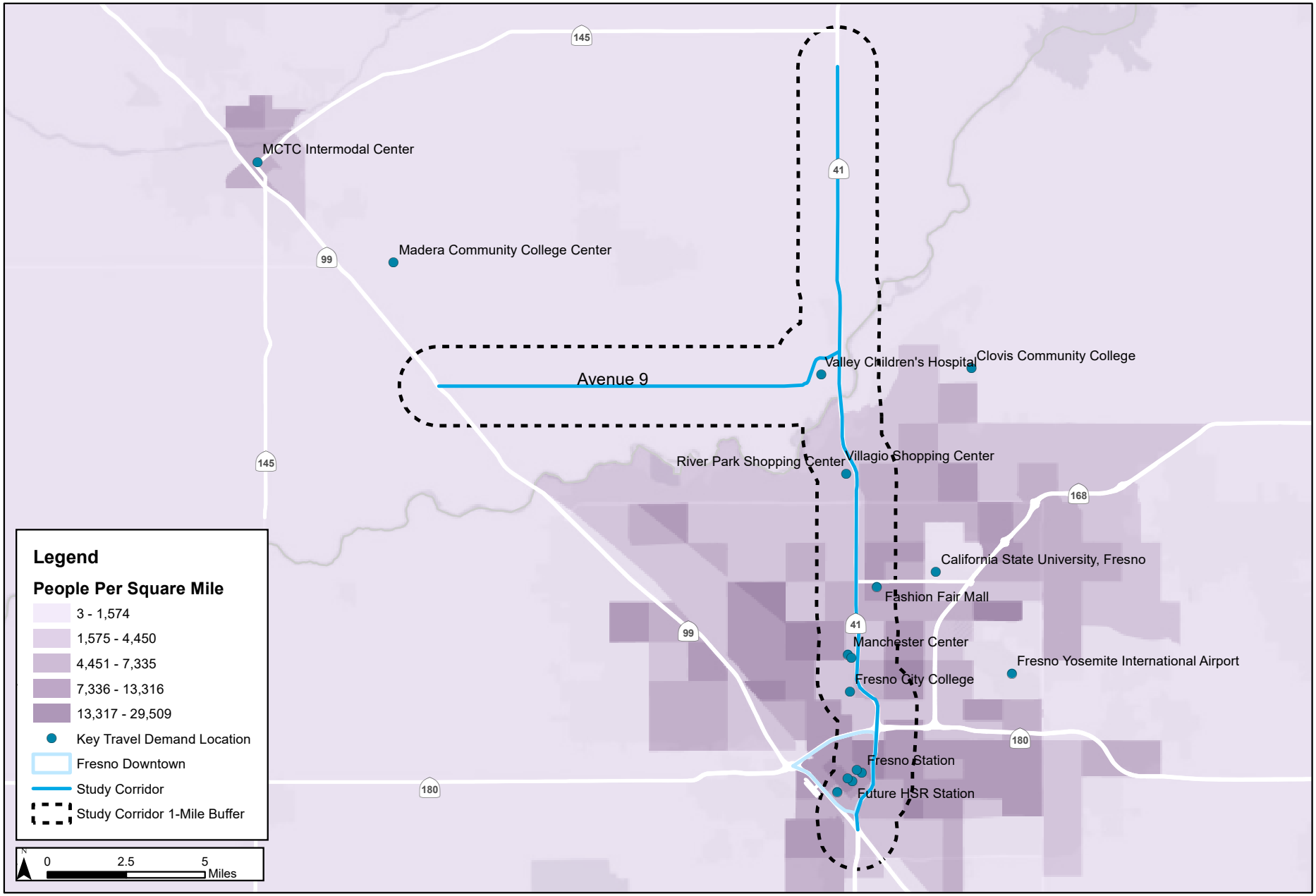
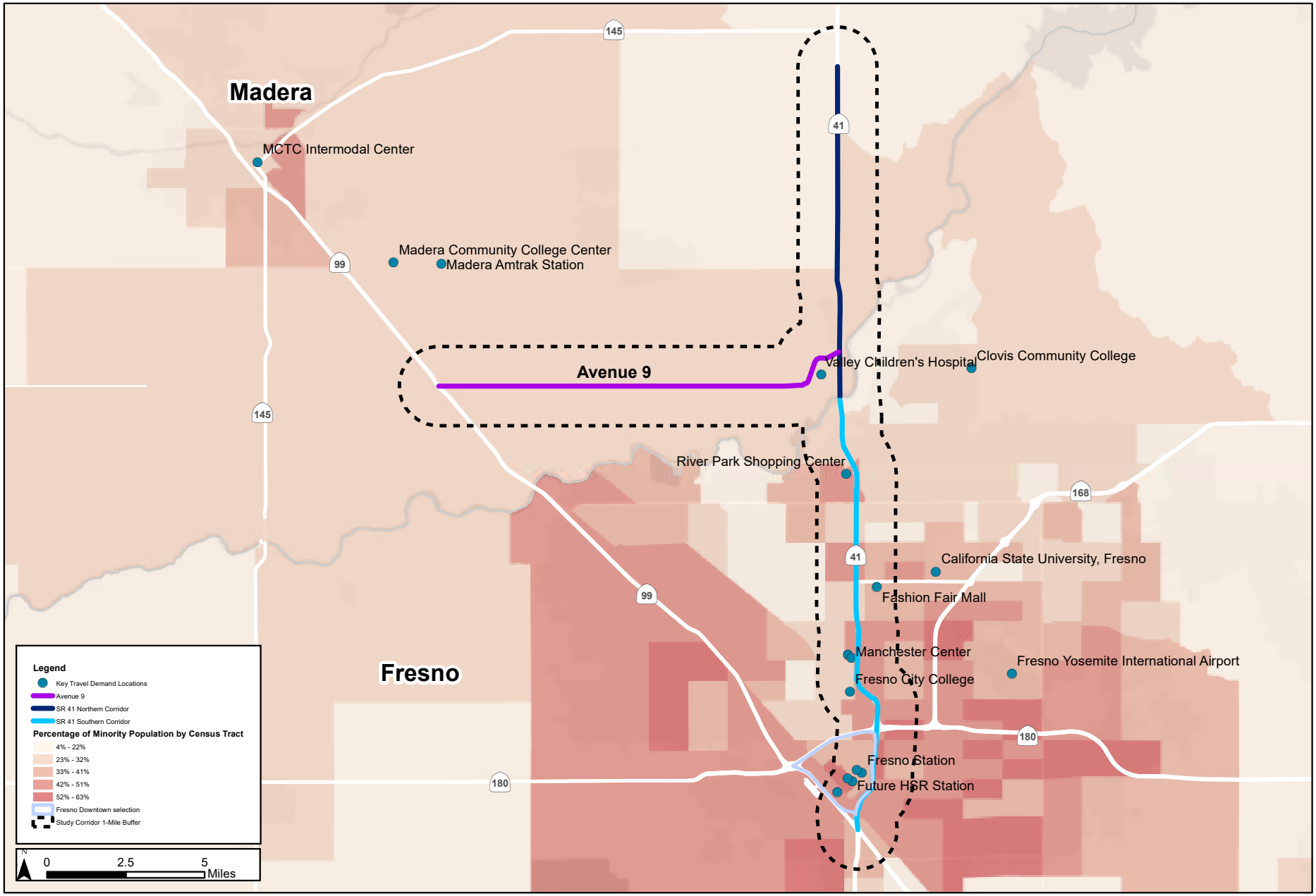


Figure 2.1: Study Area



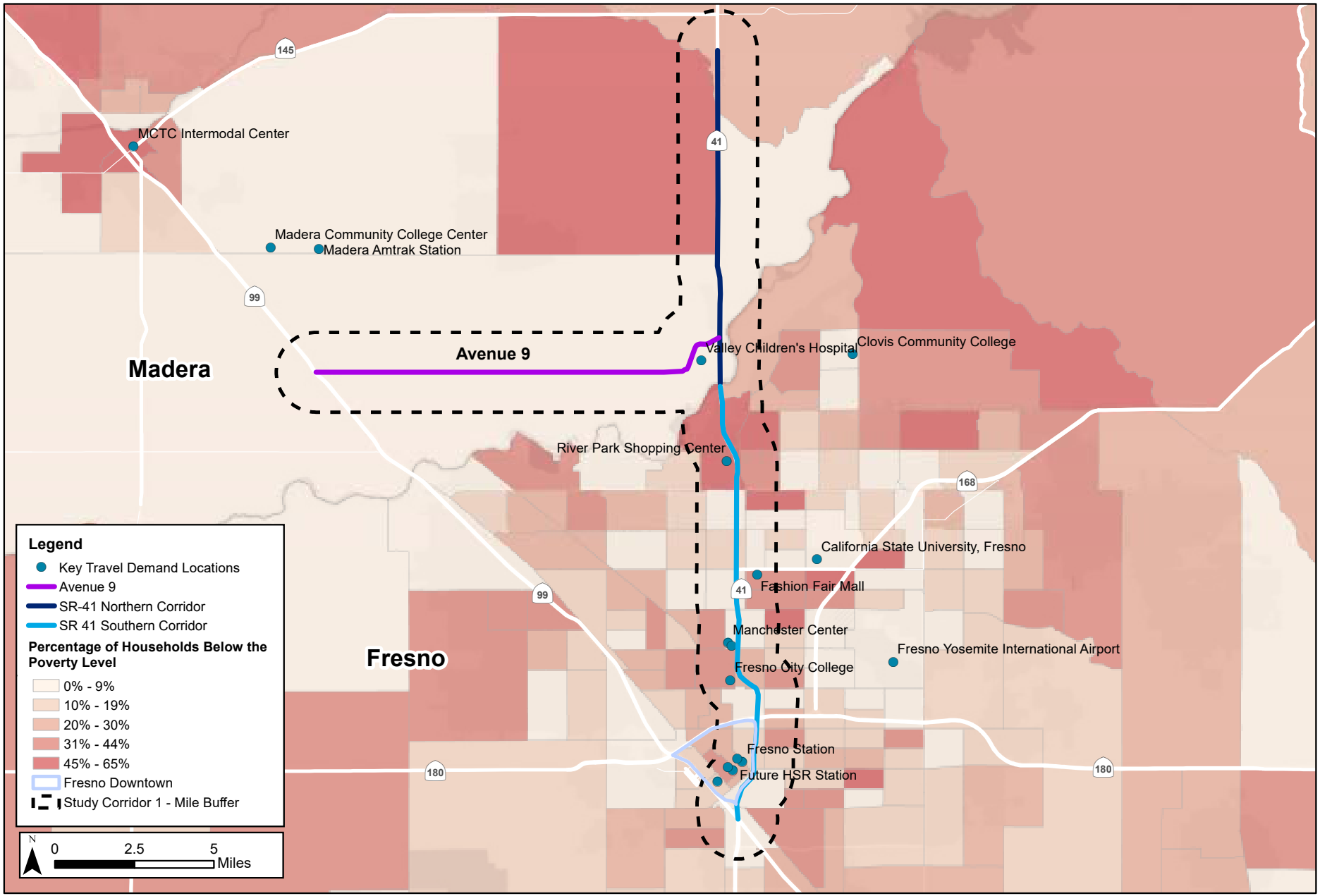
Source: US Census Bureau, American Community Survey 5-Year Estimates (2018)

Figure 2.2: Existing Population Density



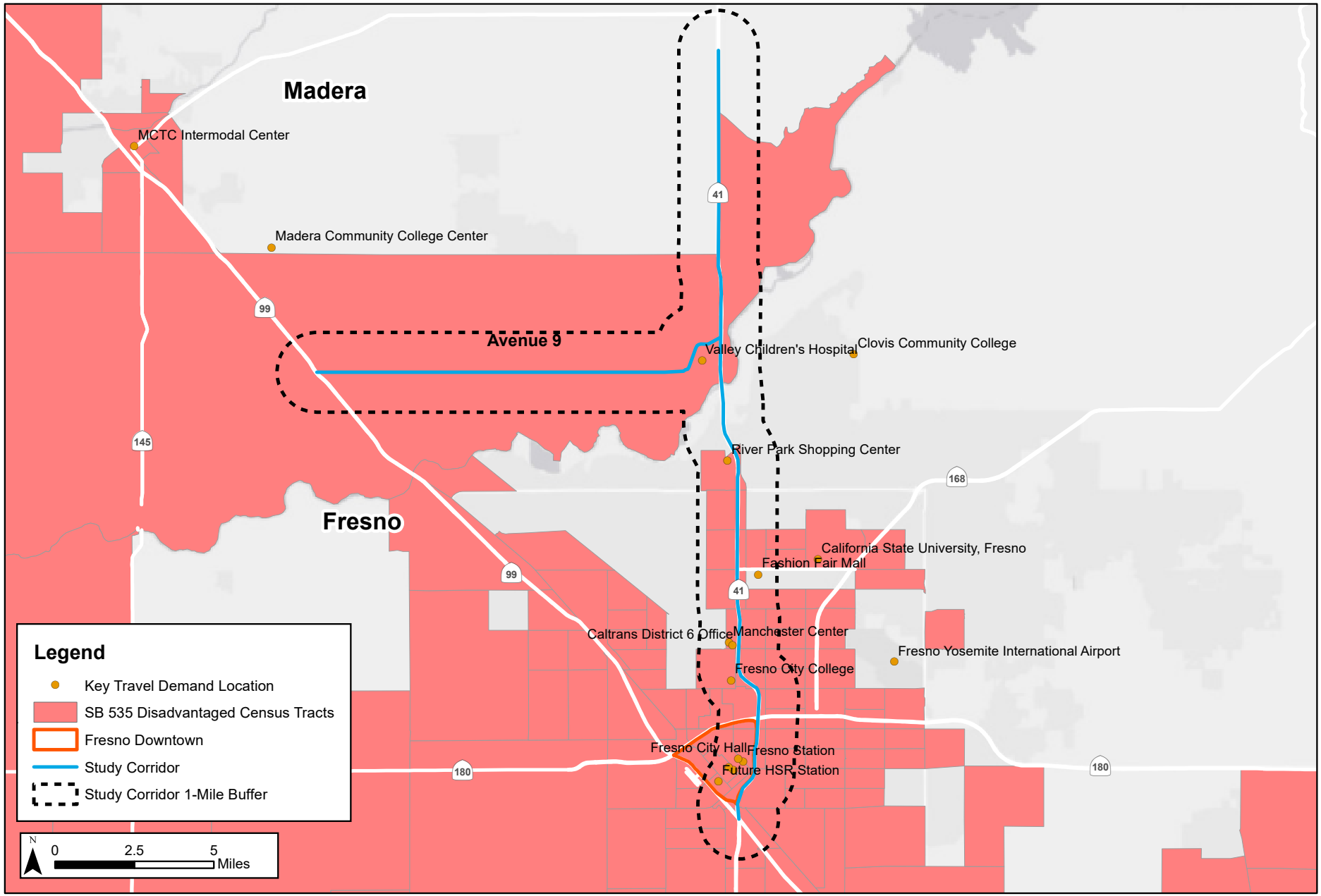
Source: US Census Bureau, American Community Survey 5-Year Estimates (2018)

Figure 2.3: Minority Population



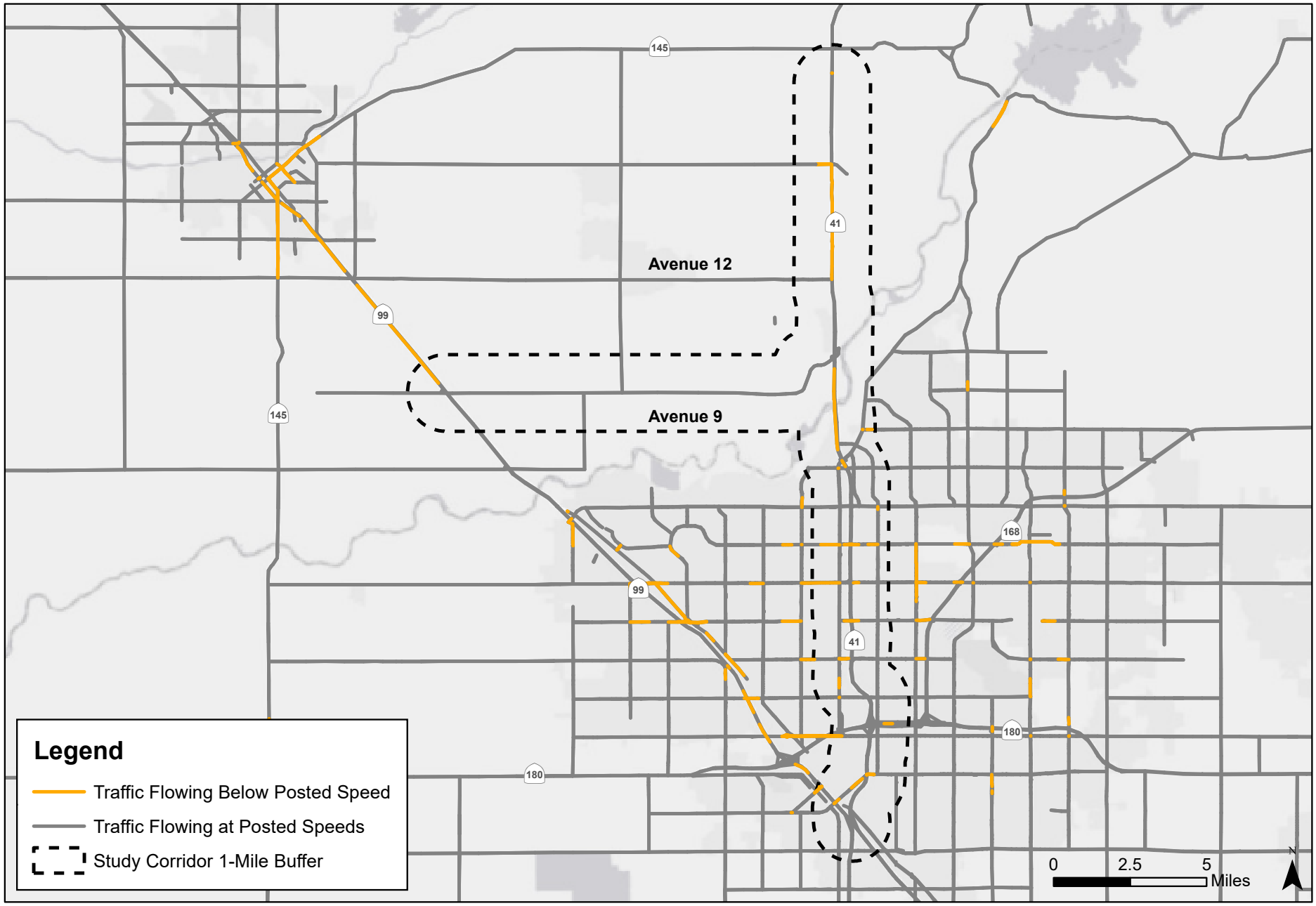
Source: US Census Bureau, American Community Survey 5-Year Estimates (2018)

Figure 2.4: Low-Income Population

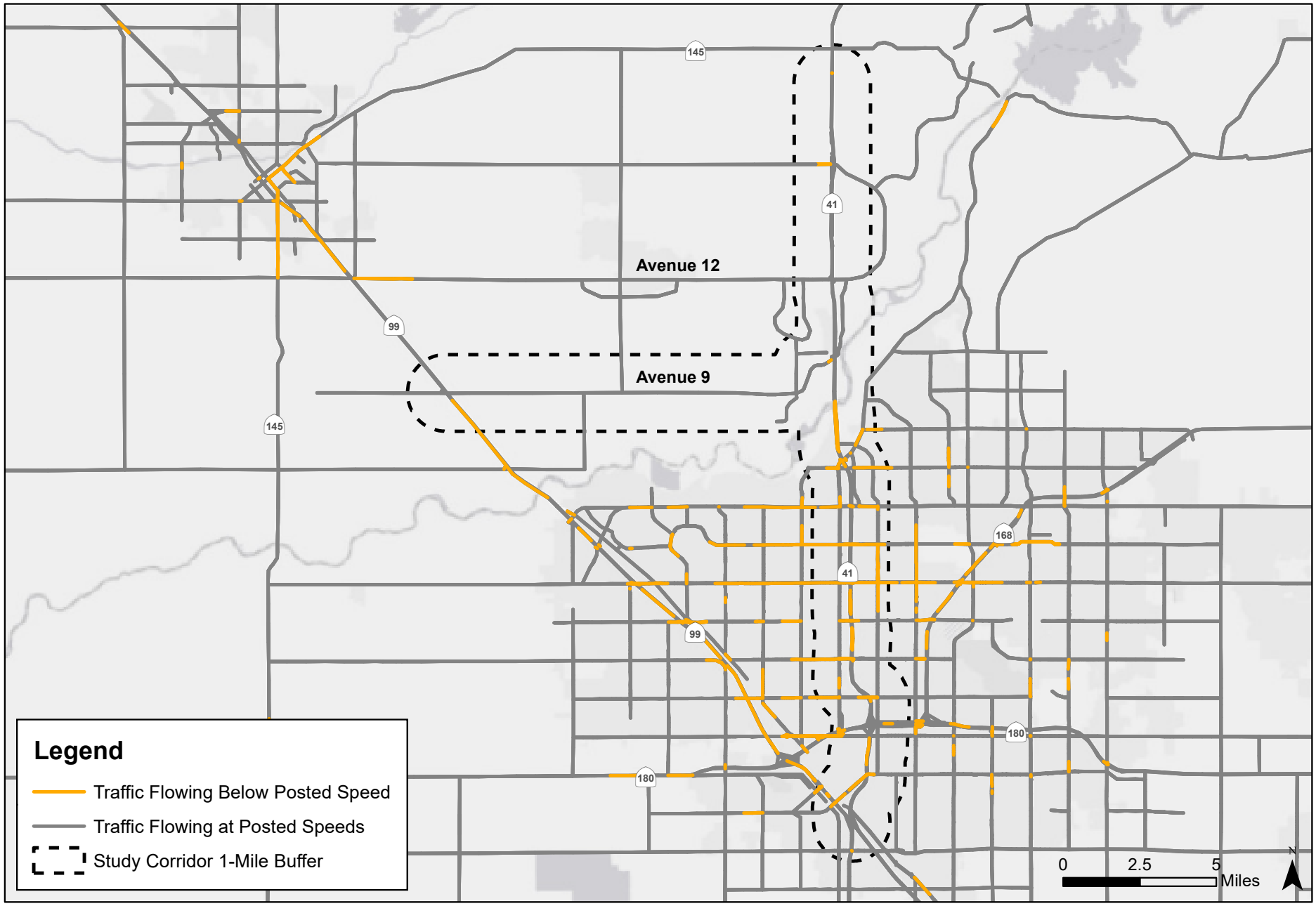


Source: CalEnviroScreen 3.0 (2018)

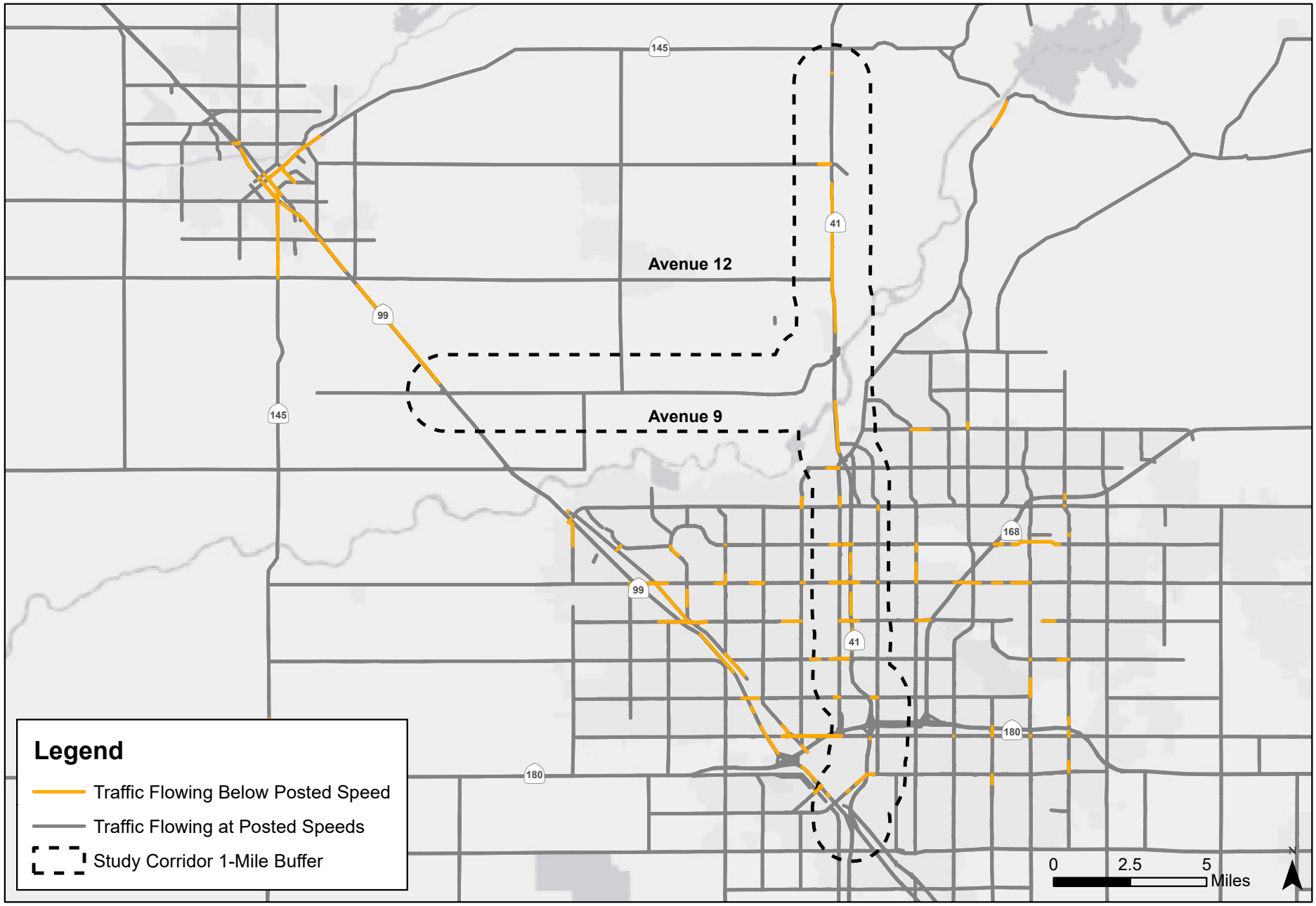
Figure 2.6: Disadvantaged Communities



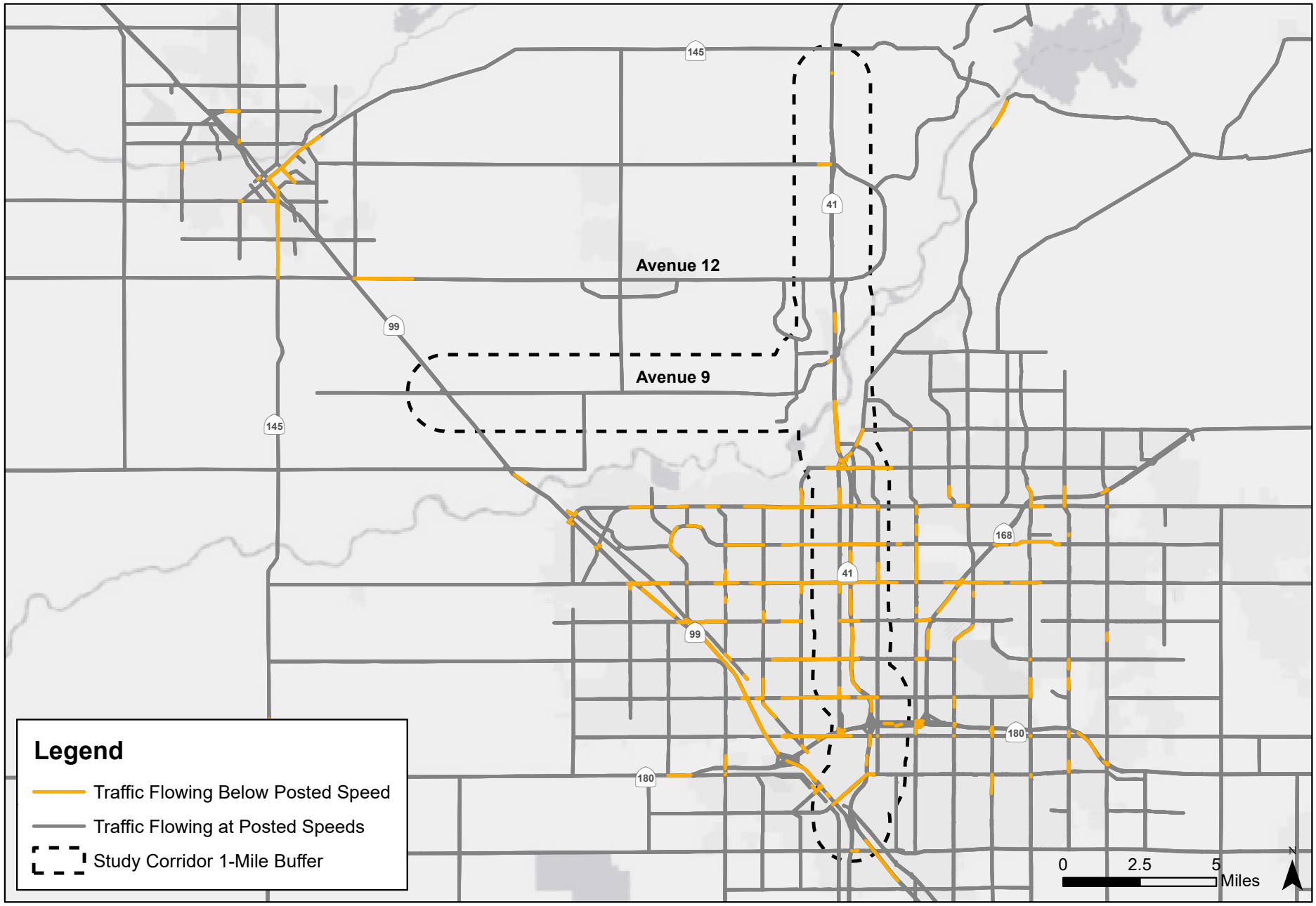
2019 Base Year: AB Speed in AM Peak Hour



2046 Horizon Year: AB Speed in AM Peak Hour



2019 Base Year: AB Speed in PM Peak Hour



2046 Horizon Year: AB Speed in PM Peak Hour

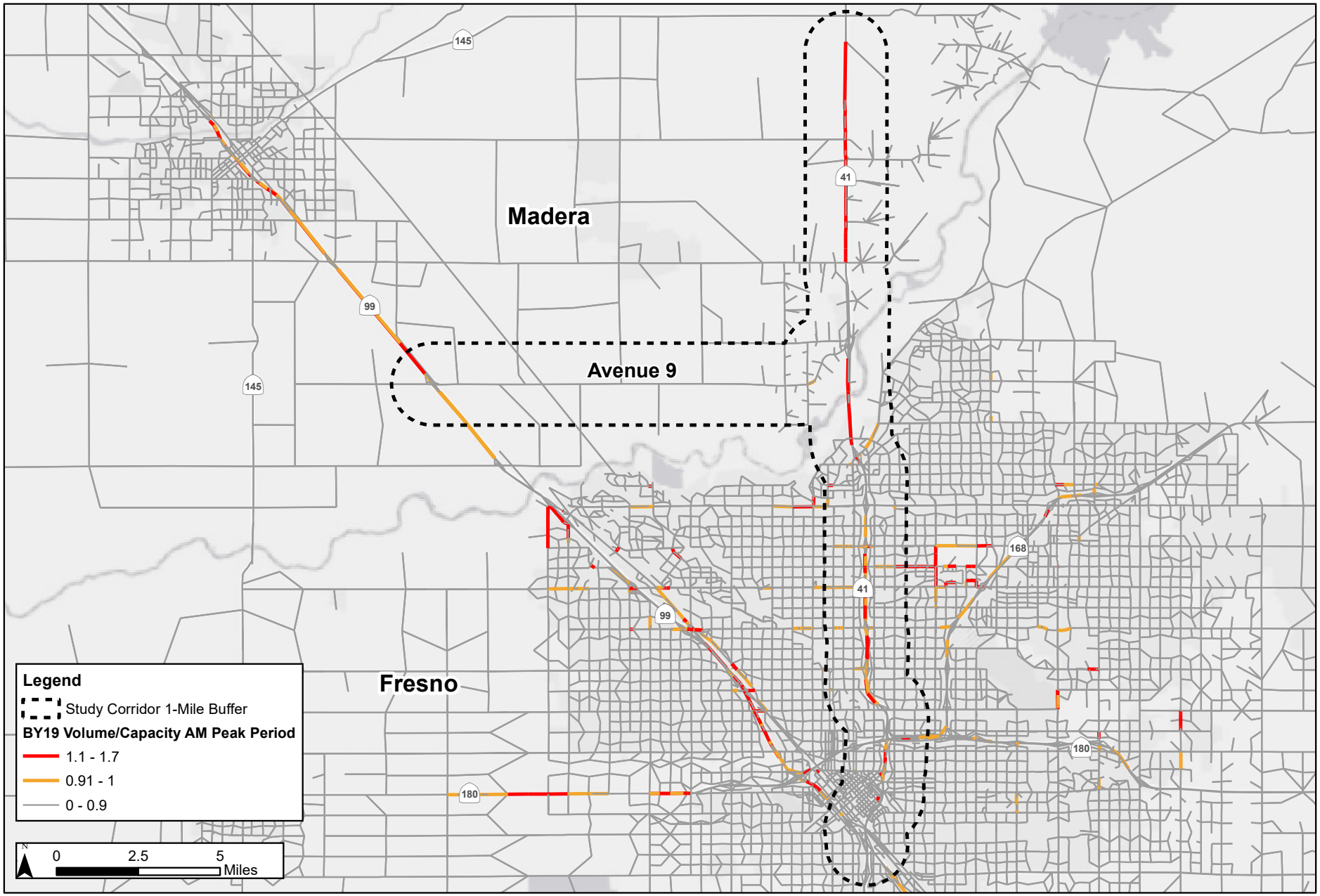


Figure 2.11: 2019 Base Year: Volume to Capacity AM Peak Period

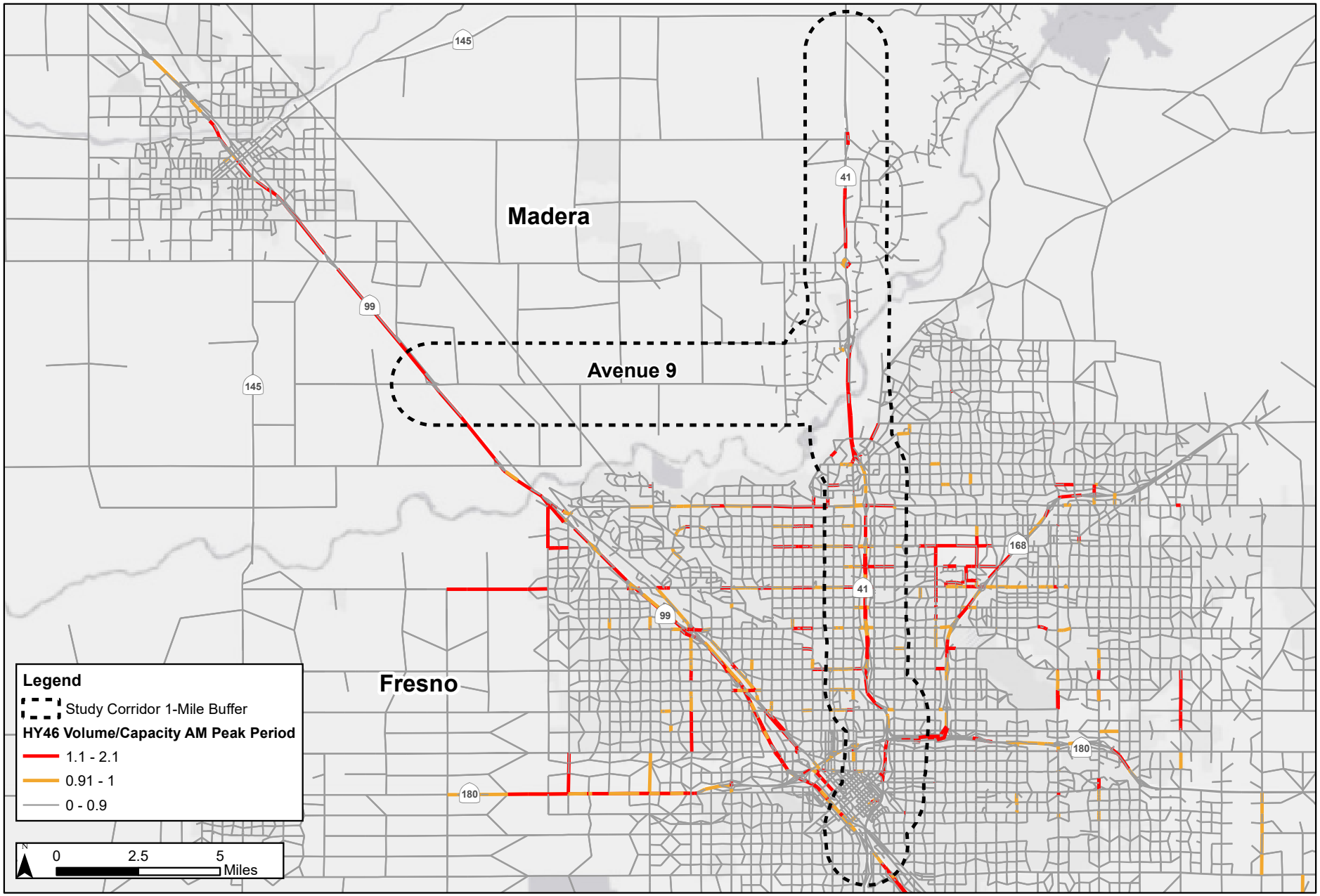


Figure 2.12: 2046 HorizonYear: Volume to Capacity AM Peak Period

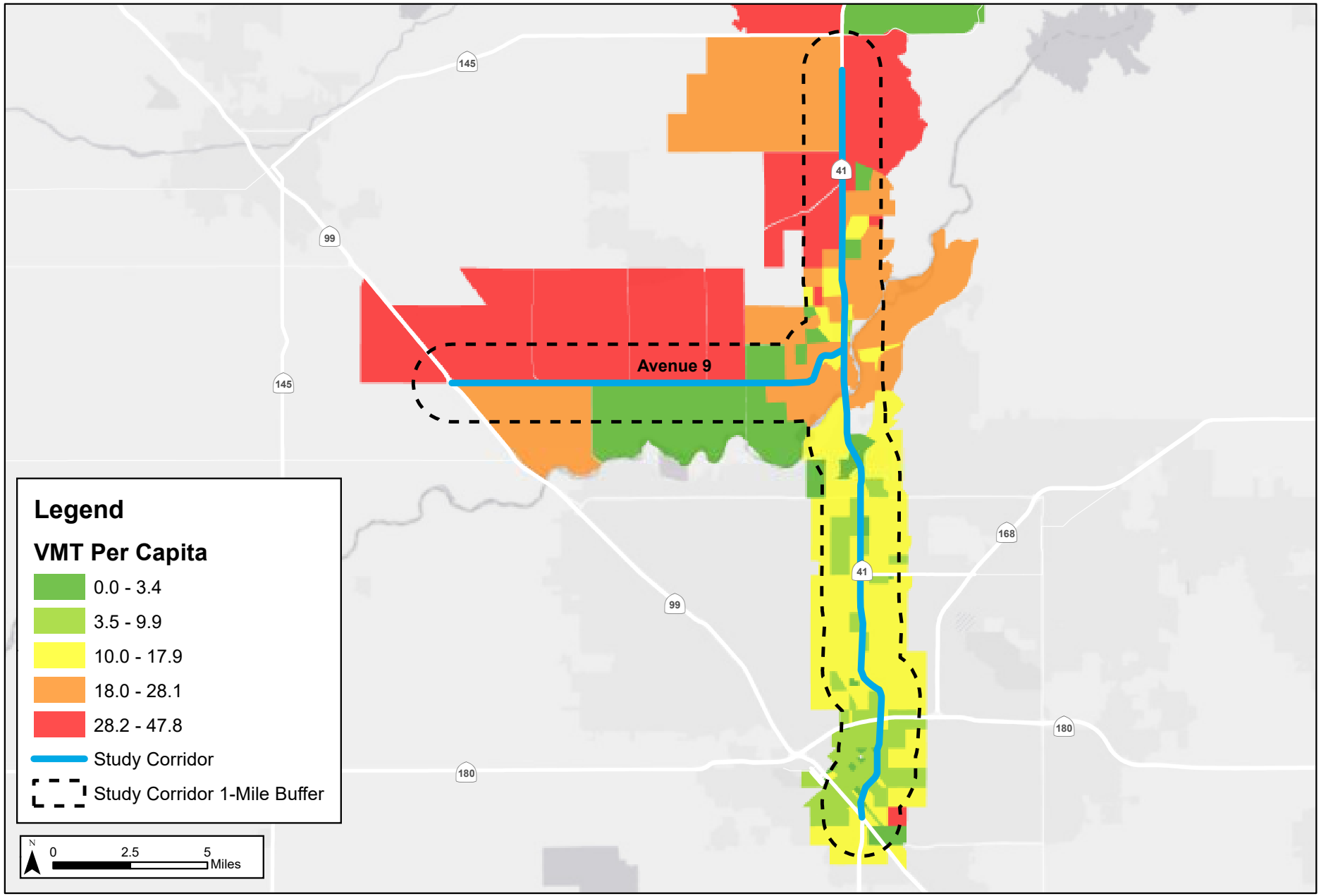


Figure 2.13: VMT Per Capita 2046 No Build

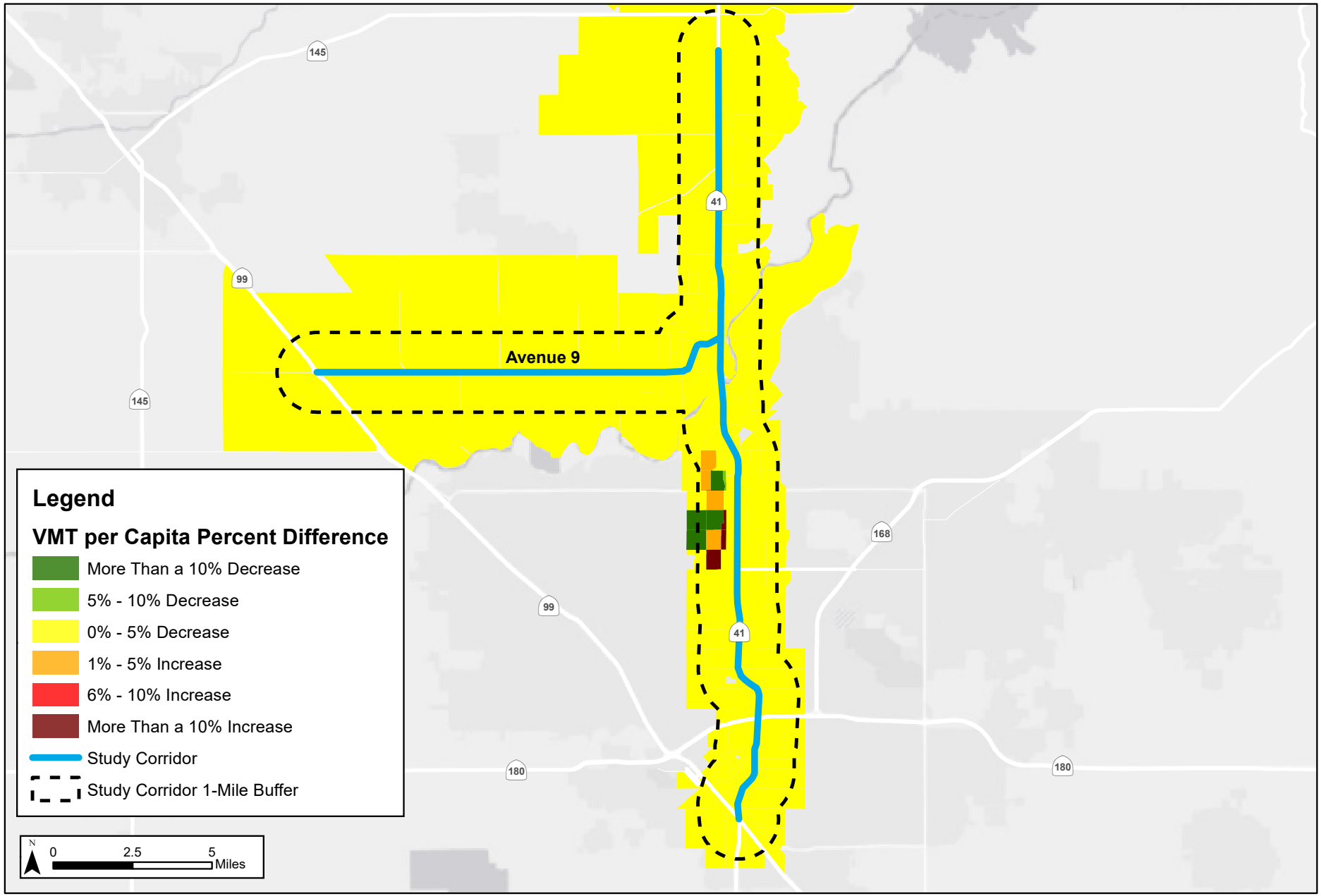


Figure 2.14: VMT Per Capita % Difference Between 2019 Base Year and 2046 Horizon Year No-Build

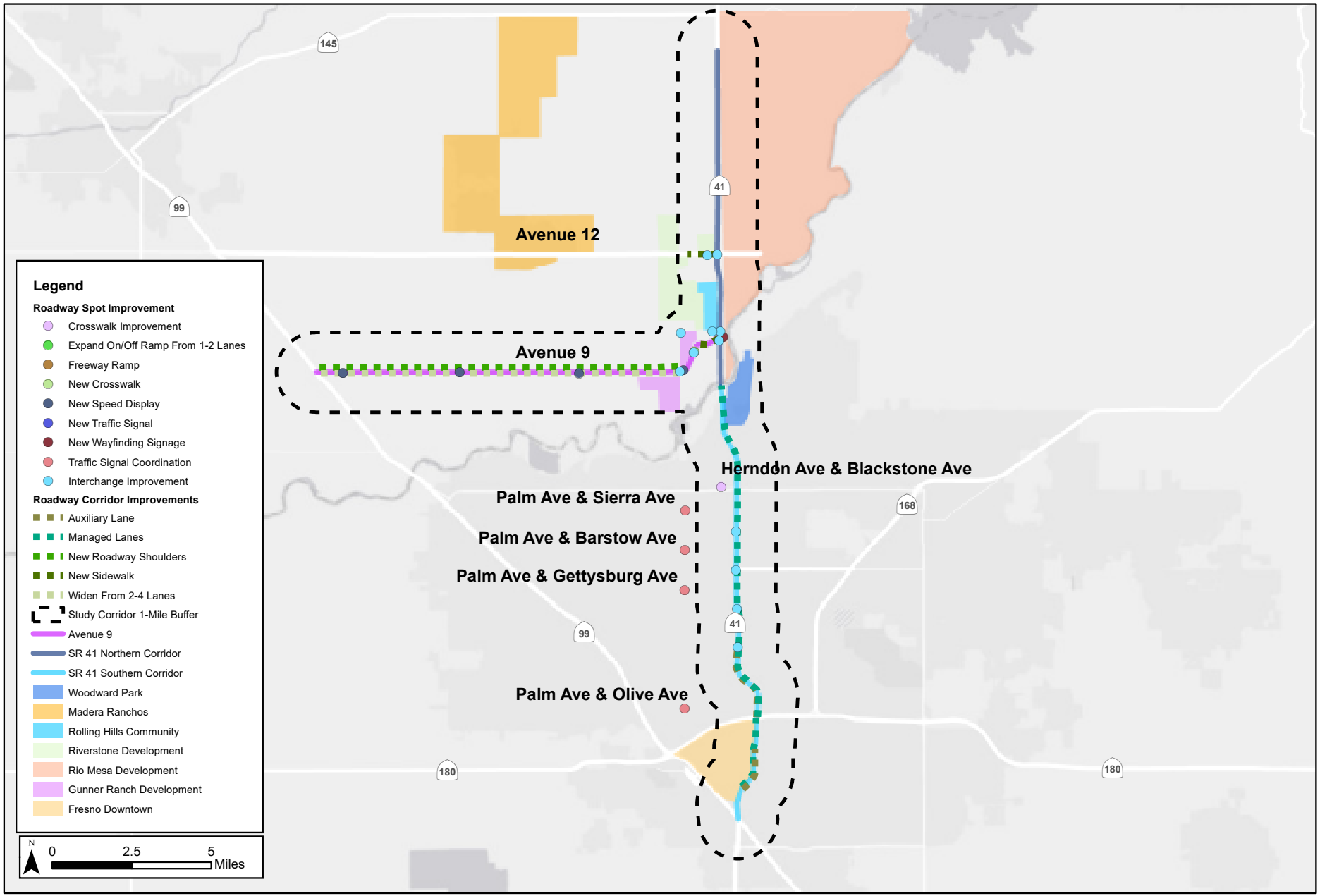


Figure 5.2: Proposed Roadway Strategies

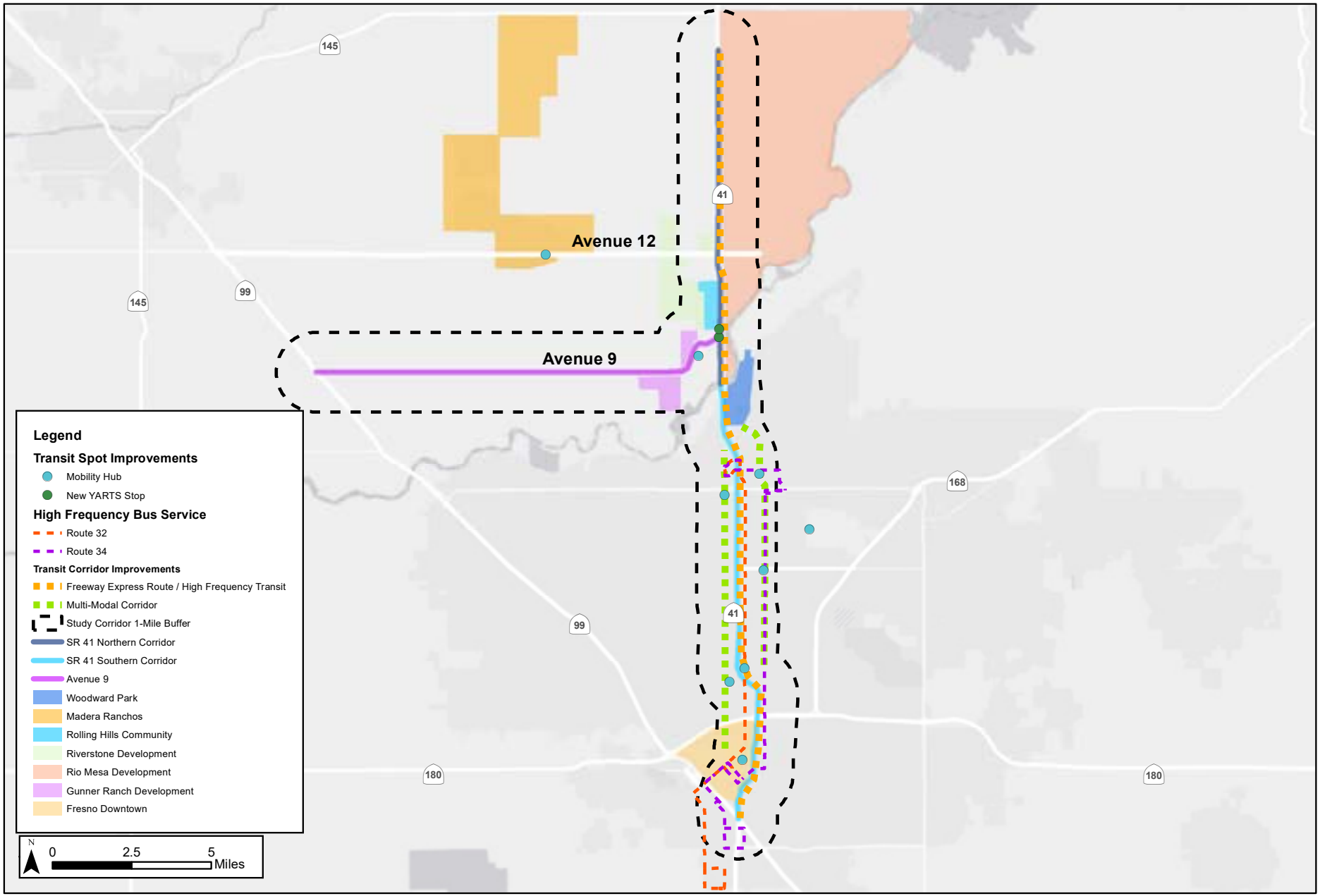


Figure 5.3: Proposed Transit Strategies

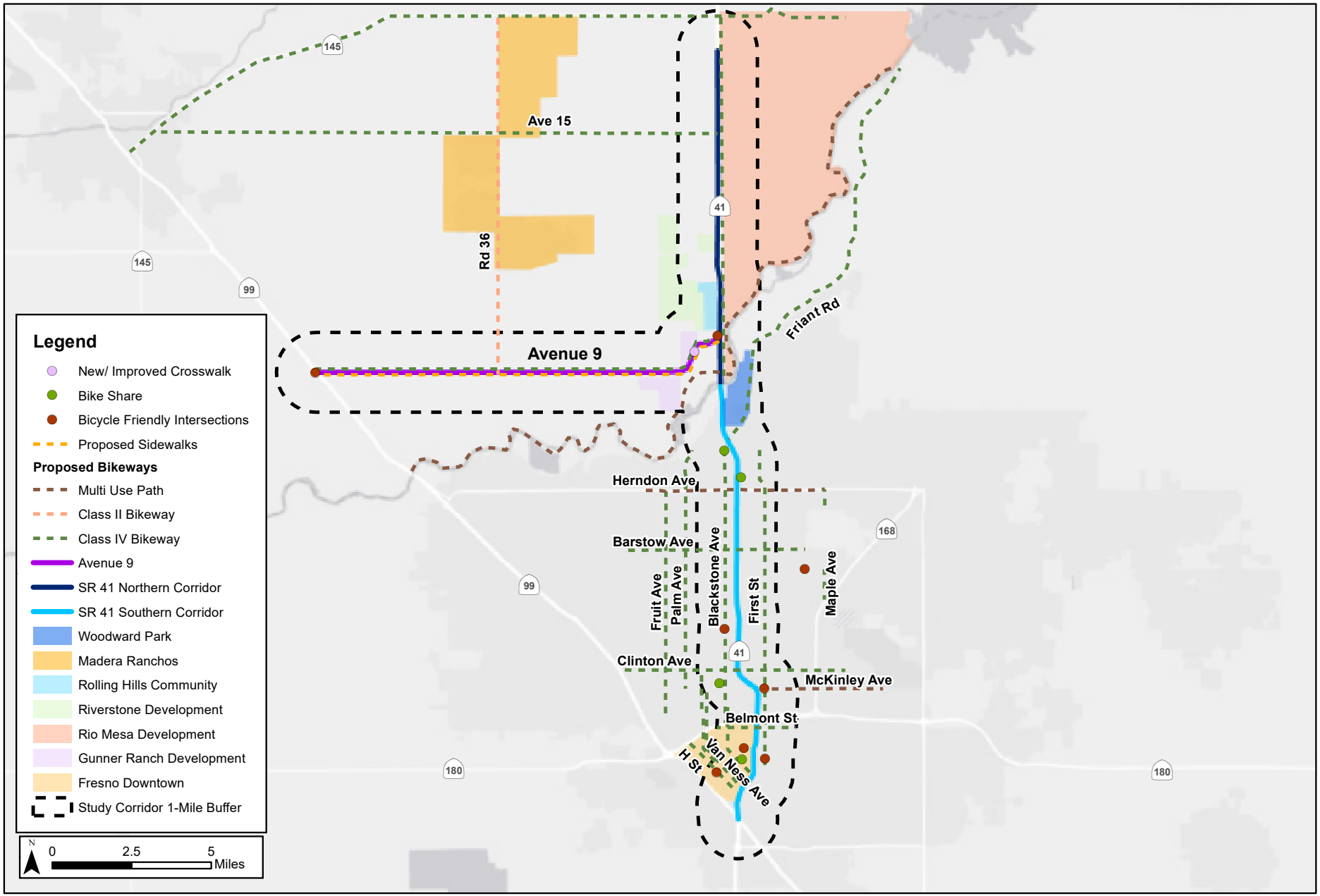


Figure 5.4: Proposed Active Transportation Strategies

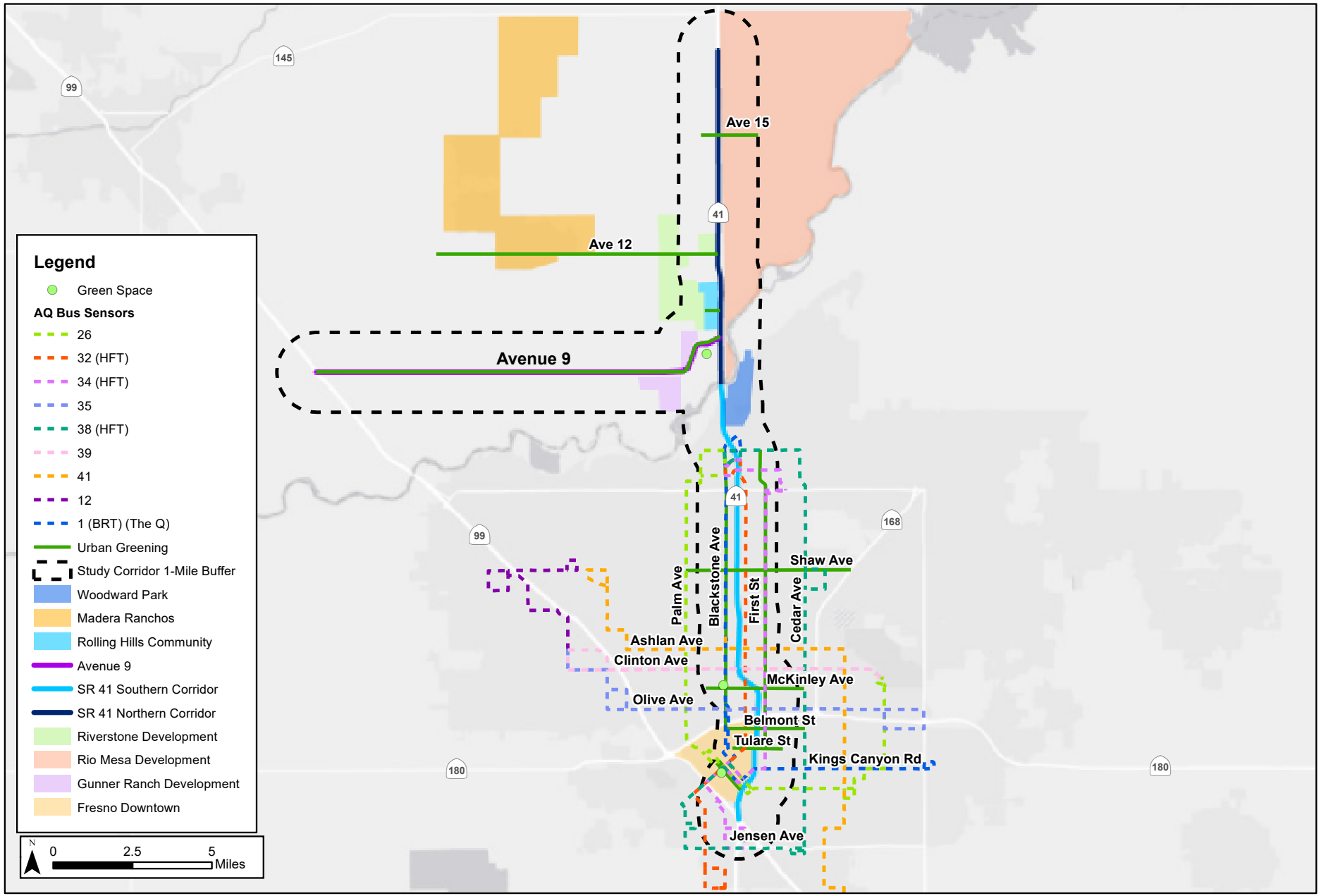


Figure 5.5: Proposed Sustainability Strategies

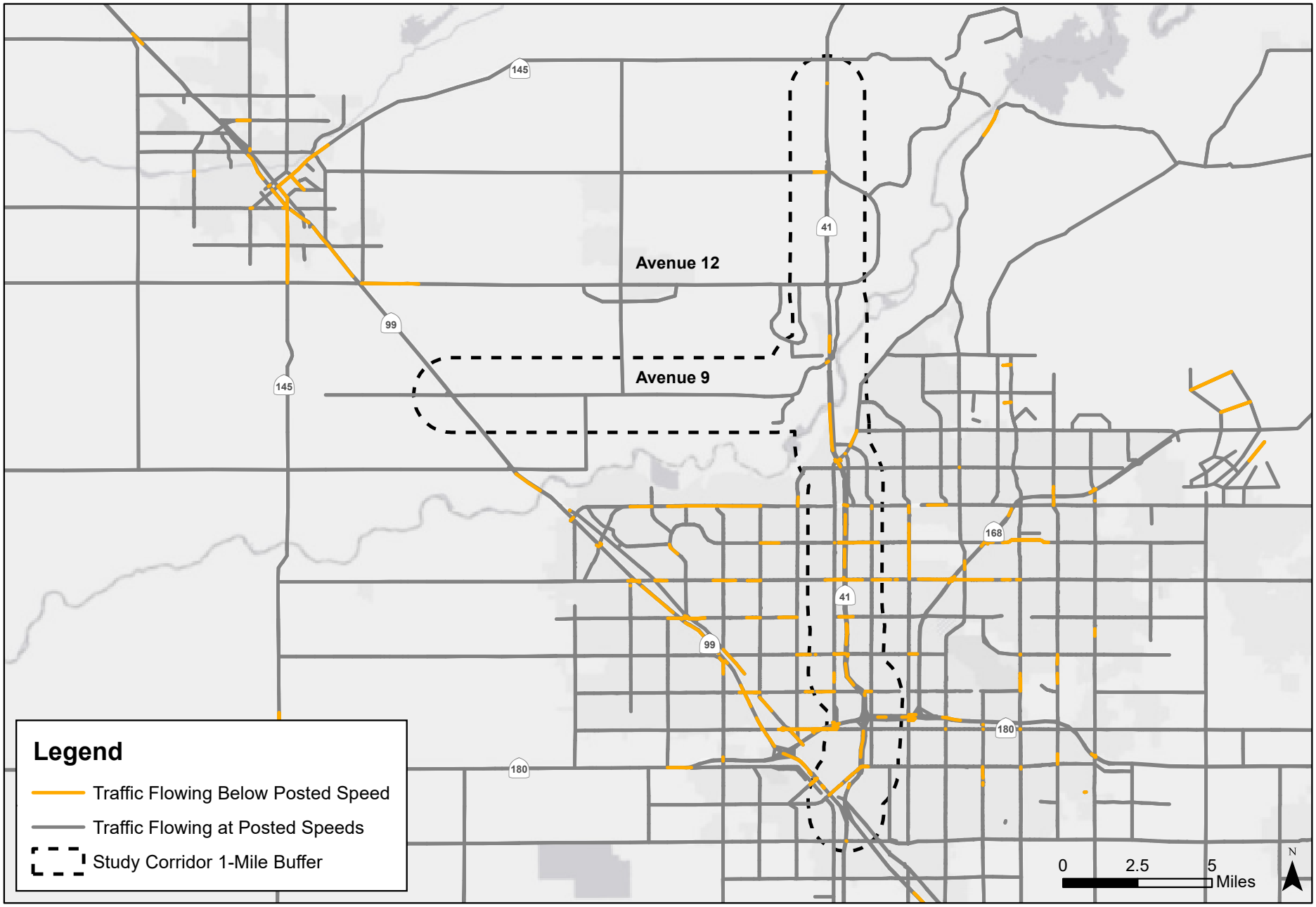


FIgure 6.1: Scenario 5: AB Speed in AM Peak Hour

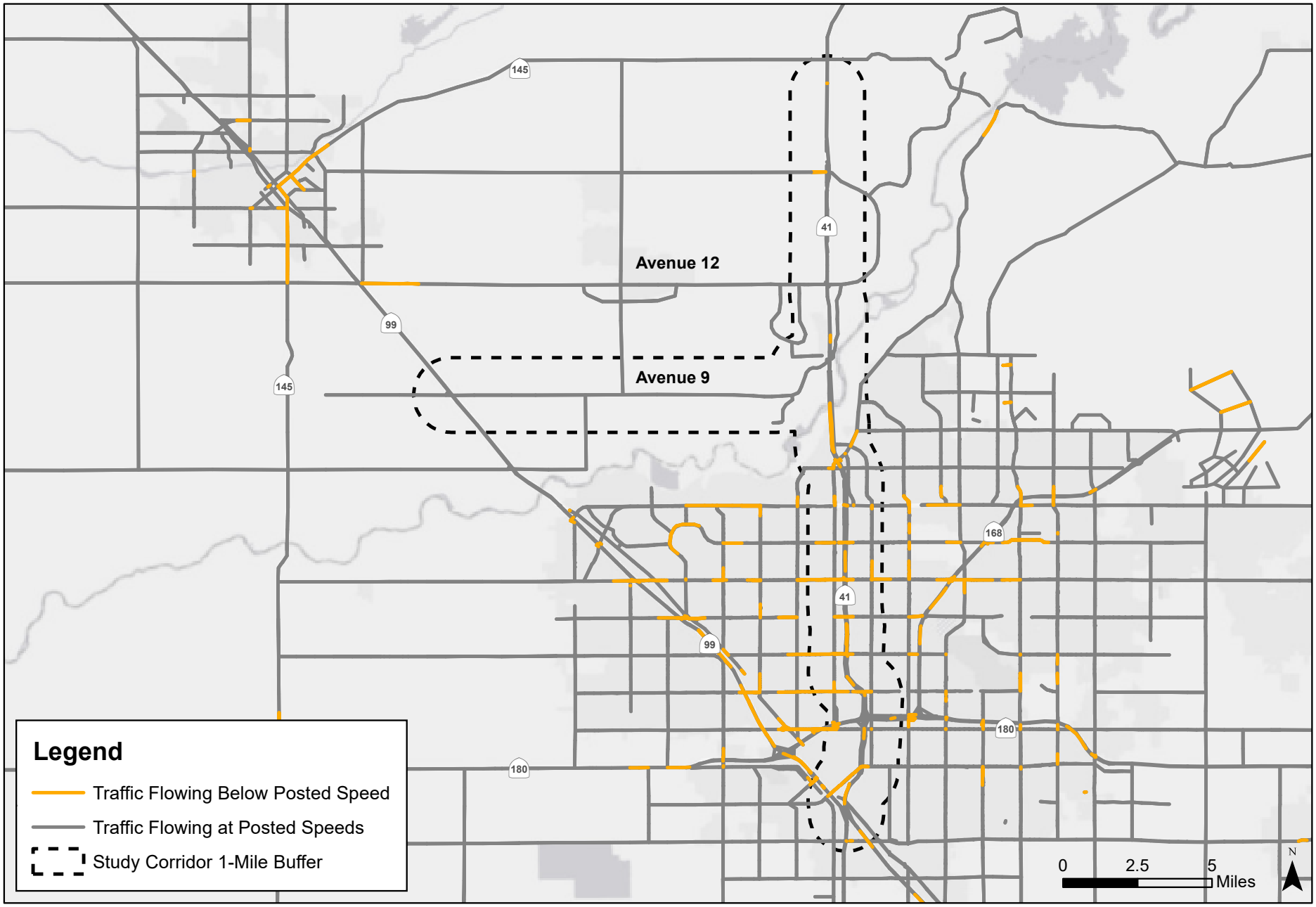


FIgure 6.2: Scenario 5: AB Speed in PM Peak Hour

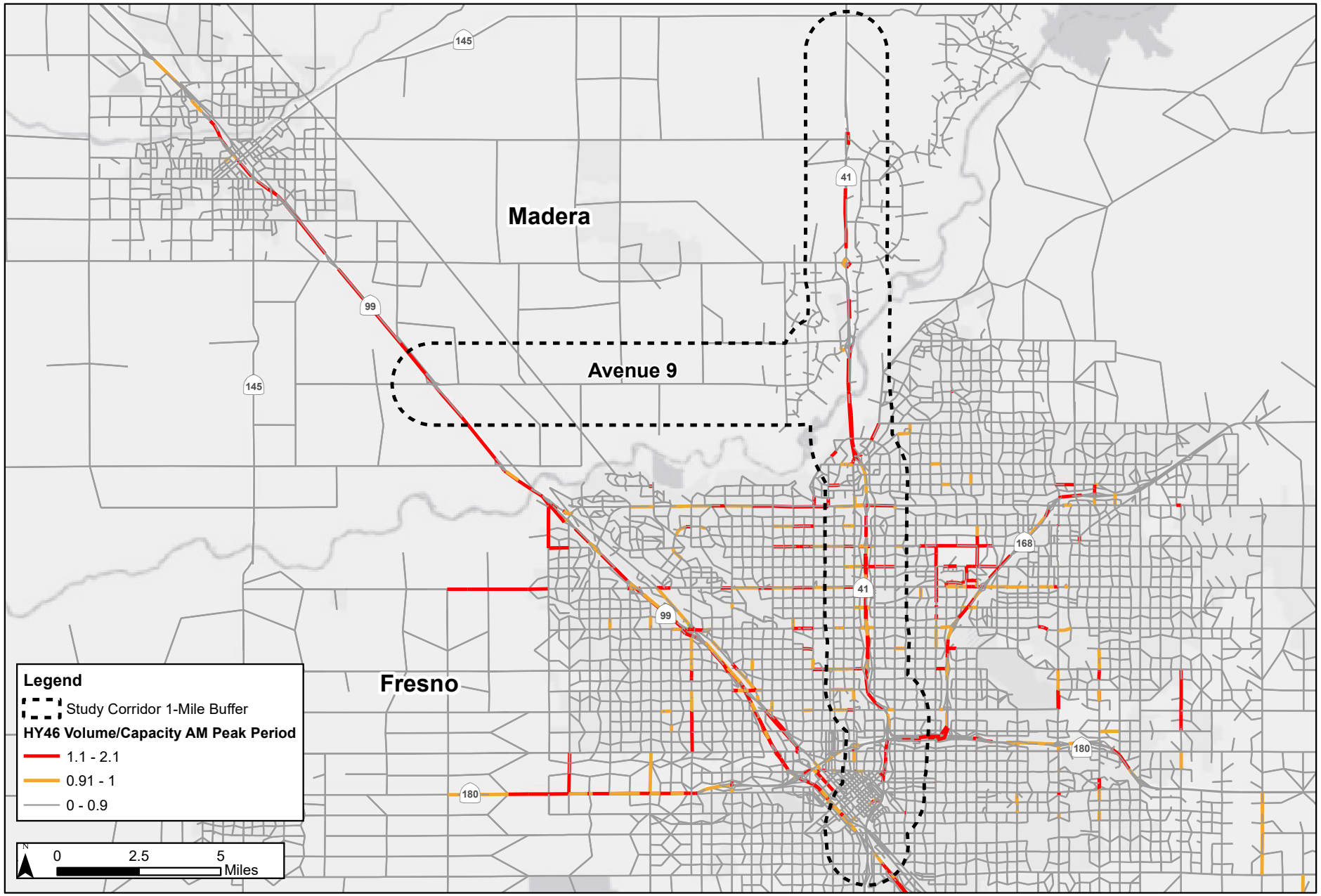


Figure 6.3: 2046 HorizonYear: Volume to Capacity AM Peak Period

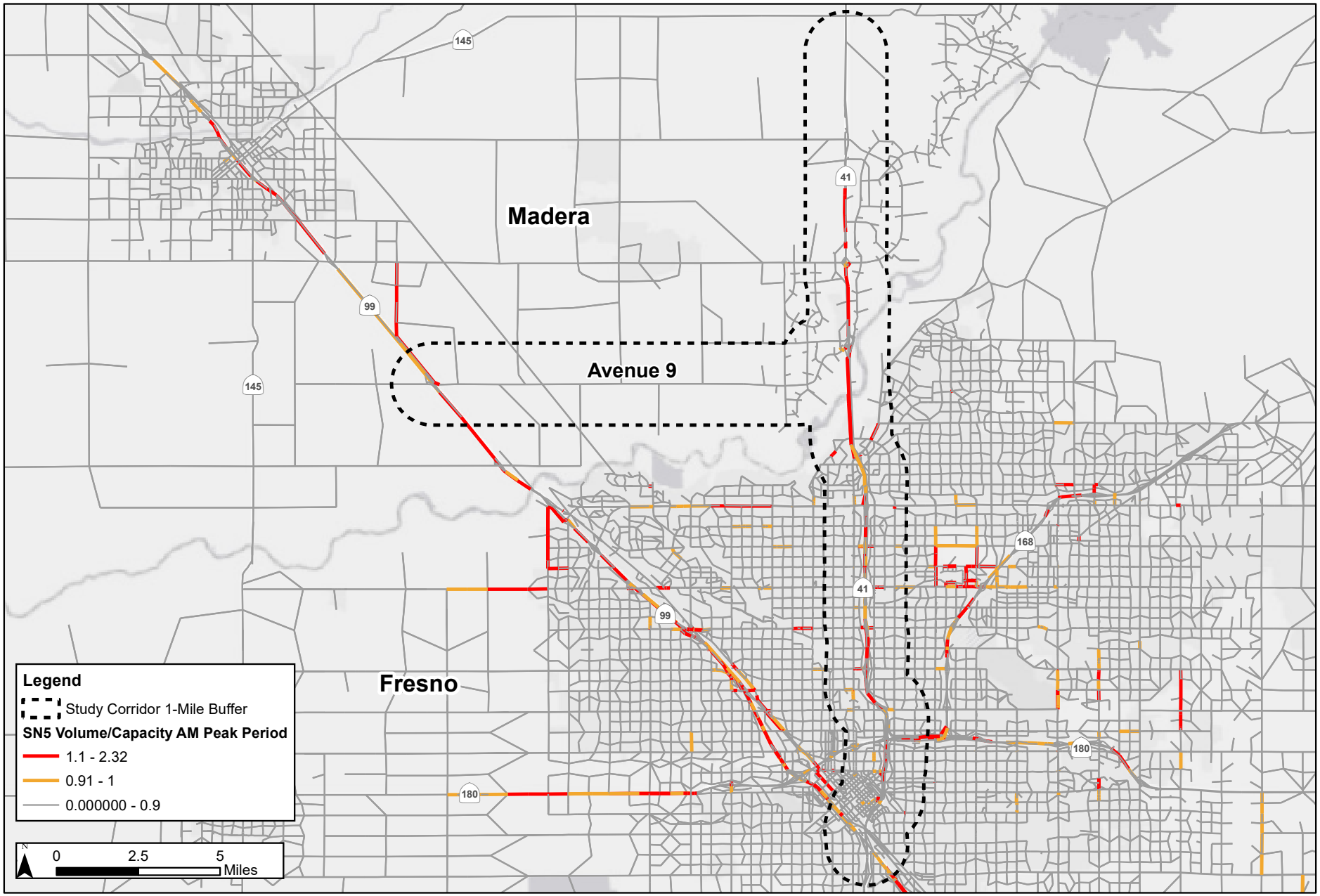


Figure 6.4: 2046 HorizonYear: Scenario 5 Volume to Capacity AM Peak Period

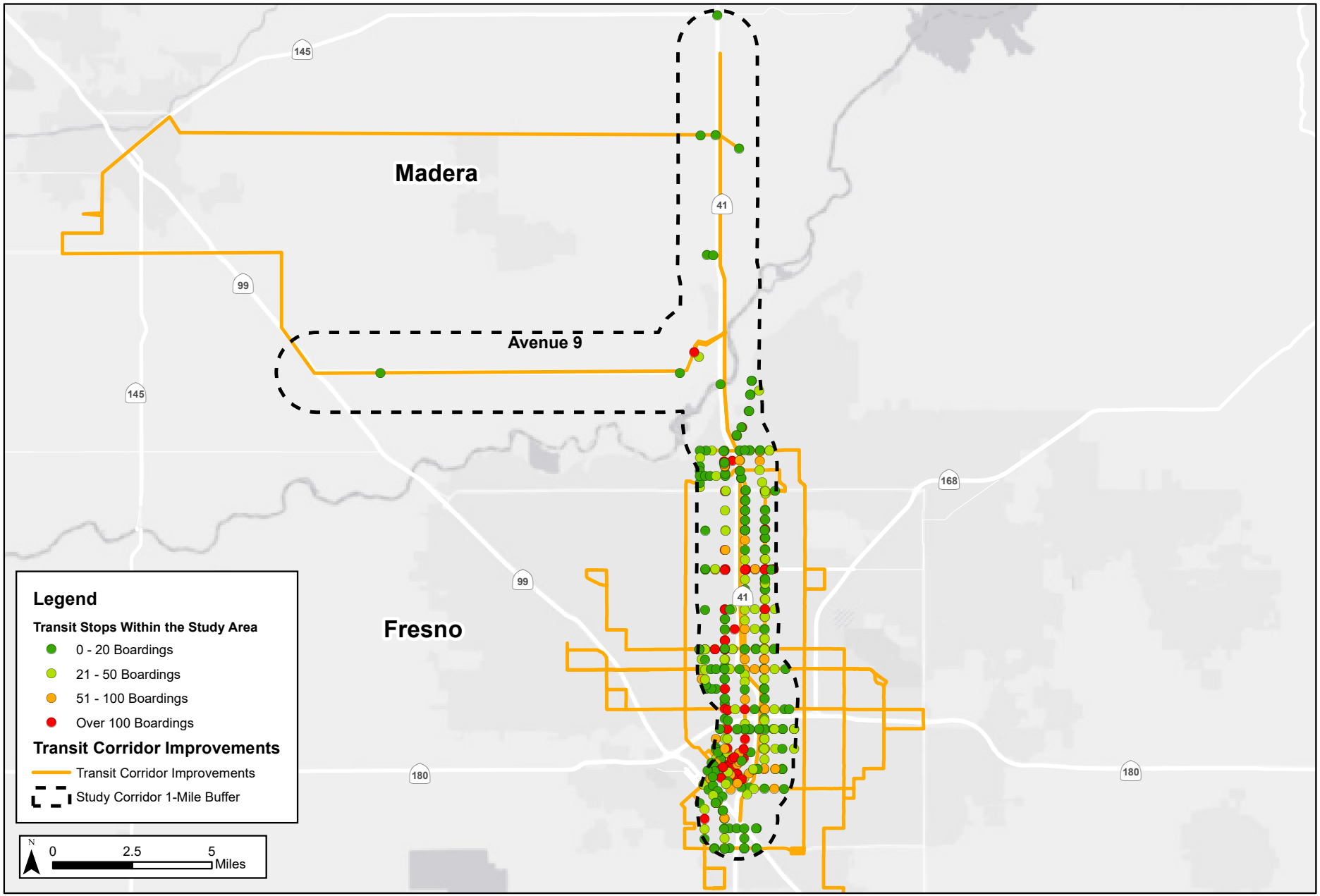


Figure 6.5: Electric Vehicle Charging Stations and Proposed Electric Bus Routes

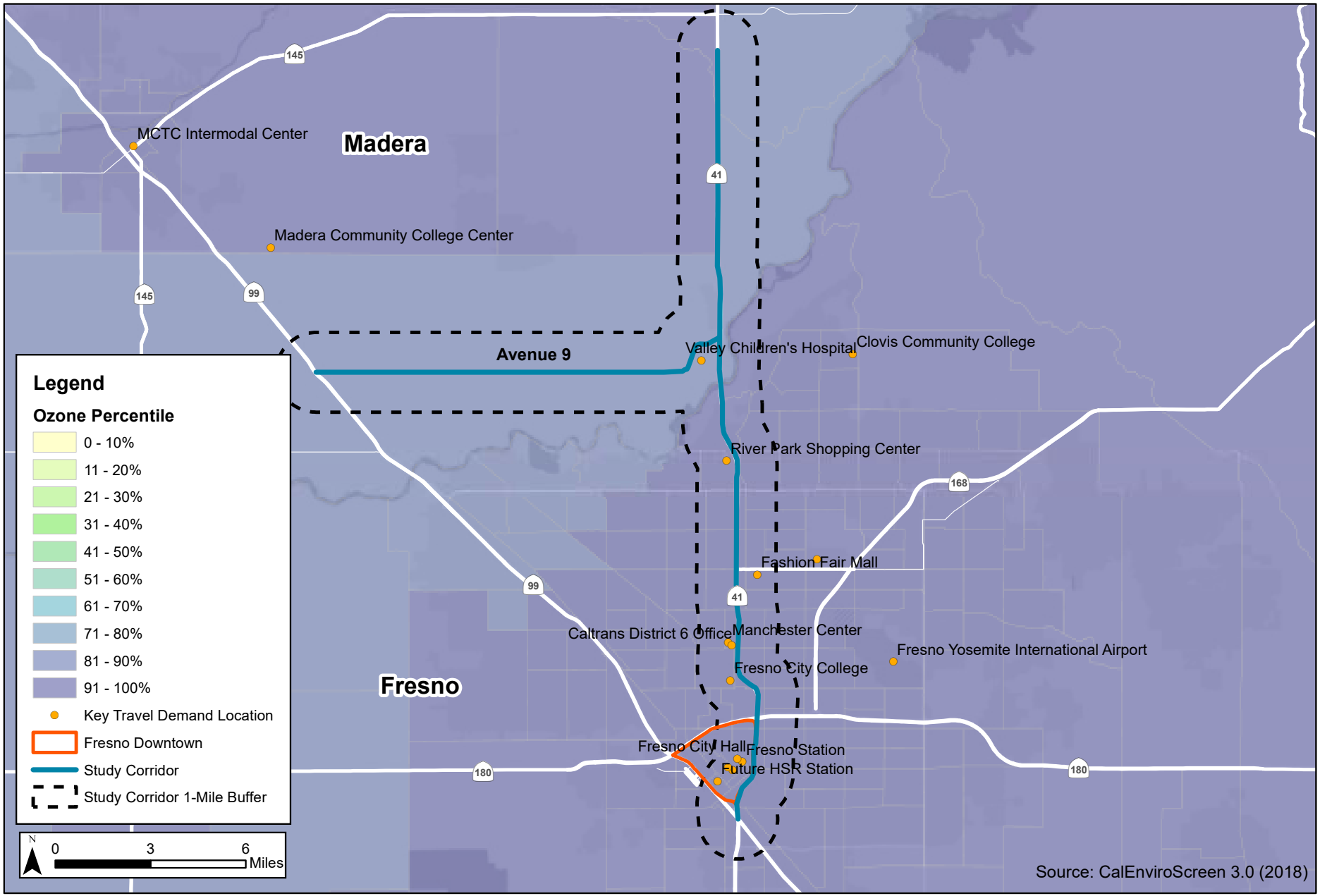


Figure 6.6: Ozone Percentiles

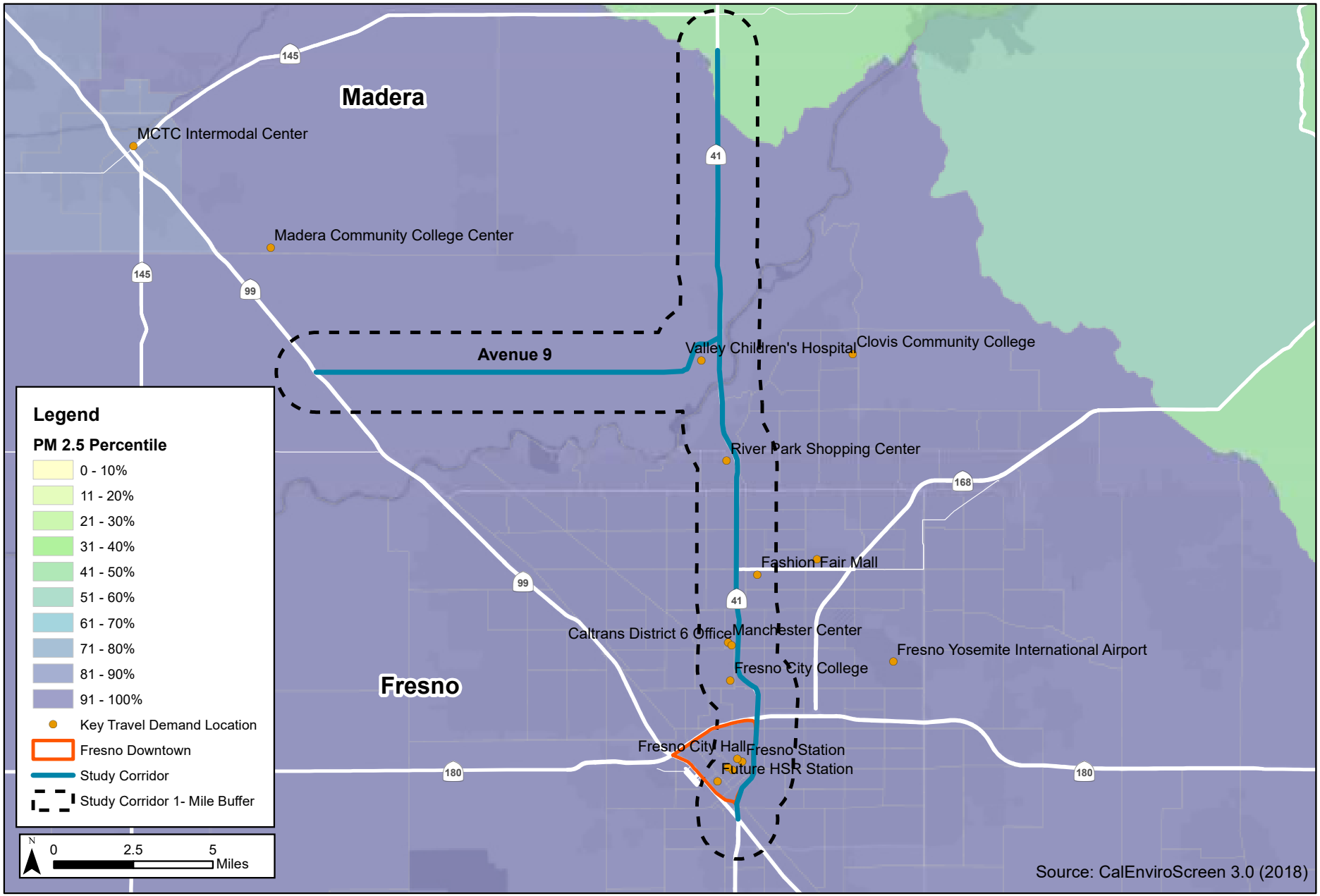


Figure 6.7: PM2.5 Percentiles

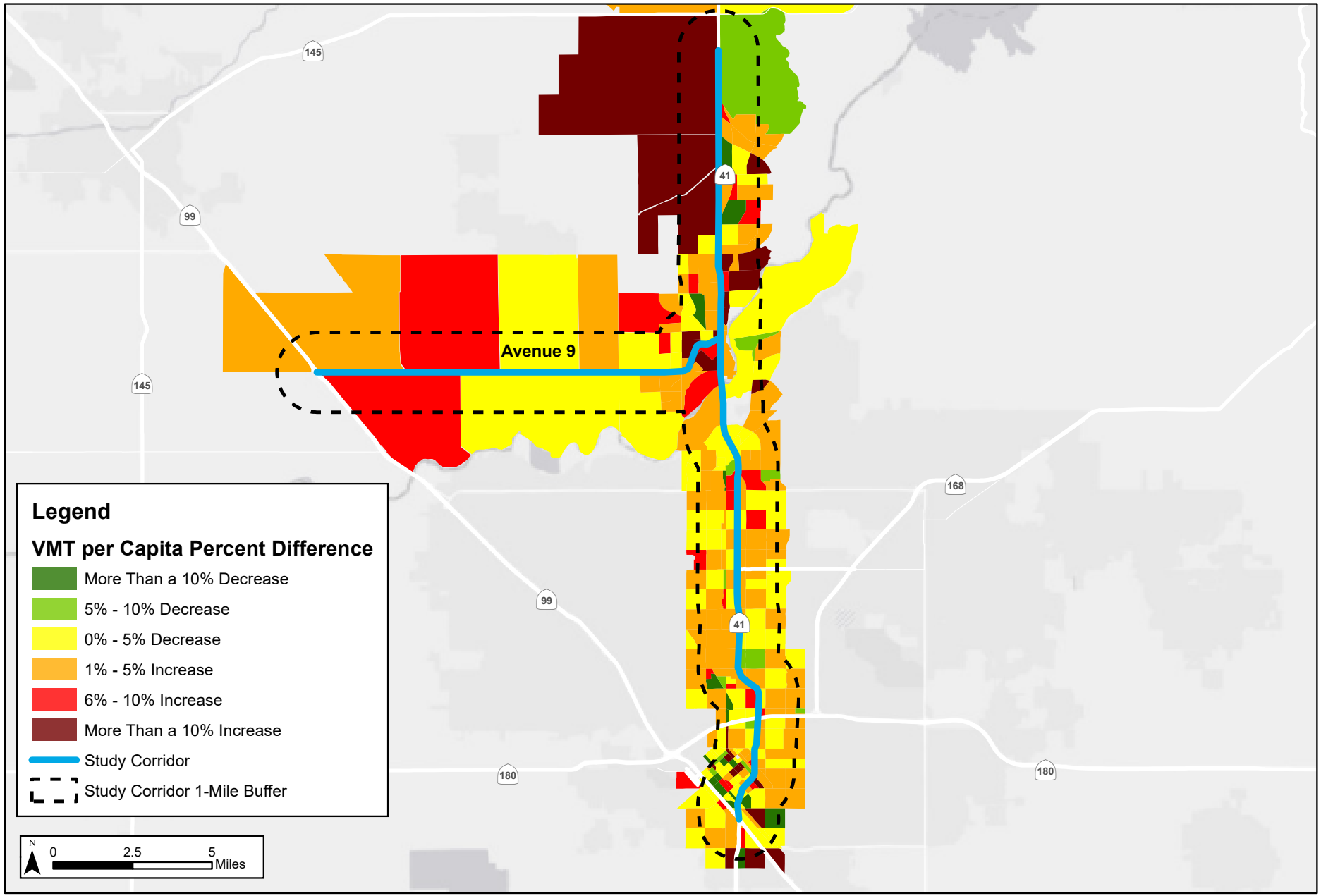


Figure 6.8: VMT Per Capita % Difference Between SN 5 and 2046 No-Build Scenario

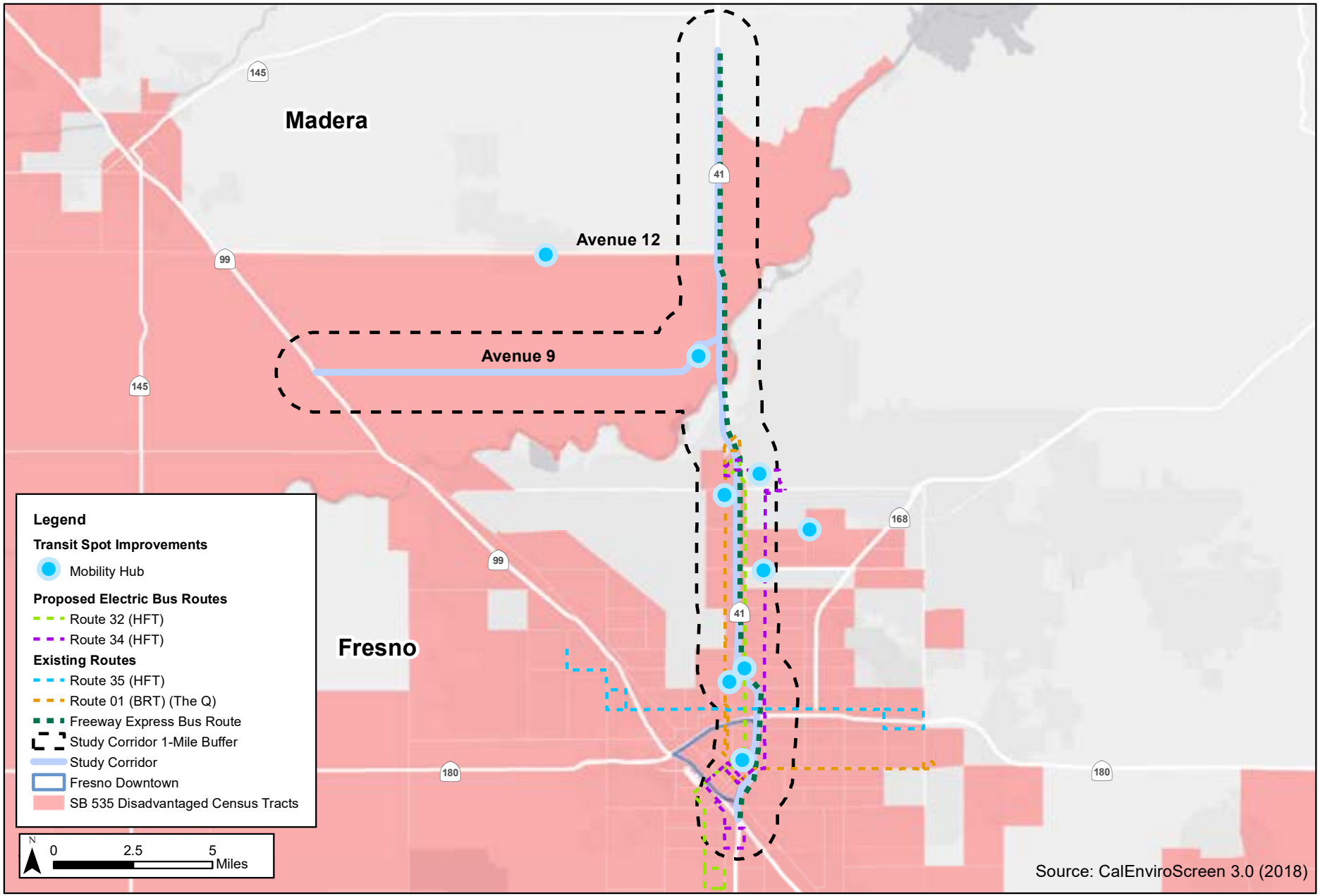


Figure 6.9: Electric Vehicle Charging Stations and Proposed Electric Bus Routes

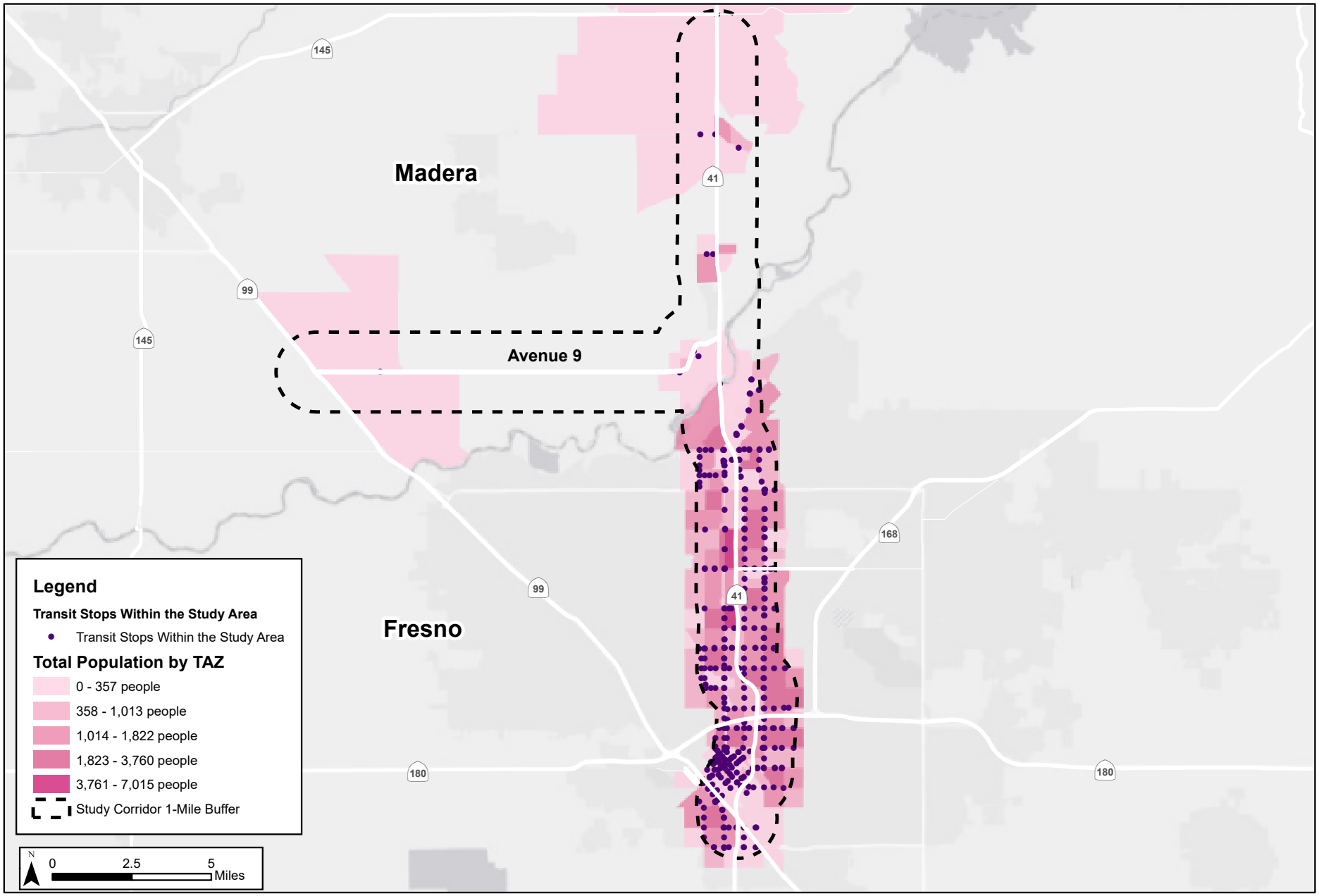


Figure 6.10: TAZ Within a Quarter Mile of a Transit Stop