

ACKNOWLEDGMENTS

CITY OF SOCORRO BIKEWAYS AND TRAILS MASTER PLAN 2017

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Socorro City Council

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INTRODUCTION



CHAPTER 1

INTRODUCTION

Walking and biking are important elements for a community's mobility, connectivity, development, health and sustainability. Providing the infrastructure for multiple modes of transportation creates travel options that suit the needs of everyone, including children, the elderly and people who cannot afford to own and maintain a vehicle. The overall goal of the plan is provide the City of Socorro with recommendations to create a comprehensive network of bicycle and pedestrian facilities, as well as recommendations for future plans and programs that will allow residents to move around the City in a safe and effective manner. Recommendations are intended to be actionable and implementable utilizing federal, state, and local funding resources available to the City. This plan grew out of previous efforts initiated through Socorro Healthy Kids and the need to acquire funding for project implementation. The plan also builds on and will support efforts to promote biking and walking within the City of Socorro.

Residents and visitors in Socorro enjoy vast mountain views and incredible access to outdoor recreational activities, including cycling and walking trails. The region has a long history of recreational cycling dating back to the 1800's with the inaugural Fat Tire Festival in 1895. An excerpt from the Socorro Country Fat Tire Trail Book (1993) states, "mountain bikers will find that Socorro is a gateway to adventure, and a dream come true: here you can bike year-round."

WHAT DOES THIS PLAN ACCOMPLISH?

While a wide variety of trails exist outside of the City limits, bicycle routes and guidance within town are relatively limited to a few “share the road” and wayfinding signs, and just four streets with designated bike lanes. In addition, sidewalk conditions are deteriorating or are non-existent in places, making it hard for people to walk and bike around the City. At the same time about about 15% of the City’s population currently bike or walk to work and other activities, proving a need for improved non-motorized infrastructure and programs (2015 ACS). This plan aims to provide a foundational framework for physical bicycle and pedestrian improvements, as well as outline educational programs the City can undertake with other public, private and nonprofit partners to improve non-motorized transportation for everyone. For the purposes of planning elements and activities included in this plan, the study area consists of the outer extent of the Socorro city limits, depicted in **Map 1: City of Socorro Limits** on the following page. The plan was funded by a grant from the New Mexico Department of Transportation (NMDOT) with local matching funds from the City of Socorro. The City hired the consulting team of Sites Southwest to prepare the plan in coordination with City Staff, Healthy Kids Socorro, and NMDOT.

It is important to note that New Mexico Tech is a major regional employer with over 170 academic staff and held an enrollment of over 2,000 students in 2015. During the public outreach process, feedback was obtained from both staff and students at NM Tech who bicycle around the City on a daily basis, and members of the campus community are engaged with cycling through the NM Tech Bicycle Club.

The Vision

The City envisions a bicycle and pedestrian network that exists on-and-off roadways in the form of bicycle lanes, routes, sidewalks and multi-use trails. Users of all ages and abilities will be allowed to experience Socorro and the surrounding region by utilizing non-motorized forms of transportation.

This plan establishes the following vision for bicycle and pedestrian transportation in Socorro:

Socorro will provide access for cyclists and pedestrians to all areas of the City and encourage cycling and walking for transportation and recreation to improve the quality of life for residents and visitors.

The plan will allow for the construction and preservation of bikeways and trails to aid users in reaching destinations and providing a recreational experience at the same time. Multiple agencies are identified for partnerships in implementation of physical projects, educational programs and advocacy.

The Challenge

Existing physical conditions and limited Right-Of-Way (ROW) on City and other public streets and facilities create a challenge to implement physical physical route and trail improvements. Limited ROW means crowded streets with little to no room for additional bicycle and pedestrian facilities such as bike lanes and sidewalks. Existing roadway networks and ROW will be examined to determine the best possible outcomes for priority route improvements and inform recommendations and implementation. In some cases, routes may be best served by additional signage and roadway markings rather than separated bicycle and/or pedestrian facilities or on-street bicycle lanes. In addition, funding sources for non-motorized modes of transportation are limited and highly competitive across the region and state. Changes in national legislation can also make securing public funds for bicycle and pedestrian improvement difficult due to high competition and limited resources. Recommendations in this plan will include possible funding sources and resources available for successful implementation of recommended improvements and programs. Coordination with NMDOT and regional planning authorities will aid in implementation activities, including securing financing for specific projects and programs.

Goals

The following goals have been established to enhance bicycle and pedestrian mobility in Socorro:

1. **Encourage and increase non-motorized transportation within the City by providing an enhanced bicycle and pedestrian network.**
2. **Improve safety for pedestrians and bicyclists.**
3. **Enhance public infrastructure that people can use to travel about town.**
4. **Increase connectivity of bicycle and pedestrian infrastructure within the overall transportation network.**
5. **Connect people to desired destinations through multiple means of transportation.**

PLAN ORGANIZATION

This plan is comprised of six chapters and covers a scope of work defined by NMDOT including the following elements:

- Identification and prioritization of specific on-road and off-road improvements for bicyclists, pedestrians and other trail users;
- Public outreach and agency stakeholder involvement;
- Analysis of existing and potential rights-of-way where facilities could be located;
- Identification of potential funding sources for improvements;
- Mapping; and
- Promotional activities to be undertaken in order to increase bicycling and walking in the community.

PLAN APPROACH

To organize recommendations and inform implementation activities, the plan is concerned with three major criteria:

1. **Safety:** this criteria is concerned with increased safety for all users. This includes physical interventions such as bike lanes, signage and off-road trails, as well as programs and policies aimed at user education and encouragement.
2. **Health:** allowing users to become active and utilize the transportation system in a healthy manner. This includes easy access to bicycle and pedestrian facilities, encouragement, and recreational opportunities.

3. **Connectivity:** connecting all users to important destinations, and allowing regional connections for recreation and transportation. This includes access to facilities, serving important destinations, and recreational opportunities.

NATIONAL TRANSPORTATION TRENDS

Recently, communities around the country have focused bicycle and pedestrian transportation planning efforts around several trends a benefits for non-motorized transportation including health, safety, connectivity, economic benefits, environmental well being, and complete streets. This section provides a brief overview of national transportation trends and their impacts on non-motorized transportation.

Health

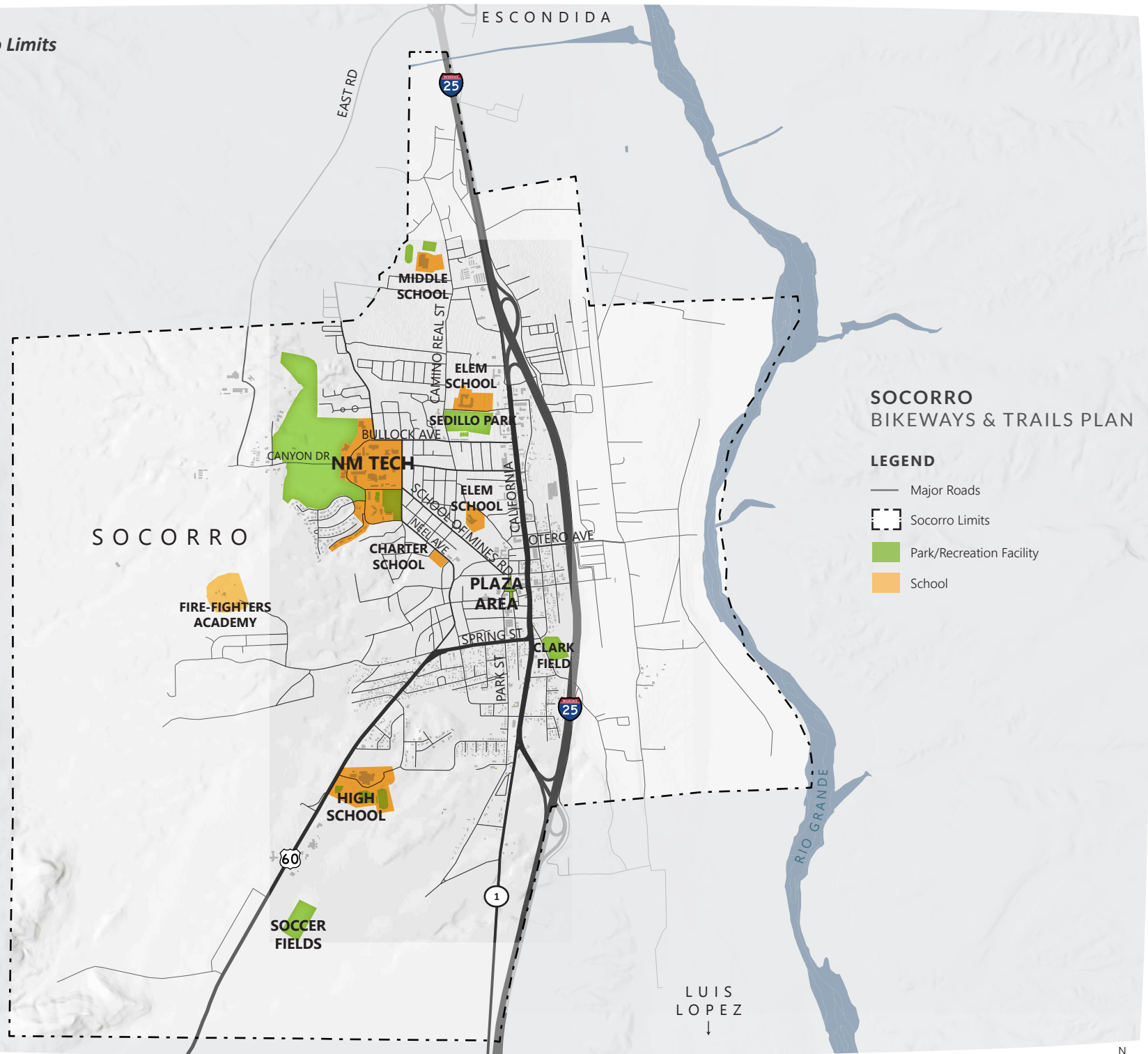
There is a vast and growing body of evidence that physical activity helps to improve overall quality of life. In the United States, higher levels of walking and bicycling are correlated with lower obesity levels, lower diabetes rates, and lower incidence of high blood pressure, stroke, depression and osteoporosis¹. Walking is one form of exercise readily available to most individuals: research shows that walking just 30 minutes per day is an exercise regimen that holds many health benefits and is accessible to people of all ages, incomes, and abilities.

Safety and Connectivity

Walking and bicycling provides alternative means for travel. Most trips, in general, begin and end as pedestrian trips, and encouraging more trips by foot and bicycle helps reduce travel demands on the roadway system while also encouraging people to be active in their everyday travel. Expanding pedestrian and bicycle systems in towns and cities also helps to increase mobility by offering infrastructure aimed at getting people out of their cars and moving around by other means.

¹Litman, T. (2017). Evaluating Active Transportation Benefits and Costs. Victoria, BC: Victoria Transport Policy Institute. <http://www.vtpi.org/nmt-tdm.pdf>

Map 1: City of Socorro Limits



SOCORRO BIKEWAYS & TRAILS PLAN

LEGEND

- Major Roads
- ⬜ Socorro Limits
- Park/Recreation Facility
- School

0 0.5 1 2 MILES



LUIS LOPEZ
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Recently, communities around the nation have begun implementing safety through infrastructure design in bicycle and pedestrian infrastructure. Examples of safety design include buffered and protected bike lanes, curb extensions, buffered sidewalks, separated bicycle lanes and pedestrian paths, and separated under/over passes, to name a few. One study shows that increases in bicycle and pedestrian specific infrastructure and traffic calming techniques has reduced pedestrian-related traffic injuries overall by 20%-70%, and serious traffic injuries by 35%-50% in some neighborhoods².

Economic Benefits

Recently, trends have emerged in how to adequately analyze the true economic benefits of improved non-motorized infrastructure. Some key themes include reduced user costs, direct economic impacts, indirect or induced economic impacts, health savings, and savings due to reduced environmental impacts³. Potential benefits of increased bicycle and pedestrian traffic come in both conventional and non-conventional forms, such as environmental impacts, and are not always easy to measure. However, economic benefits can generally be measured by transportation cost saving, mode sharing, and greater access to goods and services.

First and foremost, walking is free, and biking is much cheaper than owning a car. One blogger found the average cost of owning and maintaining a bicycle is roughly between \$25 per month to \$50 per month for more serious commuters, or \$300 to \$600 annually⁴. Comparatively, the average annual cost of owning and maintaining a vehicle averages \$9,000⁵. For those who are unable to afford the ownership and maintenance costs of a

²John Pucher and Lewis Dijkstra. Promoting Safe Walking and Cycling to Improve Public Health: Lessons From The Netherlands and Germany. *American Journal of Public Health*: September 2003, Vol. 93, No. 9, pp. 1509-1516.

³FHWA. (2015). White Paper: Evaluating the Economic Benefits of Nonmotorized Transportation. Washington, DC: Office of Human Environment, FHWA.

⁴Amster-Burton, M. (2013). The True Cost of Bike Ownership. *Mint Life*. <https://blog.mint.com/consumer-iq/the-true-cost-of-bike-ownership-0313/>

⁵Erin, S. (2017). Cost of Owning and Operating Vehicle in U.S. Increases Nearly Two Percent According to AAA's 2013 'Your Driving Costs' Study | AAA NewsRoom. AAA NewsRoom. <http://newsroom.aaa.com/2013/04/cost-of-owning-and-operating-vehicle-in-u-s-increases-nearly-two-percent-according-to-aaas-2013-your-driving-costs-study-archive/>

reliable vehicle, providing adequate pedestrian and bicycle infrastructure makes a beneficial difference in transportation to and from work, necessary services, and recreation.

Studies have found that providing pedestrian and bicycle friendly infrastructure often has economic advantages including higher property values, attraction to creative economy professionals and tourists, lower commuting costs, and lower maintenance costs to taxpayers. Walking and bicycling also contribute to improved quality of life and a greater sense of community, providing more social opportunity for residents and visitors alike.

Environmental Well Being

Driving is a major contributor to air and land pollution and greenhouse gas emissions. Walking and bicycling promote a sustainable and healthy environment because they are both zero emission modes of transportation. Reduced emissions mean improved air quality which benefits vulnerable populations and communities as a whole. Improved air quality reduces the risk for respiratory problems, decreased lung function, and mortality related to cardiovascular and respiratory illness

Complete Streets

The Complete Streets approach breaks down a traditional separation between roadway uses (vehicular, transit, biking and walking) and focuses on a desired streetscape outcome that supports the safe use of roadways for everyone. Complete streets seek to ensure roadways are consistently designed for users of all ages and abilities, and considers natural systems (landscaping, plantings, etc.) in roadway design. Many cities and towns in the country have begun implementing complete streets policies and regulations to incorporate bikeways and pedestrian facilities into the existing community fabric. These policies encourage cohesive planning, designing, and engineering, and provide flexibility to enable context sensitive design to respond to site-specific constraints and financial capacity.



EXISTING CONDITIONS





CHAPTER 2

EXISTING CONDITIONS

Socorro is located in Central New Mexico approximately 75 miles south of Albuquerque along the Rio Grande River and the I-25 corridor. It is the largest city in Socorro County, with 9,051 residents in 2010 and a land area of 14.4 square miles.

Socorro experiences a semi-arid climate with high temperatures in the summer reaching between 80° and 90°F, and low temperatures in the winter reaching between 20° and 40°F. The Rio Grande River runs through the eastern border of the City and the Magdalena Mountains dominate the skyline to the west. Monsoon season occurs between July and September and can bring higher levels of humidity, and the dry, mild winters can bring cold nights.

The existing topography and built environment in Socorro are generally supportive of walking and bicycling with typically flat routes laid out on a modified grid system. However, some existing roadway facilities lack proper maintenance of shoulders and curbs and are not wide enough for formal bicycle lanes or walkways, which can deter users. These existing conditions provide a base framework from which to improve upon a bicycle and pedestrian network.

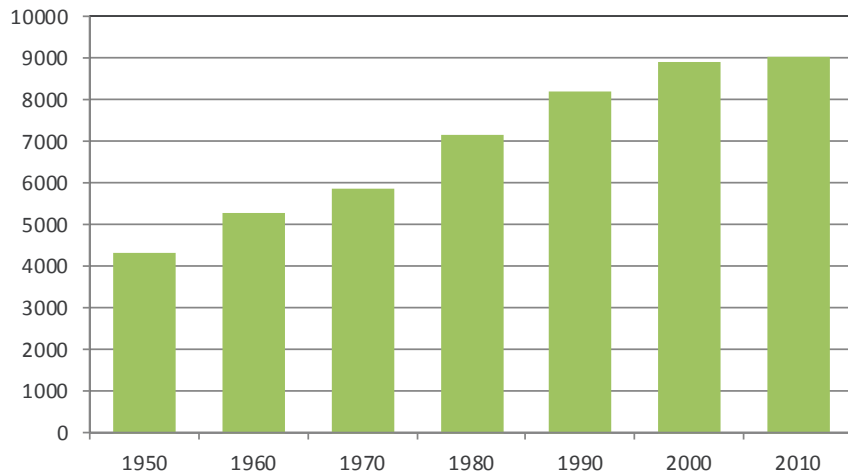
DEMOGRAPHICS

Population

According to the 2010 Census, there were a total of 9,051 people residing in the City of Socorro, comprised of 3,649 households and 2,104 families. 2014 Census estimates for the City of Socorro estimate the population has declined slightly to 8,751 residents. In addition, the New Mexico Institute of Mining and Technology (NM Tech) has an enrollment of 1,532 undergraduates, 489 postgraduates and 171 academic staff.

Figure 1: City of Socorro Historic Population illustrates historic population growth of both the City of Socorro and Socorro County. The population of the City of Socorro has grown steadily since 1910. From 2000 to 2010, the population of the City increased by two percent, while the population of the County declined. The male population increased more than the female population in both the City and County. Overall, growth rates in the City of Socorro and Socorro County were slower than for the state between 2000 and 2010. In general, the City's population has been slowly aging and is projected to remain essentially stable through 2040, although outside forces could increase or decrease the amount of population growth.

Figure 1: City of Socorro Historic Population



Race and Ethnicity

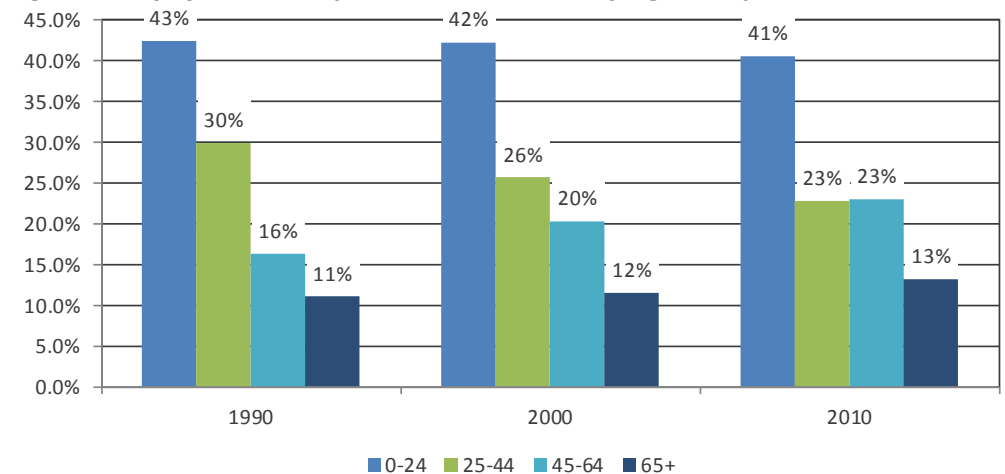
In 2010, 80.7% of the population in Socorro identified as White, 1.5% identified as Black or African American, 3.9% as American Indian or Alaskan Native, 2.1% as Asian, 0.1% as Native Hawaiian, and 3.4% as two or more races. Additionally, 54% of the population identifies as Hispanic or Latino of any race.

Age

Median age in the City of Socorro is 33.4 years, which is slightly less than the State average of 36.9 years and Socorro County median age of 36.7 years. This shows the median age for the City exists within the prime employment age where residents would likely be commuting to and from work during the weekdays.

As with many other rural New Mexican communities, residents in the City of Socorro have been aging. Between 2000 and 2010, the City lost youth population with a decrease in all age groups under 20 years old. The greatest increases were in age groups 55 to 65 and 85 or older. However, there was an increase in young adults age 20 to 34 in the City, possibly related to increased enrollment at New Mexico Tech. In general, the population is aging, with the median age going up each decade.

Figure 2: City of Socorro Population Distribution by Age Group



Of particular interest is the rate of increase for people in senior age groups and the decline in school age population and adults age 35 to 44. These trends point to the need to consider providing alternative, accessible modes of transportation for seniors as the population continues to age.

Figure 2: City of Socorro Population Distribution by Age Group shows the population distribution by age group in the City between 1990 and 2010. Age trends in Socorro also mean providing a safe, reliable and comfortable bicycle and pedestrian network can increase mobility and offer solutions to future transportation issues for users of all ages and abilities.

Special Needs Populations

Seniors

Seniors are one of the fastest growing demographic groups in the country and in Socorro. By 2030, the US Census Bureau predicts that 26.4 percent of the State population will be made up by seniors¹. Seniors often experience changing housing needs as they age. Initially, many wish to downsize and have less responsibility for maintenance that comes from owning a home, while later they may have health issues that require additional care and special housing needs. Potential lifestyles that may appeal to seniors include active living (retirement) communities that provide a range of opportunities (both independent and group housing care facilities), smaller housing with decreased maintenance needs, and active transportation.

The number of residents aged 55+ increased by 438 in the City of Socorro between 2000 and 2010. Age cohorts over 55 are by far the fastest growing groups in Socorro. Because seniors are often on a fixed income, there is a greater need for alternative transportation options that may be more affordable.

Children

Children cyclists and pedestrians are generally thought to prefer trails to on-road bicycle facilities because there is no motorized traffic. In addition, stakeholder and focus group interviews for this plan identified a need to serve schools within the City as key destinations so children have viable

options for non-motorized transportation to and from school, and for recreational opportunities. There are approximately 2,642 residents under the age of 19 living in Socorro².

People with Disabilities

There are an estimated 2,257 people with a disability in the City of Socorro. This represents 25 percent of the City's population, compared to 14 percent of the state population. Residents of all ages five years and above and those with all disability types are a higher percentage of the population than is typical in New Mexico.

Employment

The Census estimates where workers live relative to where they work through its LEHD program. Recent estimates indicate Socorro has a high percentage of workers who live outside the City and County, and a high percentage of residents who reside within Socorro and work outside the City. This leads to an interesting commuting pattern, with a large inflow of workers each day coupled to a corresponding outflow of residents to jobs in other counties.

Where Workers Live

Of the estimated 5,155 people who are employed in Socorro County as a whole, approximately 40 percent live elsewhere. There is a large number of workers who commute from Bernalillo and Valencia Counties. According to LEHD data, the primary living location of out-of-County workers is Albuquerque, with 355 people commuting from there, followed by Rio Rancho (106), Grants (36), Truth or Consequences (34), and Alamogordo (32). Overall, 2,218 workers commute from outside the County to jobs in the County. These data also indicate that as many as 390 people may travel from Catron County for work in Socorro County.

According to US Census online mapping tool, On the Map, 3,857 people are employed in the City of Socorro. Of that, 2,153 people commute into Socorro for work daily and 1,704 people live and work in Socorro. Additionally, 1,705 people live in Socorro and commute out of the City

¹US Census Bureau, Interim Population Projections, 2005.

²2011-2015 American Community Survey Data

for work daily. Some of these workers may be staff at New Mexico Tech or other area employers who choose to live closer to Albuquerque (or Las Cruces) to enjoy the benefits of a larger urban area. In some cases, the number of commuters is related to the location of a spouse’s employment. There has been an ongoing national urbanization trend of more residents moving to larger cities from rural (and suburban) areas, which has reversed to some degree the trend of rapid suburbanization seen between 1940 and 2000. Overall, this trend has had an impact on rural, satellite communities such as Socorro that are within commuting distance of desirable urban centers.

Where Workers Are Employed

Of the 6,102 employed residents living in Socorro County, 54.4 percent are employed elsewhere, with 1,067 employed in Albuquerque, and 204 employed in Las Cruces. While a seemingly large percentage, this a smaller commuting population than Rio Rancho, Belen, Los Lunas or many other more traditional “bedroom communities” in the state.

Transportation

According to 2011-2015 American Community Survey (ACS) estimates, there were 2,866 workers age 16 and over living in Socorro with an average commute time of 12.6 minutes which is lower than the national average commute time of 25.71 minutes. Of these workers, about 35.8% have a commute time of less than 10 minutes, 67% have a commute time of less than 15 minutes, and 82% have a commute time of less than 20 minutes.

Table 1: Commute Characteristics examines commute patterns by mode in Socorro³.

Table 1: Commute Characteristics

Commute Mode	Socorro	New Mexico	United States
Auto (alone)	76.7%	79.7%	76.4%
Carpool	5.9%	10.2%	9.5%
Transit	0.1%	1.1%	5.1%
Bicycle or Walk	13.6%	3.0%	3.4%
Taxicab, Motorcycle or Other Means	2.4%	1.3%	1.2%
Work at Home	1.4%	4.7%	4.4%

Commuter data shows that while residents in Socorro commute to work by vehicle at an average rate for the country, residents are also bicycling or walking to work at a much higher than average rate than that of the country. This may be do to the relatively smaller size and population of Socorro, and access to roadways with lower amounts of traffic that are more conducive to walking and biking. ACS estimates also shows those who are between the ages of 20 and 44 are more likely to walk or bike to work.

These data point to a need for increased and updated bicycle and pedestrian infrastructure to encourage safe and efficient travel. Socorro has an opportunity to provide an enhanced bicycle and pedestrian network to encourage these and other residents to walk or bike to work as part of their daily routine.

USER GROUPS

Youth

According to 2011-2015 ACS estimates, people under the age of 19 make up approximately 2,642 residents, or 29.9% of the population. This is an important age group to consider when planning for multi-modal transportation to ensure they are able to reach destinations such as school and other activities independently, safely and efficiently. By providing a multi-modal transportation network that offers direct connections to schools, parks, libraries, recreation and other public facilities, the youth population can be allowed to be independently mobile and active.

³2011-2015 American Community Survey Data

Commuters

According to 2011-2015 ACS estimates, workers age 16 and over make up 32.4% of the population. Of those commuting to and from work every day, 13.6% on average either walk or bike. The City currently has a high percentage of the population walking or biking to work with a low commute time as compared to national and state averages. This proves a need for expanded non-motorized infrastructure and enhanced bicycle and pedestrian facilities in Socorro to ensure commuters are getting to work in a safe, efficient manner.

Seniors

There are approximately 1,250 residents over the age of 65 living in Socorro, or 14.1% of the total population. Seniors are an important age group to consider in terms of mobility independence and equal access to multi-modal facilities. Ensuring seniors have adequate access to bicycle and walking trails, sidewalks and infrastructure helps to provide safe, alternative transportation modes to goods and services needed by this age group including healthcare and commercial needs.

Types of Cyclists and Pedestrians

According to research conducted in Portland, Oregon, there are four types of cyclists and pedestrians on the roadways today⁴:

1. Strong and Fearless: these users will ride or walk/run along roadways and trails regardless of conditions, and are undeterred by roadway conditions such as maintenance issues and high traffic volumes.
2. Enthused and Confident: these users are comfortable sharing the roadways with vehicular traffic, but appreciate bicycle lanes, routes and off-street trails.
3. Interested but Concerned: these users are curious about bicycling and walking, but are typically afraid to ride due to high traffic volumes and safety concerns. These users typically will not venture out on medium to high traffic volume roadways regardless of facility

type, but are interested in protected and separated bike lanes, bicycle boulevards and off-street trails.

4. No Way No How: these users are not interested in bicycling or walking at all for lack of interest or concerns around safety, topography, or inability to ride or walk.

Typically, planning efforts are concerned with users the first three types, and are interested in providing physical implementations that encourage the Interested but Concerned user category to utilize trails and roadways for transportation and recreation. While providing implementations to encourage this user type can be challenging, increasing safety for bicyclists and pedestrians on existing roadways typically means increased safety for all users, including motorized vehicles.

PREVIOUS PLANNING EFFORTS

Plans and documents prepared by local, regional and state agencies provide a background on current and past goals, efforts and plans for bicycling in the City and region as well as a framework for future planning and development. Review of these plans and documents serves as a way of identifying potential future project partners and providing background support for future grant applications. While few efforts at the local and regional level are directed at bicycle and pedestrian infrastructure planning, previous plans and documents give a sense of land use, transportation and development patterns to be considered while planning for future bicycle and pedestrian facilities. See Appendix A for more detailed information on existing plans and documents.

The New Mexico 2040 Plan

Agency: New Mexico Department of Transportation

Date Published: 2015

The New Mexico 2040 Plan provides a framework to guide transportation decision making through the year 2040. The plan addresses challenges and needs the state will face over a 25 year time horizon including accountability, safety, system preservation, multimodal access and connectivity, culture, environment, and quality of life. Specifically, the plan

⁴Portland Bureau of Transportation 2017

outlines a goal for multimodal access and connectivity that is intended to implement an efficient strategy for multimodal access that focuses on providing the efficient movement of people and goods. Included is a Transportation Demand Management (TDM) strategy that includes expanding the physical transportation network to include bicycle and pedestrian infrastructure to provide access to goods and services. Specific actions listed under this goal applicable to bicycle and pedestrian infrastructure include:

- Developing a state bicycle, pedestrian and equestrian plan to refine strategies and establish priorities for facility development;
- Use routine resurfacing projects as an opportunity to improve or maintain bicycle facilities and connectivity along identified corridors;
- Train staff and planning partners on ADA-compliant design standards for sidewalks, curb ramps, crosswalks, pedestrian facilities in rural areas, and other pedestrian elements that meet all of the requirements of the Americans with Disabilities Act (ADA); and
- Develop design guidance (including model plan and profile views for streets) to address pedestrian needs along NMDOT facilities in local communities.

South Central 2040 Regional Transportation Plan

Agency: South Central Rural Transportation Planning Organization (SCRTPO)

Date Published: 2015

The purpose of this plan is to apply the vision, goals, objectives and strategies included in the New Mexico 2040 Plan to the regional level. Like the statewide plan, the SCRTPO's long range plan also includes goals, objectives and actions for multimodal access and connectivity including:

- Supporting transit system stakeholders;
- Initiating partnerships with various programs and agencies that also have transportation initiatives;
- Coordinating with local governments and agencies that have vested interests in planning initiatives and agreements that would extend

existing walking or biking trails;

- Encouraging local governments to participate in the Recreation Trails Program (RTP) and offer suggestions to NMDOT staff on guidelines; and
- Provide local governments and the public with information regarding the importance and need for planning projects that will promote healthy and active modes of transportation and decrease emissions from the use of motorized vehicles.

2015 Comprehensive Economic Development Strategy

Agency: south Central Council of Governments (SCCOG)

Date Published: 2015

The Comprehensive Economic Development Strategy (CEDS) is a roadmap to diversify and strengthen the local economy. The CEDS establishes regional goals, objectives and actions, and identifies investment opportunities, to encourage economic development and growth, and includes goals for building and maintaining infrastructure and promoting regional tourism. Specifically, the CEDS includes non-motorized transportation initiatives through the following strategies:

- Support infrastructure projects throughout the region as identified in local entity Infrastructure Capital Improvements Plans (ICIP)
- Identifying key players in launching a regional tourism initiative
- Developing a plan for funding a regional tourism initiative

2016-2020 City of Socorro ICIP

Agency: City of Socorro

Date Published: August 2014

The City of Socorro's 2016-2020 ICIP includes the following priority projects which could enhance bicycle and pedestrian infrastructure in the City:

- Rodeo/Recreation Facility
- Highway 60 Improvements
- Texas/Vermont/B Street Reconstruction and Drainage
- Cuba Road Drainage Improvements Continuation

Additionally, the ICIP also includes projects for general road repaving, landscaping and city ordinance codification.

EXISTING FACILITIES

Socorro's existing bicycle and pedestrian network includes just four street segments with existing, signed bicycle lanes and an aging network of sidewalk facilities. In addition, some bikeway and wayfinding signage is included around the historic plaza area and along a few of the existing bicycle facilities. One formalized walk/run trail exists around Sedillo Park, and many avid cyclists and pedestrians also use existing service roadways along ditch banks and arroyos. **Map 2: Existing Bicycle Facilities** shows the location of existing bicycle facilities in the City.

Bike Lanes

Existing, formalized bicycle facilities in the City are made up of bike lanes on Otero Avenue, High School Road, and Michigan Avenue. Focus groups identified Spring Street as having existing lanes, however the lanes are not marked with bicycle signage and exist as a wide shoulder/parking lane. Bike lanes provide a striped lane for bicycle travel on a street, and are typically accompanied by a bicycle stencil on the pavement and a directional arrow. While signed bicycle lanes provide comfort and affirmation to users, cyclists are also allowed to ride on roadway shoulders and traffic lanes. In Socorro, these exist as one-way facilities that carry bicycle traffic in the same direction as motor vehicle traffic on through streets. Generally, vehicular traffic is relatively low on these streets with the possible exception of Spring Street. Generally, bike lanes are four to seven feet wide and are sometimes adjacent to on-street parking, or can share the parking lane in certain circumstances. In Socorro, roadway lane width reductions ("lane diets") have not been implemented where there are existing bicycle lanes.



Bike Parking

Bike parking is provided in the form of bicycle racks at local schools, and at some local parks and other public facilities and private businesses. There is a need to document existing bike parking locations to use as a baseline for determining bicycle parking capacity in relation to demand as future bicycle infrastructure continues to improve.

Bike Routes

While designated bike routes do not currently exist, many current users admit to utilizing facilities with low traffic and wide shoulders as an effective means to bike around the City. These routes are identified on **Map 3: Strava Bicycle Riders**, and would benefit from formal signage or striped bicycle lanes in the future. Many of these facilities provide adequate access to recreational activities both in and out of town including local and regional hiking trails, parks, and the fairgrounds located on the southern edge of town along Highway 60.



Sidewalks

Sidewalks in most of the City, with the exception of areas immediately adjacent to the Plaza, New Mexico Tech, and local schools, suffer from a lack of general connectivity and hazardous conditions such as cracks and deteriorating sections. Some street in town, such as El Camino Real, are missing sidewalks in places which deters pedestrian activity and does not provide adequate access to necessary activities and recreation as a pedestrian. The City could benefit from incorporating sidewalk construction and maintenance as a recurring line item in the ICIP, and could incorporate multi-modal access and sidewalk connectivity when maintaining roadway pavement and construction roadway enhancements.

Multi-Use Trails

Trails provide off-street connectivity to destinations and serve as both a means of transportation and recreation. Today, most trails within the City limits exist informally along ditch and arroyo Right-of-Way and connect



major streets such as El Camino Real, California and Spring Street. Most users report utilizing these ROW segments often because of increased safety and lack of vehicular traffic. Many users who fall into the interested but concerned category also prefer off-street trails to on-street bicycle lanes and routes in general, due to increased safety and ease of use. In Socorro, there is a need for formal off-street trail facilities to provide enhanced travel and recreation opportunities, and quick connections to important destinations.

Crossings and Intersections

Currently, users have limited options for crossing busy roadway intersections and waterways within the City. These crossings can be separated into three categories: interstate crossings, at grade street crossings and water crossings. Intersections are challenging and dangerous especially for non-motorized traffic.

Interstate Crossings

Currently, there are only four interstate crossings that exist along the current roadway system. Users report utilizing all four crossings, with heavy emphasis on the north most interstate crossing at Overpass. This crossing is narrow and has limited shoulder width, making crossing as a cyclist or pedestrian difficult and dangerous.

Further south, Otero and Manzanares Streets also cross underneath the interstate with a wider shoulder. Otero street currently has an existing bicycle lane, but road debris, soil and gravel make it difficult to distinguish where the bicycle lane exists currently. Both streets are viable options for interstate crossing, but are in need of increased maintenance.

Further south, Cuba Road/California Street also crosses underneath the interstate and has an existing shoulder, but no designated bicycle lane. This road too could benefit from increased maintenance, and facility striping and signage.

At-Grade Street Crossings

At-grade crossings may exist at controlled or uncontrolled roadway intersections or mid-block locations. It is especially important to focus on

where off-road trails may intersect with roadways as these intersections are often uncontrolled and can lead to safety concerns from users, including collisions with motorized vehicles. Currently, at-grade crossings for trails exist informally along Spring Street, El Camino Real, and California streets, as well as around the Rio Grande River Corridor.

Major roadway intersections with existing bicycle facilities occur at the intersections of Spring and Grant Streets, Park and Spring Street, California Street and Manzanares Avenue, and California Street and Otero Avenue. May other on-street crossings occur around the Plaza, along School of Mines Road, and El Camino Real Street. Increased signage and signalization at some or all of these intersections can lead to increased safety and ease of use for interested but concerned cyclists and pedestrians.

Water Crossings

While not common, users along multi-use trails sometimes encounter areas where they need to cross waterways, including ditches and arroyos. These



crossings are best treated with either a wooden bridge or pre-fab metal/concrete bridge. This allows users to safely cross waterways regardless of conditions without going off-trail or putting themselves in dangerous crossing situations and dealing with terrain issues.

Most cyclists and pedestrians in Socorro report issues with water crossings as what is referred to as “the pipes” where users are forced to cross the Luis Lopez ditch on a set of pipes, putting users in risk of falling or being injured. There is a need to evaluate major water crossings within the City and recommend areas where bridge crossings may be needed.



MAINTENANCE

Sweeping

While sweeping services are provided for roadways, bicycle lanes are generally not swept and tend to accumulate roadway debris, soil and sand more rapidly than vehicular travel lanes. This is also due to rain and snow storms, and roadway drainage which typically exists on the shoulder or in bike lanes. Bicyclists in the City could benefit from sweeping occurring in designated bike lanes to keep debris from accumulating where cyclists may be present.

Pavement and Sidewalk Management

The City of Socorro Public Works Departments is in charge of managing pavement and sidewalks on City owned facilities. Because of the nature of roadway wear, City resources can be limited when prioritizing for pavement



improvements, reconstruction, overlay and chip seal. Potholes in roadways and sidewalks are patched by the City as necessary.

Drainage gates also tend to accumulate debris at a rapid pace on roadway shoulders. Gates should be inspected annually, cleaned and replaced as needed.

The Department of Transportation is in charge of pavement maintenance on California Street/New Mexico Highway 1, and Spring Street/US Highway 66. Generally, these streets are in fair to good condition and are adequately maintained for vehicular travel. While the pavement is marked with a striped shoulder along California Street, there is no designated bicycle lane or signage for bicycle travel. Sidewalks do exist along most of DOT owned roadways within the City limits, but are often interrupted by parking lot and business drive lanes.

Facility Conditions

Windshield surveys conducted on December 8, 2016 and January 26, 2017 determined that the existing conditions of bicycle and pedestrian facilities may not be safe or adequate to serve the general population. In most cases, existing bicycle lanes were filled with roadway debris and were susceptible to potholes and divots caused by flooding and general deterioration. Sand, gravel and other debris can deter bicycling in designated lanes for much of the population other than avid cyclists.

It was also noted that sidewalks throughout the City were generally disconnected, or non-existent in areas, and suffered from deteriorating conditions. This poses a problem for connectivity and mobility for much of the population, including youth, seniors, and those with disabilities. The consultant team also noted the condition of existing wayfinding and bicycle route signs. Most of the existing signage is in good condition and adequately serves cyclists and pedestrians by identifying key destinations and confirming bicycle routes for all traffic. The City would benefit from additional wayfinding signage to indicate designated routes, including pavement markings to encourage sharing the roadways with vehicular and bicycle traffic, and bicycling in designated areas.

SAFETY

During the focus group meetings on December 8, 2016 and January 26, 2017, participants helped the consultant team identify areas of conflict, including problem intersections, and possible interstate crossings. **Map 4: Bicycle and Pedestrian Crashes** also shows critical areas of concern, and intersections that pose safety issues when crossing as a pedestrian or cyclist.

Crashes

Review of NM Department of Transportation crash data for the five year period between 2010 and 2014, shows that there were 8 pedestrian crashes and 10 bicycle crashes in this period. **Map 4: Bicycle and Pedestrian Crashes** shows the location of these crash by severity.

Of pedestrian crashes, 5 were resulted in injuries, 2 involved property damage only (non-injury), and 1 was fatal. Five of the crashes were along California St, include 2 injury crashes at the intersection of Ortega Ave and California St. Two pedestrian crashes also occurred at the intersection of B St and California St, including a fatal crash. This intersection is not signalized and has a Circle K and Shell Gas Station on the eastern side. Although there is a median along this section of the roadway, pedestrians may find crossing this segment of the street hazardous due to motorists increasing their speeds as they travel south out of Town or motorists already traveling fast as they exit I-25 at the southern Socorro interstate exit.

Of bicycle crashes, 6 were involved property damage only (non-injury), and 4 resulting in injuries. No bicycle crashes were fatal in this period. Six crash locations were along California St, with the others distributed around the City.

Although Spring St was identified as a hazardous street to cross (especially at the 5-point intersection) in focus groups, there were no recorded crashes except for 2 non-injury crashes around the intersections of Bagley Ave and Lucero St.

EXISTING PROGRAMS AND POLICIES

In addition to the natural and built environment, the social environment in the form of bicycle and pedestrian safety, education and recreational programs and resources helps to create, engage and sustain a bicycle friendly community. A useful framework for describing categories into which resources fall is the five E's: Engineering, Education, Encouragement, Enforcement and Evaluation. While the first E represents physical infrastructure, the last four include primarily programmatic elements. A review of existing programs targeting bicycle and pedestrian activities in Socorro gives a baseline for the planning effort to build on and learn from. The following is a list of programs and resources that currently exist in Socorro.

Education and Encouragement

Currently, Healthy Kids Socorro offers a few health-based education programs and outreach in schools that can coordinate with bicycle and pedestrian planning. These programs include:

- Walk and Bike to School Days
- Safety training
- Coordination with school programs to promote healthy lifestyles
- Two "Fun Runs" annually
- Engagement at local youth centers

Healthy Kids Socorro maintains a mission to promote healthy lifestyles within schools, and works to strengthen school policies aimed at health and active lifestyles in school-aged children. Currently, the program has limited capacity to provide additional programming to the activities listed above. Further development of education programs related to bicycle and pedestrian activities is included in Programs and Policies Section of this document.

Enforcement

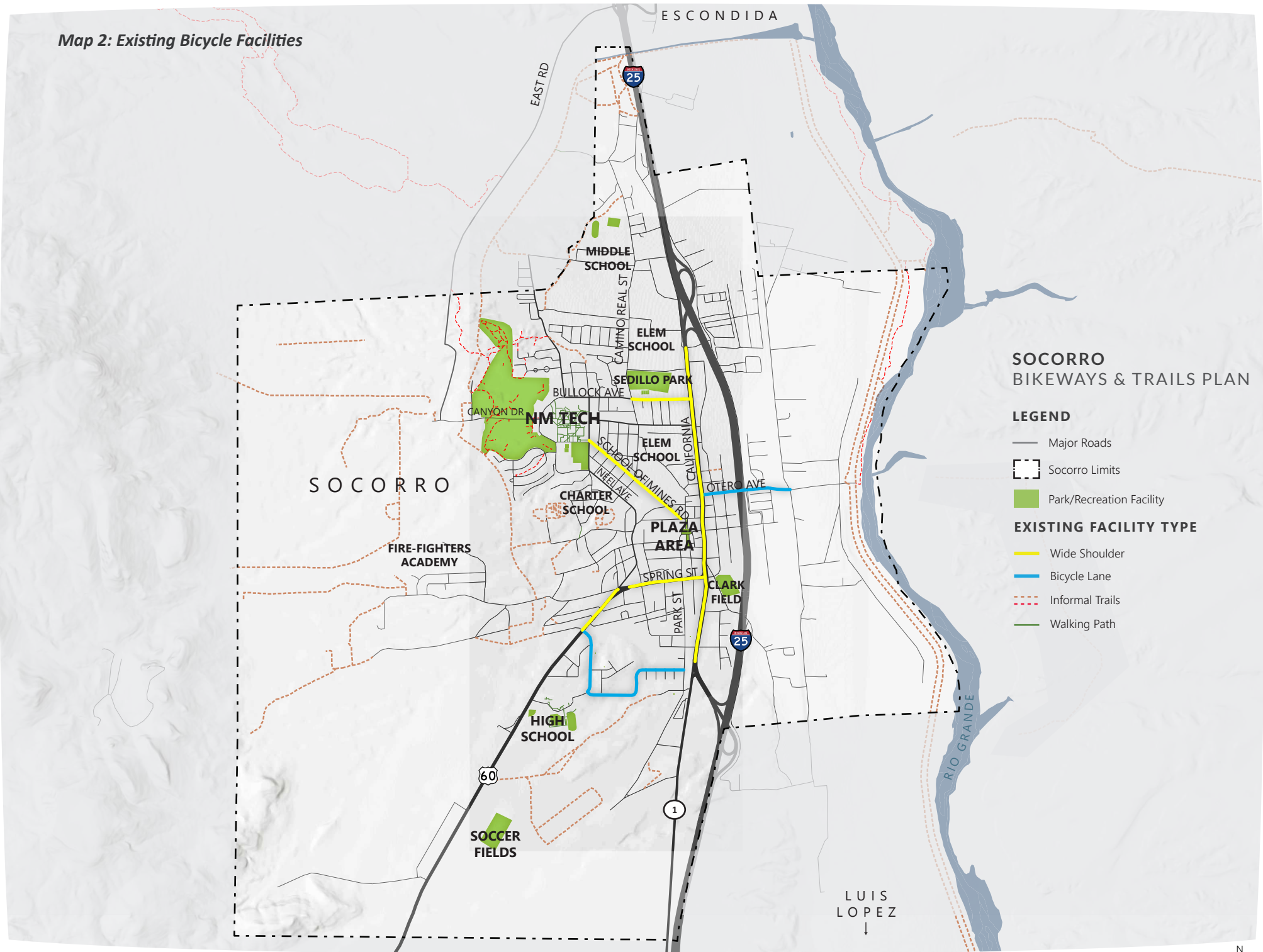
Currently, the City does not specifically offer an enforcement program tailored to bicycle and pedestrian infrastructure design and safety. However, the City could benefit from enforcement programs administered by the Community Development department that includes design and construction of bicycle and pedestrian facilities, and safety enforcement programs administered by the local Police Department tailored to promoting safe bicycle riding and vehicular traffic practices. These programs are covered in the Programs and Policies Section of this document.

Evaluation

While the City does not currently have an evaluation program for determining the performance of bicycle and pedestrian infrastructure, programs and policies, goals aimed at the evaluation and performance measuring of infrastructure and programs are included in other regional and state planning efforts. These include the following objectives and actions outlined in the New Mexico 2040 Plan and the South Central 2040 Regional Transportation Plan:

- Train staff and planning partners on ADA-compliant design standards for sidewalks, curb ramps, crosswalks, pedestrian facilities in rural areas, and other pedestrian elements that meet all of the requirements of the Americans with Disabilities Act (ADA);
- Develop design guidance (including model plan and profile views for streets) to address pedestrian needs along NMDOT facilities in local communities;
- Coordinating with local governments and agencies that have vested interests in planning initiatives and agreements that would extend existing walking or biking trails; and
- Encouraging local governments to participate in the Recreation Trails Program (RTP) and offer suggestions to NMDOT staff on guidelines.

Map 2: Existing Bicycle Facilities



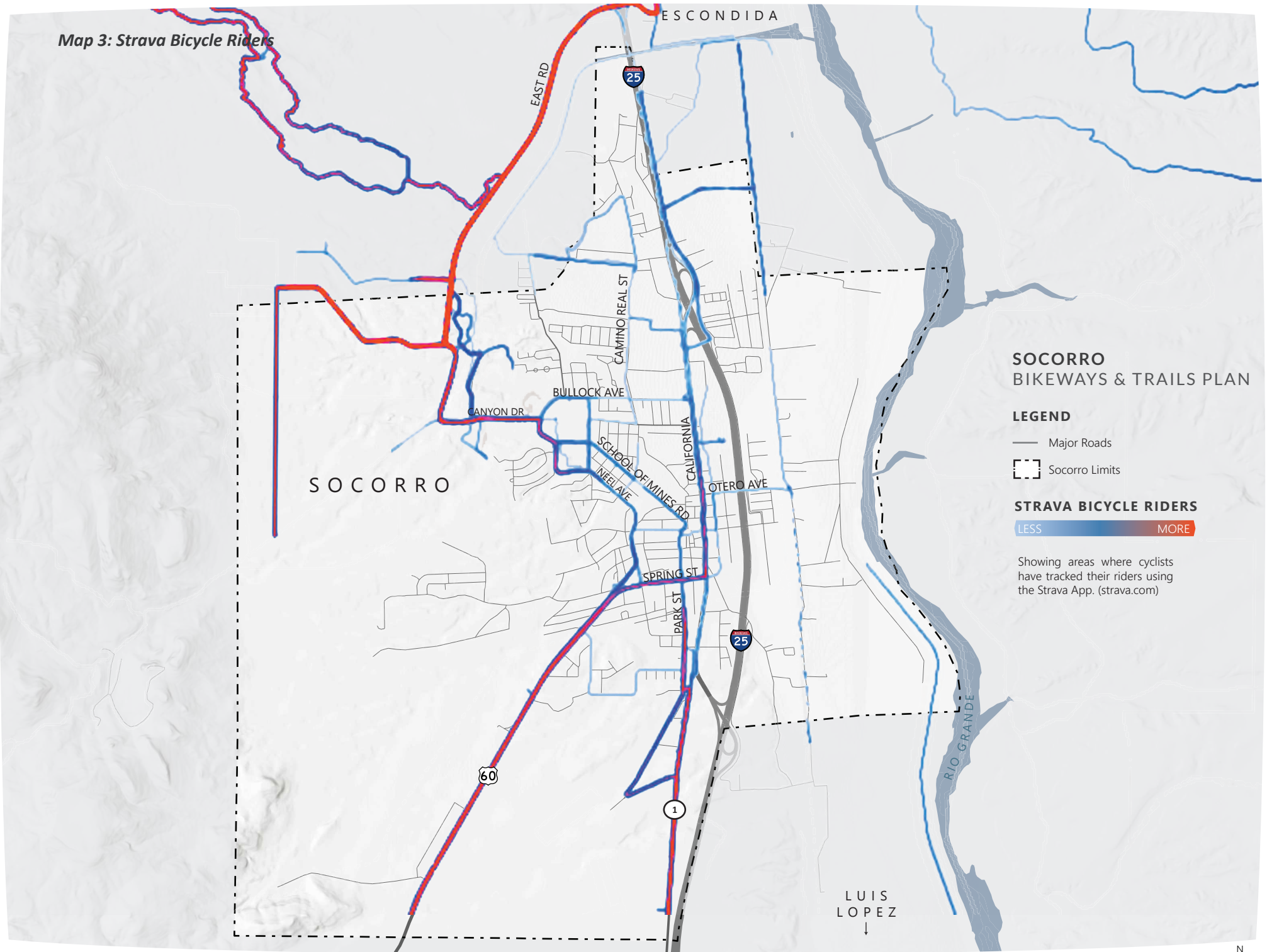
SOCORRO BIKEWAYS & TRAILS PLAN

LEGEND

- Major Roads
- Socorro Limits
- Park/Recreation Facility
- EXISTING FACILITY TYPE
 - Wide Shoulder
 - Bicycle Lane
 - Informal Trails
 - Walking Path



Map 3: Strava Bicycle Riders



SOCORRO BIKEWAYS & TRAILS PLAN

LEGEND

- Major Roads
- ⊞ Socorro Limits

STRAVA BICYCLE RIDERS

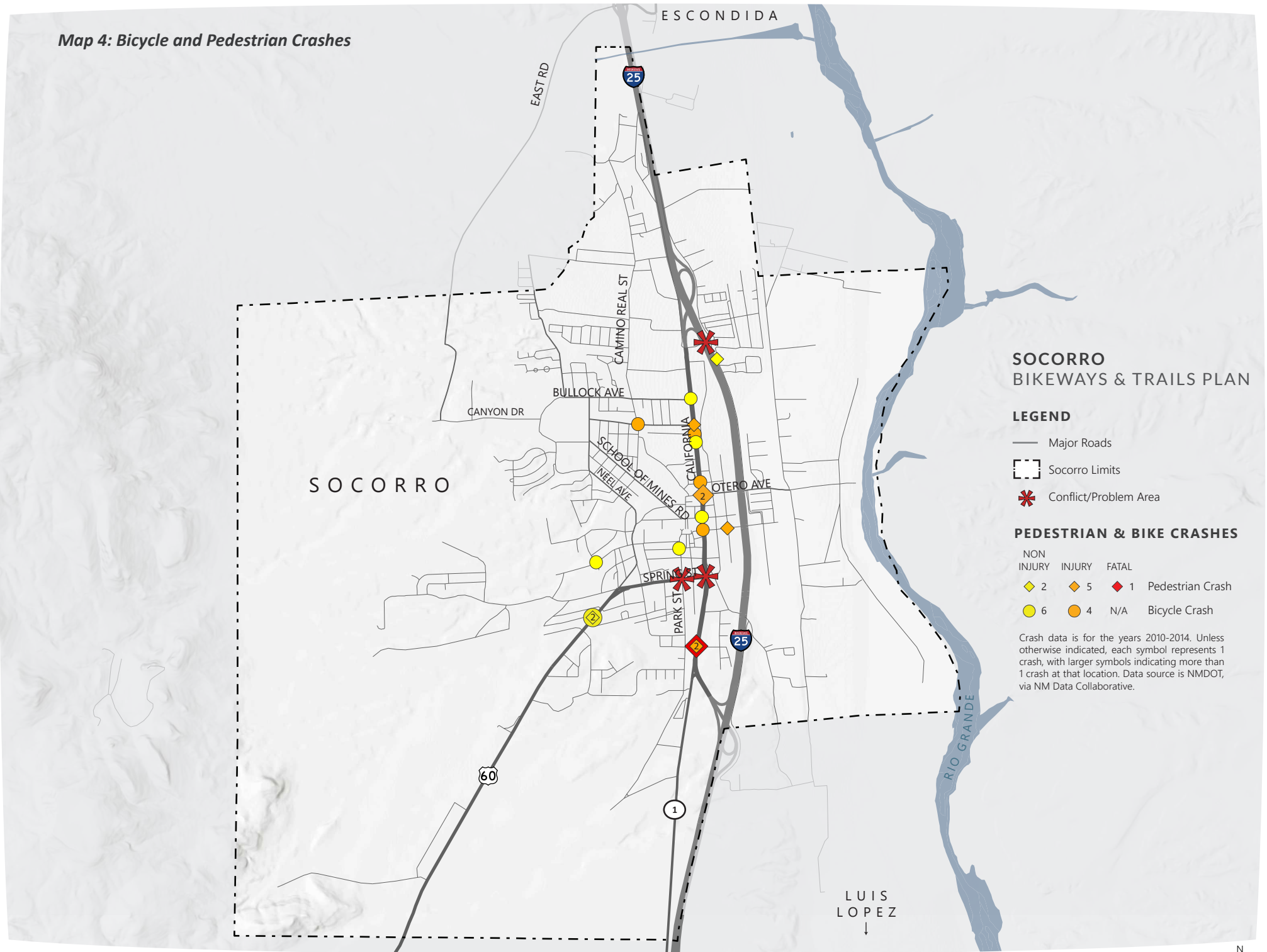
LESS MORE

Showing areas where cyclists have tracked their riders using the Strava App. (strava.com)

0 0.5 1 2 MILES



Map 4: Bicycle and Pedestrian Crashes





WHAT WE HEARD



CHAPTER 3

WHAT WE HEARD

During the planning process, it became clear that there is a desire from members of the public and stakeholder groups to have a vested interest in healthy and active lifestyles in Socorro. Because of this interest, Socorro is already a vibrant community filled with cyclists and pedestrians of all ages, and home to several regional races and outdoor activities. City Staff, stakeholders and members of the public engaged with the planning team by providing project ideas and implementation ideas, and project prioritization which will allow the projects and programs included in this plan to become reality.

KICKOFF MEETING

The City of Socorro hosted a kickoff meeting on Thursday, October 20th with Sites Southwest and Healthy Kids Socorro. The meeting was geared toward discussing the planning process and goals for physical project implementation, funding, themes and project prioritization. It was determined to proceed with the general scope outlined by NMDOT and included in the Plan Organization section of this document (page 4).

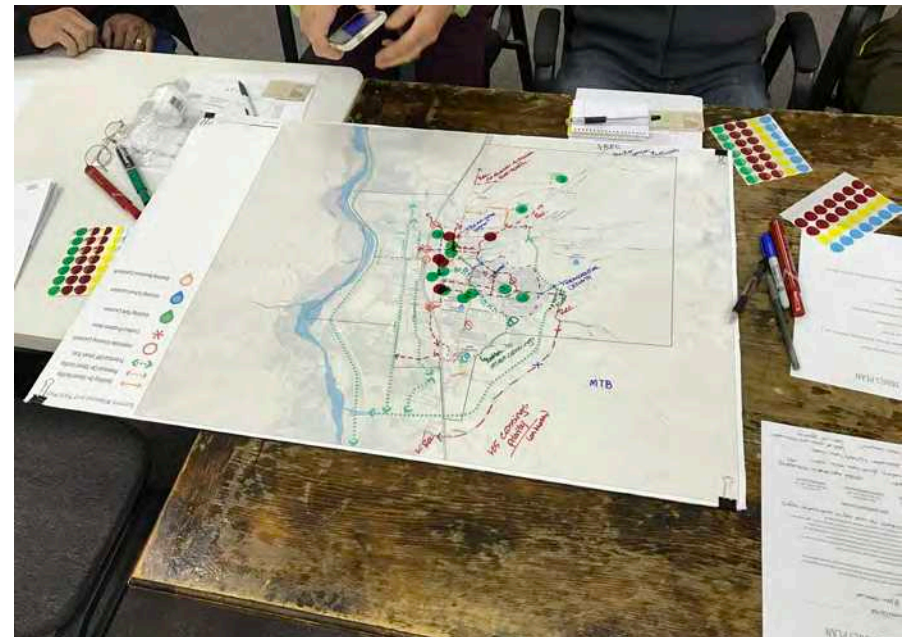
In addition, team members discussed adding elements of safety, health and overall connectivity to the greater transportation system in the plan. It was determined to move forward utilizing City and Healthy Kids Socorro staff for guidance and recommendations on specific recommendation and data gathering.

FOCUS GROUPS

December 8, 2016

The first focus group was held on Thursday, October 8, 2016 and focused on developing a list of potential on and off-street routes throughout the City that were safe and accessible to a majority of users. Focus group members included representatives from the City of Socorro, Socorro Healthy Kids, Socorro Striders and Riders, and the New Mexico Institute of Mining and Technology Bicycle Club.

The group focused on identifying on-street routes and facilities that would best serve bicyclists and pedestrians in the City. The majority of potential improvements were identified around the historic Plaza area with some routes extending north and south out of the City. Potential off-street facilities were also identified including existing routes along Middle Rio Grande Conservancy District (MRGCD) Right-of-Way. The group also began to prioritize routes for investment and implementation, beginning with a main route running north-south along El Camino Real through the center of the City.



January 26, 2017

The second focus group was held on Thursday, January 26, 2017 and focused on confirming potential on and off-street facilities, identifying additional funding resources, identifying challenges and issues with non-motorized infrastructure planning, and discussing current and possible programs and policies for the City to focus on. The meeting was held at New Mexico Tech and included nine representative from the New Mexico Tech Bike Club, university staff, local bicycle advocacy groups, and members of the public.

The group focused on confirming on-street routes and facilities identified in the previous focus group, as well as adding additional routes. The group also discussed connections to outside trails and recreation, existing programs aimed at providing bicycle and pedestrian infrastructure and activities in the town, and potential funding sources to match federal, state and local funds.

After the meeting, the consultant team completed a windshield survey of existing streets and routes throughout the City to determine the best possible course of action for route prioritization, planning, design and implementation.

STAKEHOLDER INTERVIEWS

As part of the public outreach process, the consultant team completed one-on-one phone interviews with the following organizations:

- South Central Council of Governments and Rural Transportation Planning Organization (SCCOG and SCRTPO)
- New Mexico Department of Transportation (NMDOT)
- Healthy Kids Socorro
- New Mexico Tech Bicycle Club
- Socorro Striders and Riders

These interviews were conducted to identify potential resources for physical project implementation and outreach programs, as well as to gain an understanding of constituent priorities including project and program

priorities and phasing. The main topics, issues and concerns that were identified during the interviews include:

- Identifying funding resources for project and program implementation.
- Identifying infrastructure gaps and connectivity issues.
- Strengthening the health of the community by providing access to active transportation.
- Promoting walking and bicycle riding to schools and local residents.
- Community engagement and collaboration with local public and private entities.
- Increasing the safety of users by promoting safe design practices and ridership/safety training.
- Increasing wayfinding signage to help users navigate the bicycle and pedestrian system easily and efficiently, and to help navigate users to important destinations.
- Promoting bicycle education in the community to teach riders how to follow basic “rules of the road” including signalization and integration with vehicular traffic.
- Analyzing crossing points for major roadways, including I-25, California Street and Spring Street.
- Providing connections to major destinations, including parks, schools, recreation complexes and centers, libraries, the Soccer and Rodeo Complex, and the Plaza.
- Coordinating with other entities, such as the DOT and Middle Rio Grande Conservancy District, to determine ROW and possible use of facilities for trails, on-street bicycle facilities and sidewalks.

PUBLIC MEETINGS

June 28, 2017

The consultant team held a public input meeting on June 28, 2017 to gather input about the proposed bicycle and pedestrian network, areas of conflict and interest, and potential connections to destinations throughout the City. Attendees commented on connections between the east and west side of the interstate, bicycle parking, and safety issues among other

elements that should be included in the plan. At the end of the meeting, the consultant team led a rapid fire session to discuss what priorities the public had. The top priorities were:

- More sidewalks along Highway 60
- Safe routes to all schools, especially High School
- Safer crossings for Spring Street
- Overpass at I-25 with higher guardrails
- Getting to and from Walmart. Sidewalks in area need to be improved.
- Fix gaps in sidewalks. Overgrowth from properties blocks sidewalks. Need ordinance or enforcement.
- Highway 60 improvements
- Debris on road and in bike lanes
- More bike racks/bike parking
- Street sweeper – clean streets
- “S turn” on Lopezville Rd is dangerous
- Safe routes to ALL schools
- I-25 overpass
- General road maintenance
- Connections to east side

Public Hearing

The City of Socorro will hold a formal public hearing for plan adoption on September 18, 2017.



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RECOMMENDATIONS





CHAPTER 4

RECOMMENDATIONS

This section discusses recommendations for improving the bicycle and pedestrian network in Socorro, including potential on and off-street routes and lanes, sidewalks, connectivity and wayfinding. The goals of this plan are intended to provide a safe and reliable pedestrian and bicycle network for the general population in Socorro; meeting these goals will require more than the implementation of bicycle and pedestrian facilities.

RIGHT-OF-WAY ANALYSIS

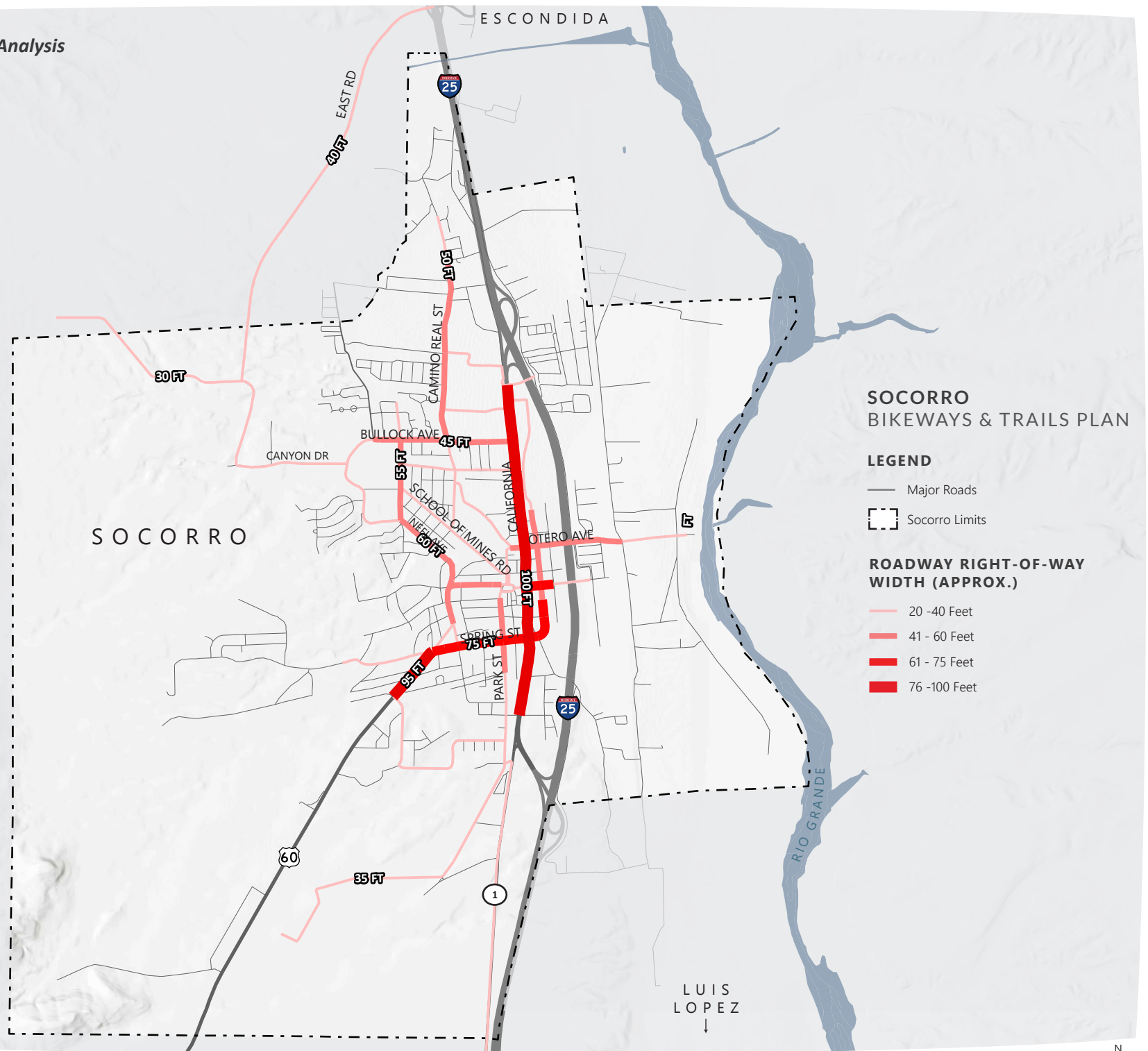
Roadway Right-of-Way (ROW) refers to the right to make a way over a piece of land, usually to and from another piece of land. For the purposes of this plan, ROW means the easement granted or reserved over the land for transportation purposes and refers to a measurement of land width where roadways, sidewalks, bicycle facilities and some utilities are established and maintained. Existing and proposed facilities included in this plan exist within the public ROW where applicable, and, in general, do not fall within private lands existing outside of the ROW. However, sometimes agreements can be made with private landowners to expand public facilities outside of the public ROW.

In Socorro, narrow ROW poses a challenge in developing additional bicycle and pedestrian facilities due to minimum width standards for roadways, bicycle and pedestrian facilities, and utilities. The following sections describe, in detail, minimum widths, measurements and surfacing for various bicycle and pedestrian facilities. Table XX below contains minimum width standards for vehicular travel lanes on various facility types. At times, minimum vehicular travel lane widths are recommended in residential areas in Socorro in order to accommodate additional bicycle and pedestrian facilities. **Map 5: Right-of-Way Analysis** shows the existing ROW along recommended facility paths in Socorro. Typical lane widths according to roadway classification type are included in **Table 2: Standard Lane Widths**.

Table 2: Standard Lane Widths

Roadway Classification	Definition	Lane Width (feet)
Freeway	Freeways are the highest classification type and are designed and constructed for long-distance travel and freight.	12
Ramps	Ramps are intended to serve freeway and arterial traffic by providing a zone for vehicles to obtain travel speed and merge into existing traffic.	12-30
Arterial	Arterial roadways serve major activity centers and provide a high degree of mobility. Adjacent land uses can be served directly.	10-12
Collector	Collectors gather traffic from local roads and funnel them to the arterial roadway network. Adjacent land uses can be served directly.	10-12
Local	Local roads are not intended for long-distance travel and serve adjacent land use directly. Local roads are often designed to discourage through traffic.	9-12

Map 5: Right-of-Way Analysis



RECOMMENDED FACILITY TYPES AND DESIGN GUIDELINES

Shared Bicycle Routes

Bicycles can be operated on roadways except where prohibited by statute or regulation. In most cases, bicycle and motor vehicles can share the same travel lanes in Socorro. There are no specific designs or dimensions recommended for shared bicycle lanes, however this section contains some guiding information on design standards for bicycle routes.

Width

Lane widths of 13 ft or less make it likely that most motor vehicles will encroach at least part way into the next lane to pass a bicyclist with an adequate and comfortable clearance of 3 ft or more. This is typically the case in Socorro where narrow ROW exists and travel lanes are minimized to provide on-street parking. Lane widths of 14 ft or greater allow motorists to pass bicyclists without encroaching into the adjacent lane.

On sections of roadway where bicyclist may need more maneuvering space, the travel lane may be marked at 15 ft wide to allow for a comfortable passing distance. This may be appropriate on sections with steep grades or on sections where drainage grates, raised delineators, or on-street parking effectively reduce the usable width. Widths wider than 15 ft are generally discouraged because they can allow for two motor vehicles to operate side-by-side.

Striping and Surfacing

In all shared route instances, signage is suggested to alert motorists of bicycle presence in the roadway. City lanes less than 13 ft wide should be striped as a shared roadway with a “sharrow”, and all shared roadways should be signed with “Share the Road” signs to encourage bicycle travel and remind motorists that bicycles may be present. In cases where “sharrow” pavement markings are desired, the markings should be placed 4 ft on center from the outside edge of the travel lane.



Top: Graphic example of shared route design guidelines in Socorro.

Bottom: An existing shared bicycle route/sharrow installed by Glen Oaks Canyon Homeowners Association in California.



Local Example: Albuquerque has implemented Bicycle Boulevards across the City to facilitate bicycle traffic on-street without a formal bike lane or protected facility. The speed limit for Bicycle Boulevards is 18mph, which was determined as a safe speed for vehicles to comfortably pass on-street bicycle traffic.

Sidewalks

Sidewalks are an integral part of city streets, but are rarely provided in rural areas. The potential for vehicle-pedestrian crashes can be high in these areas due to higher speeds and a general absence of lighting. Sidewalks near or along rural and suburban highways are typically only justified at points of development that generate pedestrian traffic such as residential areas, schools, businesses and industrial areas. If pedestrian activity is anticipated, sidewalks should be included as part of the initial construction. Sometimes, shoulders can serve as adequate sidewalk facilities, but do carry higher safety risks and potential for vehicle to pedestrian collisions. Instead of shoulders, sidewalks should be recommended where high concentrations of pedestrians occur.

Minimum Widths

Along suburban and rural highways and arterial roads, a buffer area typically occurs which can accommodate a sidewalk and/or planting/utility area. These buffer areas are typically 8 ft minimum width to provide space for streetlights, fire hydrants, street hardware, other utilities and vegetation. As a general practice, sidewalks should be constructed along any street or highway not provided with shoulders even if pedestrian traffic is light.

Sidewalk widths in residential areas typically vary from 4 to 8 ft, with a recommended minimum width of 5 ft. In areas where the sidewalk narrows below the recommended minimum width, a passing section every 200 ft is recommended for accessibility and accommodation of faster moving pedestrian traffic. If space exists within the roadway ROW, a landscape buffer 2 ft or wider is recommended between the sidewalk and roadway curb. Sidewalks covering the full border width in the ROW are generally appropriate in situations such as commercial areas, through adjoining multiple-residential complexes, near schools and other pedestrian generators, or in ROW where border width is restricted. Where sidewalks are located adjacent to the roadway curb, the recommended minimum width is 2 ft wider than the minimum required width to provide for utilities and street hardware such as lighting, fire hydrants and furniture. Buffer areas should be established along high-speed roadways where sidewalks

exist. Wider widths also need to be considered when including street furnishings such as benches and trash receptacles.

Surfacing

Sidewalks should have all-weather surfaces to accommodate pedestrians of all types and ability. Allowed sidewalk surfaces include concrete and asphalt, and may include tile, stone and brick. The surface texture of curb ramps should be coarse enough to provide slip resistance when wet.

Sidewalks using tile, stone and brick increase the amount of work required for mobility. Although these surfaces can be allowed, they are generally discouraged in order to provide for higher mobility levels for persons with disabilities. Alternative surfacing materials include colored concrete stamped to look like stone or brick, and asphalt or concrete paths with brick trim.

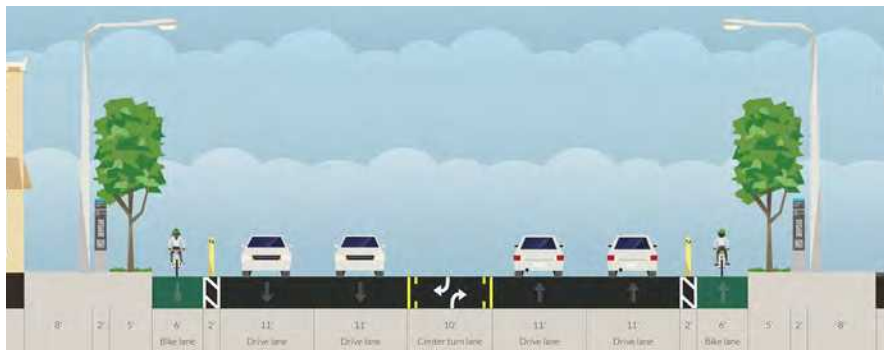
Accessibility

Sidewalks need to be designed to accommodate persons with disabilities according to the Americans with Disabilities Act of 1990 (ADA). The minimum proposed width of 4 ft allows a person travelling with a wheelchair or other mobility device to move along the sidewalk comfortably. However, larger widths should be considered to accommodate other persons travelling as well, and passing sections every 200 feet should be required where sidewalks meet the minimum proposed width. The cross slope of sidewalks is not allowed to exceed 2 percent slope for mobility and accessibility. Surfacing materials should be all-weather, including concrete and asphalt.

Curb ramps need to be included at street crossing locations and locations where pedestrians need to access uses that are separated by curbs or grade changes. In general, curb ramps should be a minimum of 4 ft wide and should not exceed 8.33 percent slope. Level landing areas at the top of each curb ramp should be provided at a minimum of 4 ft by 4 ft, if no adjacent obstructions are present, and should have a maximum cross slope of 2 percent. Detectable warning strips 2 ft in width are also required at the bottom of curb ramps to improve detectability by people with visual impairments.



Local Example: Albuquerque has implemented a bicycle route along Girard Boulevard with on-street parking accessible on both sides of the street. Bicycles share the road with motorists with on-pavement and roadway signage dictating bicycle usage.



Top: Graphic example of a bike lane located on a 50ft ROW in Socorro.

Center: Graphic example of a buffered/protected bike lane on a 75ft ROW in Socorro.

Bottom: Graphic example of a buffered/protected bike lane on a 100ft ROW in Socorro.

Bike Lanes

Bicycle lanes typically carry bicycle traffic in the same direction as motor vehicle traffic. Bike lanes are the appropriate and preferred bicycle facility for on-street facilities in both urban and suburban areas, and are sometimes provided in rural areas. Paved shoulders may also be designated as bike lanes by installing bike lane symbol markings. Bike lanes should have a smooth and rigid surface, and utility covers should be flush with the pavement. Bike lanes should also be provided with adequate drainage so water and other roadway debris does not accumulate in the useable portion of the lane.

State laws and local ordinances should always be observed when implementing bicycle facilities, and bike lanes may have an impact on roadway design and striping. Motorists are also prohibited from using bike lanes for driving, but many state and local laws and codes allow motorists to use bike lanes when merging or turning. In general, it is the legal responsibility of motorists to check for oncoming traffic, including bicycle and pedestrian traffic, before opening car doors and merging into the traveled way.

Width

Widths should be determined by context and anticipated use. Generally, bicycle lanes should be a minimum of 4 ft and a maximum of 7 ft for one-way travel, with a preferred width of 5 ft recommended for roadways in Socorro. When adjacent to an on-street parking lane, a recommended width of 6 ft should be used to allow for vehicle maneuvering and accommodate bicycle passing when motorists are opening doors to their vehicles. Additionally, parking lanes located next to bike lanes should be a minimum of 7 ft wide.

Striping and Surfacing

Bike lanes are designed for preferential bicycle use with a solid white line dividing vehicular and bicycle travel. Standard white bicycle pavement markings are recommended in the center of the bike lane, with an optional directional sign directly above the bicycle marking. Markings should be placed before and after each intersection or signalized driveway. In general,

flexibility is needed when placing bicycle lane markings. Some jurisdictions choose to transition from a solid white line to a dotted white line when approaching intersections to allow for motor vehicle merging and turning, as well as bicycle merging and turning.

Buffered Bike Lane Striping

In places where high amounts of vehicular traffic volume and high speeds exist, it may be desired to include a striped buffer or physical division between vehicular travel and bike lanes. Buffer zones are typically delineated with a solid white line on each side and diagonal stripes within the buffer indicating no vehicular or bicycle travel is allowed within the zone. Typically, these zones vary between 1 ft and 2 ft in width, and can be adjusted as needed for context and ROW. At times, flexible bollards or vertical dividers may be placed in the buffer zone to ensure motorists do not cross into the bike lane.

Multi-Use Trails

Multi-use trails can serve a variety of purposes including shortcuts through neighborhoods or to destinations, commuting routes, recreation and access to areas that are otherwise only served by limited use highways. This section covers design standards for multi-use trails built in independent ROW separate from motorways.

Width

The recommended minimum width for a multi-use trail is 10 ft for two-directional travel. Typically, widths can vary from 10 ft to 14 ft to allow for more flexibility in passing and types of travel, including bicycle, walking, running, skateboards and other non-motorized modes. In some circumstances, a reduced width of 8 ft may be allowed where bicycle traffic is expected to be low, where paths may not be subject to regular maintenance, or where there is adequate area alongside the trail for passing and/or resting. Wider pathways are recommended where bicycle and pedestrian use is expected to be high, such as on trails between major destinations or commuter routes.



Local Example: Albuquerque has recently implemented buffered bicycle lanes along Martin Luther King Blvd between Broadway and I-25. The lanes are protected by flexible bollards at all intersections to protect from turning vehicles, and bike boxes are provided at intersection to accommodate large crowds of cyclists. This corridor carries high amounts of both vehicular and bicycle commuter traffic between the University of New Mexico (UNM), I-25 and the downtown area daily.



Top: Graphic example of a paved/unpaved trail design in Socorro.

Bottom: An existing paved trail in the Bosque along the Rio Grande River in Albuquerque.

Barriers

If a barrier or rail is needed in areas where users are prohibited to travel off the path, such as adjacent to ditches or steep elevation changes, the barrier should begin prior to and extend beyond the area where it is needed. Barriers and/or rails should be a minimum of 3.5 ft, or 42 inches, to allow for user safety.

Striping and Surfacing

Typically, striping is not recommended unless there is a need to delineate travel lanes in areas of high bicycle and pedestrian volumes. Sometimes trails can also be striped with a solid white or yellow line to separate bicycle and pedestrian travel areas.

Hard, all-weather pavement surfaces are preferred for ease of travel and maintenance including concrete and asphalt type pavements. However, crushed aggregate, sand, clay or stabilized earth can also be used if pavement is too expensive or in areas where bicycle and pedestrian traffic is expected to be low. Unpaved surfaces may also be recommended where the intention of the path or trail is recreational, or as a temporary measure to open a trail before funding is available for paving.

Accessibility

Because multi-use trails are used by pedestrians and cyclists alike, they fall under accessibility requirements covered in ADA. Trails built in independent ROW should meet accessibility guidelines covered above under sidewalks including minimum width for pedestrians, cross slopes and ramps. Additional guidelines for width are also covered in this section.

Crossings

Crosswalks

Typically, crosswalk dimensions follow standards included in the Manual of Uniform Traffic Control Devices (MUTCD), with variations when needed for additional visibility. Overall crosswalk width should be no less than 6 ft wide. The MUTCD specifies that when using transverse crosswalk lines, the lines should be solid white not less than 6 inches or greater than 24 inches wide and spaced at least 72 inches apart.

Raised crosswalks may also be provided and should match the height of connecting sidewalks. The minimum width provided should be no less than 6 ft, and ramps should be provided along the edges for vehicles to travel over.

Midblock Crossings

For midblock crossings to be accessible to people with mobility impairments, a curb ramp needs to be installed at both ends of the crossing in a direct line of travel. See specifications under sidewalk design standards above for further guidance.

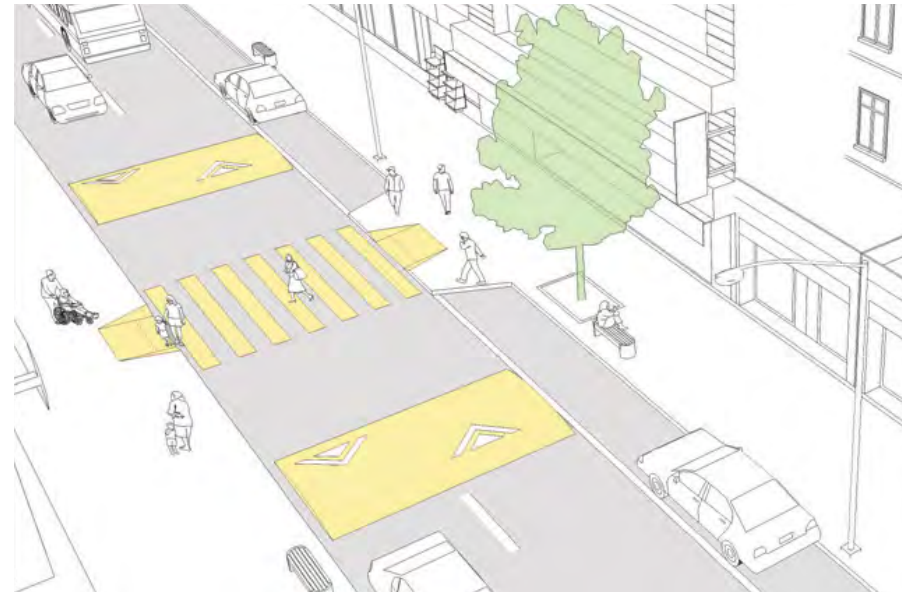
Pedestrian Refuge

Where necessary, midblock crossings may coincide with a pedestrian refuge when crossing more than two travel lanes of multi-directional traffic. Typically, pedestrian refuges exist within a median and allow users to rest in between crossings, and allow for shorter crossing times and distances. The City may wish to provide pedestrian refuge areas on streets that have one or more travel lanes in each direction with an existing median, or room for a provided median within the ROW. See crosswalk and midblock crossing design standards above for further guidance on typical widths and accessibility.

Grade Separated and Water Crossings

A bridge or underpass may be needed to provide continuity to a multi-use trail or bicycle/pedestrian crossing where paths intend to cross highways where non-motorized travel is prohibited, or at waterway crossings. Where bridges or underpasses are required, a minimum vertical clearance of 10 ft is recommended, and the recommended minimum width is 8 ft to allow for two-directional travel. In some instances, width may be reduced to 5 ft to allow for single-directional crossing, but is not typically recommended. It is best to match the intended path width if possible. Flat bridges are easiest for accessible crossing, but arched bridges can be used if needed.

Recommended materials for bridges are wood, concrete and steel/metal frames. In general, wood requires more maintenance and will deteriorate faster than steel and concrete.



Top: NACTO graphic of a mid-block crossing.

Bottom: NACTO graphic of a mid-block crossing with pedestrian refuge.



Local Example: Albuquerque recently installed a High-Intensity Activated Crosswalk (HAWK) beacon in the South Valley area for pedestrians to safely cross Isleta Boulevard where there formerly was no crosswalk. HAWK beacons are pedestrian-activated and act as a stoplight for vehicular traffic so pedestrians can safely cross a roadway where needed.

Bicycle Parking

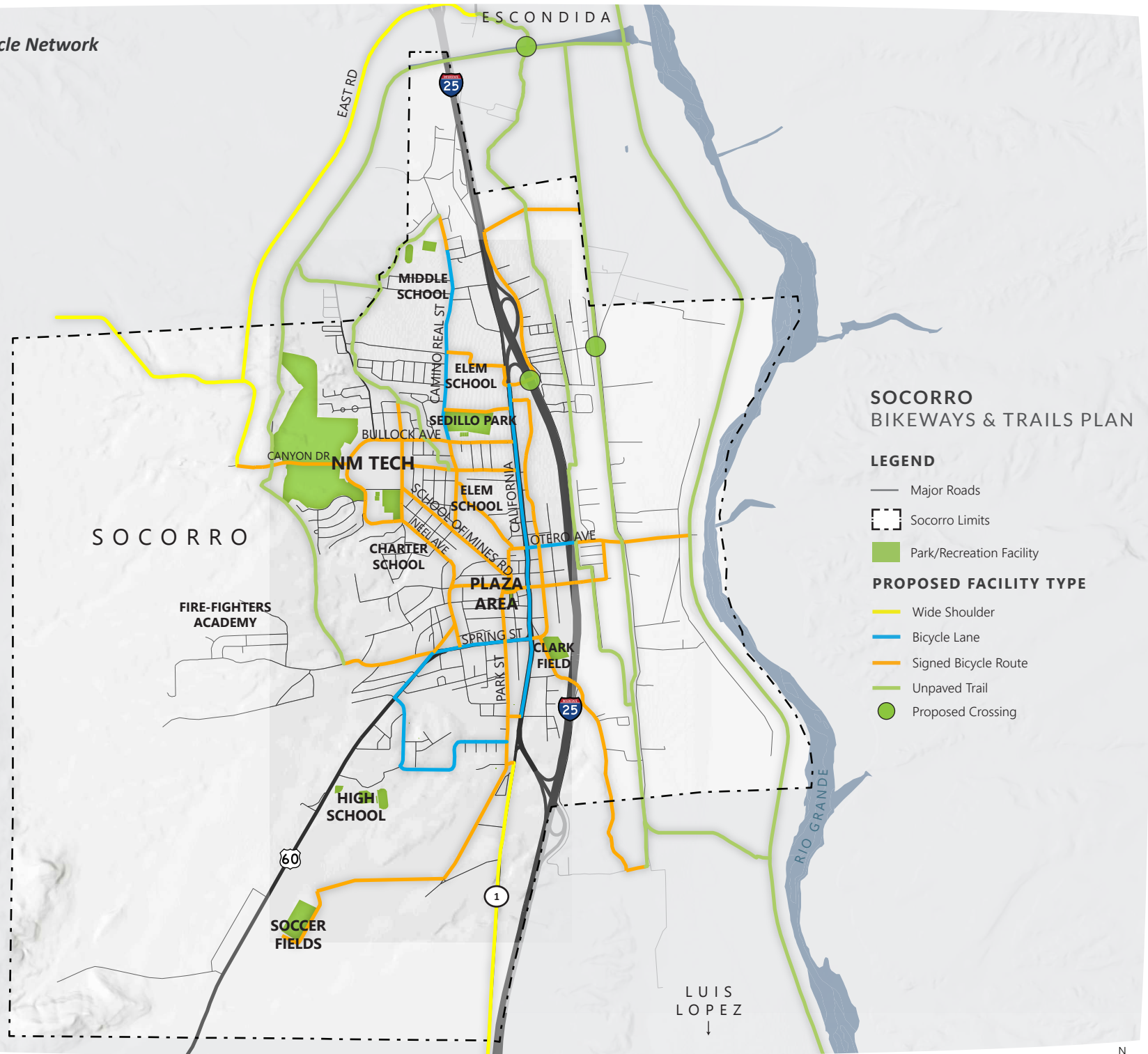
Many cities have bike parking programs to install and maintain bicycle parking in the city's Right-of-Way. These programs can work with business owners who desire bicycle parking either by installing racks on request or by cost-sharing. Socorro could benefit from an established bike rack program to work with interested local businesses and landowners to add needed bicycle parking at key destinations across the City. At a minimum, Socorro could provide interested partners with information on how to install bicycle parking, and possible bike rack vendors. The City could also establish design and placement standards to aid with installation.

RECOMMENDED BICYCLE NETWORK AND PROJECTS

Potential routes and facilities were identified during the planning and public outreach process by working with focus groups, stakeholders, City staff and elected officials, and members of the public. **Map 6: Proposed Bicycle Network** shows the recommended bicycle network throughout the City. Proposed facilities were developed to best serve important destinations across the City, as determined during the public outreach process. Destinations are shown in **Map 7: Destination Heatmap**.

Recommended projects were developed according to feedback obtained during staff meetings, focus groups, stakeholder interviews and public meetings. A detailed listing of projects is included on the following pages. All cost estimates are based on information included in Appendix B: Infrastructure Costs and are subject to change due to material costs, local construction preference, material availability and other factors.

Map 6: Proposed Bicycle Network



SOCORRO BIKEWAYS & TRAILS PLAN

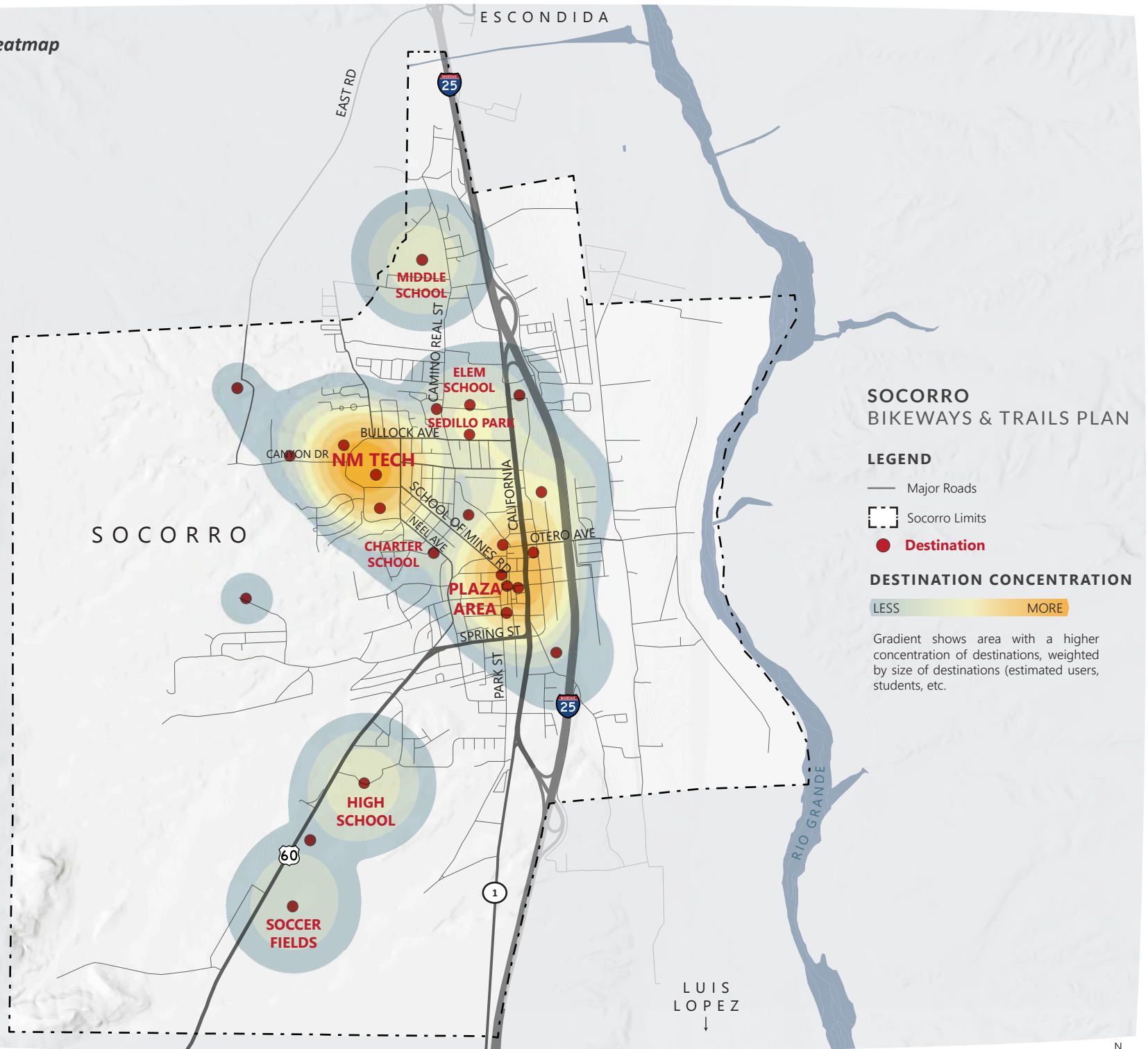
LEGEND

- Major Roads
- Socorro Limits
- Park/Recreation Facility
- PROPOSED FACILITY TYPE**
 - Wide Shoulder
 - Bicycle Lane
 - Signed Bicycle Route
 - Unpaved Trail
 - Proposed Crossing

0 0.5 1 2 MILES



Map 7: Destination Heatmap



SOCORRO BIKEWAYS & TRAILS PLAN

LEGEND

- Major Roads
- Socorro Limits
- Destination

DESTINATION CONCENTRATION

LESS MORE

Gradient shows area with a higher concentration of destinations, weighted by size of destinations (estimated users, students, etc).

0 0.5 1 2 MILES



Project 1: I-25 @ Overpass Upgrades

Description: During the public outreach process, many participants described using Overpass Road to cross I-25 either on foot or bike. In each instance, users described safety issues and lack of formal bicycle and pedestrian facilities on the bridge, and discussed their perceptions of feeling unsafe or scared to cross over on at this location. However, this bridge is heavily utilized by both pedestrians and cyclists to travel from East to West within the City, and to access trails existing along the Rio Grande River. The consultant team noted this location as a critical area of concern due to this feedback.

This project proposes increased safety implementations along the bridge including higher guard rails, formalized bike lanes/shared pedestrian space. The bridge would also benefit from signage informing vehicular traffic of bicycle and pedestrian presence.

Facility Type:

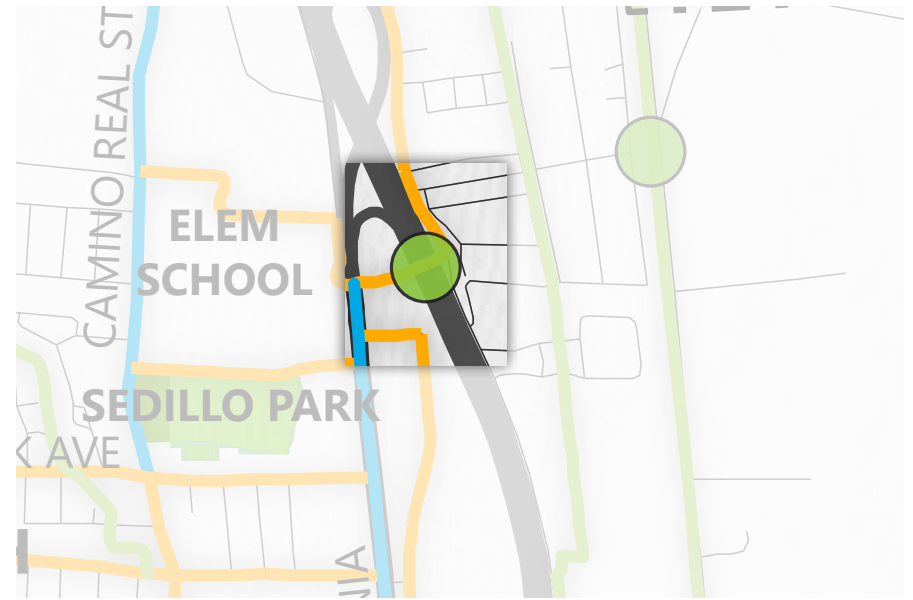
- Grade-Separated Crossing
- Bike Lane/Shared pedestrian space

Recommended Upgrades:

- Painted (green) 4' bike lane on both sides, doubling as pedestrian space when needed (0.3 miles total)
- Guard rails exceeding the recommended height of 3.5 ft (42 inches)
- Share-the-road signage informing motorists of bicycle and pedestrian presence; estimated 4 signs

Anticipated Cost:

• Painted (Green) Bike Lanes:	\$27,000
• Guard Rails:	\$50,000
• Signage:	\$1,200
• Total Estimated Cost:	\$78,200



An example of bike lanes and a sidewalk provided on a bridge in Portland.

Project 2: Spring Street 5-Points Intersection

Description: The intersection at Spring Street and Grant Street consists of a four-way stop and two right-hand turning lanes separated from traffic. The intersection is difficult to navigate due to many conflict points and tight viewing angles for vehicles, and can be intimidating to cross as a pedestrian or cyclist. During the public outreach process, many participants discussed the difficulties of navigating this intersection and expressed a desire to update the crossing, or utilize pavement markings and signage to make it easier to cross on foot or bike, and inform motorists of bicycle and pedestrian presence. The intersection was commonly referred to as the “5-points intersection” by public outreach participants.

This project proposes increased safety implementations at the intersection including signage and pavement markings (bicycle lanes, directional guidance and upgrading existing crosswalks).

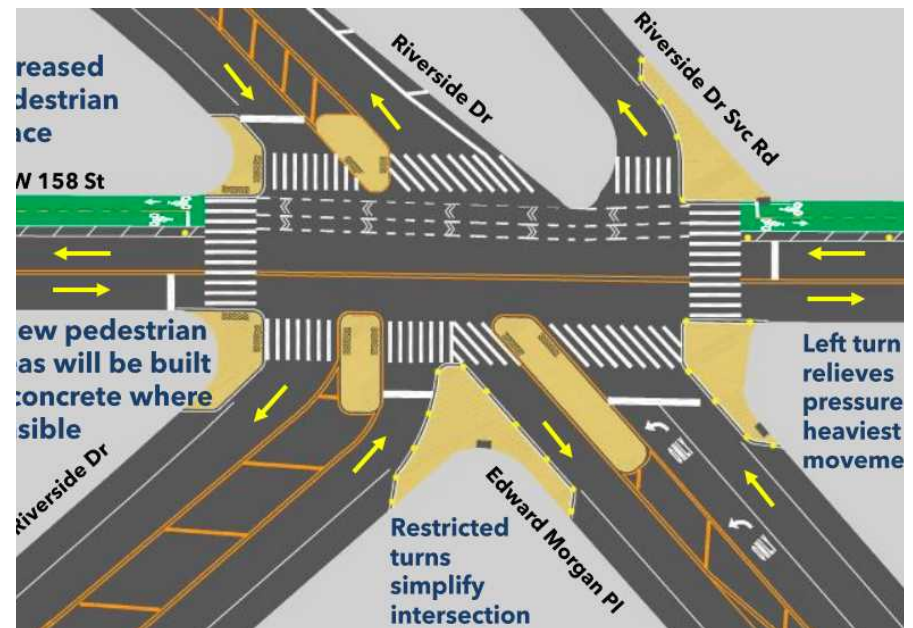
Facility Type:

- Crosswalk with Pedestrian Refuge
- Bike Lane
- Signage

Recommended Upgrades:

- Painted (green) 4' bike lane on intersection approach
- Directional pavement markings through intersection
- Re-paint crosswalks and add (2) pedestrian refuge islands
- Share-the-road signage informing motorists of bicycle and pedestrian presence; estimated 6 signs

Anticipated Cost: A complete intersection re-design could cost up to approximately \$2 million. The City should work with NMDOT and local construction experts to finalize a construction cost estimate.



Top: Photograph of existing conditions at the “5-Points” intersection.

Bottom: Design consideration for a multi-point intersection with bicycle lanes in New York.

Project 3: Highway 60 Improvements

Description: Many cyclists currently use Highway 60 south of the Spring Street intersection to access the High School, Soccer/Rodeo Complex, and recreational opportunities south of the City. It is recommended to include a formal bike lane in each direction on the roadway with continuous access to the High School, and provide a wide shoulder for recreational use south of the High School.

Facility Type:

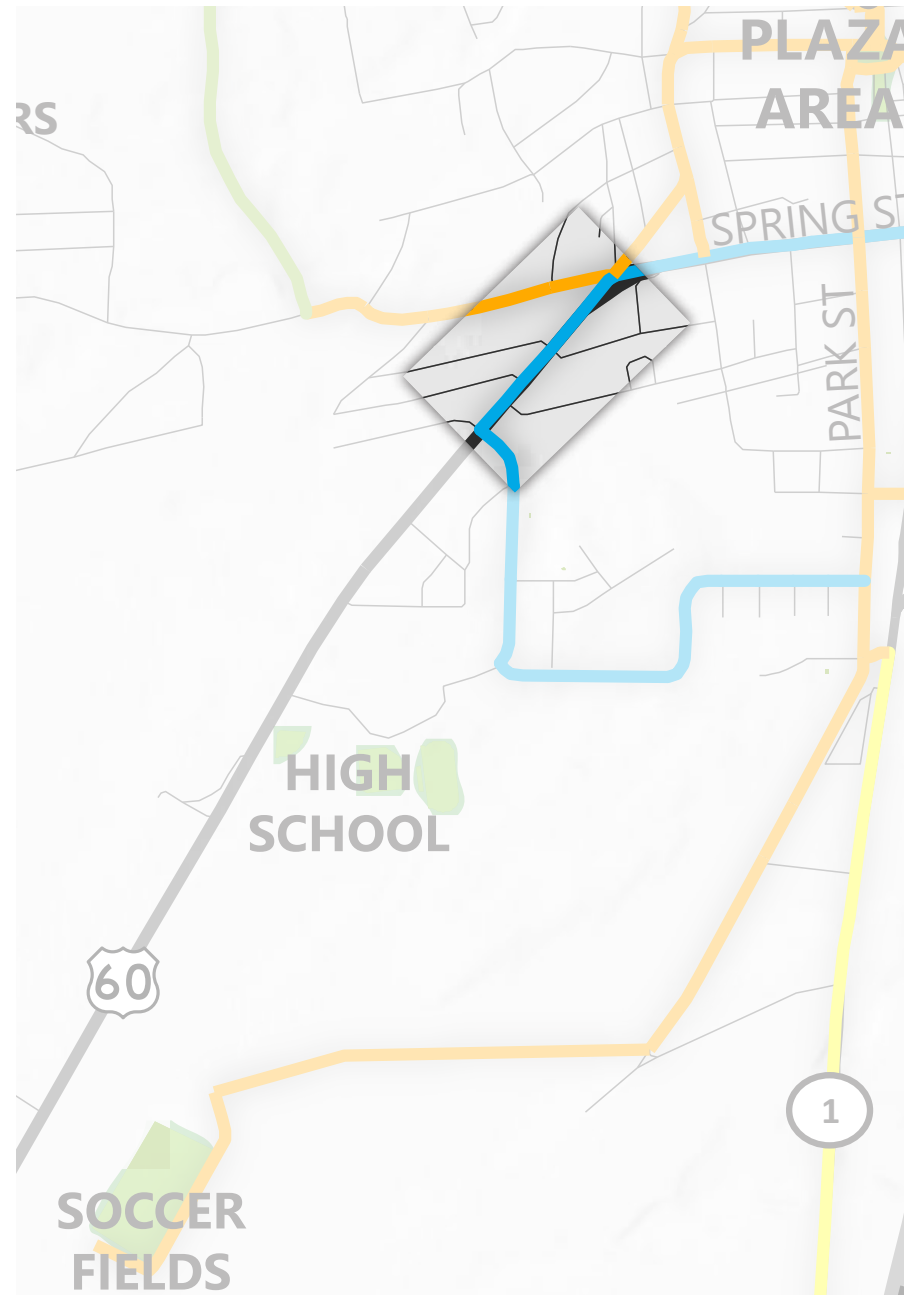
- Bike Lane
- Widened Shoulder
- Signage

Recommended Upgrades:

- Striped 4' bike lane in each direction from Spring Street to Michigan Avenue (1.25 miles total)
- Share-the-road signage informing motorists of bicycle and pedestrian presence; estimated 4 signs

Anticipated Cost:

- **Striped Bike Lanes:** \$112,000
- **Signage:** \$1,800
- **Total Estimated Cost:** **\$113,800**



Project 4: El Camino Real Improvements

Description: El Camino Real Street was identified during staff and stakeholder meetings, interviews, and the public outreach process as an important North-South corridor which could serve many locations throughout the City by bicycle or foot. While the ROW is designed to be consistent along the route, some sections offer limited space to provide on-street bicycle facilities due to existing residential parking or narrow roadway widths. Recommendations for El Camino Real include providing an on-street bike lane for the segment north of Bullock Avenue, and providing pavement markings and signage to the south. “Sharrow” pavement markings should be provided to alert both cyclists and pedestrians to share the road.

Facility Type:

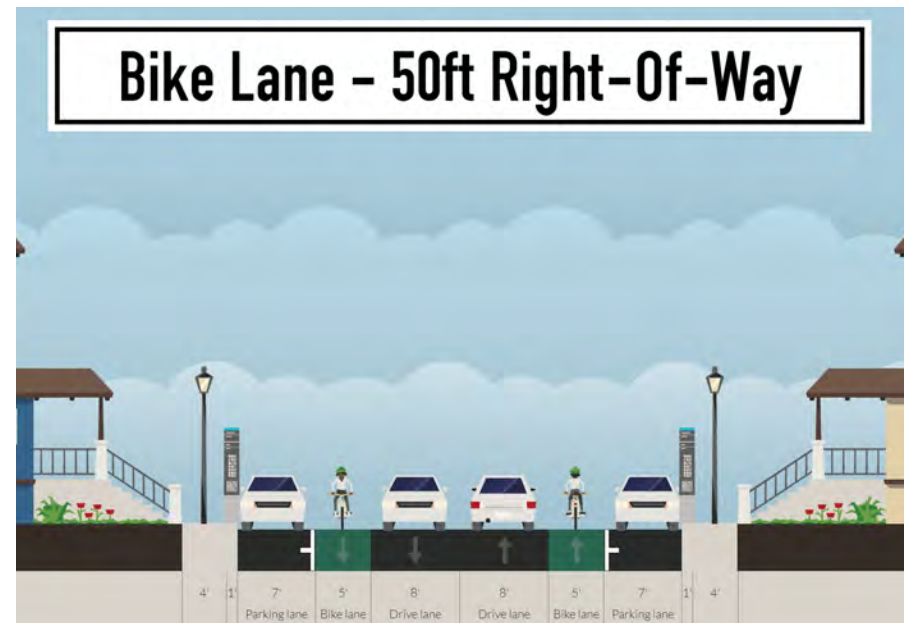
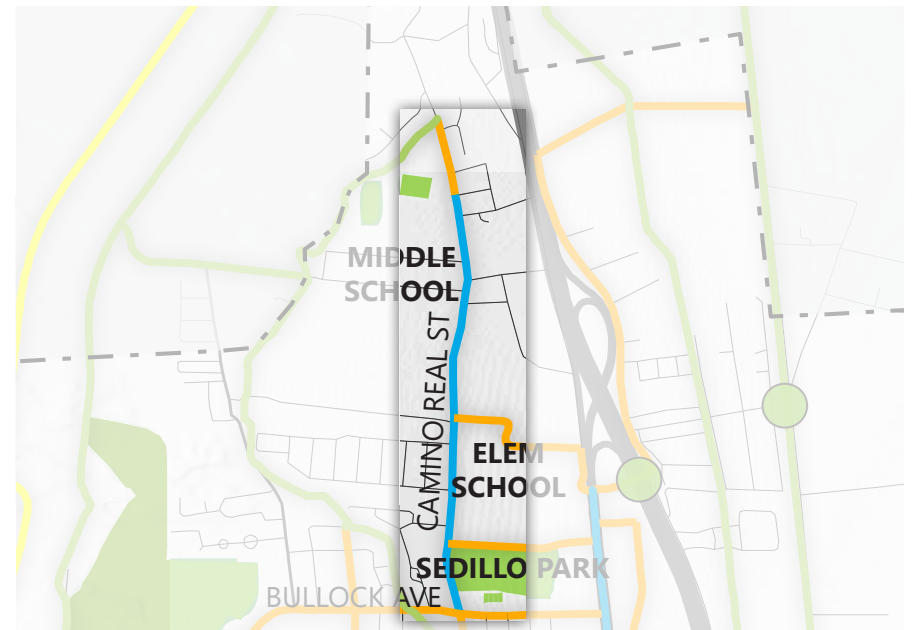
- Bike Lane
- Pavement Markings (Sharrow)
- Signage

Recommended Upgrades:

- Striped 4 to 5ft bike lane in each direction from the northern extent to Bullock Avenue (2.65 miles total)
- Share-the-road signage informing motorists of bicycle and pedestrian presence south of Bullock Avenue; estimated 20 signs
- Pavement “Sharrow” Markings, estimated 25 markings

Anticipated Cost:

- **Striped Bike Lanes:** \$238,000
- **Signage:** \$6,000
- **Pavement Markings:** \$4,500
- **Total Estimated Cost:** **\$248,500**



Project 5: Highway 1/California Street Improvements

Description: While many users did not identify California Street as a route they typically use on bike, some users reported riding in the shoulder to access popular destinations and connect to the East side of the City. The ROW along California Street is measured at 100ft and currently exists as a four-lane highway with right-and-left-hand turn lanes. Recommendations for California include providing a buffered, on-street bike lane for the segment south of Overpass and north of Spring Street, as well as wider sidewalk facilities and directional signage.

Facility Type:

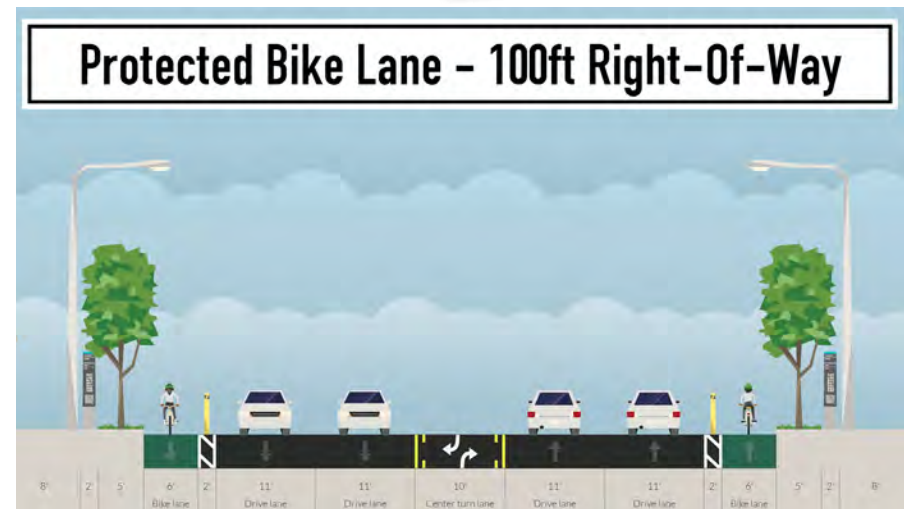
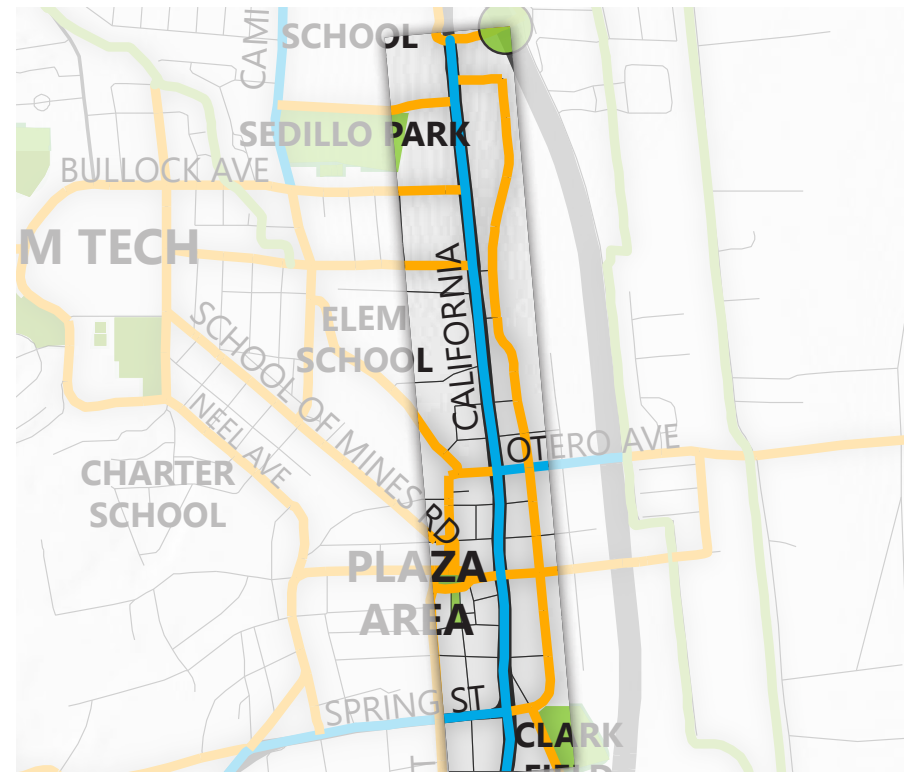
- Protected bike lane
- Wayfinding/directional signage

Recommended Upgrades:

- 6' bike lane in each direction with a 2' striped buffer from Overpass to Spring Street
- Wayfinding signage directing users to important destinations; estimated 15 signs

Anticipated Cost:

- **Buffered Bike Lanes:** \$280,000
- **Signage:** \$4,500
- **Total Estimated Cost:** **\$284,500**



Project 6: Otero Avenue Improvements

Description: Currently, cyclists and pedestrians utilize Otero Avenue as a safe interstate crossing to access the east side of the City, including trails into the Rio Grande River corridor. This project proposes formalized bike lanes and directional signage along Otero Avenue, in addition to signage currently in place, to aid in user access and connectivity between the east and west sides of the City.

Facility Type:

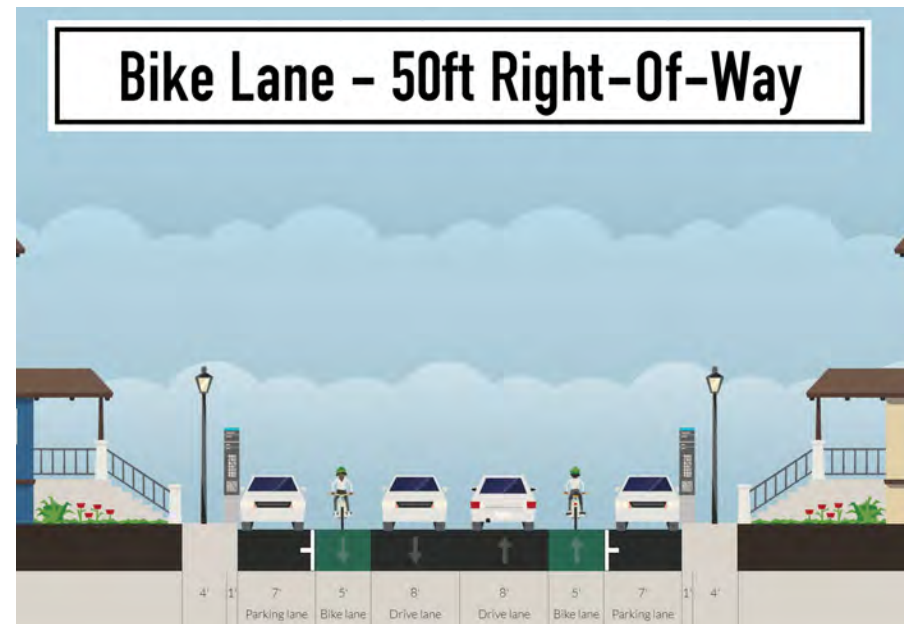
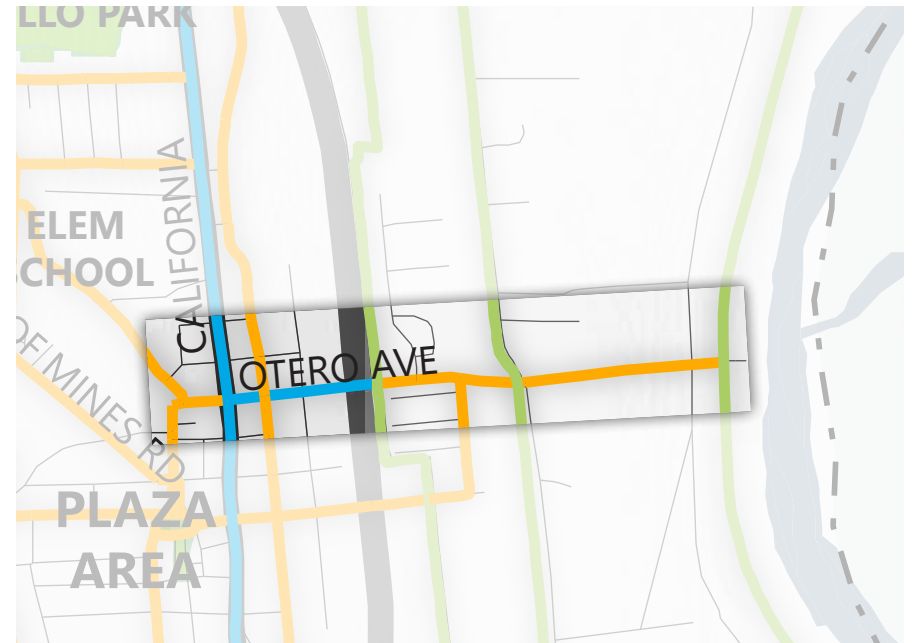
- Bike Lane
- Wayfinding/signage

Recommended Upgrades:

- 4' bike lane in each direction
- Share-the-road signage informing motorists of bicycle and pedestrian presence; estimated 14 signs

Anticipated Cost:

- **Bike Lanes:** \$144,000
- **Signage:** \$4,200
- **Total Estimated Cost:** **\$148,200**



Project 7: Manzanares Avenue Improvements

Description: In addition to Otero Avenue, cyclists and pedestrians utilize Manzanares Avenue as a safe interstate crossing to access the east side of the City, including trails into the Rio Grande River corridor. This project proposes similar facilities to Otero including formalized bike lanes and directional signage, in addition to signage currently in place, to aid in user access and connectivity between the east and west sides of the City.

Facility Type:

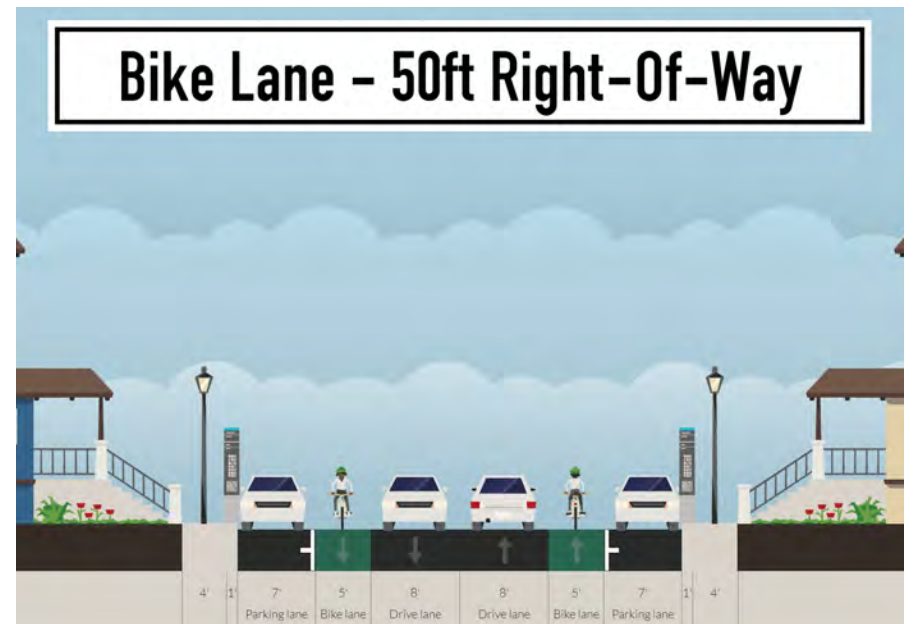
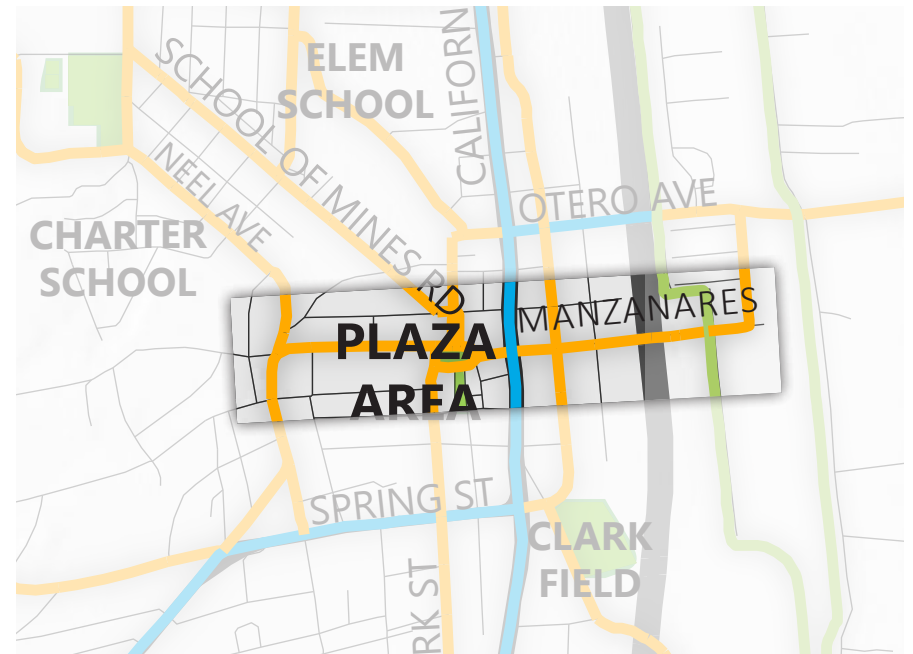
- Bike Lane
- Wayfinding/signage

Recommended Upgrades:

- 4' bike lane in each direction
- Share-the-road signage informing motorists of bicycle and pedestrian presence; estimated 8 signs

Anticipated Cost:

- **Bike Lanes:** \$72,000
- **Signage:** \$2,400
- **Total Estimated Cost:** **\$74,400**



Project 8: Spring Street Improvements

Description: Spring Street is currently a popular route for cyclists in the City as it provides a good east-west connection with ample ROW. The ROW along Spring Street is measured at 75ft and currently exists as a four-lane highway connector with a wide shoulder for vehicular parking. Recommendations for Spring include providing a buffered, on-street bike lane for the segment between Grant and California Streets, as well as wider sidewalk facilities and directional signage.

Facility Type:

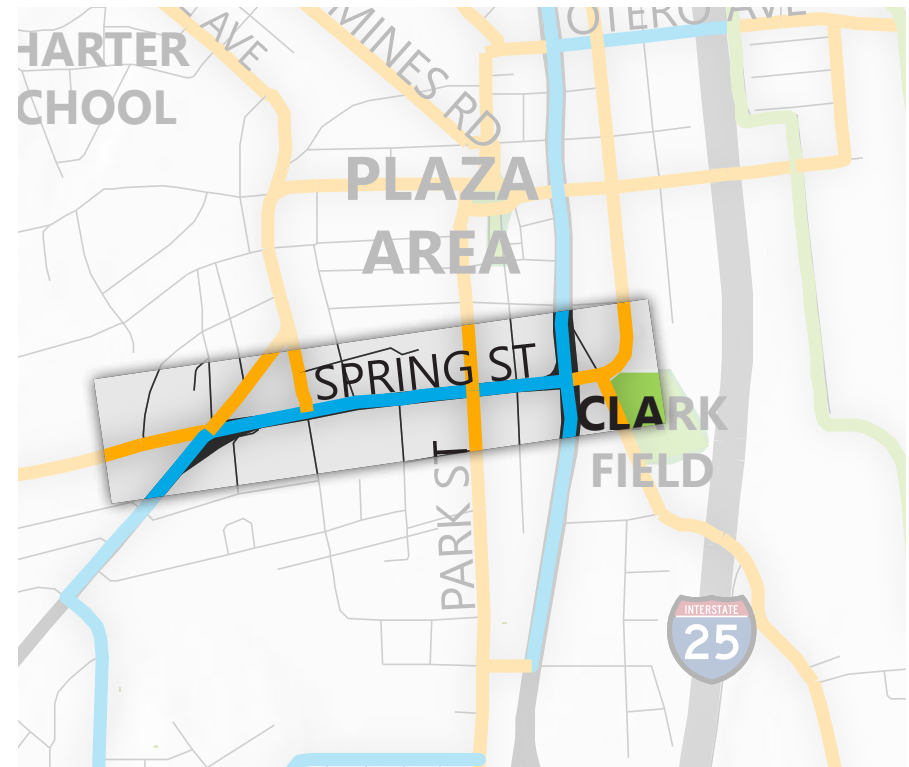
- Protected bike lane
- Wayfinding/directional signage

Recommended Upgrades:

- 6' bike lane in each direction with a 2' striped buffer from Grant to California Streets
- Wayfinding signage directing users to important destinations; estimated 6 signs

Anticipated Cost:

- **Buffered Bike Lanes:** \$100,000
- **Signage:** \$1,800
- **Total Estimated Cost:** \$101,800



Project 9: Water Crossings

Description: Currently users are reporting access issues at locations where off-street trails encounter ditch and/or arroyo crossings, and users are either forced to find an alternative route or cross using pipes, boards or walking at-grade across the waterway. One particular location was identified as “the pipes” where users are forced to cross a ditch using narrow pipes which can be tricky and difficult, especially during peak-flow season when the ditch is carrying water. These locations are in need of bridge crossings so users can safely utilize the proposed off-road trail system.

Facility Type:

- Grade-separated (bridge) crossing
- Wayfinding/directional signage where needed

Recommended Upgrades:

- 8’ wide bridges in areas with two-directional crossing with a 42” barrier railing for safety. See design standards earlier in this chapter for material guidance.
- Wayfinding signage directing users to important destinations if needed

Anticipated Cost: Bridges and crossing will vary. The average cost of a wooden bridge is approximately \$125,000, and the average costs of a pre-fabricated steel bridge is approximately \$206,000. See **Appendix B: Infrastructure Costs** for more details.



Top: A cyclist crossing on the “pipes” located east of I-25.

Bottom: A typical steel and wooden bridge crossing on a multi-use path.

Project 10: Off-Street Trails

Description: Currently, many users report utilizing off-street paths and roadways belonging to either the Middle Rio Grande Conservancy District or NM Tech as off-street trails for both commuting and recreational purposes. Map 6: Proposed Bicycle Network on page 40 shows the total proposed network of off-street trails that were developed during the public and stakeholder outreach process.

Recommended trails are to be designed with a minimum 10ft width to accommodate both bicycle and pedestrian traffic in two directions. Paved trails are recommended, however unpaved trails using materials such as crusher fines and gravel are acceptable.

Facility Type:

- Off-street trail
- Wayfinding signage
- Bridge crossings where needed (see Project 9)

Recommended Upgrades:

- 10' wide off-street trail either paved or unpaved (see design guidelines earlier in this chapter for additional guidance)
- Grade-separated bridge crossings where needed (see Project 9 for additional guidance)
- Wayfinding signage directing users to important destinations if needed

Anticipated Cost: Approximately \$3.1 million to complete all trail segments included in this plan (25 miles of trails).



Top: Existing conditions along a commonly used off-street path in Socorro.

Project 11: Bike Rack Program

Description: During the public outreach process, many participants noted an increased need for bicycle parking at popular destinations throughout the City. These destinations include public spaces such as schools and the plaza area as well as private companies such as WalMart. While the City can provide parking at public sites, partnerships with private entities will need to be created if the City wishes to donate or provide financial aid for bicycle parking (bike racks) on private property. Private partners may also chose to provide bicycle parking with their own funds, or work with community organizations such as Striders and Riders to help fund bicycle parking.

Facility Type:

- Bike rack

Anticipated Cost: Varies. According to research included in **Appendix B: Infrastructure Costs**, bike racks average around \$660 per rack.



Project 12: Sidewalk Program

Description: Sidewalks are an integral piece to public infrastructure, and are key to providing a truly complete transportation network. Many areas of the City are currently lacking when it comes to adequate sidewalk widths, or are missing sidewalk segments completely. Currently, the City does a good job on building sidewalks and bicycle infrastructure when re-designing roadway segments or paving new portions of roadways. A sidewalk enhancement program should be included in the City's Infrastructure Capital Improvements Program (ICIP), and sidewalk condition and connectivity should be evaluated annually.

Facility Type:

- Sidewalk

Recommended Upgrades: Evaluate sidewalk condition and provide new sidewalks or rehabilitate sidewalks where needed.

Anticipated Cost: Varies. New sidewalks cost around \$32 per linear foot.



Top: Example of publicly funded bike racks in Illinois.

Bottom: A rural street section with bicycle signage and sidewalks in New Jersey.

Project 13: Wayfinding

Description: Wayfinding is a critical part of a successful and complete bicycle network. Wayfinding signs exist in the form of directional and confirmation signs to help users find their way along the network, get to key destinations and confirm they are riding on appropriate bicycle routes. Currently, the City has partnered with local organizations like Healthy Kids Socorro to provide basic wayfinding signs on various routes across the City. This plan recommends continuing the trend by providing additional wayfinding signs along the proposed facilities identified in Map 6: Proposed Bicycle Network. Applicable public destinations, such as schools, libraries and other public services, should be listed on the signs with applicable mileage and/or travel times in minutes. Typically, private businesses are not listed on signs unless they financially partner with the City to provide wayfinding signs.

Facility Type:

- Directional Signs
- Pavement Markings
- Confirmation Signs

Recommended Upgrades: Evaluate bicycle routes as they are implemented for signage needs. Specific projects included in this document list an estimate of the number of signs needed. An evaluation of existing routes should also be conducted to determine existing signage needs.

Anticipated Cost: Varies. For planning purposes, this document estimates typical roadside directional signs at \$300 each. Additional cost estimates are included in **Appendix B: Infrastructure Costs**.



Existing wayfinding and share the road signage in Socorro.

MAINTENANCE

The facilities recommended in this plan are prone to damage caused by environmental conditions and deterioration caused by use. Maintaining the various elements in this plan in good condition is an essential part of providing access to public ROW and ensuring users have access to a safe bicycle and pedestrian transportation system. Sidewalks, trails and on-road bicycle facilities in poor condition can limit access and threaten the health and safety of cyclists and pedestrians alike, and force users to travel in the street which can lead to accidents and general safety concerns. Typically, pedestrians and cyclists report maintenance issues to local authorities or City staff. It is recommended that staff continue to engage the public in reporting maintenance issues, and that an action plan for identifying and fixing general maintenance and safety issues is pursued.

Assessing the bicycle and pedestrian system should be an integral part of standard City procedures. A survey program to identify sidewalk, trail and on-street bicycle facility conditions should be implemented and continually maintained to keep facilities in good condition. This could be included in the City's Capital Improvements Program as ongoing maintenance, and regular City staff should be directed towards maintaining an inventory of facility condition. This could be combined with general street maintenance activities to streamline the process. Staff inspection includes checking sidewalks for conditions that could inhibit access such as cracks, crumbling surfaces, tree root damage, settled areas and noncompliant driveway crossing; checking bicycle lane for striping condition, debris and cracks or uneven surfaces in the pavement; inspecting multi-use trails for cracks, settled areas, debris, litter and signage compliance; and checking roadways for general maintenance issues including striping, signage, pavement condition and debris along shoulders and the edges of roadways.

RESOURCES AND PROGRAMS

New Mexico Tech Bicycle Club

The bike club at New Mexico Tech offers a common location with tools and maintenance equipment where members of the college community and

residents of Socorro can perform basic maintenance on bicycle and related equipment. The club is run by volunteers who are available to assist users with basic maintenance activities, and who are capable of performing bicycle advocacy and education concerning safety and ridership training programs. The NM Tech bike club can offer the following resources to aid in implementation activities included in this plan:

- Offering weekly bicycle repair sessions and assistance with bicycle maintenance at little to no cost to users;
- Offering a fleet of bicycles available for rental to students and campus visitors; and
- Availability to assist with ridership and safety training

Healthy Kids Socorro

Healthy Kids Socorro assists with planning, project implementation and education centered around providing healthy alternatives to students in Socorro. The organization assists with planning for trails, Safe Routes to Schools, parks, and aims to strengthen school district policies and programs to implement healthy lifestyles. Healthy Kids Socorro can offer the following resources to aid in implementation activities included in this plan:

- Trail and route planning to schools and neighborhoods that serve school-aged populations;
- Promoting walking and bicycling to schools;
- Community engagement and collaboration with other public and private entities including the school districts and local businesses;
- Providing health-based programs in schools throughout Socorro City and County;
- Cooperating in a bicycle lending program that provides a limited number of bicycles to school-aged children for use during breaks and after school activities; and
- Coordinating with a local school health council.

New Mexico Department of Transportation

The New Mexico Department of Transportation (NMDOT) provides planning and funding assistance to communities wishing to establish a network of bicycle and pedestrian facilities, programs and policies in the following capacity:

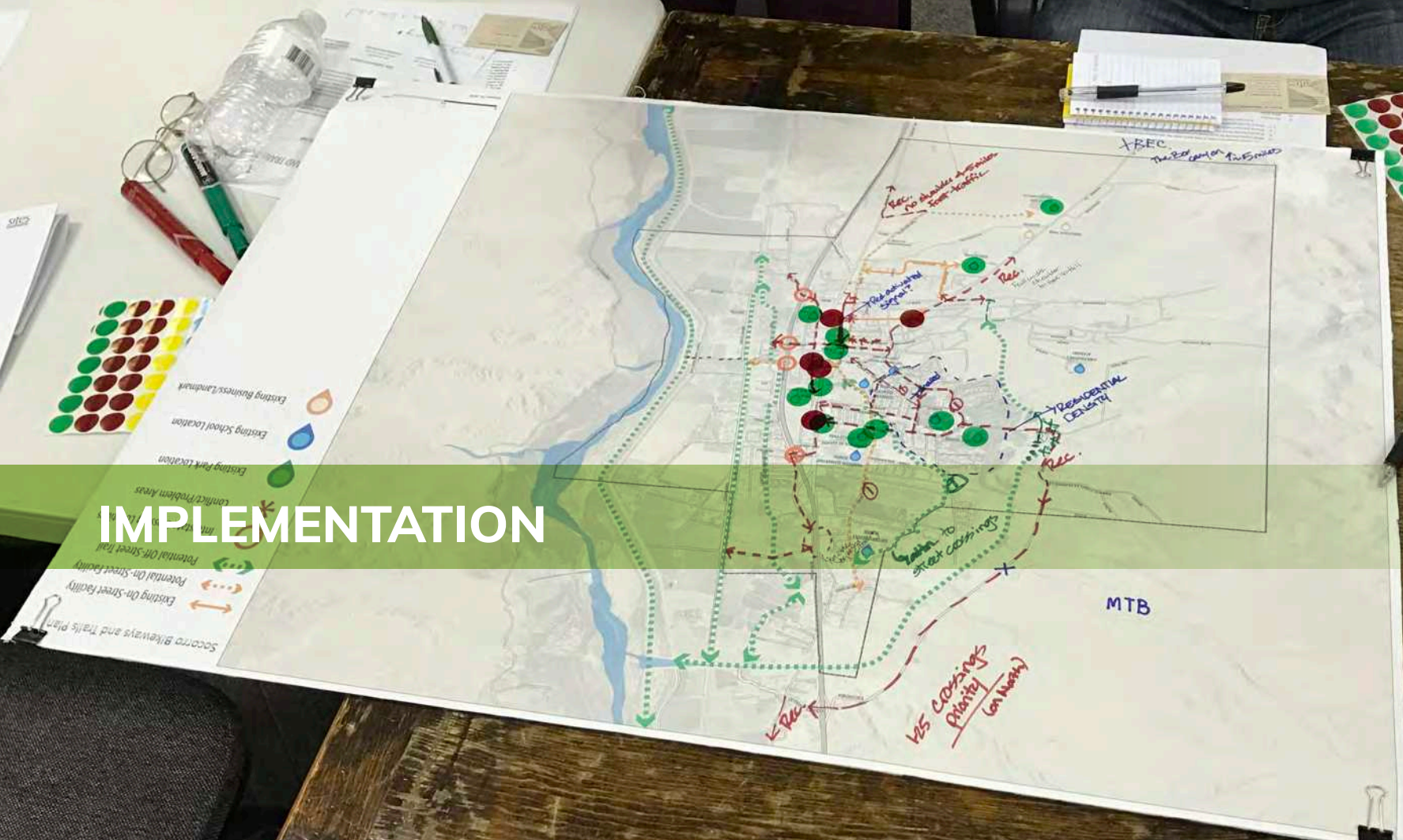
- Providing a call for projects to receive federal and state funding (included in this section) every two years;
- Providing assistance through the Safe Routes to Schools (SRTS) program;
- Data collection and analysis including crash and safety data;
- Project mandates to consider bicycle and pedestrian infrastructure in every state transportation project; and
- Coordination with regional and local governments in transportation planning.

South Central RTPO

The South Central RTPO provides planning and funding assistance to member communities in the following capacity:

- Assisting with grant writing and funding at the state level;
- Incorporating bicycle and pedestrian policies into their long-range planning efforts;
- Coordinating project programming with state and local governments;
- Assistance with information gathering on project costs and assistance in funding application processes, including the DOT's call for project process; and
- Funding research through a league established by the SCRTPO.

IMPLEMENTATION



TRAILS PLAN

SITES PARTNERSHIP

Trail connections
to existing trails and other green spaces
should be identified and integrated into the
plan. This includes identifying potential
connections to existing trails and other
green spaces, and identifying potential
connections to existing trails and other
green spaces.

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green spaces should be identified and
integrated into the plan. This includes
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CHAPTER 5

IMPLEMENTATION

Project included in the previous section of this plan will benefit cyclists and pedestrian in the City of Socorro over the next five-to-ten years. Without implementation, this plan would simply sit on a shelf and never become reality. The City relies on resources included in the following section, and on funding sources included in Appendix A: Funding Sources to successfully implement projects, programs and policies, and to ensure the bicycle and pedestrian system in Socorro is sustained for years to come.

NETWORK PHASING & PRIORITIES

Projects included in the previous chapter were prioritized in terms of need based on feedback received during the public outreach process. The projects with the highest need and public attention are:

- Project 1: I-25 @ Overpass Upgrades
- Project 2: Spring Street 5-Points Intersection
- Project 9: Water Crossings
- Project 11: Bike Rack Program
- Project 12: Sidewalk Program

These projects also represent a wide range of costs and span from short-term to long-term implementation. While these projects were important to members of the public and stakeholders, there are other “low hanging fruit” projects the City could work on implementing until funds become available to implement priority projects. These “low hanging fruit” projects include those with cost estimates under \$150,000:

- Project 1: I-25 @ Overpass Upgrades
- Project 3: Highway 60 Improvements
- Project 6: Otero Avenue Improvements
- Project 7: Manzanares Avenue Improvements
- Project 8: Spring Street Improvements
- Project 11: Bike Rack Program
- Project 13: Wayfinding

See Table 3: Prioritized Project Listing for more information on project priority, timeline, applicable funding sources, and cost estimates. Keep in mind cost estimates are based on research included in Appendix B: Infrastructure Costs, and may vary due to construction costs and material costs and availability. More information on financing sources listed in Table 3 can be found in Appendix A: Funding Sources.

COST ESTIMATES

A table of infrastructure cost by type can be found in Appendix B: Infrastructure Costs.

The projects outlined in this plan are intended to best serve bicyclists and pedestrians while traveling around Socorro. To address the financing of these projects, the City will have to use creative financing strategies that leverage fiscal resources from various sources. It should also be kept in mind that securing funds and executing financing arrangements may require additional staff capacity and/or training.

FINANCING

Municipal Investment

Direct investment of City funds in the bicycle and pedestrian transportation system is a necessary financing source for project implementation. An agreement to contribute public funds to a project ensures public buy-in and that investments will be protected by the City over time. However, with a limited City budget, direct investment may be limited to specific projects that can demonstrate a direct public benefit. The City may consider direct investment through matching funds for State and Federal grants, and through utilizing City owned ROW where applicable. Other direct investments could happen through Public-Private-Partnerships, and through Memorandums of Understanding with private partners for education, outreach, maintenance, donation and management of facilities.

Federal and State Funding Sources

Although the State is facing a new round of budget cuts, there is a possibility to seek state and federal funding sources through capital outlay and through appropriated grants. Grant funding sources may require a local match, and matching funds with local investment or private resources may increase the likelihood for a project to be funded.

One source of community grants is the Community Development Block Grant (CDBG) Program, which provides planning, economic development,

Table 3: Prioritized Project Listing

#	Description	Priority	Implementation	Funding Source(s)	Cost Estimate
1	I-25 @ Overpass Upgrades	High	Moderate	Local, State, Federal	\$75,000- \$80,000
2	Spring Street 5-Points Intersection	High	Moderate- Long	Local, State, Federal	\$1,500,000- \$2,000,000
3	Highway 60 Improvements	Medium	Moderate	Local, State, Federal	\$110,000- \$120,000
4	El Camino Real Improvements	Medium	Moderate	Local, State	\$240,000- \$250,000
5	Highway 1 / California Street Improvements	Medium	Moderate-Long	Local, State, Federal	\$280,000- \$290,000
6	Otero Avenue Improvements	Low	Short	Local, State	\$140,000- \$150,000
7	Manzanares Avenue Improvements	Low	Short	Local, State	\$70,000- \$75,000
8	Spring Street Improvements	Medium	Moderate	Local, State, Federal	\$100,000- \$110,000
9	Water Crossings	Medium-High	Short-Long	Local, State, Private	Varies
10	Off-Street Trails	Medium	Short-Moderate	Local, State, Private	\$3,000,000- \$3,100,000
11	Bike Rack Program	High	Ongoing	Local, State, Private	Varies
12	Sidewalk Program	High	Ongoing	Local, State, Private	Varies
13	Wayfinding	Medium	Per Project / Ongoing	Local, State, Private	Varies
				Total:	\$5,515,000 - \$6,175,000

and public infrastructure financing. Funds are administered by the New Mexico Department of Finance and Administration, with a \$500,000 grant limit per applicant, and a demonstration that the funds will lead to private investment in lower income areas is a primary objective.

The typical source for transportation funding is through the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA). Appropriations for each state are determined through the current Surface Transportation Act determined by congress. The current reauthorization, the Fixing America's Surface Transportation (FAST) Act, was approved in 2015 and includes many of the same funding sources and requirements established under the Moving Ahead for Progress in the 21st Century (MAP-21) Act before it. Generally, population based formulas are used to determine the Statewide and MPO appropriations. The following funding sources are currently being utilized under the FAST Act and are administered by the Federal Highway Administration (FHWA).

Charitable Grants & Donations

Given declining state revenues, the City may wish to seek out other sources of funding for project and program implementation, including private donations. There are many grant funding and other entities in the State, and nationally, that may help pay for public improvements, and non-profit operations. Most of these grants are submitted on behalf of a non-profit or municipality, although some are project or business specific. Although these grants may not cover the entire project cost, they may help provide matching funds and facilitate projects that would not receive funding otherwise. The City could benefit from developing grant writing capacity, as well as utilizing non-profit organizations and regional entities, such as Healthy Kids Socorro and the South Central RTPO, for aid in grant writing. A further option is to seek smaller scale, crowdfunded donations, sponsorships, and host fundraising activities. Specific funding sources are included in Appendix A.

APPENDICES



Appendix A

FUNDING SOURCES

LOCAL FUNDING SOURCES

L-1. General Obligation Bonds/General Funds

Agency: City of Socorro

Type: Capital Outlay

Description: The City of Socorro may choose to fund infrastructure costs using the City's existing general fund or by issuing new bonds to pay for capital improvements.

L-2. Capital Improvements Program (CIP) Bonds

Agency: City of Socorro

Type: Revenue Bonds

Description: CIP Bonds are used to undertake projects such as building roads, parks, and other necessary improvements to the City.

L-3. Gross Receipts Tax (GRT)

Agency: City of Socorro, Socorro County

Type: Tax

Description: GRT is collected by: selling property in New Mexico; leasing or licensing property employed in New Mexico; granting a right to use a franchise employed in New Mexico; performing services in New Mexico; and selling research and development services performed outside New Mexico, the product of which is initially used in New Mexico. The current GRT tax rate from July 2016-December 2016 for the City of Socorro is 7.0625% and 6.0000% for the Socorro Industrial Park. GRT can be used for operating and improvement fees.

L-4. Lodgers Tax

Agency: City of Socorro

Type: Tax Funds

Description: The City may use the existing lodgers tax for promotion to visitors.

L-5. Municipal Infrastructure Gross Receipts Tax

Agency: City of Socorro

Type: Additional Tax Funds

Description: The City can impose a maximum municipal infrastructure gross receipts tax of one-quarter percent (.25%). The tax can be implemented by adoption of one or more ordinances in tax rate increments of one-sixteenth percent, and proceeds can be dedicated to various infrastructure improvements or to repay obligation bonds.

L-6. Municipal Capital Outlay Gross Receipts Tax

Agency: City of Socorro

Type: Tax Funds

Description: The City can impose a maximum municipal capital outlay gross receipts tax of one-quarter percent. Proceeds from the tax may be dedicated to any municipal infrastructure purpose or for the payment of gross receipts tax revenue bonds for infrastructure purposes.

STATE FUNDING SOURCES

ST-1. Transportation Alternatives Program

Agency: NMDOT

Type: Capital Outlay

Description: The New Mexico Transportation Alternatives Program (TAP) is a Federal-Aid funding program. TAP funds can generally be used for bicycle and pedestrian infrastructure and activities, in addition to other projects, related to economic development, increased safety, and increased accessibility. NMDOT has a competitive process to afford TAP funds, based on how well each project proposal addresses the needs of the program.

ST-2. Cooperative Agreements Program

Agency: NMDOT

Type: Capital Outlay

Description: NMDOT sets aside money each year for local government road improvements. This program assists local governments to improve, construct, maintain, repair, and pave highways and streets with matching funds from NMDOT.

ST-3. Small Cities Community Development Block Grants (CDBG)

Agency: New Mexico Department of Finance and Administration

Type: Community Grant

Description: CDBG can be used to fund planning projects and the construction of public buildings, community facilities, infrastructure and housing. Funds are administered by the New Mexico Department of Finance and Administration, with a \$500,000 grant limit per applicant. There is a local match requirement of 5%.

ST-4. The Public Project Revolving Fund (PPRF)

Agency: New Mexico Finance Authority (NMFA)

Type: Community Loan

Description: The PPRF is an up to \$200,000 revolving loan fund that can be used to finance public infrastructure projects, fire and safety equipment, and public buildings. Both market rate based loans and loans to disadvantaged communities at subsidized rates are made from PPRF funds. Such funds could be used for larger infrastructure projects in the future.

FEDERAL FUNDING SOURCES

FS-1. National Highway System (NHS)

Agency: NMDOT

Type: Federal Aid Grant

Description: Funds used to construct and maintain urban and rural roadways designated as part of the NHS, such as I-25 and US 84/85.

FS-2. Surface Transportation Program Block Grant (STPBG)

Agency: NMDOT, South Central Rural Transportation Planning Organization (SCRTPO)

Type: Federal Aid Grant

Description: Funds that can be used to construct and maintain all Federal-Aid roadways, NGS roadways, and bridge projects. This is the most flexible of the federal funding sources.

FS-3. Highway Bridge Program

Agency: NMDOT

Type: Federal Aid Grant

Description: Funding to replace or rehabilitate deficient highway bridges and to perform preventative maintenance.

FS-4. Highway Safety Improvement Program (HSIP)

Agency: NMDOT

Type: Federal Aid Grant

Description: Designated funding through each state's Congressional Delegation for specific projects identified in the FAST Act.

PRIVATE FUNDING SOURCES, CHARITABLE GRANTS AND LOANS

CH-1. Sponsorships

Agency: Miscellaneous

Type: Donation

Description: Although they may often be considered insubstantial or time consuming, sponsorships from local businesses including banks, large retail chains, and other donors can be an effective way to raise money for small scale projects. Often, this is enough to fund bicycle parking racks, signage or small scale pavement markings. Socorro could also seek sponsors for outreach and advocacy events in the future.

CH-2. Crowdfunding

Agency: Miscellaneous

Type: Donation

Description: Crowdfunding is a way for individuals from around the world to pool their assets to fund projects or organizations they support. Most crowdfunding relies on internet platforms that allow donors to connect with projects they are interested in funding. Crowdfunding can be used to support a wide variety of projects that individuals feel are worthy of funding, including many of smaller scale projects such as bicycle parking racks, signage or small scale pavement markings. Although donations amounts vary, they can be used as a supplement to larger funding sources. In some cases, these efforts can also be the impetus to moving a conceptual project to one that can actually be implemented.

CH-3. McCune Foundation Grants

Agency: McCune Charitable Foundation

Type: Community and Organization Grants

Description: The McCune Charitable Foundation awards grants to communities, non-profits, public schools, and government agencies that are engaged in community-based projects related to the Foundation's nine foundational priorities. This includes projects that build capacity in

the nonprofit sector, promote economic development, education and childhood development, health care, local food, the arts and community engagement, natural resources, urban design, and rural development are all considered. The average grant award is \$15,000, with some as large as \$25,000.

CH-4. NM True Event Funds

Agency: New Mexico Tourism Department

Type: Small Scale Grant

Description: The Tourism Department knows that events, especially large-scale, unique events that showcase New Mexico's culture drive visitors to our state. The NM True event scholarship program helps communities and organizations promote their annual events.

Appendix B

INFRASTRUCTURE COSTS

The following infrastructure costs were included in a report conducted by the Federal Highway Administration (FHWA) in October, 2013. The report can be accessed online at: http://www.pedbikeinfo.org/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf

Table 4: Infrastructure Costs

Infrastructure Description	Minimum Cost	Maximum Cost	Average Cost	Cost Unit
Bike Facilities				
Bicycle Locker	\$1,280	\$2,680	\$2,090	Each
Bicycle Rack	\$64	\$3,610	\$660	Each
Bicycle Lane	\$5,360	\$536,680	\$89,470	Mile
Signed Bicycle Route	\$5,360	\$64,330	\$25,070	Mile
Signed Bicycle Route with Improvements	\$42,890	\$536,070	\$239,440	Mile
Traffic Calming				
Chicane (traffic calming)	\$2,140	\$25,730	\$9,960	Each
Curb Extension / Choker / Bulb-Out	\$1,070	\$41,170	\$13,000	Each
Diverter	\$10,000	\$51,460	\$26,040	Each
Partial / Semi Diverter	\$5,000	\$35,000	\$15,060	Each
Median Island	\$2,140	\$41,170	\$13,520	Each
	\$2.28	\$26	\$10	Square Foot
Median	\$1.86	\$44	\$7.26	Square Foot
Raised Crosswalk	\$1,290	\$30,880	\$8,170	Each
Raised Intersection	\$12,500	\$114,150	\$50,540	Each
Roundabout / Traffic Circle	\$5,000	\$523,080	\$85,370	Each
Speed Hump	\$690	\$6,860	\$2,640	Each
Speed Bump	\$540	\$2,300	\$1,550	Each
Speed Table	\$2,000	\$4,180	\$2,400	Each

Table 4: Infrastructure Costs

Infrastructure Description	Minimum Cost	Maximum Cost	Average Cost	Cost Unit
Pedestrian Accommodations				
Bollard	\$62	\$4,130	\$730	Each
Wheelchair Ramp	\$89 \$3.37	\$3,600 \$76	\$810 \$12	Each Square Foot
Fence	\$17	\$370	\$130	Linear Foot
Gate	\$330	\$1,170	\$910	Each
In-Pavement Lighting	\$6,480	\$40,000	\$17,620	Total
Streetlight	\$310	\$13,900	\$4,880	Each
Wooden Bridge	\$91,010	\$165,710	\$124,670	Each
Pre-Fab Steel Bridge	\$41,850	\$653,840	\$206,290	Each
Railing	\$7.20	\$690	\$100	Linear Foot
Bench	\$220	\$5,570	\$430	Each
Trash / Recycle Receptacle	\$310	\$3,220	\$1,420	Each
Pedestrian Crossings and Paths				
High Visibility Crosswalk	\$600	\$5,170	\$2,540	Each
Striped Crosswalk	\$110 \$1.03 \$1.06	\$2,090 \$26 \$31	\$770 \$8.51 \$7.38	Each Linear Foot Square Foot
Asphalt Paved Shoulder	\$2.96	\$7.65	\$5.56	Square Foot
Asphalt Sidewalk	\$6.02	\$150	\$35	Linear Foot
Brick Sidewalk	\$12	\$160	\$60	Linear Foot
Concrete Paved Shoulder	\$2.79	\$58	\$6.64	Square Foot
Concrete Sidewalk	\$2.09	\$410	\$32	Linear Foot
Concrete Sidewalk + Curb	\$23	\$230	\$150	Linear Foot
Sidewalk Unspecified	\$14	\$150	\$45	Linear Foot
Multi-Use Trail- Paved	\$64,710	\$4,228,520	\$481,140	Mile
Multi-Use Trail- Unpaved	\$29,520	\$412,720	\$121,390	Mile

Table 4: Infrastructure Costs

Infrastructure Description	Minimum Cost	Maximum Cost	Average Cost	Cost Unit
Signals				
Flashing Beacon	\$360	\$59,100	\$10,010	Each
Rectangular Rapid Flashing Beacons	\$4,520	\$52,310	\$22,250	Each
Pedestrian Hybrid Beacon	\$21,440	\$128,660	\$57,680	Each
Pedestrian Detector (furnish and install)	\$68	\$1,330	\$390	Each
Push Button	\$61	\$2,510	\$350	Each
Audible Pedestrian Signal	\$550	\$990	\$800	Each
Countdown Timer Module	\$190	\$1,930	\$740	Each
Pedestrian Signal	\$130	\$10,000	\$1,480	Each
Signal Face	\$130	\$800	\$430	Each
Signal Head	\$100	\$1,450	\$550	Each
Signal Pedestal	\$490	\$1,160	\$800	Each
Signage				
Stop/Yield Sign	\$210	\$560	\$300	Each
Directional Sign	\$210	\$560	\$300	Each
Striping/Pavement Marking				
Advance Stop/Yield Line	\$77 \$4.46	\$570 \$100	\$320 \$10	Each Square Foot
Island Marking	\$0.41	\$11	\$1.94	Square Foot
Painted Curb / Sidewalk	\$0.44 \$1.05	\$12 \$10	\$3.40 \$3.06	Square Foot Linear Foot
Pedestrian Crossing	\$240	\$1,240	\$360	Each
Shared Lane / Bicycle Marking	\$22	\$600	\$180	Each
School Crossing	\$100	\$1,150	\$470	Each
Curb	\$1.05	\$110	\$21	Linear Foot
Curb and Gutter	\$1.05	\$120	\$21	Linear Foot
Gutter	\$10	\$78	\$23	Linear Foot