



Eagle Mountain Bicycle & Pedestrian Master Plan

JULY 2015





This Plan was prepared for Eagle Mountain City by Alta Planning + Design and Fehr & Peers, with funding and planning assistance from the Mountainland Association of Governments.





Shared-use path in The Ranches

Executive Summary: Introduction

Eagle Mountain is a growing and vibrant city in Utah County, Utah, with an estimated 2014 population of over 25,000, abundant developable land, convenient access to parks, and a family-friendly environment. Eagle Mountain is one of the fastest-growing communities in the state, having grown by more than 1000% since 2000. Due to the city's tremendous potential for growth and its desire to grow in a way that maximizes quality of life and preserves its unique character, the City has chosen to develop the Eagle Mountain Bicycle & Pedestrian Master Plan.

This Plan formalizes a vision for a safe, efficient, and connected network of sidewalks, bikeways, paths, and trails that will grow with the City and improve quality of life for all residents.

Goals

NETWORK & FACILITY PLANNING

- Develop a diverse network of pedestrian pathways and bikeways that serve people of all ages and abilities
- Develop safe and efficient facilities that meet current industry standards
- Plan for the seamless integration of a comprehensive bicycle and pedestrian system with existing and future development.
- Plan for connectivity to regional destinations beyond Eagle Mountain city limits.

FUNDING

- Identify, track, and pursue a variety of funding sources to implement, renovate, and maintain Eagle Mountain's bicycle and pedestrian system.
- Encourage, incentivize, and require new development to participate in the advancement of a robust bicycle and pedestrian system.

PROGRAMS, EDUCATION, & ENCOURAGEMENT

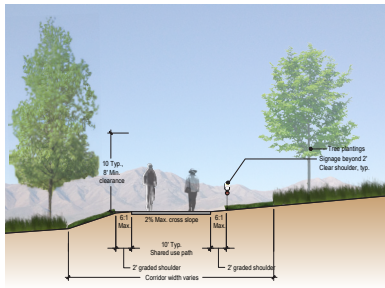
- Promote pedestrian and bicycle safety and awareness through education and encouragement activities.
- Leverage and support the existing number of Eagle Mountain school children walking and bicycling to school through enhanced Safe Routes to School programming.

Executive Summary: Plan Organization



Main Document: Eagle Mountain Bicycle & Pedestrian Master Plan

- Vision & Goals
- Introduction
- Public Involvement
- Existing System
- Recommendations
- Implementation
- Maintenance
- Funding



Appendix A: Bicycle & Pedestrian Facility Design Standards

- Roadway Cross Sections
- Intersection Design
- Bicycle Parking Design
- Path Design
- Crossing Design & Application



Appendix B: Project Information

- Individual Project Details for Shared-use Paths, On-Street Bikeways, and Spot Improvements
- Prioritization
- Phasing
- Cost Estimates



Appendix C: Bicycle Parking Generation Code Language

- City Code Language
- Definitions of Short and Long Term Bicycle Parking
- Required Spaces per Land Use

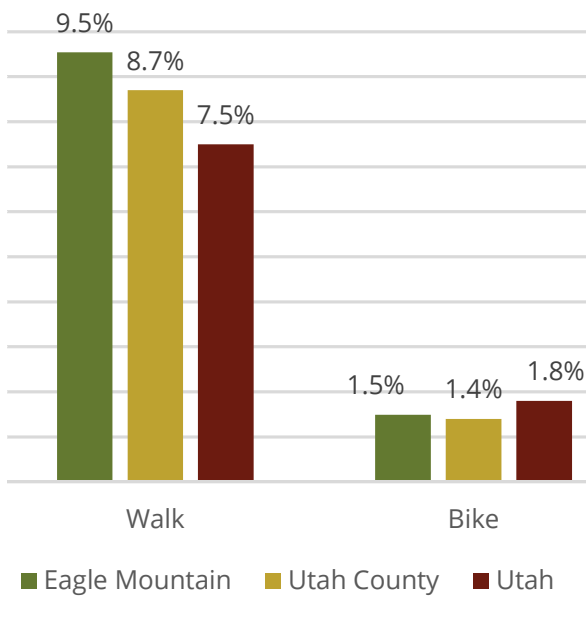
Executive Summary: Existing Conditions

Core Principles of the Plan



How Much Are People Walking & Biking?

According to the Utah Travel Study, which was performed in 2012, **Eagle Mountain residents walk and bike more than their Utah County counterparts**, and walk more and bike only slightly less than the statewide averages.



In What State is Our Existing System?

Eagle Mountain has an impressive **34-mile shared-use path network** within city limits. However, sporadic development patterns have also created inconsistencies within the bicycle and pedestrian network and have ultimately led to a lack of connectivity between some Eagle Mountain neighborhoods, schools, parks, and churches. The core principle "Refining the Existing System" seeks to define walking and bicycling improvements that can enhance or optimize the active transportation network as it exists today.

What Prevents People from Walking & Biking More?

Responses from the Utah Travel Study also indicate that **barriers or gaps in the existing system have to do more with lack of or incomplete infrastructure along roadways, sidewalks, or paths**, rather than unmaintained infrastructure, though improving maintenance was a common suggestion heard from the public throughout the planning process.

Crashes Involving Bicyclists, Pedestrians, and Motorists

11

CRASHES INVOLVING BICYCLISTS

10

CRASHES INVOLVING PEDESTRIANS

33% OF THESE CRASHES OCCURED DURING **PEAK COMMUTE TIME**

50% OCCURRED AT **DUSK OR AT NIGHT**

0 **INCAPACITATING OR FATAL INJURIES RELATED THESE CRASHES**

Executive Summary: Public Outreach

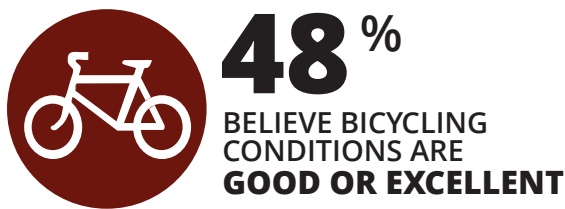
Purpose & Methodology

In order to determine the needs of current and possible users of the walking and bicycling system, multiple public outreach efforts were conducted during the course of the development of this Plan to collect input from residents, visitors, and people who work in Eagle Mountain. More than 400 people, almost all of which lived in Eagle Mountain, participated via various methods:

- Interactive Mapping Tool
- Online Public Survey
- Two Open Houses (November & April)

Types of Bicyclists

80% of Eagle Mountain survey respondents self-identified as enthused and confident about bicycling or interested but concerned about traffic and other safety issues. One of the purposes of this Plan is to create a network of facilities and supportive programs that are accessible and appealing to this under-served majority of the population.



MOST IMPORTANT BIKING PRIORITIES



ON-STREET BIKE
FACILITIES



MAINTENANCE OF
EXISTING FACILITIES



GREATER SEPARATION
BETWEEN ROADS & PATHS

MOST IMPORTANT WALKING PRIORITIES



SAFE ROUTES TO
SCHOOL IMPROVMENTS



CONNECTIVITY
TO PARKS & REC



NEW SIDEWALKS
& CROSSWALKS



CONNECTIVITY TO
CIVIC & RELIGIOUS CENTERS



INCREASED
ENFORCEMENT

Executive Summary: Recommendations

Programs & Policies

Facility recommendations, like painted bike lanes and paved paths, are supported by programs and policies that encourage and educate with the objective of having more people walking and bicycling. Programs and policies recommended in Chapter 4 fall under several categories:

- Safe Routes to School comprehensive program
- Safety
- Wayfinding & trip planning
- Economic & community development
- Reporting
- End-of-trip support facilities, like bicycle parking (see also Appendix C)

Facilities

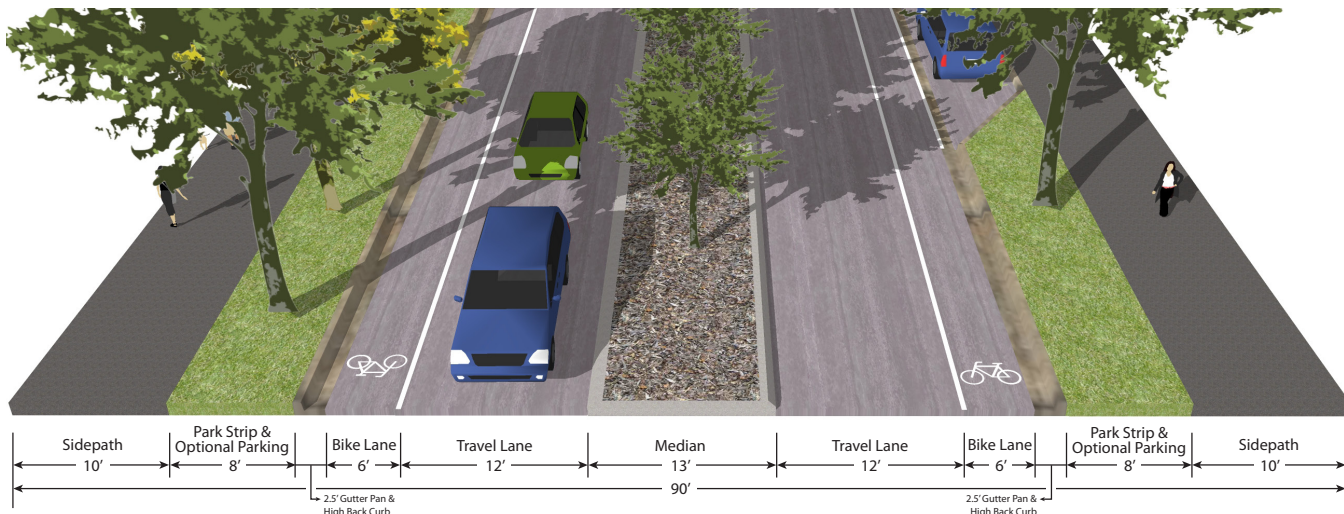
The facility recommendations in the Plan fill gaps where they exist, standardize roadway cross sections and facility design (see Appendix A and below), improve connectivity and safety for Eagle Mountain's youth, establish a maintenance plan, and expand and improve the overall system as development occurs. Recommended facilities include off-street paths, on-street bikeways (like bike lanes), and spot improvements (like signals and crossing improvements).

Implementation

Not all of the recommended facilities can be implemented all at once, either because of lack of adequate budgets, political support, or other factors. To assist planners and decision-makers, the Plan establishes prioritization criteria to determine the most important projects, including how much the project improves safety, proximity to schools, approximate cost, if it fills an existing gap, and if it connects existing and/or recommended facilities. Near, mid, and long-term implementation strategies also help guide the development of the recommendations found in the Plan.

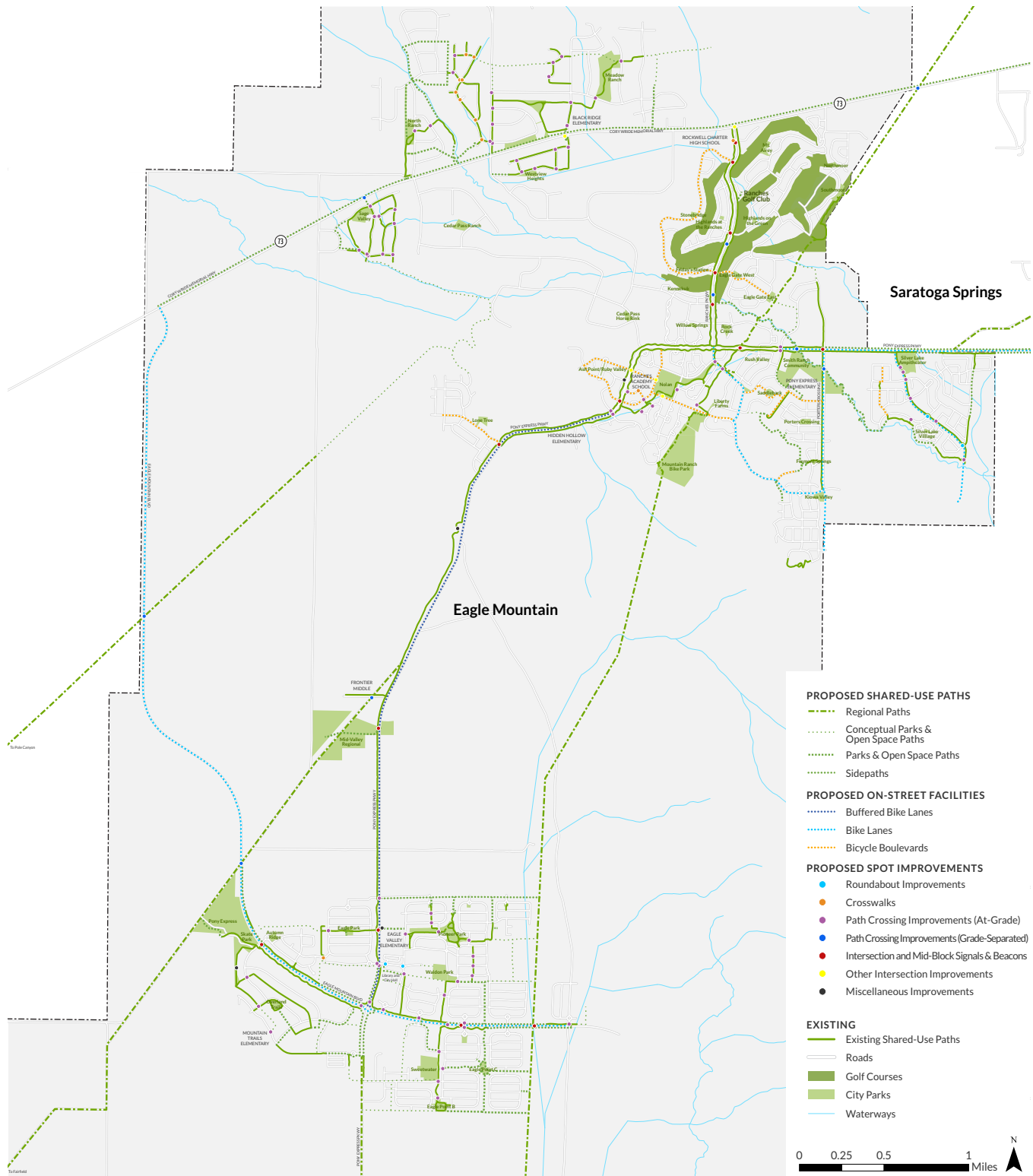


Golden Eagle Drive with proposed bike lanes and improved crossing



Major Collector Street cross section (based on the Eagle Mountain Transportation Master Plan)

Executive Summary: Citywide Existing & Proposed Bicycling & Walking System



ES-6 | EAGLE MOUNTAIN

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The project team is especially grateful to the hundreds of residents who participated by providing original ideas and feedback during both public open houses, the online survey and interactive mapping tool, and Planning Commission and City Council public hearings.

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Vision & Goals

*The Eagle Mountain Bicycle & Pedestrian Master Plan formalizes a **vision** for a safe, efficient, and connected network of sidewalks, bikeways, paths, and trails that will grow with the City and improve quality of life for all residents.*

Network & Facility Planning

- *Develop a diverse network of pedestrian pathways and bikeways that serve people of all ages and abilities*
- *Develop safe and efficient facilities that meet current industry standards*
- *Plan for the seamless integration of a comprehensive bicycle and pedestrian system with existing and future development.*
- *Plan for connectivity to regional destinations beyond Eagle Mountain city limits.*

Funding

- *Identify, track, and pursue a variety of funding sources to implement, renovate, and maintain Eagle Mountain's bicycle and pedestrian system.*
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Programs, Education, & Encouragement

- *Promote pedestrian and bicycle safety and awareness through education and encouragement activities.*
- *Leverage and support the existing number of Eagle Mountain school children walking and bicycling to school through enhanced Safe Routes to School programming.*



Shared-use path in The Ranches

1: Introduction

About the Plan

Eagle Mountain is a growing and vibrant city in Utah County, Utah. With an estimated 2014 population of over 25,000, Eagle Mountain could be considered a small city, however, abundant developable land, convenient access to parks, and a family-friendly environment has made Eagle Mountain one of the fastest-growing communities in the state. Eagle Mountain has already grown by over 1000% since 2000 (when the population was 2,157).

Due to the city's tremendous potential for growth and its desire to grow in a way that maximizes quality of life and preserves its unique character, the City has chosen to develop the Eagle Mountain Bicycle & Pedestrian Master Plan. This document will guide the development of Eagle Mountain's bicycling and walking infrastructure, programs, and culture in coming years.

Why Walking and Bicycling?

Bicycle and pedestrian mobility, or "active transportation", is an important component of overall mobility, in concert with automobile-based transportation and transit. There are numerous reasons, in addition to improved mobility, why active

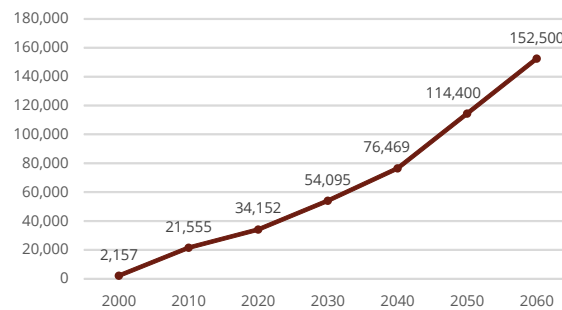


Figure 1.1 Population projections until 2060 (Mountainland Association of Governments, Jan 2013).

transportation should be integrated with the future growth and development of Eagle Mountain.

ECONOMICS

Active transportation makes economic sense. Benefits include decreased family transportation costs¹, lower healthcare costs², more jobs created by way of capital

¹ AAA's "Your Driving Costs" Report (2013); League of American Bicyclists; Bureau of Transportation Statistics "Pocket Guide to Transportation" (2009); Metro Magazine, August (2014); Internal Revenue Service; "Quantifying the Benefits of Nonmotorized Transportation for Achieving Mobility Management Objectives".

² Rous, Larissa, et al. "Cost Effectiveness of Community-Based Physical Activity Interventions". American Journal of Preventive Medicine, 2008; Pratt, Macera & Wang. Higher Direct Medical Costs Associated with Physical Inactivity, 2000; Chenoweth, D. The Economic Costs of Physical Inactivity, Obesity, and Overweight in California Adults: Health Care, Workers' Compensation, and Lost Productivity. Topline Report, 2005.

infrastructure projects³, and higher property values⁴. For example, bicycling and walking construction projects create more jobs per million dollars spent than roadway projects alone.⁵

Facilities such as shared-use paths and trails can also positively influence property values. Nearly two-thirds of homeowners who purchased their home after a path or trail was built said that it positively influenced their purchase decision. Eighty-one percent felt that the nearby path or trail's presence would have a positive effect or no effect on the sale of their homes.⁶

ENVIRONMENT

Bicycling and walking produce low land use impact, no direct air or water pollution, and minimal noise and light pollution. Nearly one-third of all developed land is dedicated to roads. Because of the smaller operator and vehicle footprint of pedestrians and bicyclists, not only does demand for streets and parking decrease but also the amount of road space required. Hence, less dependence on oil to make roads and more space for public space, buildings, food production, and houses.⁷

Air quality along the Wasatch Front fluctuates widely depending on the season and other factors. Promoting active transportation over single-occupant vehicle trips is one way to mitigate seasonal air quality problems. Vehicles are the primary source of PM 2.5 pollutants,

which account for almost half of typical winter workday emissions.⁸

HEALTH

Active transportation can have many positive impacts on community health issues such as diabetes, heart disease, and obesity. In 2013, 7.1% of Utahans were considered diabetic and 24.1% were obese.⁹ Although these statistics rate favorably when compared to other states' and national levels, there is room for improvement in Utah communities. States with higher levels of bicycling and walking to work have lower levels of diabetes ($r = -0.70$), obesity ($r = -0.55$), and high blood pressure ($r = -0.54$), and higher percentages of the population meeting recommended weekly physical activity levels ($r = 0.63$).¹⁰

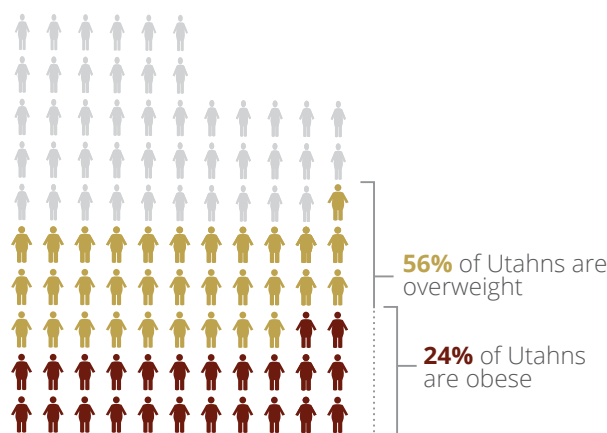


Figure 1.2 Overweight & Obese Population in Utah (Centers for Disease Control, BRFSS, 2013).

3 Heidi Garrett-Peltier, "Pedestrian and Bicycle Infrastructure: A National Study of Employment Impacts", 2011.

4 "Walking the Walk", CEOs for Cities, 2009; Lindsey, Greg, Seth Payton, Joyce Man, and John Ottensmann. (2003). Public Choices and Property Values: Evidence from Greenways in Indianapolis. The Center for Urban Policy and the Environment; "Valuing Bike Boulevards in Portland through Hedonic Regression", 2008.

5 Heidi Garrett-Peltier, Pedestrian and Bicycle Infrastructure: A National Study of Employment Impacts, Political Economy Research Institute University of Massachusetts, Amherst, 2011, 1.

6 "Omaha Recreational Trails: Their Effect on Property Values and Public Safety". Rivers and Trails Conservation Assistance, National Park Service. Donald L. Greer, 2000; "Nebraska Rural Trails: Three Studies of Trail Impact". Rivers and Trails Conservation Assistance, National Park Service. Donald L. Greer, 2001.

7 Hashem Akbari, L. Shea Rose and Haider Taha (2003), "Analyzing The Land Cover Of An Urban Environment Using High-Resolution Orthophotos," Landscape and Urban Planning (www.sciencedirect.com/science/journal/01692046), Vol. 63, Issue 1, pp. 1-14.; Chester L. Arnold Jr. & C. James Gibbons (1996): Impervious Surface Coverage: The Emergence of a Key Environmental Indicator, Journal of the American Planning Association, 62:2, 243-258; Todd Litman (2010): Evaluating Active Transport Benefits and Costs, Victoria Transport Policy Institute.

8 Utah Clean Air Partnership. Sources of Emissions (<http://www.ucair.org/sources-of-emissions>)

9 Trust for American's Health. Key Health Data about Utah (<http://healthyamericans.org/states/?stateid=UT>)

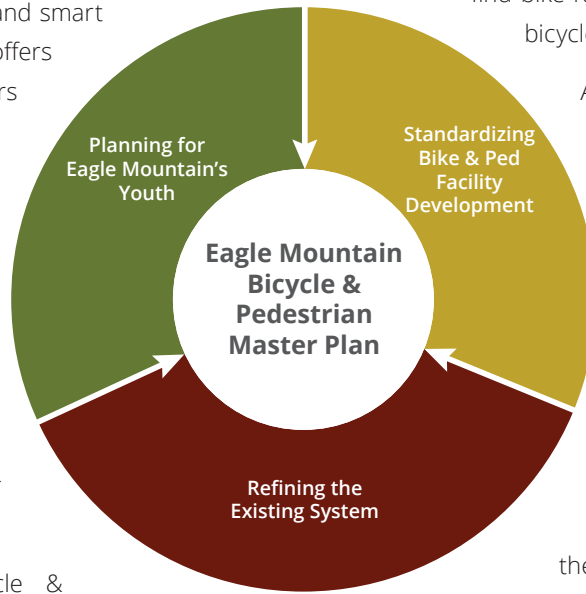
10 Annual Survey Data. Behavioral Risk Factor Surveillance System. Centers for Disease Control, 2011; "2014 Benchmarking Report", p. 70. Alliance for Biking and Walking. <http://bikewalkalliance.org>



Core Principles of the Plan

Eagle Mountain's transportation and recreation future depends on effective and smart planning and design that offers choices to residents, employers and employees, and visitors. Creating a safe, efficient, and connected network of sidewalks, bikeways, paths, and trails that complements the excellent existing network, closes gaps, and standardizes facilities will enhance quality of life and mobility options for all.

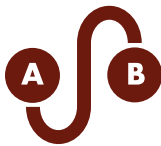
The Eagle Mountain Bicycle & Pedestrian Master Plan was developed around the following three core principles; symbols in the margins throughout the document highlight where one or more of these principles is discussed.



one will likely see crowds of kids playing in the splash pad at Nolan Park. Visit during the school year and you'll find bike racks overflowing with students' bicycles.

As of 2013, 45% of Eagle Mountain residents, or roughly 11,000 people, are under the age of 16 (more than twice the state average, which is already the highest in the United States).¹¹ Nearly half of Eagle Mountain residents, therefore, cannot legally operate a motor vehicle. They have fewer transportation options than their older counterparts and are often dependent on the latter (parents, caretakers, or friends) for transportation.

Recommendations included later in this Plan seek to cultivate a culture and environment where Eagle



REFINING THE EXISTING SYSTEM

Eagle Mountain has an impressive 34-mile bicycling and walking shared-use path network within city limits. Since its incorporation as a city in 1996, land use development policies and private development have driven construction of many of these pathways. However, sporadic development patterns have also created inconsistencies within the bicycle and pedestrian network and have ultimately led to a lack of connectivity between some Eagle Mountain neighborhoods, schools, parks, and churches. One of the core principles of this Plan seeks to improve the existing bicycling and walking system by eliminating gaps, removing barriers, strategically tracking goals, and identifying funding options for proposed projects.



PLANNING FOR EAGLE MOUNTAIN'S YOUTH

Eagle Mountain is unmistakably a "family-friendly" community. Travel to Eagle Mountain in the summer and

Table 1.1 Eagle Mountain, Utah County, and Utah Demographics

	Eagle Mountain	Utah County	Utah
Total Population	24,217*	551,891*	2,900,872*
Median Household Income	\$70,697	\$60,391	\$58,561
Median Age	22.3	24.4	29.9
Population Under 16 Years Old	45%**	32%	28%
Population Over 75 Years Old	<1%	3%	4%

Data: American Community Survey (ACS) 3-Year Estimates, 2011-2013

* Mountainland Association of Governments projections, 2013

** Data was only available from the ACS 5-Year Estimates, 2009-2013. Source: American Community Survey, 2009-2013, 5-Year Estimates, 2009-2013, U.S. Census Bureau, 2013.





Bicycles and scooters parked at Hidden Hollow Elementary



Parents and children at the splash pad at Nolan Park



Bike rack at Ridley's Family Market on Pony Express Parkway full of kids' bikes

Mountain youth walk and bike to school, parks, and social gatherings on a regular basis.

The benefits related to getting children walking and bicycling at an early age are significant. Physical activity associated with walking and bicycling to school has been shown to improve a child's mental alertness to the equivalent of a student half a year further in their studies.¹² Adolescents who bike or walk to school are 30% more likely to bike or walk to other neighborhood destinations, regardless of age, free-time physical activity, and neighborhood risk. Additionally, bicycling to school is associated with lower odds of being overweight or obese when they are adults.¹³

By designing safe and comfortable walking and biking facilities, Eagle Mountain youth will experience fewer obstacles to making active transportation trips and will become more frequent users of the system. The ultimate goal of this core principle is to encourage lifelong habits that will allow Eagle Mountain youth to grow into healthy, active adults who regularly ride a bike and walk as part of their daily lives. Studies have shown that adults who are confident bicycling are more likely to have ridden a bike frequently when they were young than those people who, as adults, are not riding regularly.¹⁴

STANDARDIZING BICYCLE AND PEDESTRIAN FACILITY DEVELOPMENT



Due to Eagle Mountain's tremendous potential for residential and commercial growth, standardizing bicycle and pedestrian planning, design and development processes are critical to establishing a comprehensive and connected active transportation system as the city matures. The guidance in this Plan seeks to encourage development to partner in the

¹² "Mass Experiment 2012". Niels Egelund, 2012.

¹³ Mehan TJ, Center for Injury Research and Policy, Bicycle-related injuries among children and adolescents in the United States, 2009; Dollman, J., and J. Lewis, 2007. "Active transport to school as part of a broader habit of walking and cycling among South Australian youth". *Pediatric Exercise Science*, 19, 436-43.

¹⁴ Dill, J., and McNeil, N., 2012. "Four Types of Cyclists? Testing a Typology to Better Understand Bicycling Behavior and Potential (Working Paper)"; Menschik, D., et al., 2008. "Adolescent physical activities as predictors of young adult weight". *Archives of Pediatrics & Adolescent Medicine*, 162, 23-28.



construction of infrastructure to support bicycling and walking. *Appendix A: Bicycle & Pedestrian Facility Design Standards* offers clear guidance for implementing active transportation facilities as an integral part of new development. Policies and code language in Chapter 4 also support bicycling and walking for new development.

Local Walking and Bicycling Trends

Eagle Mountain's character as a bedroom community means that traditional data sources, like the American Community Survey, which focus on commute to work trips, do not reflect the real amount of active transportation trips within city limits. Additional survey data that tracks all trips regardless of purpose is helpful in a community of Eagle Mountain's size and character.

AMERICAN COMMUNITY SURVEY (ACS) JOURNEY TO WORK DATA

The American Community Survey (ACS) Journey to Work data measures changes in mode share over time. Unfortunately, the ACS only collects transportation information about the main mode of transportation for trips from home to work (only 12% of all trips made in Eagle Mountain) and excludes trips made by those outside of the workforce, including children, retirees, unemployed residents, and stay-at-home parents and

trip purposes such as shopping, going to and from school, and recreational outings. Capturing non-work bicycling and walking trips is important because most jobs held by Eagle Mountain residents are outside of the city and require considerable effort to travel by foot or by bike. Though useful in many communities (and possibly viable in the future following local job growth in Eagle Mountain), the American Community Survey's Journey to Work data is not an accurate representation of current or future walking and bicycling activity.

UTAH TRAVEL STUDY

The 2012 Utah Travel Study was a statewide survey and report that contains a wealth of information on statewide and local transportation behaviors, attitudes and trends. The primary tool of the study, the household travel diary, was supplemented by additional surveys including a bicycle and pedestrian barriers survey. Due to the lack of plans to repeat the Study on a regular basis, the tremendous amount of valuable data cannot be monitored from year to year (unlike the ACS), making tracking progress difficult.

As shown in Figure 1.3, walking and bicycling trips in Eagle Mountain are above the average for Utah County and Utah statewide. A combined 11% of all trips in Eagle Mountain are done by walking and bicycling. Figure 1.4 identifies the most and least common types of trips

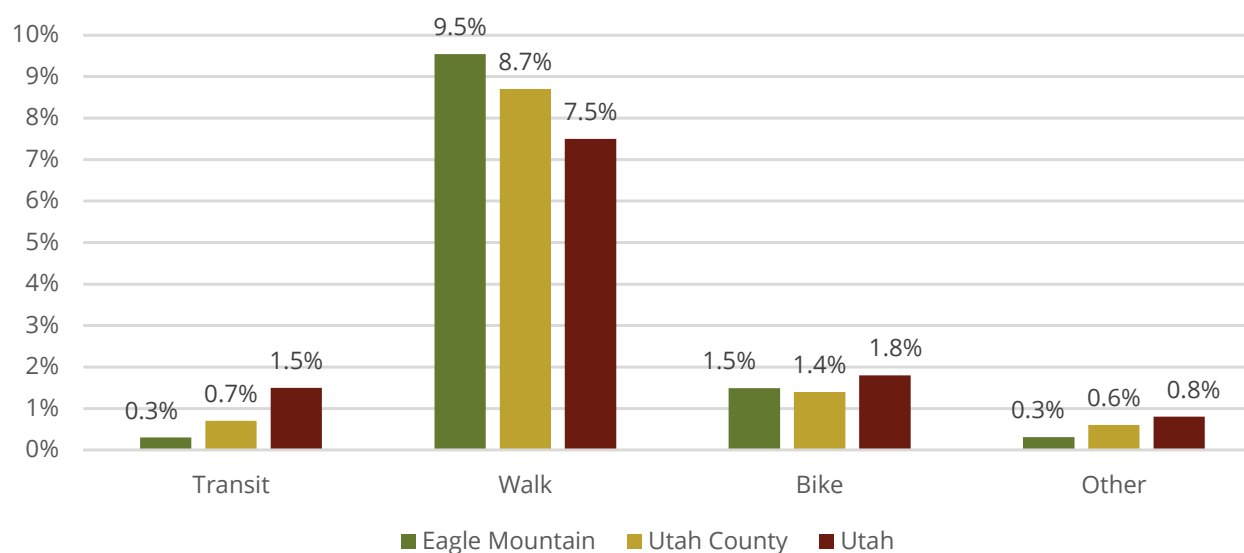


Figure 1.3 Non-Automobile Mode Share (% of Total Trips) in Eagle Mountain, Utah County, and State of Utah (Utah Travel Study)

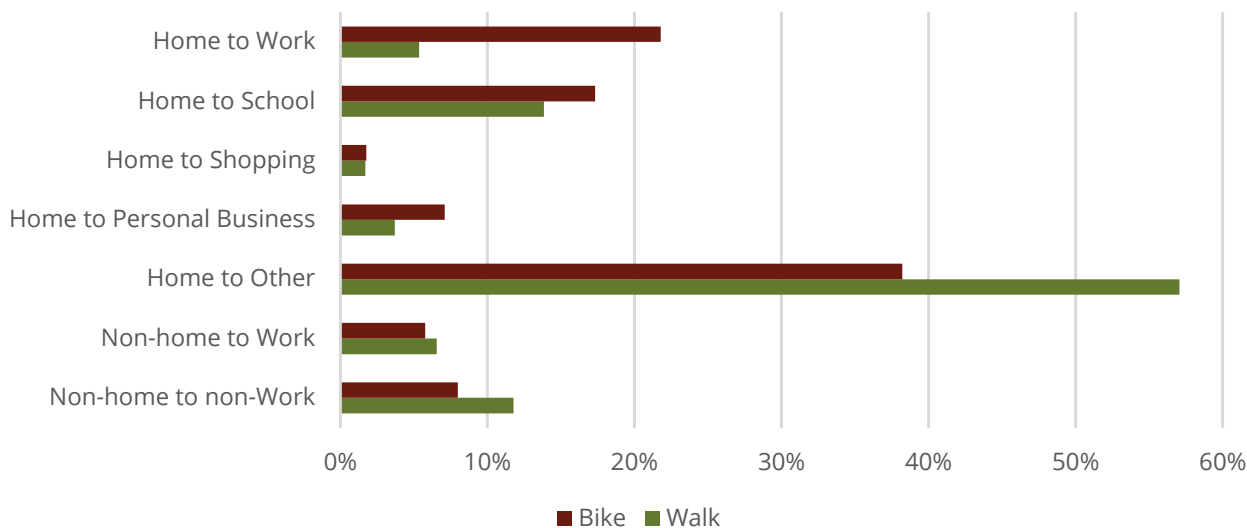


Figure 1.4 Walking and Bicycling Trip Purposes in Utah County (Utah Travel Study) Note: Figure 1.4 depicts trip purpose for residents in Utah County, instead of Eagle Mountain, due to the sample size from the latter for this particular question being too small.

on foot and by bike in Utah County. By far, “Home to Other” trips, which include trips for exercise, recreation, or without a purpose, are the most common.

Making local, shorter trips to school, recreation, church, and shopping easier will have a greater impact on health, transportation demand, and overall ridership than focusing on longer, commute type trips. Many of Eagle Mountain’s major destinations, such as the library, elementary and middle schools, The Ranches Golf Course, and churches, are located along existing shared-use paths and are relatively accessible by walking or bicycling.

The analysis zone (AirSage zone) that includes Eagle Mountain, 4909, also includes Cedar Fort, Fairfield, and Saratoga Springs. Therefore, although residents of these communities likely have similar travel habits, the data is not representative of only Eagle Mountain residents.

Youth Responses

According to the Utah Travel Survey, 35% of trips taken by Eagle Mountain residents under 16 years old are to school and 42% are for recreation, leisure, or unspecified purposes.

National Walking and Bicycling Trends

Data collected from the National Household Travel Survey (NHTS) and American Community Survey (ACS) in recent years estimate that out of all trips made in the U.S., regardless of purpose, 1.0% are made by bicycle and 10.4% are by foot. In fact, commute-related bicycling trips in the United States have increased 60% from 2000 to 2012.¹⁵ Eagle Mountain’s walking and bicycling mode shares are generally consistent to national averages.

Connectivity To Transit

In 2008, the Utah Transit Authority (UTA) began Route 806, the first bus route to serve Eagle Mountain, which currently runs between the area near the Ranches Pkwy & Pony Express Pkwy intersection and Nolan Park in Eagle Mountain (western terminus) and the Lehi FrontRunner station (eastern terminus). According to the Utah Travel Study, 54% of trips in Eagle Mountain are less than one mile and, therefore, the likelihood of Eagle Mountain residents to take transit, especially within the city, is high.

¹⁵ “Benchmarking”, 12-13.



Nationally, more than 90% of people use bicycling or walking to access bus or transit stops.¹⁶ Improving access to and from stops, making it possible to take a bicycle with you on the bus, and providing secure bike parking at stops or stations, among other improvements, will allow transit users to comfortably ride a bike or walk the first or last mile of a transit-centered trip. This, in addition to broadening the transit service area, will make transit more attractive and feasible for Eagle Mountain residents.

Existing Plans, Policies, & Codes

The Eagle Mountain Bicycle & Pedestrian Master Plan will require coordination with many departments and stakeholders to actively promote increased bicycling and walking within the city. As such, coordination with different planning efforts is necessary to take advantage of opportunities to share resources and leverage greater community value out of future projects. To

understand the planning context and future of Eagle Mountain, the following studies have been reviewed to determine their influence on this Plan:

A review of relevant, existing documents also helps to understand the City's overall vision, planning history, limitations, and direction found in existing codes and policies. With a clear understanding of this planning context, the Bicycle & Pedestrian Master Plan seeks to develop compatible and coordinated goals and recommendations.

PARKS & OPEN SPACE PLAN (2009)



This plan seeks to guide the city's continued growth and development of parks, open space, paths, and trails. Major goals and objectives related to the Eagle Mountain Bicycle & Pedestrian Master Plan include:

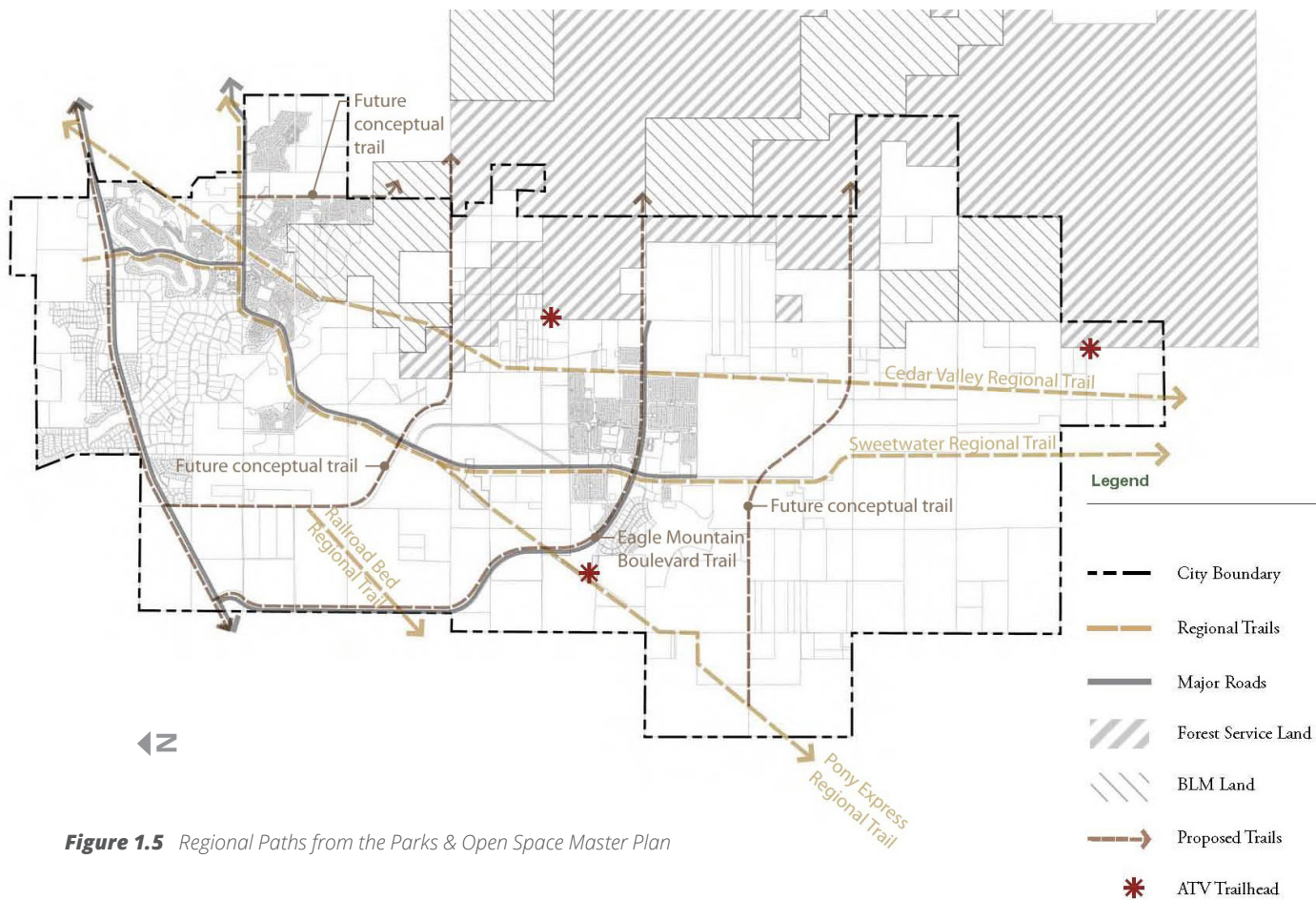


Figure 1.5 Regional Paths from the Parks & Open Space Master Plan

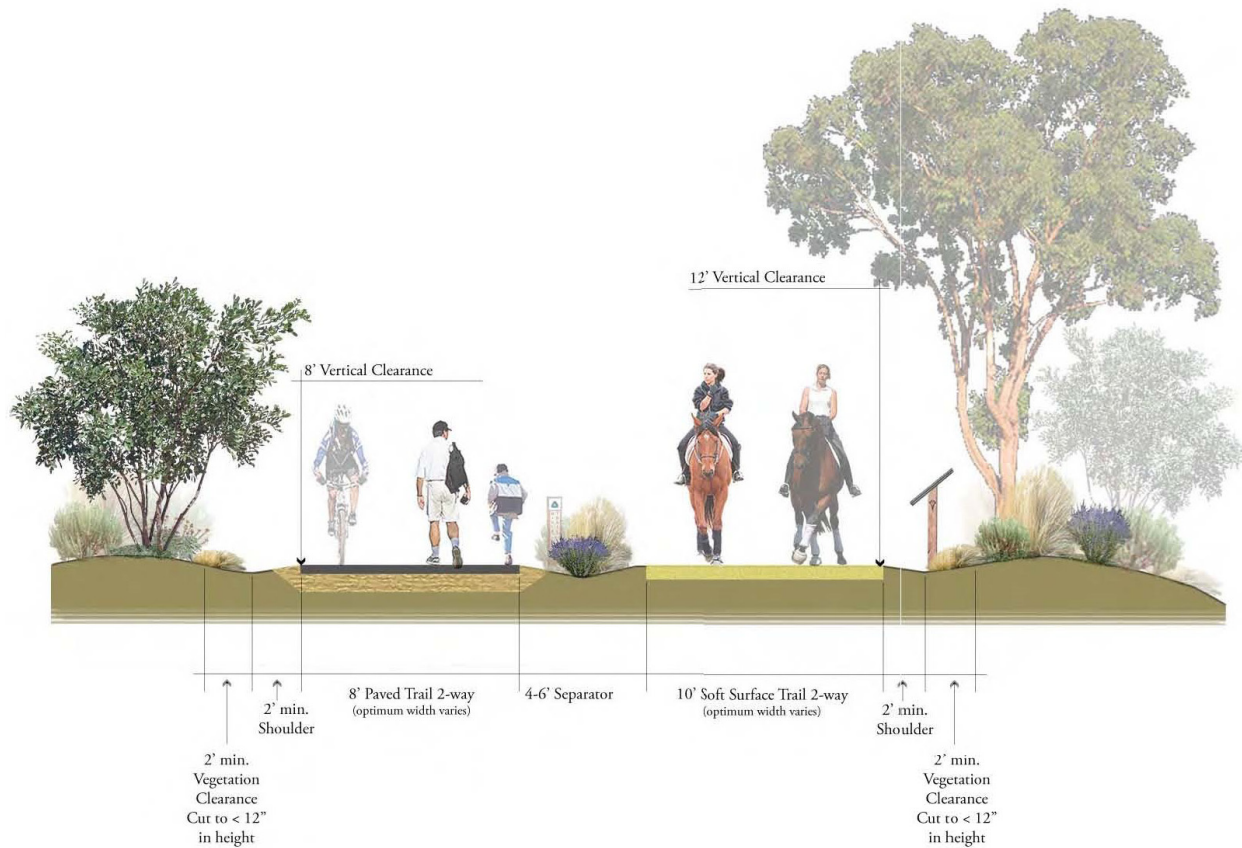


Figure 1.6 Shared Non-Motorized & Equestrian Trail Cross-Section from the Parks & Open Space Plan

- Retain the “small town” feel and openness of the current Eagle Mountain landscape
- Provide recreation for all ages and user groups
- Provide connections between residents, parks, paths, and trails
- Provide Eagle Mountain City with the guidelines for furthering their information base, acquiring funding and implementing the recommendations found in the plan

The plan recognizes four major shared-use path corridors in Eagle Mountain. The most prominent and recognized path is the Pony Express Regional Path. In addition to linking the two developed cores of Eagle Mountain, The Ranches and City Center, the path also provides historic and interpretive opportunities. Other existing and proposed regional paths include the Cedar Valley Regional Path (Powerline Corridor Regional Path), Pony Express Regional Path, Ranches Parkway Regional Path, Sweetwater Regional Path, and Railroad Bed Regional Path. In addition to these currently planned

shared-use path corridors, the Parks and Open Space Plan makes recommendations for additional connections along some of the arterial and major collector streets. Since adoption of the plan in 2009, portions of the Eagle Mountain Boulevard Path have been implemented as subdivisions and neighborhoods have developed or been improved.



Powerline Corridor where the Cedar Valley Regional Path is planned, according to the Parks & Open Space Plan





The Parks and Open Space Plan also discusses which trails should accommodate off-highway vehicles (OHVs), equestrian users, bicyclists, and pedestrians. Since adoption, a more complete description and regulatory framework for the Eagle Mountain OHV trail system has been adopted and can be found on the Eagle Mountain website.

WEST LAKE LAND USE AND TRANSPORTATION VISION PLAN (2008)

This planning effort developed multiple community-supported “build-out” scenarios for the Western portion of Utah County. The study explored four different scenarios ranging from populations of 500,000 to 1,500,000. Complete streets are favorably referenced during the plan and all of the future conceptual roadway cross-sections include bicycle and pedestrian accommodations.

EAGLE MOUNTAIN GENERAL PLAN

An extensive shared-use path system has been a goal for Eagle Mountain since the City's first general plan and visioning exercise. The general plan addresses shared-use paths at the community level and other paths at the regional level.

Eagle Mountain requires developers to build shared-use paths that provide neighborhood connections to local destinations as part of all subdivisions. Cul-de-sacs should provide pedestrian connectivity when adjacent to open space or paths. The general plan states that these should be built to the performance standards listed in the Eagle Mountain Development Code, the Eagle Mountain City Construction Specifications and Standards, the American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities and the Manual on Uniform Traffic Control Devices (MUTCD). Improvements, widths, surfacing and signage are also identified by the plan.

The plan identifies paths that exist along arterial and major collector corridors as right-of-way trails, which are buffered from vehicular traffic by at least 4'-0"; wider park strips and planting street trees are encouraged.

Regional paths by their nature require additional cooperation and commitment from adjacent municipalities or land managers. Regional paths are typically funded through impact fees and Capital Facility Plans. Trailheads should be carefully located to promote greater access to public lands, paths, trails, and open space and should be considered whenever development occurs.

EAGLE MOUNTAIN DEVELOPMENT CODE

The Eagle Mountain Development Code regulates growth and development within the city according to the General Plan's recommendations. Per the Right-of-Way Classifications, paths, trails, and sidewalks are required improvements to street infrastructure for developers, however early versions of the Development Code did not require them.



On-street bikeways, like marked bike routes, bicycle boulevards, bike lanes, and buffered bike lanes, however, are not mentioned. The combination of this and the fact that most of the bicycle and pedestrian infrastructure in Eagle Mountain has come from private, residential development (i.e. subdivisions), there are not any on-street bikeways in city limits. Paved shoulders required by the Development Code may create a rideable area for more experienced bicyclists on roads without parking (i.e. collectors and arterials), however, this has not occurred on some roads that may pre-date these requirements (i.e. Eagle Mountain Boulevard, Pony Express Parkway, and Ranches Parkway).



A bicyclist riding on the far edge of the shoulder on Pony Express Pkwy near City Center

MASTER TRANSPORTATION PLAN (2014)

The Master Transportation Plan discusses existing land use, transit, level of service, regional plans for the future, travel demand modeling and includes analysis, planning, and design of future level of service, safety hot spots, future bicycle infrastructure, roadway classifications and cross sections, and a proposed future network.

The latter three are particularly important to this Plan because they propose roadway classifications, contain some general bicycle and pedestrian infrastructure guidance, and propose new roadways for and on which bicycling and walking infrastructure will be recommended later in this plan.

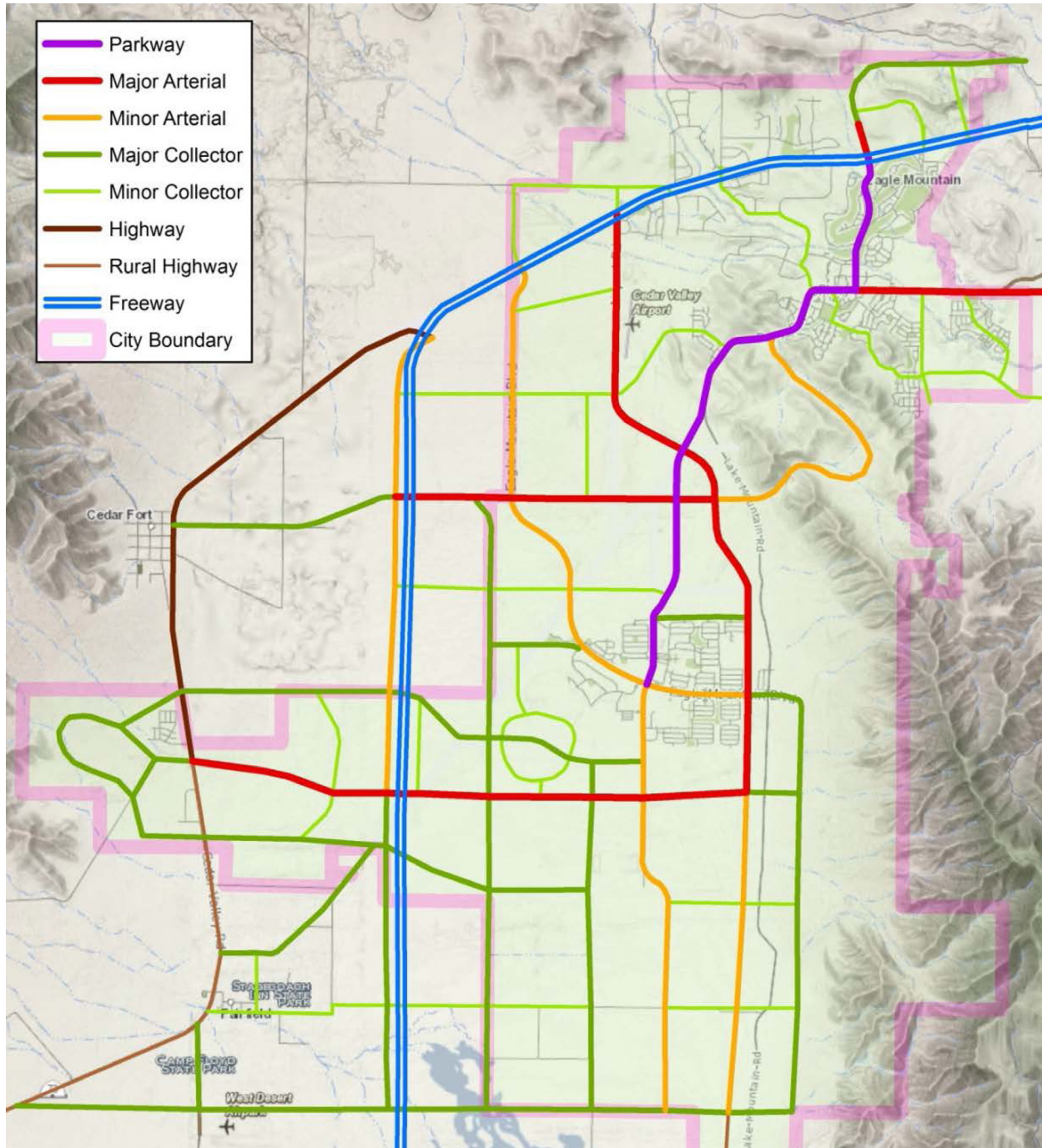


Figure 1.7 2014 Master Transportation Plan Proposed 2040 Roadway Network by Classification (Source: Interplan). Standard roadway classification cross sections found in Appendix A: Design Standards require bicycle and pedestrian facilities on every non-freeway road.



Attendees at the second public open house on April 28, 2015

2: Public Involvement

In order to determine the needs of current and possible users of the walking and bicycling system, multiple public outreach efforts were conducted during the course of the development of this Plan to collect input from residents, visitors, and people who work in Eagle Mountain. More than 400 people, almost all of which lived in Eagle Mountain, participated in the process.

Interactive Online Mapping Tool

An interactive, online mapping tool allowed users to draw routes they liked or those they thought needed improvement, mark where their homes and typical destinations are, and where they saw gaps in the system or barriers that discouraged them or their families from walking and bicycling more.

The interactive online mapping tool received 163 responses: 59 describing linear facilities (roads, paths, sidewalks) and 104 spots (gaps and barriers).

Eagle Mountain Blvd, Pony Express Parkway between City Center and Unity Pass as well as between Porters Crossing and the eastern city limit, Cory Wride Memorial Highway, and roads that lead to adjacent communities were the most used and on which respondents wanted to see improvements.

The most popular destinations were City Hall, Eagle Mountain Library, churches, parks, and schools. The most cited types of gaps in the network and barriers to bicycling and walking more often were uncomfortable roadway crossings at intersections and mid-block, namely, along Cory Wride Memorial Highway, Ranches Parkway, and Pony Express Parkway. The lack of sidewalks between homes and destinations, discontinuous sidewalks, and general lack of connectivity to natural amenities, retail, and adjacent communities were also frequently cited issues.

Online Public Survey

A 25 question online survey about bicycling and walking habits and preferences was conducted between October 29 and December 31, 2014. The survey was promoted on the City's website and social media outlets, and via email to stakeholders, City staff, and interested parties. 212 people completed the survey: about 1/3 from City Center and 2/3 from The Ranches and Cedar Valley.

Respondents' feedback, coupled with the interactive mapping and open house input, helped to identify improvements that can increase comfort and safety for all types of users, regardless of age or ability.

Public Open Houses

OPEN HOUSE #1

About 20 people attended the first public open house on the evening of November 12, 2014, at Eagle Mountain City Hall, where they learned about the Plan's vision and goals; were encouraged to draw their preferred facilities and suggested improvements on maps of the city; identify preferred types of bicycling and walking infrastructure; and complete the online public survey on several iPads. Participation also included discussing important issues in a casual setting with elected officials and City staff. Grade-separated crossings, on-street bicycle facilities (especially protected bike lanes), and expanded mountain biking opportunities were among the most popular suggestions.

OPEN HOUSE #2

About 100 people attended the second open house, which was held from 5:00 to 7:00 pm on April 28, 2015 in conjunction with the Eagle Mountain Food Truck Roundup. Attendance was higher in part due to the draw of multiple food truck vendors. Participants reviewed and provided feedback on initial recommendations made by the project team. The most popular recommended improvements were: better pedestrian crossings across and a buffered bike lane on Pony Express Parkway, smoother roadway surfaces, connectivity to Saratoga Springs and the Jordan River Parkway Trail, mitigating possible conflicts between bicyclists and pedestrians on paths, improving connectivity for students to and from Mountain Trails Elementary School, considering different types of users, and creating bike-centered events in Eagle Mountain.

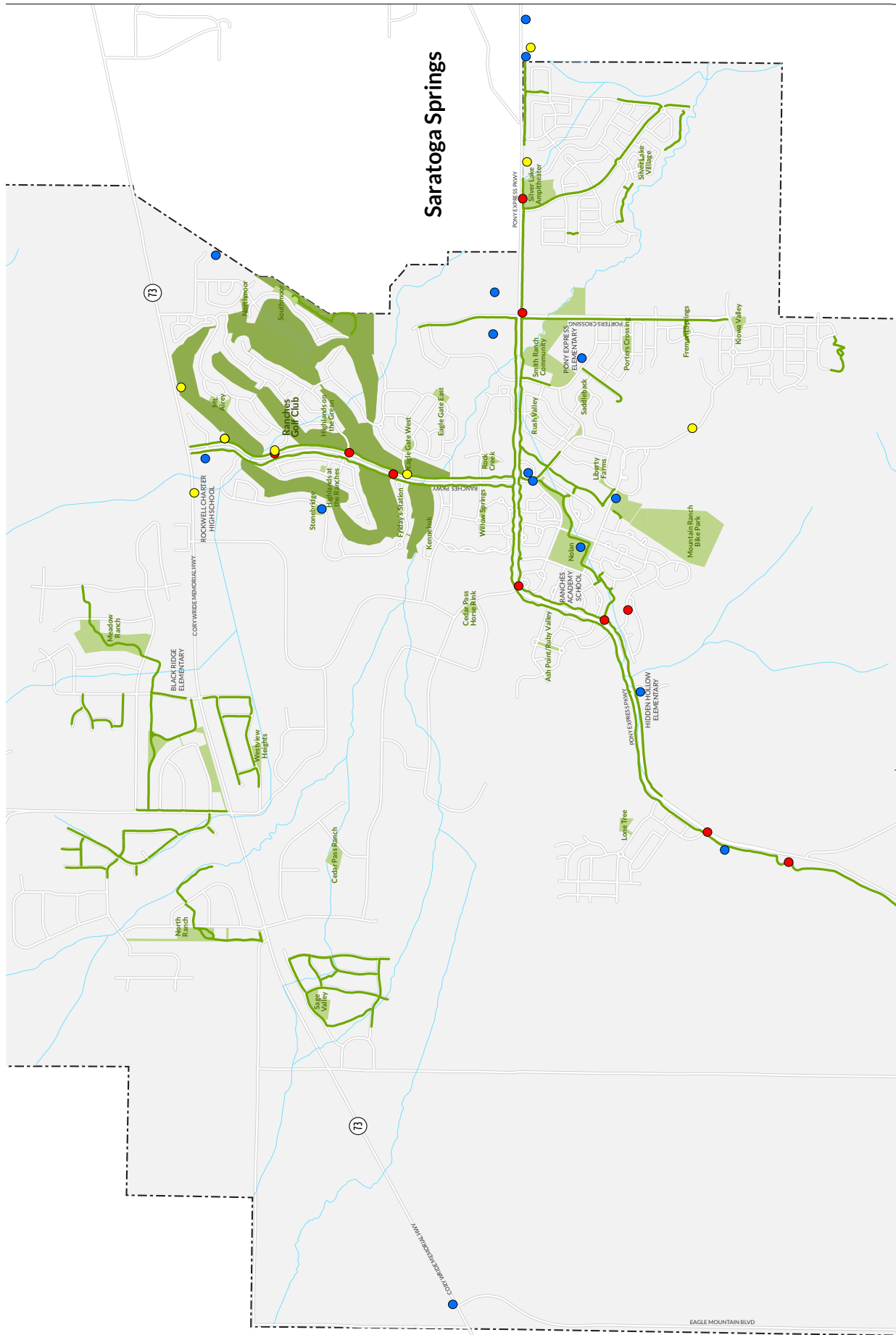
Types of Bicyclists

80% of Eagle Mountain survey respondents self-identified as enthused and confident about bicycling or interested but concerned about traffic and other safety issues. One of the purposes of this Plan is to create a network of facilities and supportive programs that are accessible and appealing to this under-served majority of the population.



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Saratoga Springs



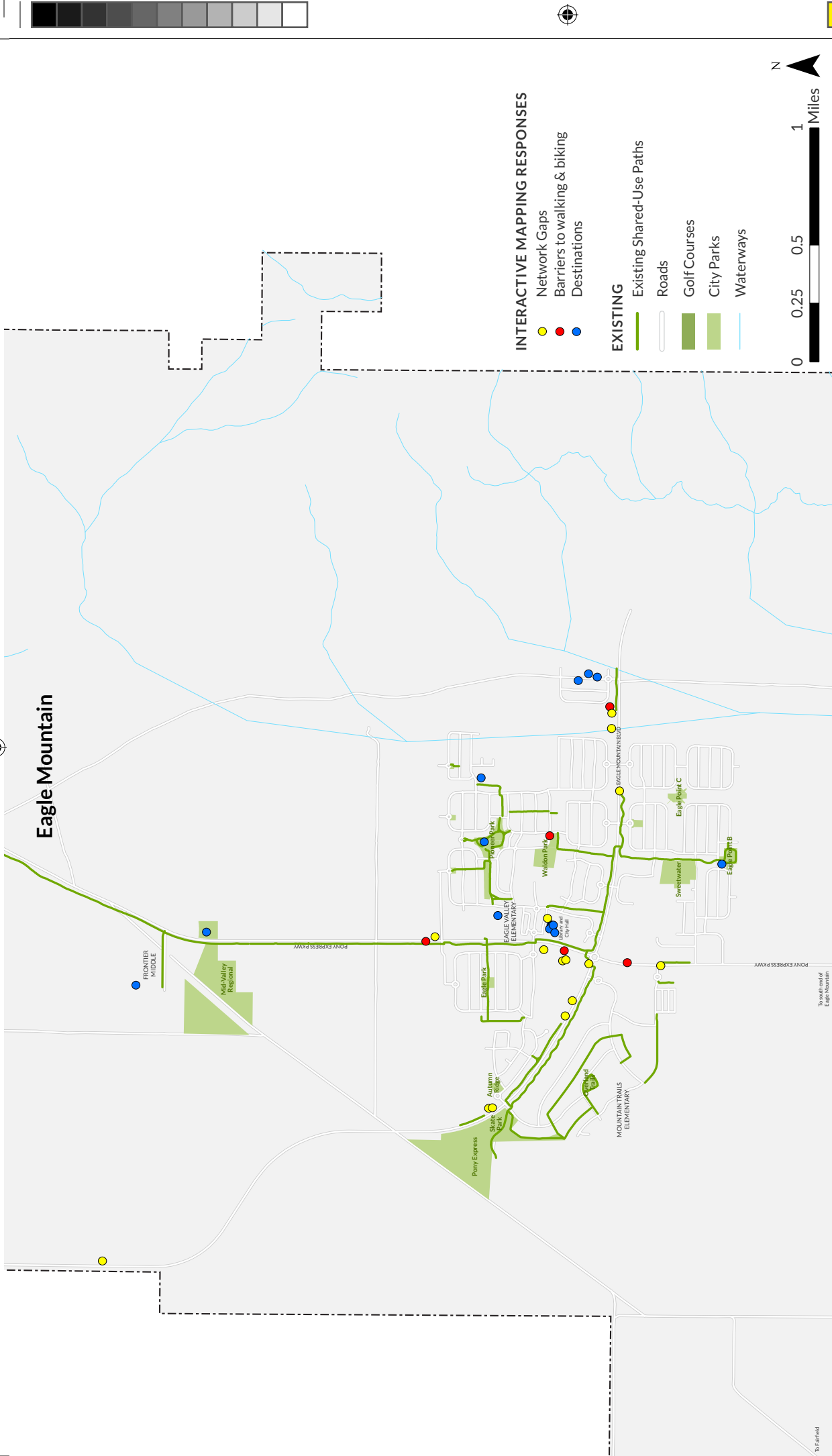


Figure 2.1 Visualization of Responses from the Interactive Online Mapping Tool



EAGLE MOUNTAIN



PUBLIC ONLINE SURVEY

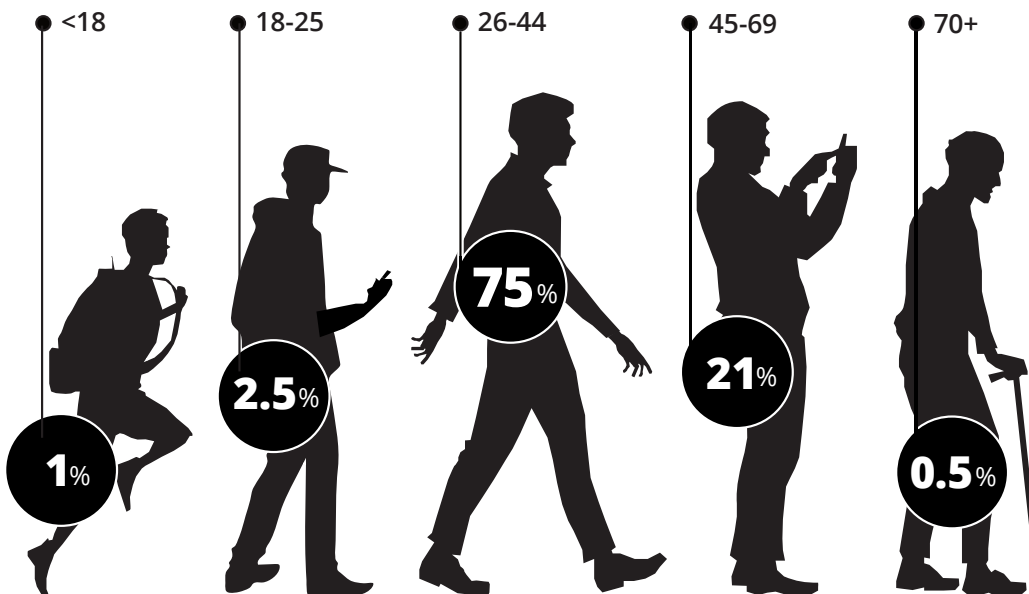
WHO RESPONDED



EQUAL NUMBER OF
WOMEN & MEN



AGE BREAKDOWN



EXISTING CONDITIONS



83%

BELIEVE WALKING
CONDITIONS ARE
GOOD OR EXCELLENT



48%

BELIEVE BICYCLING
CONDITIONS ARE
GOOD OR EXCELLENT

FAVORITE ACTIVITIES

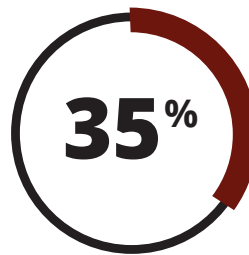


BEING
HEALTHY & OUTDOORS
WAS THE TOP REASON FOR
WALKING & BICYCLING

FREQUENCY



WALK
A COUPLE TIMES
PER WEEK



BIKE
A COUPLE TIMES
PER WEEK

TYPES OF BICYCLISTS

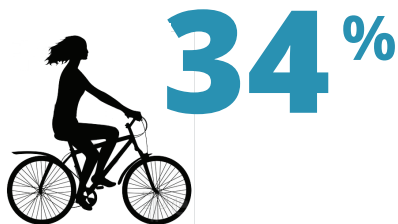
NO WAY, NO HOW



8%

INTERESTED BUT CONCERNED

46%



34%

ENTHUSED & CONFIDENT

12%



STRONG & FEARLESS

BARRIERS

TOP 5 BARRIERS TO WALKING

1.  NO SIDEWALKS
2.  UNMAINTAINED SIDEWALKS
3.  NO LIGHTING
4.  BAD WEATHER
5.  TRAFFIC

TOP 5 BARRIERS TO BIKING

1.  TRAFFIC
2.  BAD WEATHER
3.  NO BIKE LANE
4.  TRAVELING WITH KIDS
5.  UNMAINTAINED PATHS & BIKE LANES

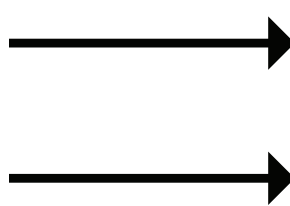
COLD WEATHER

MORE LIKELY TO **WALK** (54%)
THAN TO **BIKE** (14%)
IN THE **WINTER**



THE RANCHES

PEOPLE FROM THE RANCHES WERE **MORE LIKELY TO**



RESPOND THAT THE SIDEWALK NETWORK IS COMPLETE NEAR THEIR HOMES



WALK TO CHURCH



PROJECT PRIORITIES

MOST IMPORTANT WALKING PRIORITIES

-  SAFE ROUTES TO SCHOOL IMPROVEMENTS
-  CONNECTIVITY TO PARKS & REC
-  NEW SIDEWALKS & CROSSWALKS
-  CONNECTIVITY TO CIVIC & RELIGIOUS CENTERS
-  INCREASED ENFORCEMENT

MOST IMPORTANT BIKING PRIORITIES

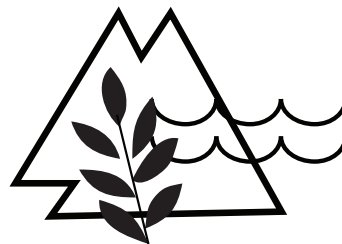
-  ON-STREET BIKE FACILITIES
-  MAINTENANCE OF EXISTING FACILITIES
-  GREATER SEPARATION BETWEEN ROADS & PATHS

CONNECTIVITY

WHERE PEOPLE WANT TO WALK & BIKE OUTSIDE OF EAGLE MOUNTAIN



SARATOGA SPRINGS

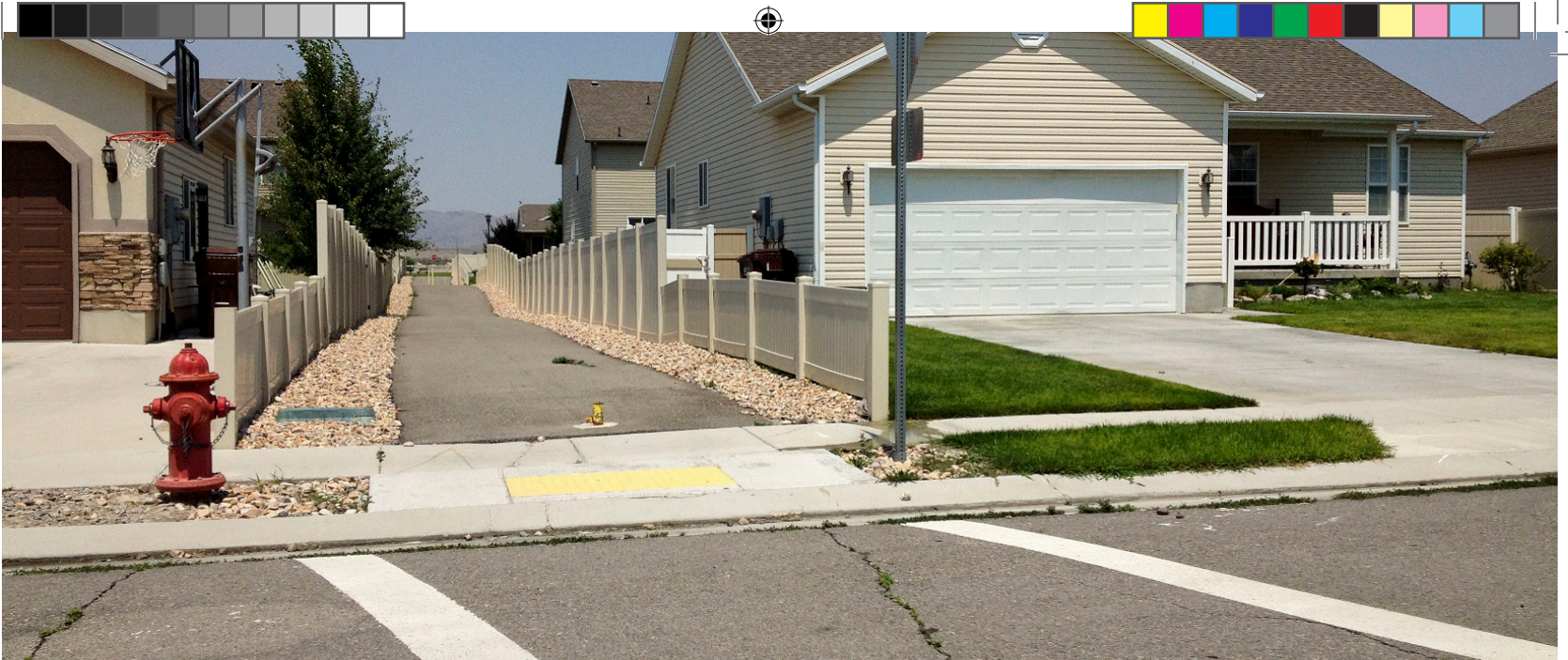


JORDAN RIVER TRAIL



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Intra-neighborhood path and mid-block crossing in City Center

3: Eagle Mountain's Existing System

This chapter discusses the existing system of shared-use paths, sidewalks, and parks; maintenance policies; crashes involving bicyclists and pedestrians; and programs and events.

Shared-Use Paths

The 34 miles of paved paths in Eagle Mountain are frequently found in parks, open spaces, adjacent to roadways, and within neighborhoods. The Eagle Mountain City Code describes shared-use paths as "trails... [or] developed paths for walking, running, or bicycling"¹, which allow for two-way, off-street use by bicyclists, pedestrians, skateboarders, wheelchair

users, and other non-motorized users. Some of the paths in Eagle Mountain are, by definition, sidepaths, or shared-use paths directly next to a roadway that tend to act as sidewalks. Sidepaths have more driveway and roadway crossings, an increased potential for conflicts with cross traffic, and have usually been constructed in concert with housing developments. AASHTO cautions practitioners of the use of sidepaths on suburban streets which typically have many driveways and street crossings.²

SHARED-USE PATH NETWORK DENSITY

The two ½ mile square, figure-ground drawings at right show the shared-use paths (white) and roadways (dark



A shared-use path in Eagle Mountain City Code Section 7.05.030 "Definitions"



5-8 American Association of State Highway Transportation Officials (AASHTO) 2012 a suburban street in Cedar Pass Ranch

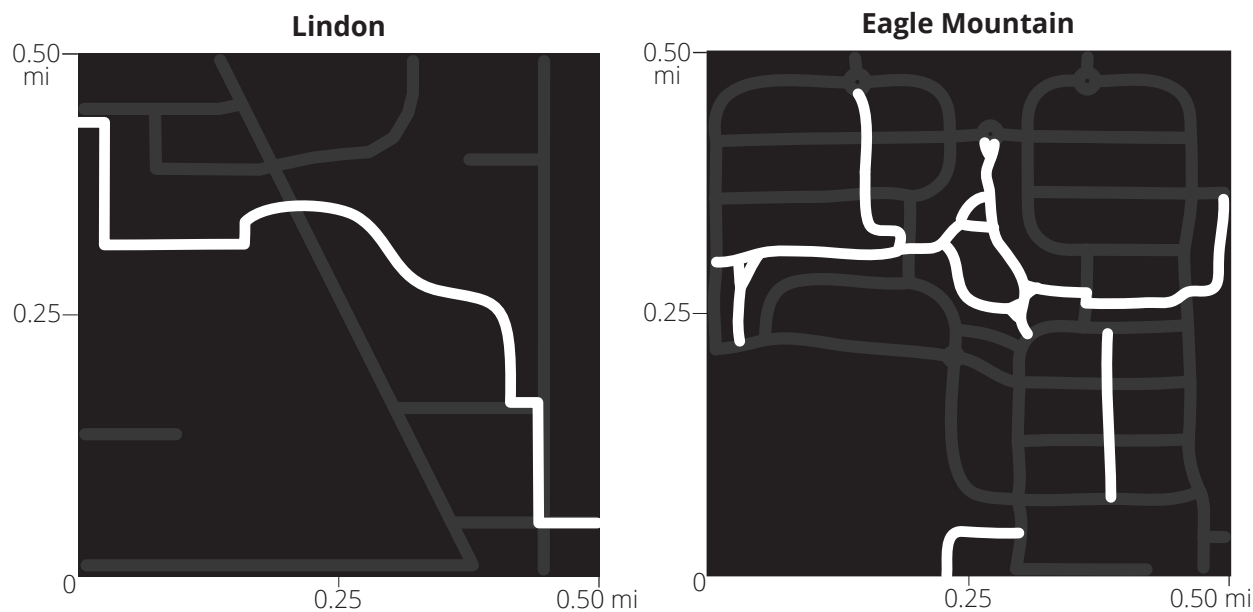


Figure 3.1 Figure-ground drawings of density of shared-use paths and roadways in Lindon (left) and Eagle Mountain

gray) in Lindon (Heritage Trail and City Park) and Eagle Mountain (City Center neighborhood). The Heritage Trail in Lindon allows for comfortable cross-city trips by bike or on foot, but does not offer multiple route choices or citywide access. Eagle Mountain's more extensive network of paths acts as another layer of the overall transportation network that allows for bicycling and walking route choices every $\frac{1}{8}$ to $\frac{1}{4}$ of a mile.

Because many of the shared-use paths and sidewalks were constructed through private subdivision development, there are some maintenance coordination issues on and small, physical gaps between existing facilities that, if remedied, would greatly enhance connectivity. One of the goals of the Eagle Mountain Planning Commission is to prevent development from leapfrogging, or building farther out than necessary and leaving gaps between developments, in order to reduce utilities and amenities costs and improve mobility and shared-use path and roadway connectivity. Eagle Mountain has experienced rapid residential growth, especially since 2000. This growth has yielded parks, schools, and other amenities, however, there has not been the same growth in retail, commercial, and other



Intersection of two shared-use paths in City Center



types of services and employment type destinations. Eagle Mountain has met or exceeded national averages for rates of walking and bicycling despite its lack of traditional destinations and employment figures. More diverse land uses and densities in the future may make

walking and bicycling more attractive, comfortable, and easy to choose.

CONNECTIVITY TO SCHOOLS

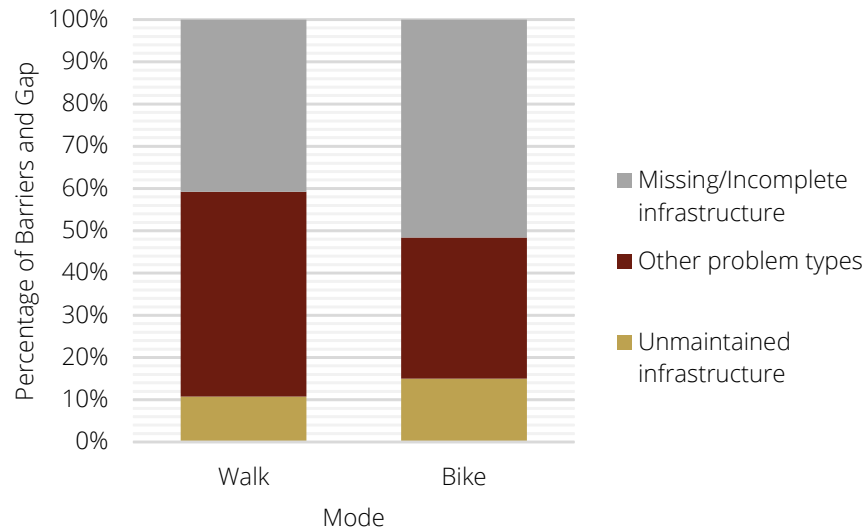


Figure 3.2 Type of Barriers or Gaps by Travel Mode (Utah Travel Study); Notes: Responses from the Study were very similar to type and location of gaps and barriers identified in the interactive online mapping tool.

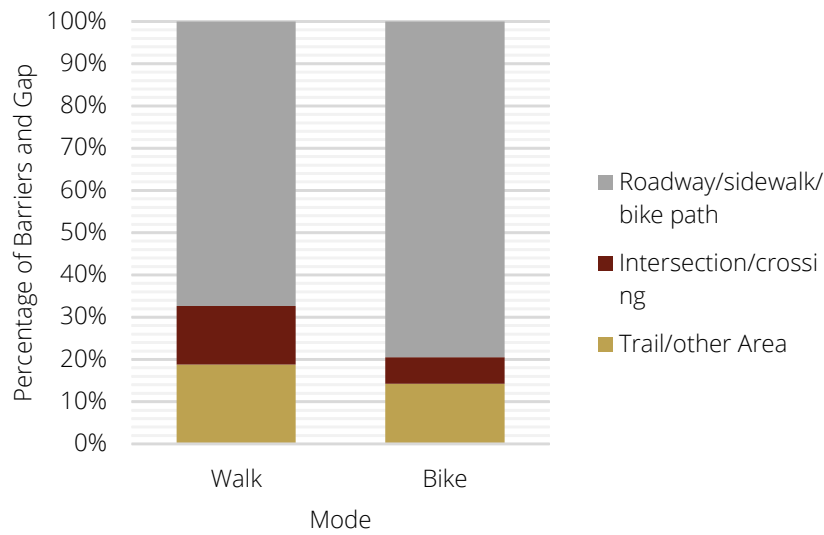
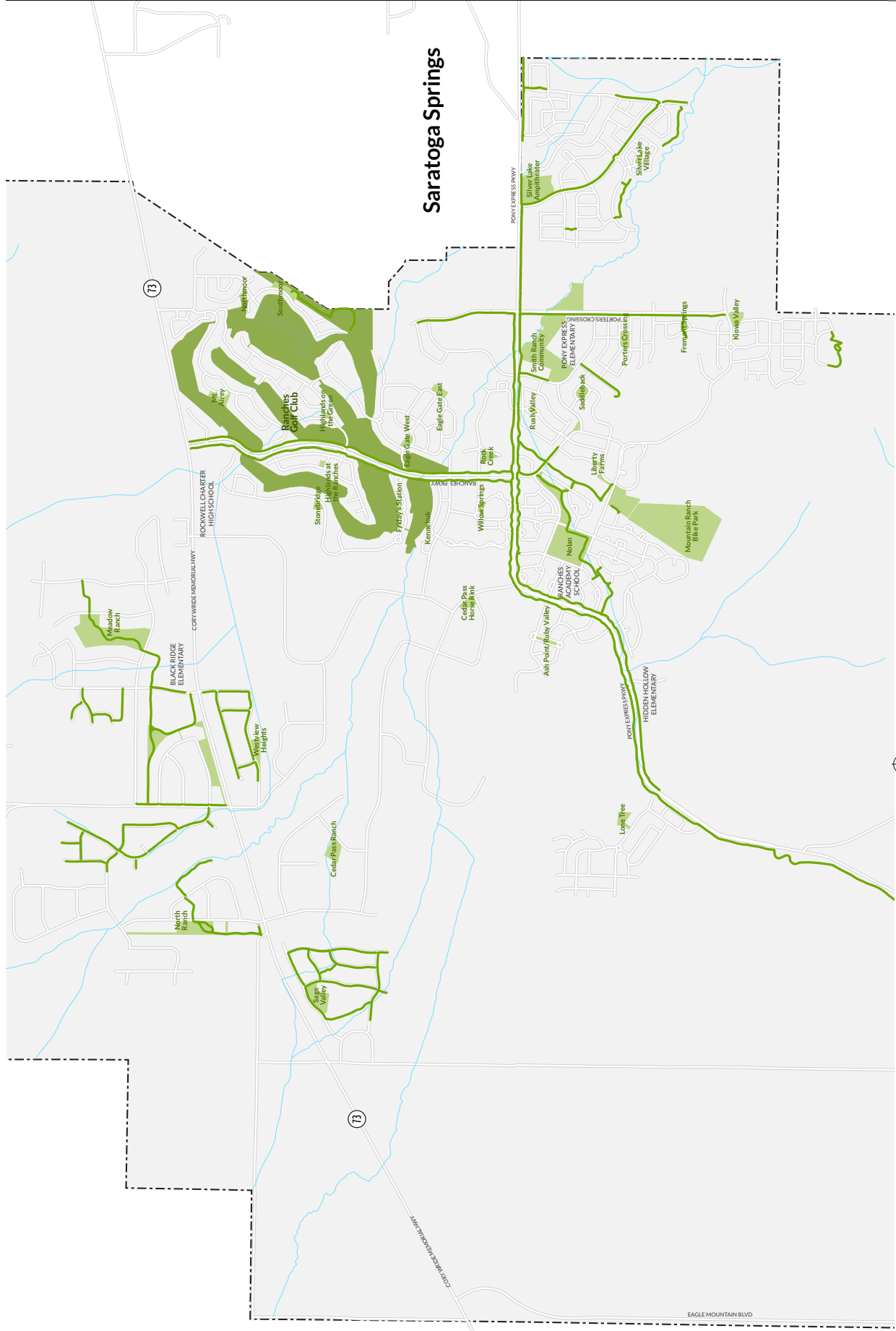


Figure 3.3 Location of Barriers or Gaps by Travel Mode (Utah Travel Study)



Saratoga Springs



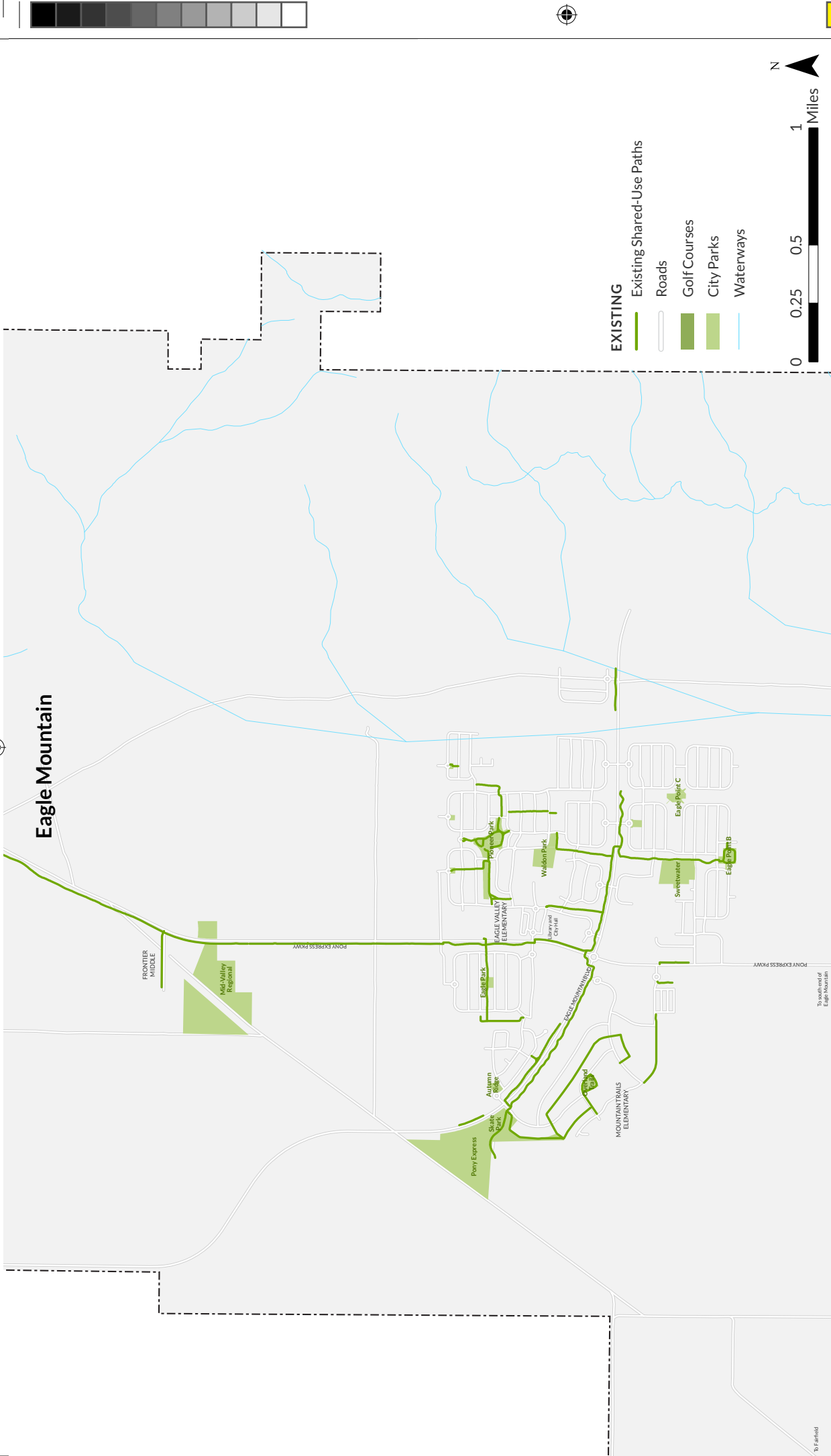


Figure 3.4 Citywide Existing Conditions Map

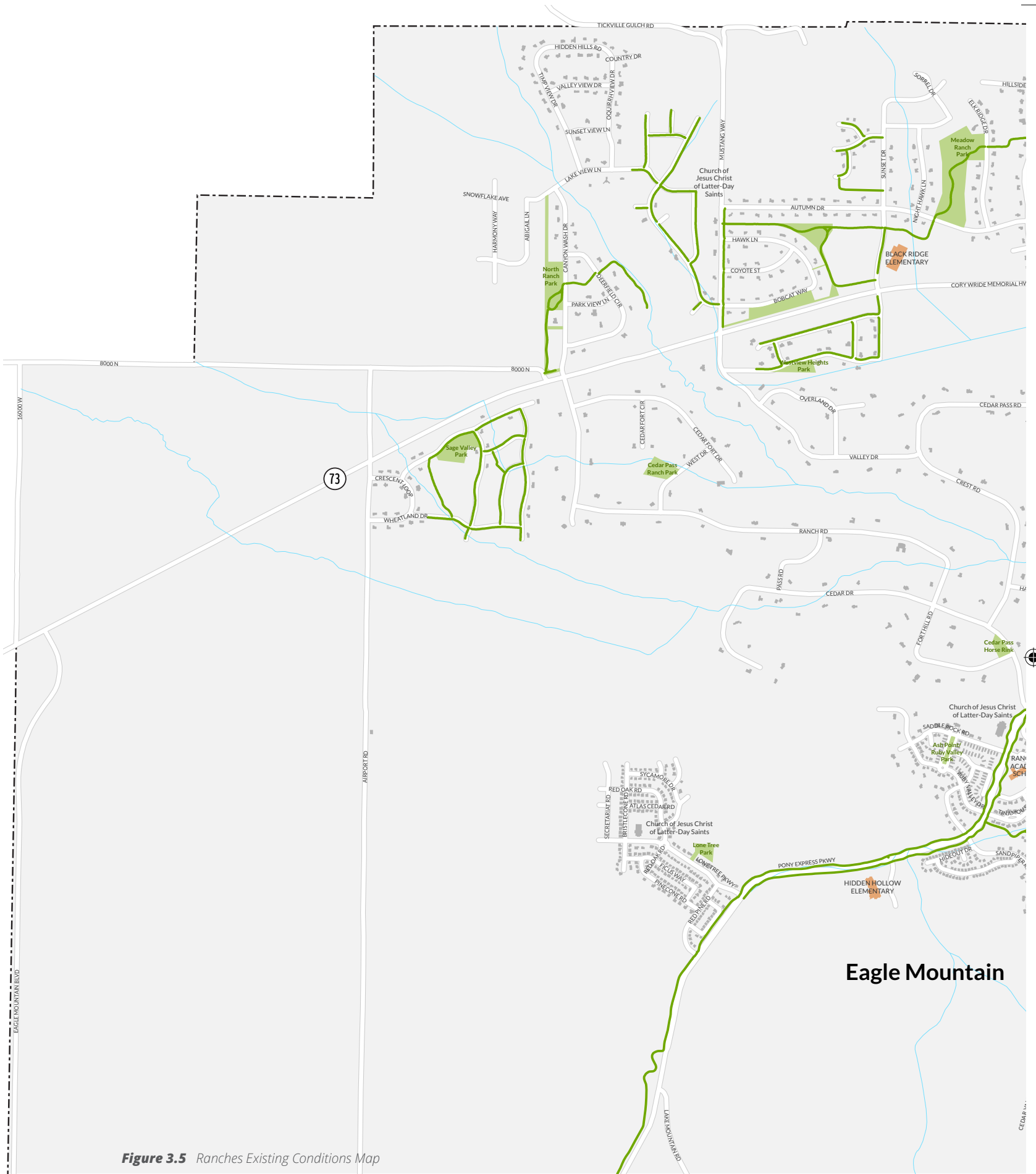







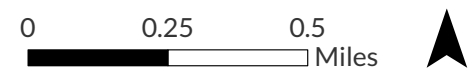
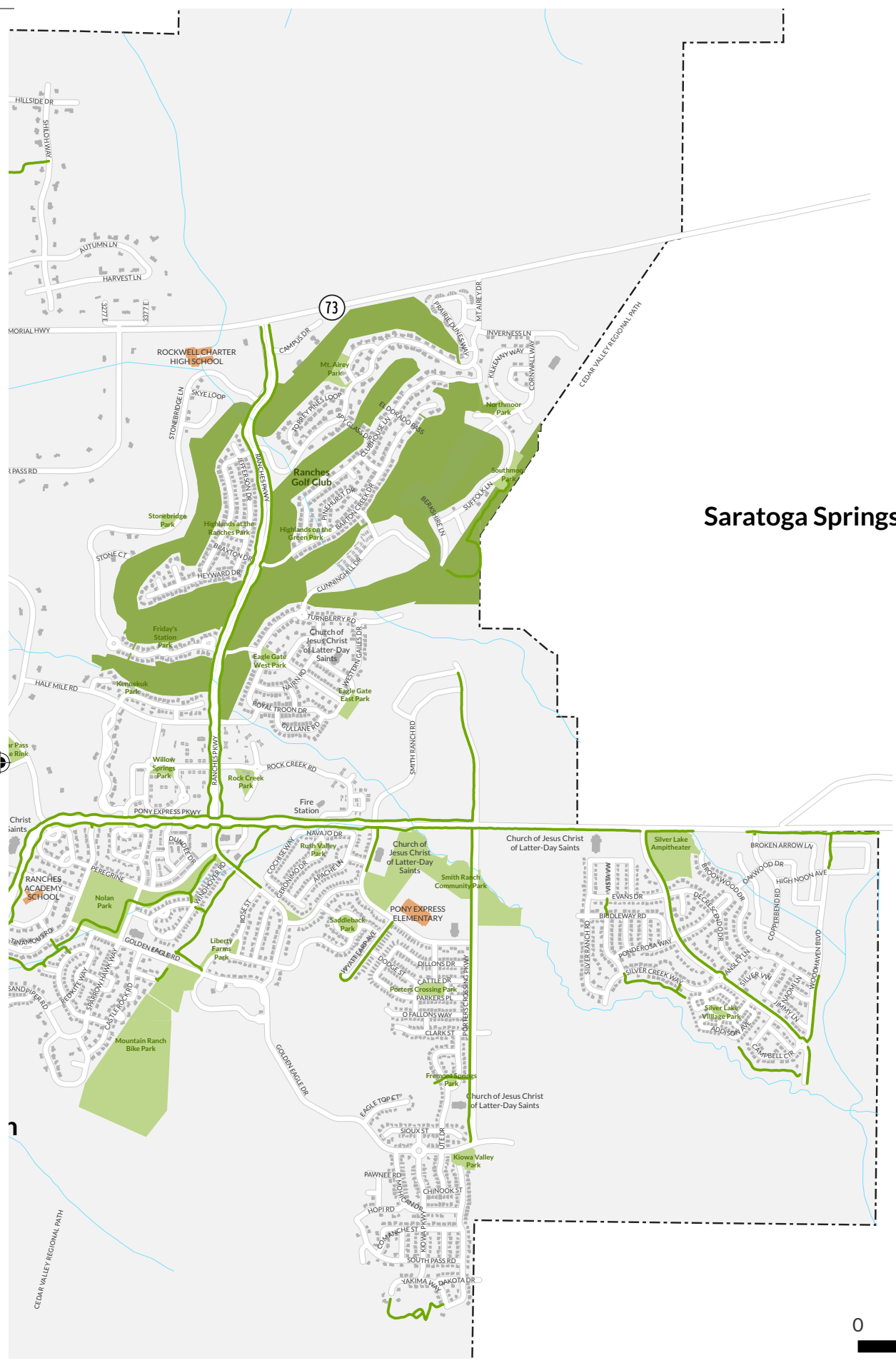


Figure 3.5 Ranches Existing Conditions Map

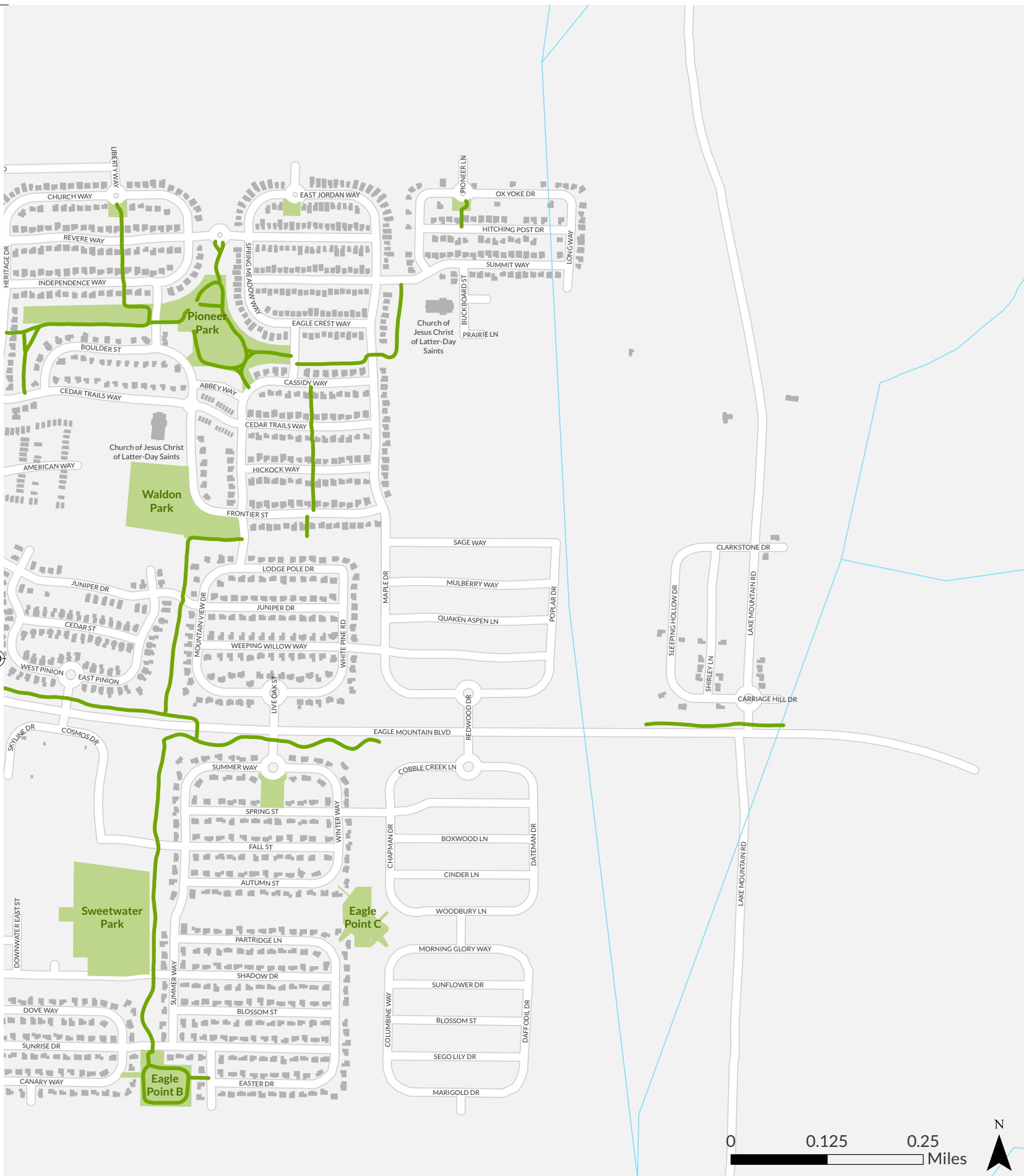




- EXISTING**
-  Existing Shared-Use Paths
 -  Roads
 -  Golf Courses
 -  City Parks
 -  Waterways
 -  Building Footprints
 -  School Buildings









All public schools in Eagle Mountain are in the Alpine School District, which covers most of northern Utah County. Eagle Mountain has five public elementary schools (Black Ridge, Hidden Hollow, Pony Express, Eagle Valley, and Mountain Trails) and one public middle school (Frontier). High school students (grades 10-12) in Eagle Mountain attend Westlake High School in Saratoga Springs; within the next five years, a public high school will be built in Eagle Mountain. There are also two public charter schools in Eagle Mountain: Ranches Academy (K-6) and Rockwell Charter High School.

Shared-use paths connect users to within 1/3 of a mile of each school in Eagle Mountain, though some paths end prematurely or do not access the school directly. Improving connectivity between schools and adjacent neighborhoods will encourage more students to ride a bike or walk and can motivate parents to allow their children to do so.

Sidewalks

87% of online survey respondents said that the sidewalk network near their home was complete or mostly complete but with some gaps. The neighborhoods and general areas that have incomplete sidewalks are:

- New and/or unfinished neighborhood developments (homes built before roadways, curbs, gutters, and sidewalks)



Sidewalk gap at an Eagle Mountain Blvd intersection in City Center

- City Center neighborhood south of Eagle Mountain Blvd and bounded by Ira Hodges Parkway and Major Street
- Entrances to some City Center neighborhoods
- By its nature as a large lot, semi-rural development, the low-density Cedar Pass Ranch neighborhood
- All neighborhoods north of Cory Wride Memorial Highway (SR-73)



Mountain Ranch Bike Park

The Mountain Ranch Bike Park, located on Golden Eagle Rd in the power line corridor between Castle Rock Rd and Jacob's Way, was the first mountain bike park of its kind in the Wasatch Front region. The Park reaches a local and a regional audience, well-known as a viable alternative to more popular riding areas in the Wasatch



History, rules, and tips posted at the entrance to Mountain Ranch Bike Park



The skills park area (wood features and pump track) of the Park



Back, especially during the winter. It features a skills park (pump track and wood features) as well as a jump line, two slope style tracks, and several intermediate and expert cross country and downhill trails. Although some new trails have been added in recent years, the park has remained largely unchanged since it was built in 2009. There is additional land nearby that may allow for expansion in the future. If this comes to



fruition, parking demand management will be important for Park users as well as residents.

Athletes and coaches from the Lehi High School Mountain Bike Team, which covers Lehi, Saratoga Springs, and Eagle Mountain and is part of the Utah High School Mountain Bike League and the National Interscholastic Cycling Association (NICA), regularly use the park to train and practice for races. Many of the features in the park and adjacent hillside, however, are too difficult for entry and intermediate-level riders, including most adults and youth.

Safe Routes to School Program



Individual schools in Alpine School District may promote walking and bicycling programs and incentives. They are also individually responsible for installing on-site walking and bicycling amenities, like bicycle parking. The district works with each city to promote and encourage bicycling and walking infrastructure (i.e. paths, sidewalks, bike lanes, crossings) so that students feel as safe as possible



walking and bicycling to school. One of the District's concerns is that in cities with newer developments, like Eagle Mountain, homes are built before sidewalks and other infrastructure, making walking and bicycling to newer schools more difficult.

As of 2012, approximately 17% of schools in the United States participated in a Safe Routes to School (SRTS) program.³ None of the schools in Eagle Mountain, however, have SRTS programs. Alpine School District encourages their schools to look at Meadow Elementary School (Lehi) and Alpine Elementary School (Alpine) as exemplary SRTS programs. Between September 2008 and May 2010, Alpine Elementary School increased the

³ "Benchmarking", 135.



Alpine Elementary School in Alpine, UT, was selected as the winner of the 2010 James L. Oberstar Safe Routes to School Award by the US Department of Transportation. (Photo: LetsMove.gov)

percentage of students walking or bicycling to school to over 50% (from 35%). Strategies to encourage students and parents to walk and bike more included assemblies, safety poster contests, bike rodeo, and safety walks.⁴

Crashes

In recent years, the number of bicyclist fatalities in crashes has decreased overall in the United States (with an increase during 2014), particularly for bicyclists under 16 years old and in larger cities or more dense communities that have increased investment in bicycle facilities. Pedestrian crash and fatality rates also decreased dramatically as walking rates increased.⁵

11 

CRASHES INVOLVING BICYCLISTS

10 

CRASHES INVOLVING PEDESTRIANS

33% OF THESE CRASHES OCCURED DURING **PEAK COMMUTE TIME**

50% OCCURRED AT **DUSK OR AT NIGHT**

0 **INCAPACITATING OR FATAL INJURIES RELATED THESE CRASHES**

⁴ <http://www.letsmove.gov/blog/2011/01/25/utahs-alpine-elementary-earns-2010-oberstar-award-national-center-safe-routes-school>

⁵ "Benchmarking", 85.



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Bicycles parked in front of Mountain Trails Elementary School in City Center


4: Recommended Programs & Policies

This chapter contains program and policy recommendations that will improve the existing system; make bicycling and walking more accessible and enjoyable for all Eagle Mountain residents, visitors, and other patrons, especially youth; and take advantage of a standardized bicycle and pedestrian facility system.

Programs & Policies


 Education, encouragement, enforcement, promotional, and school-based programs enhance the walking and bicycling experience and can be cost effective complements to infrastructure investments. Research shows that adopting and maintaining new behaviors related to bicycling and walking is a process that involves changing the way transportation users relate to one another and choose to travel. The following strategies will help people in Eagle Mountain realize the full potential of the recommended network of built infrastructure (bike lanes, paths, sidewalks, crosswalks) and will help the City achieve the goals set forth earlier in this Plan.

SAFE ROUTES TO SCHOOL

 Although Safe Routes to School (SRTS) events and activities have been held at some Eagle Mountain schools, there is limited formal guidance

or support for SRTS. Historically, SRTS promotion has fallen on the individual school champions like principals or school board members. Formalizing an SRTS program and providing easily implementable strategies is a major goal of this Plan. The SRTS Champion Agreement serves as the cornerstone of this Plan's SRTS recommendations. Without a designated and committed champion at each Eagle Mountain School, most SRTS-related programs are unlikely to succeed or create real change over the long-term.

SRTS Champion Agreement

Formalize a parent volunteer program through PTAs to identify and retain SRTS Champions  and provide them with resources and toolkits from existing programs. The SRTS Champions Agreement (p. 34) recognizes commitment from both the City and the volunteer Champion to make efforts to improve bicycling and walking conditions for Eagle Mountain youth. SRTS Champions will be vital in implementing many of the recommended SRTS activities including conducting bike/walk audits and establishing education and safety programs.



Eagle Mountain Safe Routes to School Champion Agreement

Date: _____

School Name: _____

Do you have a passion for physical activity, a healthy community, and clean air? Eagle Mountain schools are looking for parent volunteers to champion the Safe Routes to Schools (SRTS) program. This program works to support schools with fun and engaging activities and events that increase walking, bicycling, and carpooling to school. The role of a Safe Routes to Schools Champion is to be the school liaison and coordinator of SRTS programs with the support of school staff.

The anticipated time commitment from the SRTS Champion is 2-4 hours per month. Champion tasks include:

- Serve as the school liaison and point of contact for Safe Routes to School activities at your school
- Support in getting onto the agenda for PTA and Staff meetings
- Coordinate the execution of the Safe Routes to School Program identified in the Eagle Mountain Bicycle and Pedestrian Master Plan

In exchange for school and SRTS champion participation in executing SRTS programs, the City of Eagle Mountain has agreed to be a willing partner in support of SRTS goals as resources allow. Eagle Mountain will prioritize infrastructure improvements within 1/4 mile of schools to establish an active transportation system that allows safe and efficient biking and walking routes to Eagle Mountain schools. The partnership between Eagle Mountain City, Eagle Mountain schools and SRTS Champions is critical in creating a healthy culture of walking and bicycling among Eagle Mountain's youth. This agreement should be renewed annually to ensure continued commitment to SRTS goals.

Champion Signature

Principal Signature

Eagle Mountain Planning Director Signature

Figure 4.1 Sample Safe Routes to School Champion Agreement



SRTS Walk and Bike Audits



Audits help to demonstrate the City's commitment to safer routes to schools by identifying and prioritizing recommended projects in this Plan that are within ½ mile (walking) or 1 mile (bicycling) of schools, as well as other projects that provide missing links or logical connections to these facilities (i.e. connections from neighborhoods outside of the boundary to pertinent schools). Perform walk and bike audits in order to identify the top projects, especially those that are ready for grant applications.

School Planning and Design



An essential part of the SRTS program is ensuring that any future development or projects near schools help improve transportation for all users, especially vulnerable users like pedestrians and bicyclists.

- Encourage developers and Alpine School District to locate schools in accordance with ITE's Safe Routes to School Briefing sheet on "School Site Selection and Off-Site Access"
- Encourage Alpine School District to require school site and facility designs to comply with ITE's Safe Route to School Briefing Sheet "School On-Site Design"

Establish a School Bicycle Parking Program



Currently, each school is responsible for funding, installing, and maintaining its own bicycle parking. Establish a comprehensive school bicycle parking program, funded by the City, Alpine School District, a coalition of schools in Eagle Mountain, PTAs, and/or neighborhood organizations (HOAs) that will ensure consistent, sufficient, and organized bicycle parking at each school. The comprehensive school bicycle parking program should include the development of school bicycle parking guidelines and regular assessments.

SRTS Education and Safety Programs



Provide bicycle education for elementary school children. Work with schools to establish and expand SRTS programs to teach children to safely walk and ride a bicycle to school.

Assess the feasibility and cost of including middle school/junior high and high school roadway safety

education. This strategy will educate new drivers about how to be safe driving around other users that are walking and bicycling to school instead of driving.

SRTS Encouragement

Encouraging more bicycling and walking to schools can be achieved through a variety of programs and strategies. Potential SRTS encouragement activities could include, but are not limited to:



- Increasing awareness of SRTS at back to school nights
- School assemblies
- Hosting "Walk and Roll to School" events
- SRTS related contests: poster contests, inter-classroom competition for most students riding or walking to school
- Creating Walking School Buses and Bicycle Trains



Bicycle parking near the entrance of Mountain Trails Elementary



Walking school bus in Columbia, Missouri

SRTS Evaluation



Surveying student transportation modes are an important way to measure the success of SRTS programs and activities. The SRTS Champion should seek to implement one or both of the following survey methods to help measure student transportation choices in Eagle Mountain Schools.

Parent surveys help Safe Routes to School program facilitators stay in touch with parents and understand their concerns and perceptions of walking and bicycling. Because they collect information about transportation mode choice and how far from school the family lives, they provide valuable insight into the potential for shifting to active or shared modes of transportation.

The National Center for SRTS parent survey is an established survey form and methodology. Results can be sent or entered into the Data Collection System, which generates reports by school and program-wide, comparing among time periods.

Student hand tallies are a quick and effective way of gathering data about students' transportation mode for a Safe Routes to School program and are often required for SRTS funding. Teachers, program staff, and/or volunteers simply go to classrooms at participating schools and ask students how they get to and from school. Hand tallies are considered the most accurate method of collecting information about the school commute. The National Center for SRTS has developed a standard tally sheet for use.

Table 4.1 Safe Routes to School Programs

Program Name	Responsibility	Resources	Goal	Time Frame	Potential Cost
Champion Agreement	EM City, Alpine School District (ASD)	Sample Champion Agreement	Establish at least one SRTS Champion at each school in Eagle Mountain	Short-term	Medium
Walk & Bike Audits	EM City Public Works, ASD	SRTS Briefing Sheet on Walking & Bicycling Audits	Perform one bicycling and walking audit per school per year	Mid-term	Medium
School Planning & Design	EM City Planning, ASD	ITE's School Site Selection and Off-site Access; School On-Site Design	Develop formalized school design guidelines for Eagle Mountain schools that promote walking, bicycling, and overall travel safety.	Short-term	Low
School Bicycle Parking	EM City, ASD, SRTS Champions	APBP Bicycle Parking Guidelines	Establish a partnership program between Eagle Mountain City and Alpine School district to provide sufficient and secure bicycle parking at all Eagle Mountain schools	Mid-term	Medium
Education & Safety	SRTS Champions	Utah DOT Student Neighborhood Access Program; National SRTS Center	Conduct a minimum of one safety or education campaign each year	Mid-term	Low
Encouragement	SRTS Champions	SRTS Walking School Bus Guide	Conduct two or more encouragement activities annually	Mid-term	Medium

IMPROVING SAFETY

The following safety-related programs will support the Plan goal to promote pedestrian and bicycle safety and awareness through education and encouragement activities. Safety education and other programs will



help to form lifelong transportation habits, especially for youth. It is also important to continue to educate adults about new bicycle and pedestrian facilities and how to interact with them regardless of which travel mode they prefer to ensure safe streets for all users of the roadway. Targeting wider audiences will build broad community knowledge about safety and bicycle riding and walking opportunities.

Safety Campaign

Develop or research educational materials and programs that explain how to safely drive and bicycle on or near streets with bicycle facilities. This information will help people understand how to use new and existing facilities for all modes of travel and will help to clear up biases and misinformation surrounding bicycling and walking. Work with the Utah County Sherriff's Office Eagle Mountain Division to help share materials promoting all users' responsibilities for safe streets.

Education and Awareness Campaigns

Educating all users on rules of the road and creating awareness of bicyclist and pedestrian issues is the goal of any bicycle/pedestrian campaign. Creating and implementing customized campaigns allow targeted messages to get to the right audiences. An education and awareness campaign can be as large



Road Respect is a statewide program that promotes cooperation and respect between all road users (Photo: UDOT)

or small as necessary to fit the time and budget of the implementation staff. Campaigns can include Public Service Announcements (PSAs) on local media outlets, billboards, bus wraps, fliers around the community, interactive booths at farmers markets, and announcements or notices through the schools. Campaigns can focus on:

- Bike safety
- Pedestrian education
- Driver awareness of bicyclists/pedestrians
- Rules of the road
- Safe Routes to School (SRTS)
- Health benefits of active transportation
- Sharing the road
- Identifying as a bicyclist/pedestrian

Table 4.2 Safety Programs

Program Name	Responsibility	Resources	Goal	Time Frame	Potential Cost
Safety Campaign	EM City Public Information Officer	League of American Bicyclists' Ride Smart Campaign	Broadcast at least two bicycle or walking safety campaigns annually via the City's communication channels include flyers, social media and the City website	Short-term	Medium
Education & Awareness Campaigns	EM City Public Information Officer	UDOT's Road Respect Campaign	Broadcast at least two bicycle or walking education and awareness campaigns each year	Mid-term	Medium

WAYFINDING & TRIP PLANNING

Wayfinding tools such as signs, pavement markings, maps, and online trip planning tools do not replace the need for high-quality bicycle facilities. They can, however, make the bicycling and walking network easier to navigate and access. These programs will make information easier to find and use, improving equitable access to the benefits of bicycling or walking.

Unified Wayfinding System

Create a unified wayfinding system that uses bicycle and pedestrian-scale standard or modified signage to direct people to destinations in Eagle Mountain (i.e. transit stops, City Center, The Ranches, parks, schools, trailheads, shared-use paths, mountain biking trails, neighborhoods, and community landmarks) and general destinations in adjacent communities. Incorporate new destinations and include wayfinding signs as a component of all projects. Coordinate with major institutions to encourage cohesive signage and information sharing.

Develop Bicycle & Pedestrian Mapping Resources

Develop a bicycle map, possibly as a joint area map with Saratoga Springs, that shows bicycling and shared-use facilities and additional information regarding programs and applicable traffic laws on the back or side of the map. Make all bicycle-related GIS data available through the Eagle Mountain City website and publish other bicycle and pedestrian data (such as collision analysis) to allow development of third-party applications. Link to MAG's existing trail, path, bikeway, and sidewalk maps.

Upload current bikeway and shared-use path data to Google Maps. Many smartphone users rely on Google for wayfinding and navigation. Recent improvements, like turn-by-turn bicycling and walking directions, make navigation for bicyclists and pedestrians easier. Providing Google with accurate data can be a simple and easy way to improve wayfinding at little cost to the City.



Wayfinding sign from Jackson, Wyoming, with destinations, mileage, and time required to travel by bike

Table 4.3 Wayfinding and Trip Planning Programs

Program Name	Responsibility	Resources	Goal	Time Frame	Potential Cost
Unified Wayfinding System	EM City Planning, Parks, and Public Works	Town of Jackson, WY Bicycle Improvement Plan	Develop a formalized wayfinding system that can be implemented for the on and off-street bicycle and pedestrian network	Short-term	Medium
Mapping Resources	EM City Planning, Public Information Officer	Salt Lake City Bikeways Map, MAG Online Maps, Google Maps	Develop an annually updated bicycling and walking map. Publish annually-updated GIS mapping of paths, sidewalks, and bikeways to the Eagle Mountain City website and the MAG website. Annually update new path, sidewalk, and bikeway data to Google Maps	Mid-term	Medium



ECONOMIC & COMMUNITY DEVELOPMENT

Bicycle and pedestrian infrastructure and activity can serve as a powerful tool in Eagle Mountain's economic and community development strategies. Cities around Utah and North America are seeing that a bicycle-friendly reputation can be advantageous in attracting new residents, creating economic growth, and creating more livable and vibrant communities.

The City should seek to promote access to paths and trails, recreation and public lands as a selling point for

prospective residents and future development. The City should maintain an updated fact sheet highlighting Eagle Mountain's number of trails, paths, bikeways and recreation statistics.

Eagle Mountain City should also support events that encourage neighborhood-level active transportation. These events could include Summer Streets (also known as Ciclovía, Open Streets, or Parkways programs), Kidical Mass, and others.



A Sunday Parkways (Open Streets) event in Portland, Oregon

Table 4.4 Economic & Community Development Program

Program Name	Responsibility	Resources	Goal	Time Frame	Potential Cost
Miscellaneous	EM City Planning	Bike Walk Alliance's Open Streets Guide	Promote neighborhood level active transportation events	Short-term	Medium



REPORTING

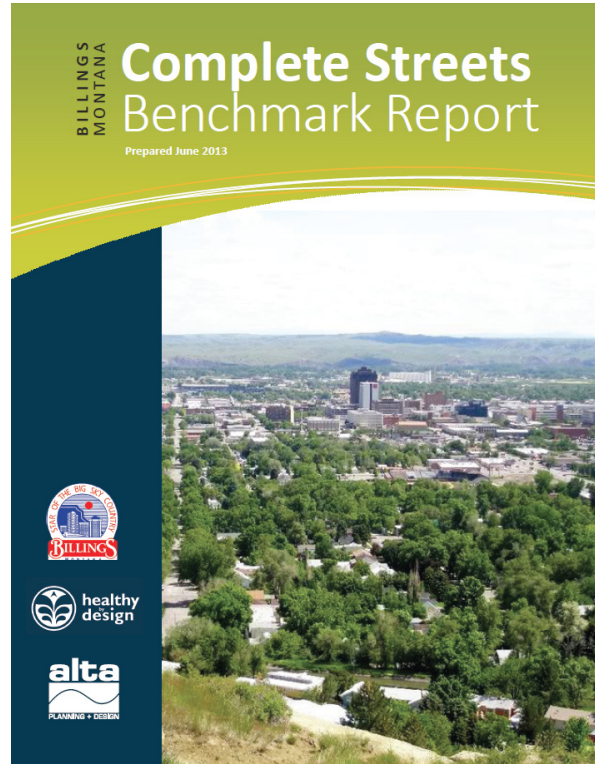
Measuring the utility, participation, and performance of these programs and the overall bicycling and pedestrian system will help the City determine how well the Plan is meeting its goals over time, highlight the need for any course adjustments, and measure how effectively funding is being allocated and spent. The outcomes of these measures can also help Eagle Mountain celebrate victories, small and large, and keep momentum moving forward.

Annual Count Program

One way to determine this Plan’s success at increasing bicycling and walking rates and associated safety, is to establish an annual data collection program. At a minimum, this program should tally the number of bicyclists and pedestrians at key locations around the community (particularly near schools or other bicycle and walking trip generators). The same locations should be counted in the same manner annually. If major bikeway or greenway infrastructure projects are planned, baseline and post-construction user counts can be performed through this coordinated annual count process for maximum efficiency. This will provide the City with information about the growth of bicycling and walking.

Annual Report

An annual report should be published each year and include relevant bicycling and pedestrian metrics (count results, new bikeway/greenway/sidewalk facility miles, major completed projects, bicycle and pedestrian-involved crashes, number of organized events) and



Billings, Montana's 2013 Complete Streets Benchmark Report

may also include information on user satisfaction, public perception of safety, or other relevant qualitative data that has been collected. Cumulative bikeway, path, and sidewalk mileage should be shown to demonstrate long-term progress in improving infrastructure. Crash data should also be compiled annually as part of this effort to highlight improvements that have increased safety and to monitor developing trends. The report can take many forms and be as simple or complex as desired. For an example, see the San Francisco Bicycle Coalition’s annual report.

Table 4.5 *Evaluation Programs*

Program Name	Responsibility	Resources	Goal	Time Frame	Potential Cost
Annual Counts	EM City Planning, Parks, and Public Works	National Bicycle and Pedestrian Documentation Project	Annually quantify number of users taking utilizing Eagle Mountain’s paths, sidewalks, and bikeways	Short-term	Medium
Annual Report	EM City Planning	San Francisco Bicycle Coalition Bike Report Cards and Annual Reports	Release an annual report of active transportation progress included user counts, miles of bikeways and pedestrian facilities constructed and other relevant data	Short-term	Medium



BICYCLE PARKING POLICY RECOMMENDATIONS

Bicycling parking is an important end-of-trip facility for those riding bicycles for any purpose. Secure end-of-trip accommodations encourage people to travel by bicycle.

The City should formally adopt parking generation code language changes and recommendations found



in *Appendix C: Bicycle Parking Generation Code Language* into Chapter 17.55 of the Eagle

Mountain City Code, thereby increasing the number and quality of end-of-trip standardizing bicycle parking for all new development and redevelopment.

Additional information and standards about short and long-term bicycle parking, placement and parking area design, recommended and discouraged racks, and on-street bicycle corrals are found in *Appendix A: Design Standards* and should be treated as such once adopted as standards in the City Code, development standards, and other ordinances.



Bicycle parked at a rack outside of a meetinghouse of the Church of Jesus Christ of Latter-day Saints





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Rendering of what Golden Eagle Drive would look like with proposed bike lanes and improved crossing

5: Recommended Facilities

Off-Street Path Recommendations

Eagle Mountain boasts a robust existing network of off-street, shared-use paths, which serves Eagle Mountain's residents well, especially young families who typically prefer low-stress facilities. Shared-use paths, as discussed in Chapter 3, are facilities separate from roadways for use by bicyclists, pedestrians, and other non-motorized user groups. They are frequently found in separate rights-of-way along railroads, utility corridors, parks, and waterways, but can also exist within the street or highway right-of-way with adequate separation. Shared-use paths are generally paved, however unpaved examples can exist that function well for multiple user groups.



A typical shared-use path

Specific guidelines on location selection, widths, implementation, and other design standards are found in *Appendix A: Design Standards*. The following off-street, shared-use path recommendations describe diverse approaches to improving and expanding on Eagle Mountain's existing system.



REGIONAL PATHS

This type of shared-use path is typically longer and improves regional connectivity within Eagle Mountain or between Eagle Mountain and adjacent communities. Four regional paths have been mentioned in previous planning studies and are included in this Plan:

- Pony Express Regional Path
- Cedar Valley Regional Path
- Sweetwater Regional Path
- Railroad Grade Regional Path

PARKS AND OPEN SPACE PATHS

These paved or unpaved paths are either within parks or open space areas or they act as short connections between other paths, parks, and open space. This facility type is recommended where development has already occurred and investment in these recommendations will likely be undertaken by the City rather than by future development.



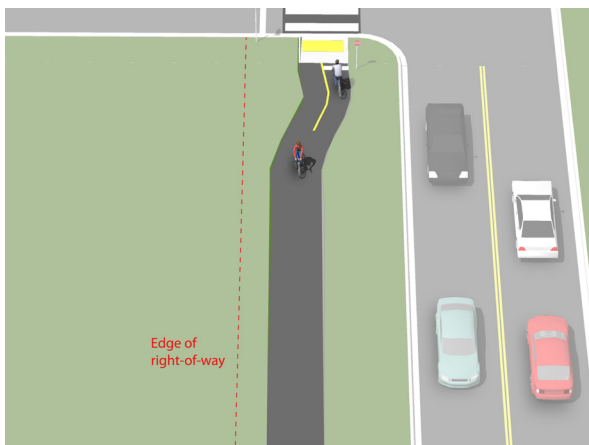
CONCEPTUAL PARKS AND OPEN SPACE PATHS

Eagle Mountain's evolving development patterns will require a long-term, shared-use path implementation approach. Conceptual parks and open space path recommendations shown in this Plan are not meant to be representative of all future paths or exact alignments in undeveloped areas. Rather, these recommendations are meant to communicate connections to key destinations, general location of path corridors and general density of the overall off-street bicycling and walking network. These conceptual path corridors should be coordinated with the development process so that as parcels develop, the parks and open space path and trail system can grow in a logical and systematic way while still providing flexibility for developers.



SIDEPATHS

Sidepaths, also discussed previously in Chapter 3, are shared-use paths that are next to a roadway and tend to have more driveway and roadway crossings. Due to their proximity to traffic, they require additional safety considerations.



A typical sidepath, adjacent to and/or within the same right-of-way as the roadway

On-Street Bikeway Recommendations

This section outlines how recommended, on-street bikeways will improve the connectivity to and comfort of Eagle Mountain's existing facilities and destinations. One of the principal needs identified through the

public input process was the lack of on-street bikeway connections in Eagle Mountain. The intent of these recommendations is to bring the same connectivity and accessibility that Eagle Mountain's off-street, shared-use path network currently offers to a network of on-street facilities. Traditional on-street facilities, like bike lanes, have typically served more experienced bicyclists, but several of the facilities proposed in this Plan, like bicycle boulevards and buffered bike lanes, will cater to bicyclists of all ages and abilities.

Opportunities to develop on-street bicycle facilities into a cohesive network will vary and may range from deliberate and coordinated development on the part of the City to taking advantage of independent street construction, reconstruction, and resurfacing projects. Depending on existing right of way and roadway widths, reconfiguring roadway design to include on-street striping and symbols for dedicated bicycle facilities during street re-surfacing, in particular, is a low-cost way to provide bicycle infrastructure. In these cases, additional study and public outreach activities may be needed prior to implementation. The recommended Eagle Mountain on-street bikeway network represents a comprehensive set of existing and proposed bicycle facilities.



BICYCLE BOULEVARDS

There are many opportunities to upgrade some of Eagle Mountain's local streets (and sometimes collectors) into bicycle boulevards. Bicycle boulevards are low-volume, low-speed streets that enhance bicyclist comfort by using a variety of treatments, such as signage, pavement markings, traffic calming, and/or traffic diversion and intersection modifications. These treatments allow bicyclists to ride comfortably without a dedicated lane while simultaneously discouraging through-trips by non-local, motorized traffic.

Typically, local streets with vehicle speeds at or below 25 miles per hour and vehicle volumes at or below 3,000 vehicles per day (with 1,500 vehicles per day preferred) are the most comfortable for bicyclists of all ages and abilities. Speed limits on some of Eagle Mountain's collector streets may need to be reduced





Bicycle boulevard treatments shown include wayfinding signage, directional wayfinding pavement markings, and curb extensions

to meet this criteria. Many of the improvements made for bicyclists are also advantageous for pedestrians and homeowners. Crossing improvements, increased activity, and calmed traffic conditions can make bicycle boulevards natural walking corridors and more pleasant streets, as well.

BIKE LANES

A bike lane provides a striped lane with bicycle pavement markings for one-way travel on a street or highway. Many of the bike lane recommendations in this Plan will occur in conjunction with pavement resurfacing or roadway reconstruction.



Bike lanes are delineated from the adjacent travel lane by a painted line parallel to the lane

BUFFERED BIKE LANES

Similar to bike lanes, buffered bicycle lanes go one step further and provide additional width to 'buffer' the bike lane from the adjacent travel lane and/or parking, providing a more comfortable experience for bicyclists. When a roadway reconfiguration project converts an underutilized travel lane or parking lane into a buffered bike lane, sometimes excess width remains. Buffered bike lanes are an effective tool to discourage motorists from driving or parking in a bike lane that would otherwise be excessively wide.



Buffered bike lanes have a painted buffer on the travel lane and/or parking lane side, based on volumes, speeds, and parking turnover


BALANCING SHORT-TERM NEED WITH LONG-TERM PLANNING HORIZONS

Many of the recommendations for Eagle Mountain's bicycle and pedestrian system will be leveraged through newly recommended City standards, including standard street cross-sections, engineering standards, and the development code. The proposed system will be installed over time as existing roadways are repaved or widened to their full width, or as new roadways are constructed. However, there are a number of projects that potentially warrant improvement in the short-term without waiting on development to help improve conditions for bicyclists and pedestrians. The following projects have been proposed as near-term solutions.






Pony Express Parkway (Bobby Wren Blvd. to Mountain Ash Way)

 During the public process, many bicyclists expressed the need for improving on-street bicycling conditions on Pony Express, namely, shoulder width and pavement quality. Future construction of Pony Express Parkway (south of Eagle Mountain Blvd) will include buffered bike lanes (per the roadway cross-sections in the Design Standards), however the timing for this project is uncertain. To improve conditions along Pony Express in the near term, adding six feet of shoulder with a 1/2" aggregate chip size is recommended to facilitate bike lanes. At Bobby Wren Blvd., bicyclists will be advised to enter the sidepath.

Pony Express Parkway (Smith Ranch Rd to Saratoga Springs)

 Fully constructed segments of Pony Express Parkway from Smith Ranch Rd. to Ruby Valley

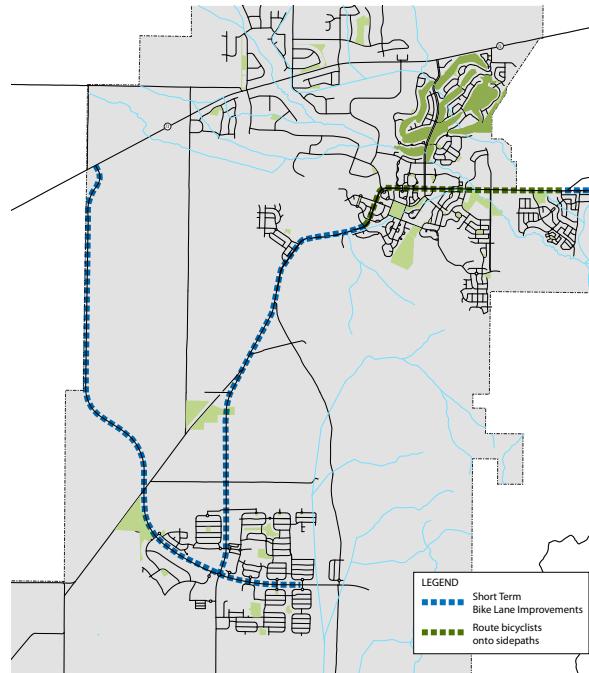


Figure 5.1 Short-term bikeway recommendations




A rendering of what Pony Express Parkway would look like south of Unity Pass, with improved shoulders and buffered bike lanes






Dr. pose barriers to accommodating bicyclists on the street within the existing curb-to-curb cross-section. Throughout these areas “Share the Road” signage should be installed to encourage motorists to respect bicyclists who choose to ride on the shoulder rather than on the dedicated shared-use sidepaths. Signage should also be installed to warn bicyclists that bike lanes end and should direct them onto the sidepaths along Pony Express Parkway.

Eagle Mountain Blvd (Cory Wride Memorial Highway to Lake Mountain Rd)

 Many residents also expressed concern about bicycling conditions along Eagle Mountain Blvd. High speeds, limited shoulder area, and uncomfortable pavement were among the chief concerns. The proposed cross-section for Eagle Mountain Blvd ultimately calls for an 8’ on-street, buffered bike lane and sidepaths, however near-term improvements should provide six feet of additional shoulder width with a 1/2” aggregate chip size to accommodate a 6’-0” bike lane.

Spot Improvements

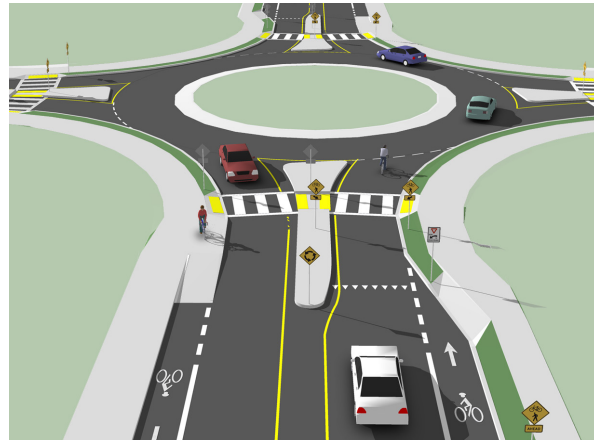
Many of the recommended improvements in this Plan are classified as spot improvements. Eagle Mountain has many miles of existing off-street paths. However, inconsistent connectivity and street interfaces are some common issues that prevent the overall system from functioning to its full potential. Proposed improvements include improved roundabouts, curb ramps, high visibility crosswalks, grade-separated crossings, and signals or beacons such as Rapid

 Rectangular Rapid Flashing Beacons and Hybrid Beacons. These improvements will help users navigate the existing and proposed systems more safely and efficiently.

UNSIGNALIZED CROSSING IMPROVEMENTS

Roundabout Improvements

In single lane roundabouts, it is important to indicate to motorists, bicyclists and pedestrians the right-of-way rules and correct way for them to circulate, using appropriately designed signage, pavement markings,



Roundabout improvements include curb ramps, marked, high visibility crosswalks, signage, and channelizers, among other treatments

and geometric design elements. These improvements to existing roundabouts in Eagle Mountain are outlined in greater detail in *Appendix A: Design Standards*.

Curb Extensions

Curb extensions, or bulbouts, visually and physically narrow the street creating shorter and safer crossings for pedestrians and bicyclists as well as potentially slowing motor vehicles at crossings. They can be installed mid-block or at intersections and can be used with the other treatments in this section. One advantage of curb extensions at signalized intersections is that they reduce the time needed for the pedestrian phase and can thereby increase intersection capacity and reduce wait times for all users.



Curb extensions shorten crossing distances for pedestrians and can calm traffic as well





Median Refuge Islands

A median refuge island is located in the middle of the roadway for bicyclists and pedestrians to use when crossing. Median refuge islands also provide added comfort and should direct users to see oncoming traffic before crossing the second half of the road. They can reduce crossing distances, allow staged crossing of the roadway, and improve visibility of bicyclists and pedestrians crossing the roadway.



Median refuge island

Undercrossings

Undercrossings are grade-separated crossings for bicyclists and pedestrians and are especially useful when crossing streets that have high volumes and/or high speeds. Special considerations for cost-benefit, lighting, safety, and topography need to be considered when evaluating potential use of an undercrossing.



A grade-separated undercrossing using the existing slope and riverbed to pass under a roadway

SIGNALIZED CROSSING IMPROVEMENTS

Full Signal

Full signals, present at most traditional signalized intersections, control competing flows of traffic from all legs of an intersection. They can be placed at road intersections (like existing signals at Pony Express Pkwy & Ranches Pkwy, and Cory Wride Memorial Highway & Ranches Pkwy), pedestrian crossings, and other locations. Full signals alternate right of way between conflicting directions of traffic and user types. Warrant for implementation should be determined before installation.

Hybrid Beacon

A hybrid beacon, or High-intensity Activated CrossWalk (HAWK), consists of a signal head with two red lenses and a single yellow lens below. Hybrid beacons were developed specifically to enhance pedestrian crossings of major streets in mid-block locations and, in limited cases, in locations where side street volumes do not support installation of a conventional traffic signal or where there are concerns that a conventional signal will encourage additional motor vehicle traffic on the minor street. If used at a minor intersection, it should be noted that hybrid beacons do not have signal indications for motor vehicles on the minor street approaches.



Hybrid beacon, or HAWK



The primary difference when compared with a standard, full traffic signal is that a hybrid beacon displays no indication (i.e., it is dark) when it is not actuated. Upon actuation, either by a pedestrian or bicyclist at the crossing or on the minor street, the beacon begins flashing yellow, changes to solid yellow, then displays a solid indication on both red lenses. After a determined amount of time (depending on crossing length), solid red turns to alternating, flashing red. Then the beacon returns to displaying no indication.

Rapid Rectangular Rapid Flashing Beacons (RRFBs)

A Rectangular Rapid Flashing Beacon, or RRFB, is a user-actuated, amber flashing light system that supplements warning signs at un-signalized intersections or mid-block crosswalks. The beacons can be actuated either manually by a push-button or passively through detection. RRFBs use an irregular (rapid) flashing pattern similar to emergency flashers on police vehicles and can be installed on either two-lane or multi-lane roadways (but should generally not be used where pedestrians cross more than two lanes of traffic without a refuge; additional guidance on where they are appropriate in *Appendix A: Design Standards*). RRFBs can be used to alert drivers to yield to bicyclists and pedestrians when they have the right-of-way crossing a road. They have been shown to improve driver yielding compliance up to 95% in most locations.



RRFB with passive detection (white bollard in foreground)

Eagle Mountain

- PROPOSED SHARED-USE PATHS**
- Regional Paths
 - Conceptual Parks & Open Space Paths
 - Parks & Open Space Paths
 - Sidepaths

- PROPOSED ON-STREET FACILITIES**
- Buffered Bike Lanes
 - Bike Lanes
 - Bicycle Boulevards

- PROPOSED SPOT IMPROVEMENTS**
- Roundabout Improvements
 - Crosswalks
 - Path Crossing Improvements (At-Grade)
 - Path Crossing Improvements (Grade-Separated)
 - Intersection and Mid-Block Signals & Beacons
 - Other Intersection Improvements
 - Miscellaneous Improvements

- EXISTING**
- Existing Shared-Use Paths
 - Roads
 - Golf Courses
 - City Parks
 - Waterways

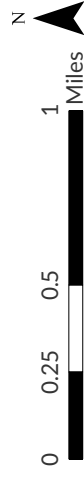
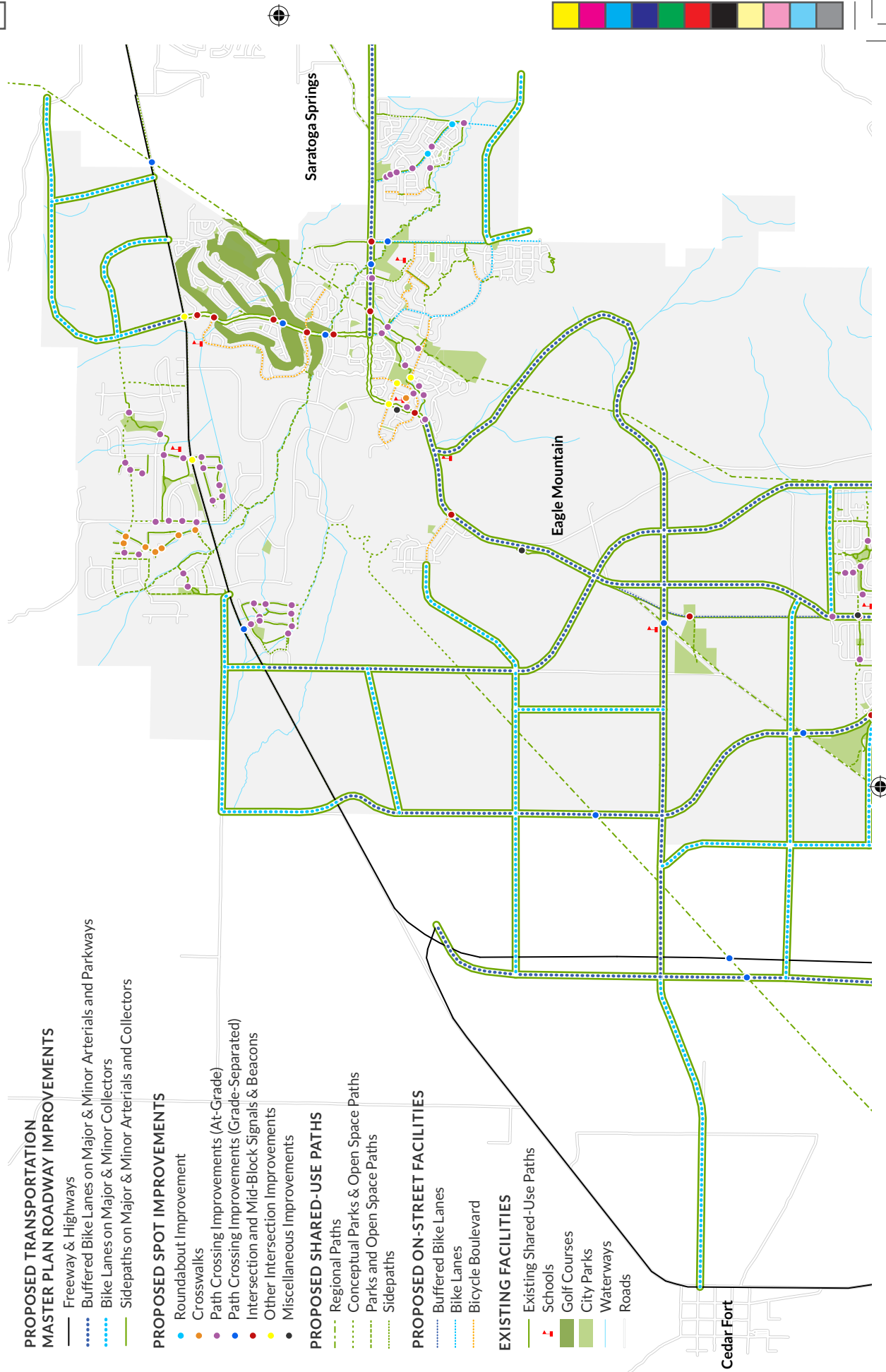


Figure 5.2 Citywide Recommendations Map



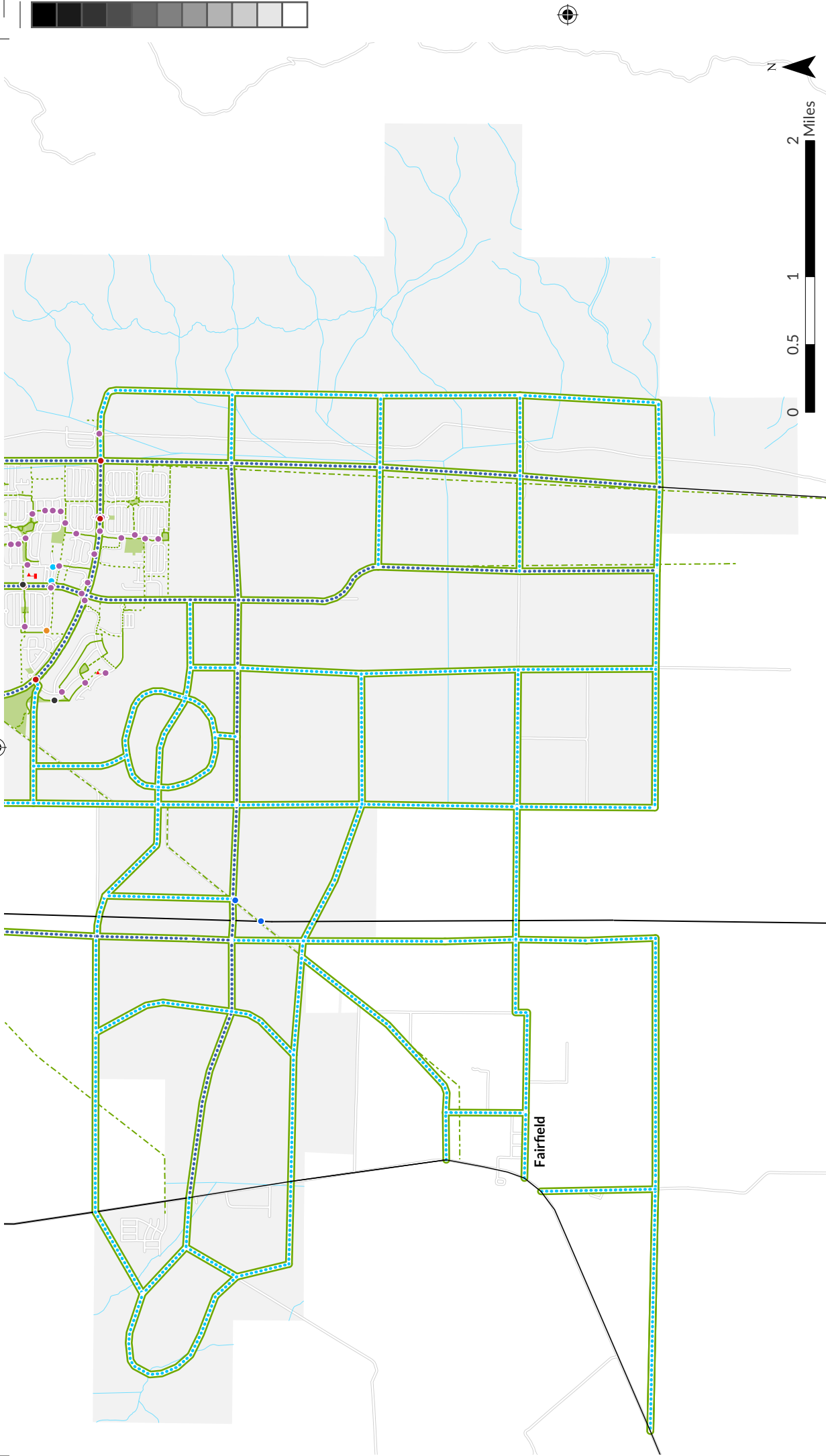
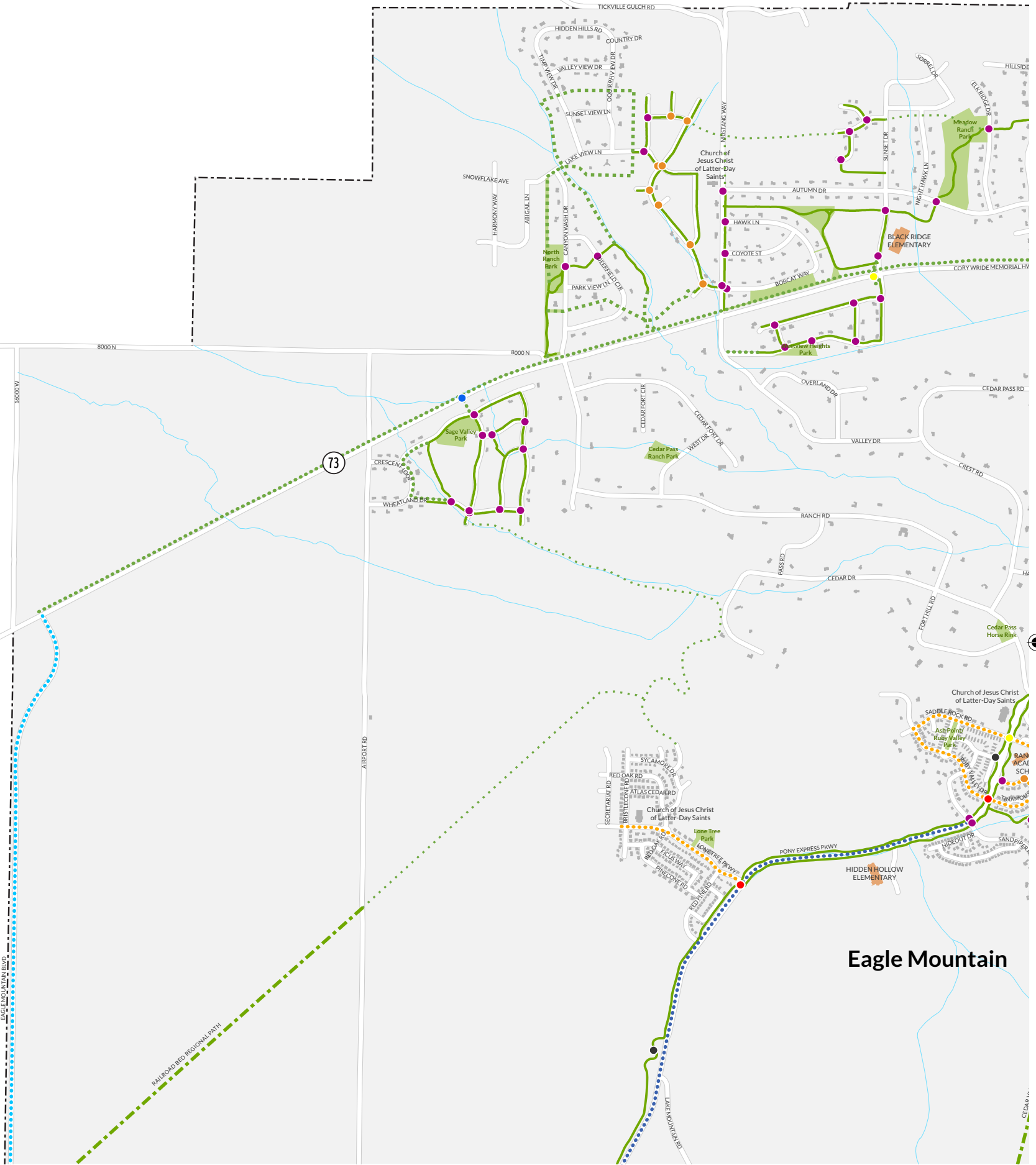
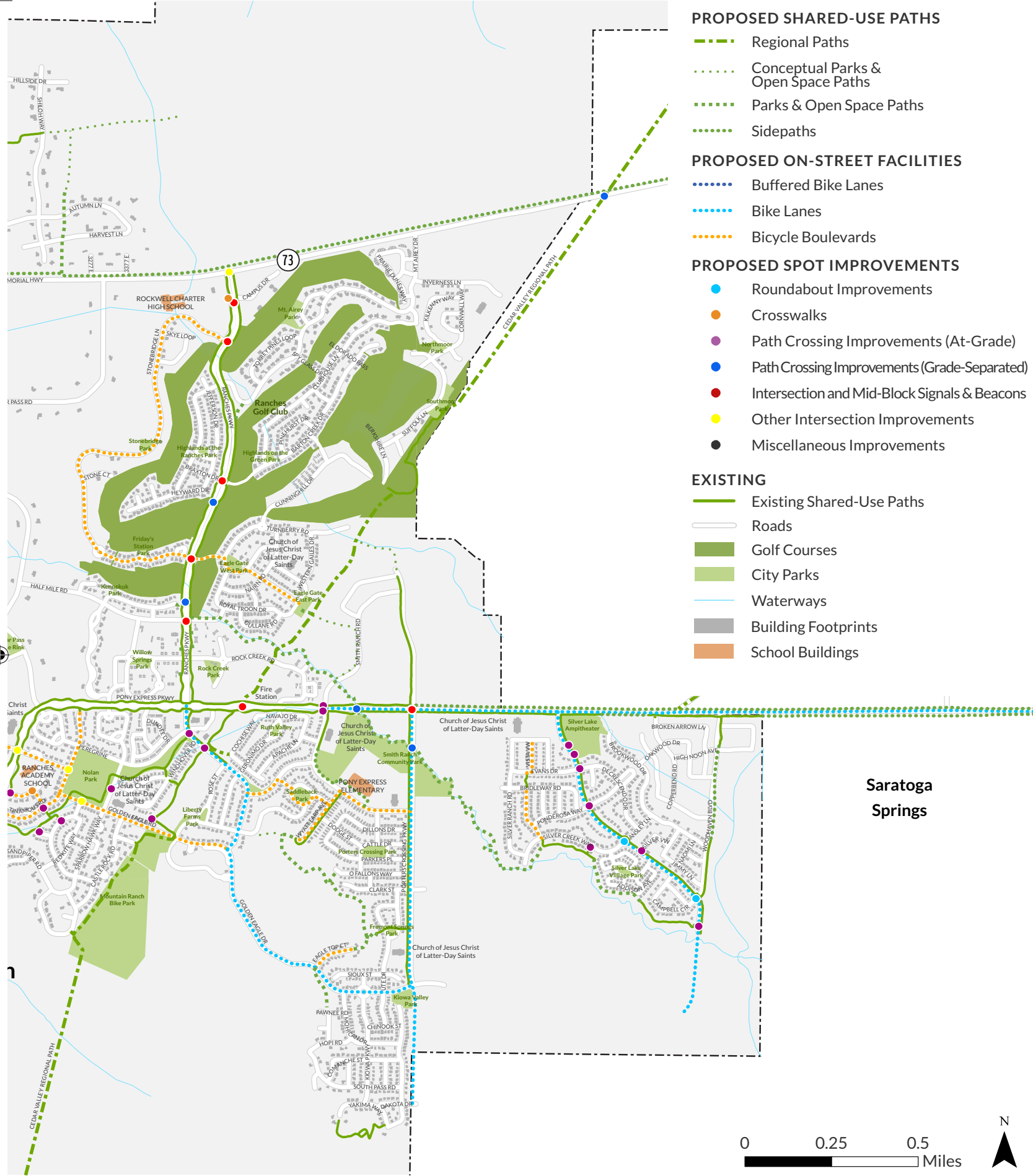


Figure 5.3 Citywide Recommendations Map with Future Planned Roadways from the Transportation Master Plan

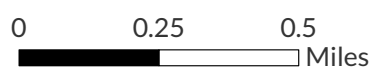


Eagle Mountain

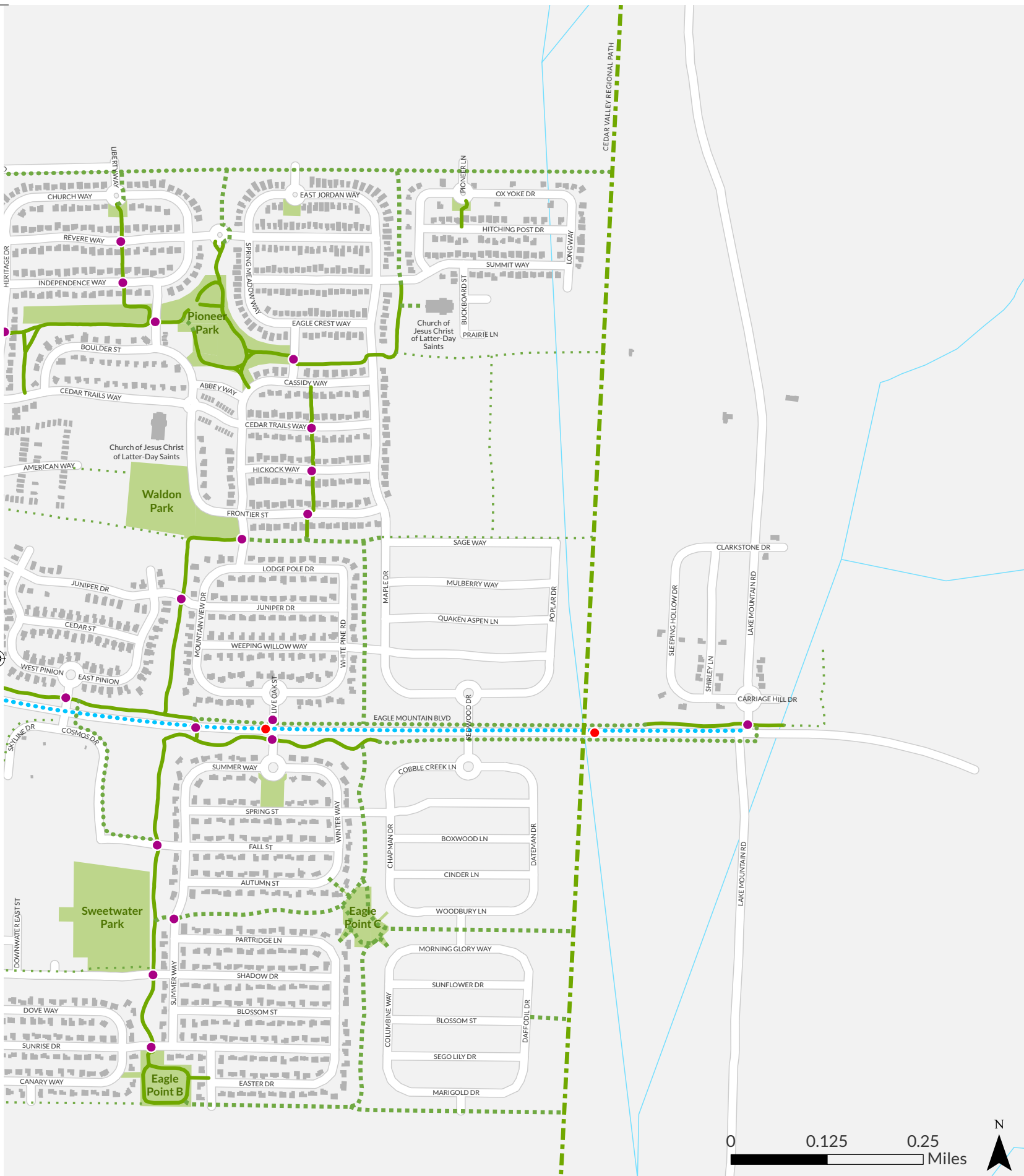
Figure 5.4 Ranches Recommendations Map



Saratoga Springs









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Mountain Bike Trails

The Lehi Mountain Bike Team, a member of the National Interscholastic Cycling Association (NICA), recently constructed 5.5 new miles of singletrack mountain bike trails on SITLA land in the proposed Upper Hidden Valley development. Ultimately, the Lehi Mountain Bike Team plans to hold multiple races per year at the venue with two races scheduled for the 2015 season. This could bring significant exposure and business to Eagle Mountain with thousands of potential spectators attending these races.

As the Upper Hidden Valley property develops, the City should encourage development that preserves as much of the trail system as possible and provides additional connections to the proposed Cedar Valley Regional Path. Linking the mountain bike trail system to the Cedar Valley Regional Path and the existing Mountain Ranch Bike Park would provide a valuable and accessible recreation asset for Eagle Mountain residents and visitors. In Figure 5.5, the trail alignment

has been placed on top of the proposed open space development plan in order to better visualize how the trail system might be integrated with future development.

Bicycle Safety Town

A bicycle safety town is a permanent course made for children to learn and practice safe cycling skills through community based safety education programs. The “miniature city” is built at about 1/3 scale and are typically a half-acre to an acre in size. The goal is to create safe behavior, habits, and an understanding of traffic rules in children at an early age. After children are instructed in pedestrian and bicycle safety, they receive hands on experience using bicycles. Children who take a bicycle and pedestrian safety class are proven to be less likely to be involved in a collision than children who did not receive training. Communities who build safety towns can take different design and training approaches depending on local needs and desires.

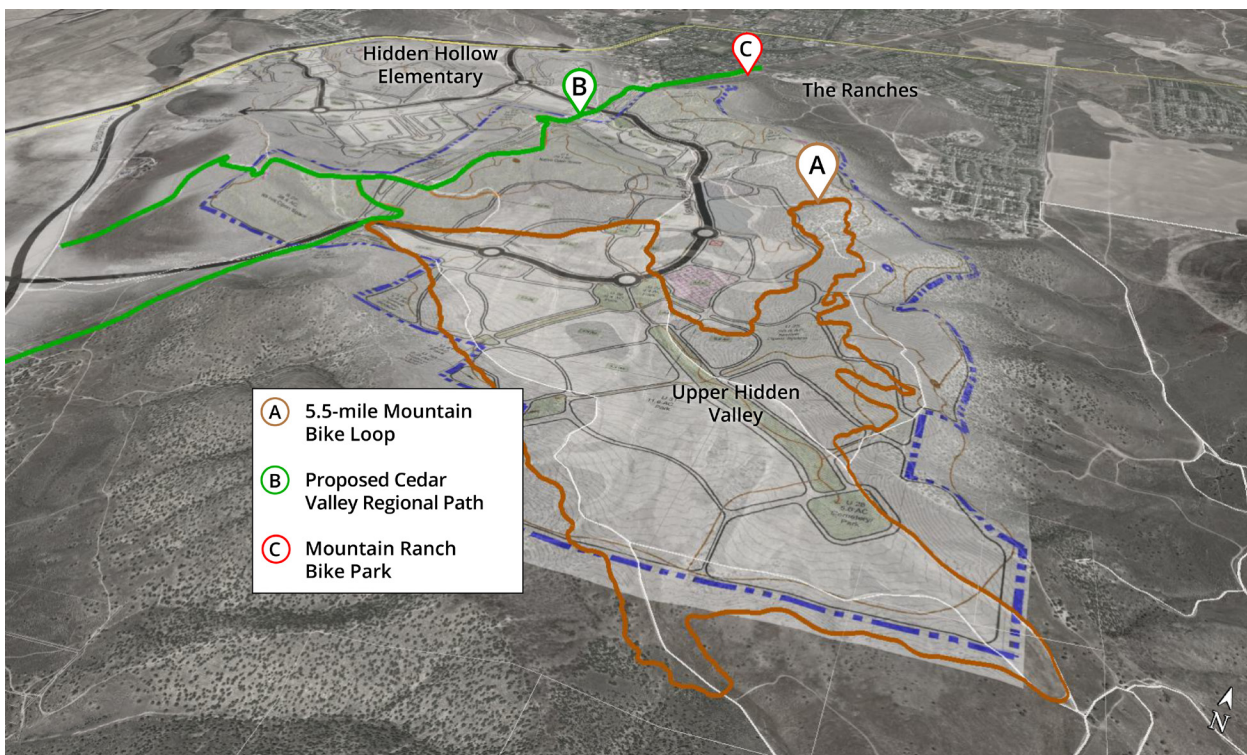


Figure 5.6 The mountain bike trail loop, proposed Cedar Valley Regional Path, and the existing Mountain Ranch Bike Park (Aerial photography: Google)

A bicycle safety town could easily be integrated into the design of future Eagle Mountain parks or school sites to provide residents a safe place to learn bicycle safety. Common design elements of a bicycle safety town include:

- Streets
- Traffic signals
- Signage (stop signs, yield signs etc.)
- Roundabouts
- Crosswalks
- Driveways
- On-street vehicle parking
- Overpasses
- Ramps



Children learn new skills and navigate in the bicycle safety town in Brookhaven, NY (Photo: Town of Brookhaven)

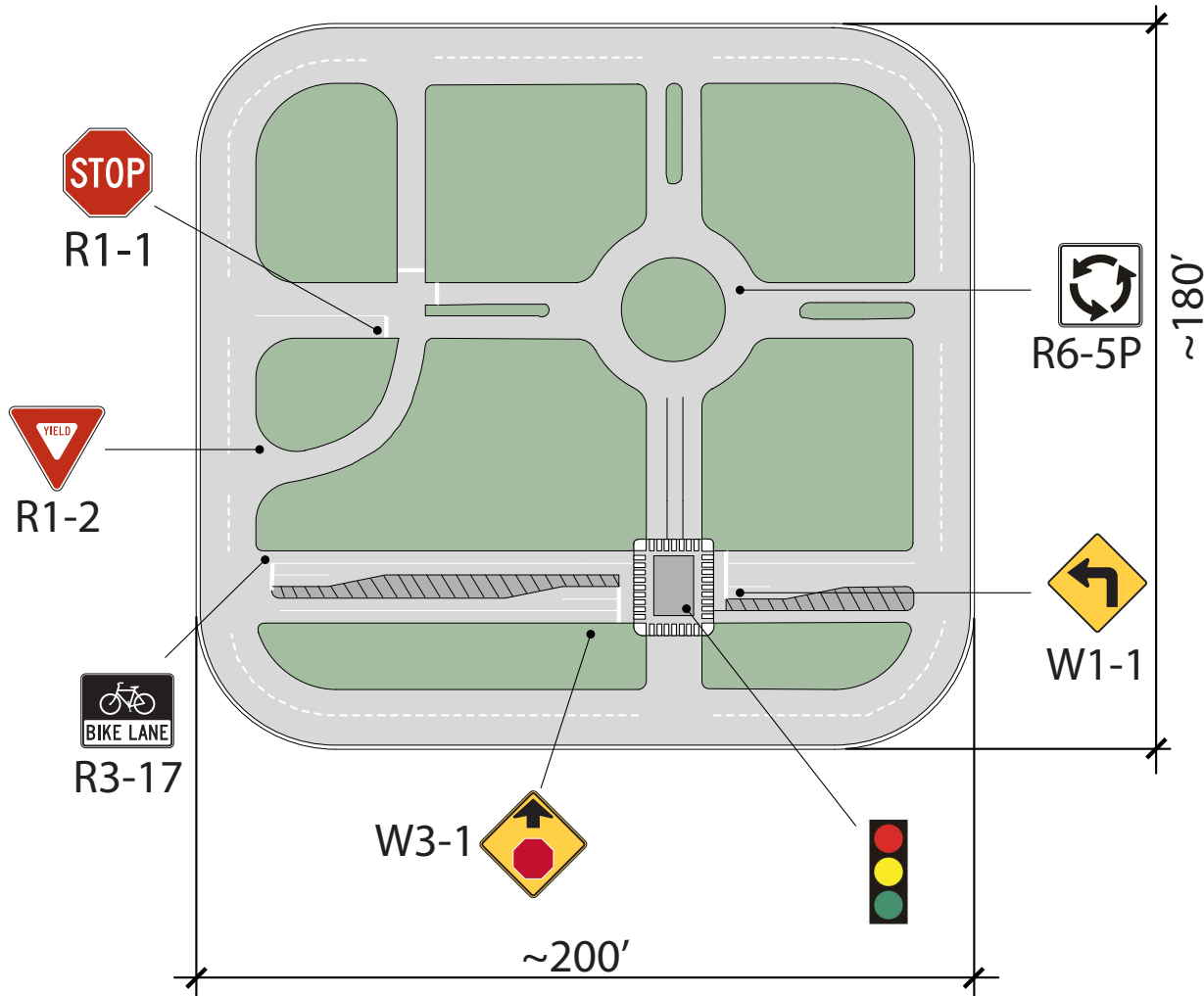


Figure 5.7 A preliminary design for a bicycle safety town course that can be developed in Eagle Mountain as a standalone course, in a park space within a development, or as part of a school site



School zone speed limit sign and yellow flashing beacons in front of Black Ridge Elementary School

6: Implementation

Introduction

Implementation strategies for active transportation projects require a blend of careful planning and opportunistic decision-making. Bike lane projects can often be implemented quickly and efficiently when coordinated with planned roadway projects or pavement management activities like overlays or seal coatings. Conversely, shared-use path projects may require years of easement negotiations, permitting, or fundraising to reach construction.

The following project prioritization methodology should serve as a general guide for prioritizing investment in the active transportation system. However, flexibility in implementation is highly encouraged when opportunities arise to share resources, achieve cost savings, or partner with other agencies (such as UDOT, Alpine School District, or UTA).

For each standalone project identified as part of the proposed system, scoring was established based on criteria and weighting agreed upon by the project's Steering Committee. Spot improvements associated with proposed routes should default to the recommended phasing for the route they help facilitate, even if scoring indicates another (especially an earlier) phase.

Proposed projects were classified into three categories:

- **On-street projects** (bike lanes, buffered bike lanes, and bicycle boulevards)
- **Off-street projects** (regional paths, parks and open space paths, and sidepaths)
- **Spot Improvements** (crossing improvements, signals and beacons, curb ramps, etc.)

Proposed projects were then separated into three phases:

- **Phase one:** The top five (or more in the case of ties) scoring projects in each category
- **Phase two:** The next 10 (less in the case of ties from phase one, or more in the case of ties in this phase) scoring projects in each category
- **Vision phase:** Projects outside of the top 15 in each category's prioritization methodology ranking



Project Prioritization Criteria

The prioritization framework relies upon facility-based criteria. The following criteria will be applied to each facility (except “Resurfacing Projects”, which is only applicable to on-street bicycle facilities). Each recommended facility will be assigned a numeric value to the degree it meets the criteria requirements. The criteria values are outlined in Tables 6.1, 6.2, and 6.3. The criteria multipliers were determined by the Steering Committee and can be adjusted by City preference to align with Eagle Mountain’s specific values in the future.

PUBLIC SUPPORT

Public support is an important criteria when evaluating potential bicycle and pedestrian facility improvements. Throughout the Eagle Mountain Bicycle & Pedestrian Master Plan process, the project team conducted outreach at two public meetings and collected information from the project website. Input from these meetings and the website will be used to determine the scoring of this category.

CONNECTIVITY TO EXISTING FACILITIES

Creating connectivity to existing bicycle or pedestrian facilities enable more trips to be made and provides bicyclists or pedestrians multiple routes for reaching their destinations. Facilities that connect to an existing shared-use path will receive points for this scoring criterion.

CONNECTIVITY TO PROPOSED FACILITIES

In addition to the existing bicycle and pedestrian network, the Eagle Mountain Bicycle & Pedestrian Master Plan recommends the addition of many projects throughout the city. While not as immediately effective for bikeway continuity, facilities that connect to proposed facilities will, in time, help create a robust and cohesive network. Proposed facilities that intersect with other proposed facilities will be awarded point for this criterion.

NETWORK GAPS

Gaps in the bicycling and walking networks discourage bicycling and walking because they limit route continuity, require users to choose less direct paths to access their destinations, or don’t allow access whatsoever by bicycle or on foot. Some feel “stranded” when a facility abruptly ends or does not easily connect to their destination, forcing them to ride on a street that does not accommodate their comfort or ability level or increases the length of their trip. Facilities that fill gaps in the bicycling and walking network will qualify for points for this criterion.



CONNECTIVITY TO PARKS OR CIVIC CENTERS

Increasing accessibility to parks and civic locations (such as City Hall or the library) was one of the most requested improvements in the public involvement process and projects that add or improve upon this connectivity qualify for this criterion.

CONNECTIVITY TO SCHOOLS

To encourage more students to walk and ride a bicycle to school, proposed facilities that directly connect to or travel within ¼ mile of any K-12 school (public, charter, or private) qualify for this prioritization criterion.



CONNECTIVITY TO CHURCHES

Increasing accessibility to the churches and other places of worship in Eagle Mountain can help reduce traffic congestion. With improved connections and opportunities to walk and bike to church, community members have the opportunity to decrease their driving trips. Projects that connect to or are within ¼ mile of church property qualify for this prioritization criterion.

CONNECTIVITY TO COMMERCIAL CENTERS

Eagle Mountain’s few commercial centers, like Ridley’s and the businesses near the Ranches Pkwy and Pony Express Pkwy intersection, represent major destinations in the city. Increasing bicycle and pedestrian connectivity to these destinations will allow many of these trips to be converted into walking and bicycling trips. Projects that connect to or travel within ¼

mile of commercial centers qualify for this prioritization criterion.

SAFETY



Maintaining or improving safety is a prerequisite for most bicycle and pedestrian projects. Projects that address or remedy a major or minor safety issue for bicyclists and/or pedestrians qualify for this criterion.

COST EFFICIENCY

Projects that require little capital investment but yield high benefits for Eagle Mountain residents and other users are attractive projects for implementation in the early years following adoption of this Plan. These projects will demonstrate progress and foster momentum for difficult or costly future improvements. Projects that yield exceptional or above average improvements to bicycling and walking conditions in respect to their capital costs would qualify for this criterion.

RESURFACING PROJECTS (ONLY APPLICABLE TO TABLE 6.2)

On-street bicycle facilities like bike lanes and buffered bike lanes should be installed when a street is scheduled to be resurfaced, seal coated, or widened. Furthermore, developers should be required to include recommended facilities in the Eagle Mountain Bicycle & Pedestrian Master Plan that are located on streets they are improving. This will benefit the City as they will not have to cover capital costs for the construction of these bikeways. Facilities that coincide with street paving projects will meet this scoring criterion.

Table 6.1 Recommended Off-Street Path Prioritization Criteria

Criteria	Score	Multiplier	Total	Description
Public Support	2	2	4	Path was identified multiple times by the public as desirable for a future facility
	1		2	Path was identified by the public once as desirable for a future facility
	0		0	Path was not identified by the public as desirable for a future facility
Connectivity - Existing	2	3	6	Direct access to two or more existing shared-use paths
	1		3	Direct access to one existing shared-use path
	0		0	Does not directly or indirectly access an existing shared-use path
Connectivity - Proposed	2	2	4	Direct access to two or more proposed bikeways or shared-use paths
	1		2	Direct access to one proposed bikeway or shared-use path
	0		0	Does not directly access any proposed bikeways or shared-use paths
Network Gaps	2	3	6	Facility fills a network gap between two existing facilities
	1		3	Facility fills a network gap between an existing and a proposed facility
	0		0	Does not directly or indirectly fill a network gap
Connectivity - Parks/Civic Center	2	3	6	Direct access to a park or civic center (library, City Hall)
	1		3	Secondary access to a park or civic center (within ¼ mile)
	0		0	Does not provide connectivity to any Eagle Mountain parks or civic centers
Connectivity - Schools	2	5	10	Direct access to an Eagle Mountain school
	1		5	Secondary access to an Eagle Mountain school (within ¼ mile)
	0		0	Does not directly or indirectly access an Eagle Mountain school
Connectivity - Churches	2	1	2	Direct access to an Eagle Mountain church
	1		1	Secondary access to an Eagle Mountain church (within ¼ mile)
	0		0	Does not provide direct or indirect access to an Eagle Mountain church
Connectivity - Commercial Centers	2	3	6	Direct access to an Eagle Mountain commercial center
	1		3	Secondary access to an Eagle Mountain commercial center (within ¼ mile)
	0		0	Does not provide any connectivity to an Eagle Mountain commercial center
Safety	2	4	8	Project addresses a significant safety problem
	1		4	Project addresses a minor safety problem
	0		0	Project does not directly contribute to improve a safety problem
Cost Efficiency	2	2	4	Project provides exceptional value when evaluating its capital cost versus the potential improvement to bicycling and walking conditions
	1		2	Project provides above average value when evaluating its capital costs versus the potential improvement to bicycling and walking conditions
	0		0	Project provides average value when evaluating its capital costs versus the potential improvement to bicycling and walking conditions

Table 6.2 Recommended On-Street Bikeway Prioritization Criteria

Criteria	Score	Multiplier	Total	Description
Public Support	2	2	4	Street was identified multiple times by the public as desirable for a future bikeway
	1		2	Street was identified by the public once as desirable for a future bikeway
	0		0	Street was not identified by the public as desirable for a future bikeway
Connectivity - Existing	2	3	6	Direct access to two or more existing shared-use paths
	1		3	Direct access to one existing shared-use path
	0		0	Does not directly or indirectly access an existing shared-use path
Connectivity - Proposed	2	2	4	Direct access to two or more proposed bikeways or shared-use paths
	1		2	Direct access to one proposed bikeway or shared-use path
	0		0	Does not directly access any proposed bikeways or shared-use paths
Network Gaps	2	3	6	Facility fills a network gap between two existing facilities
	1		3	Facility fills a network gap between an existing facility and a proposed facility
	0		0	Does not directly or indirectly fill a network gap
Connectivity - Parks/Civic Center	2	3	6	Direct access to a park or civic center (library, City Hall)
	1		3	Secondary access to a park or civic center (within ¼ mile)
	0		0	Does not provide connectivity to any Eagle Mountain parks or civic centers
Connectivity - Schools	2	5	10	Direct access to an Eagle Mountain school
	1		5	Secondary access to an Eagle Mountain school (within ¼ mile)
	0		0	Does not directly or indirectly access an Eagle Mountain school
Connectivity - Churches	2	1	2	Direct access to an Eagle Mountain church
	1		1	Secondary access to an Eagle Mountain church (within ¼ mile)
	0		0	Does not provide direct or indirect access to an Eagle Mountain church
Connectivity - Commercial Centers	2	3	6	Direct access to an Eagle Mountain commercial center
	1		3	Secondary access to an Eagle Mountain commercial center (within ¼ mile)
	0		0	Does not provide any connectivity to an Eagle Mountain commercial center
Safety	2	4	8	Project addresses a significant safety problem
	1		4	Project addresses a minor safety problem
	0		0	Project does not directly contribute to improve a safety problem
Cost Efficiency	2	2	4	Project provides exceptional value when evaluating its capital cost versus the potential improvement to bicycling and walking conditions
	1		2	Project provides above average value when evaluating its capital costs versus the potential improvement to bicycling and walking conditions
	0		0	Project provides average value when evaluating its capital costs versus the potential improvement to bicycling and walking conditions
Street Paving Projects	2	3	6	Bikeway is located on a street that will likely be repaved or improved by adjacent development within 1 to 5 years. Shared roadways and bicycle boulevards received the maximum score because they can be implemented on existing pavement and do not require repaving or reconstruction
	1		3	Bikeway is located on a street that will be unlikely to be repaved or improved in the immediate future, but may be improved within 5 to 10 years
	0		0	Bikeway is not located on a street scheduled for pavement improvements

Table 6.1 Recommended Spot Improvement Prioritization Criteria

Criteria	Score	Multiplier	Total	Description
Public Support	2	2	4	Project was identified multiple times by the public as desirable for a future improvement
	1		2	Project was identified by the public once as desirable for a future improvement
	0		0	Project was not identified by the public as desirable for a improvement
Connectivity - Existing	2	3	6	Improves direct access to or between two or more existing shared-use paths
	1		3	Improves direct access to one existing shared-use path
	0		0	Does not improve access to or between any existing shared-use paths
Connectivity - Proposed	2	2	4	Improves direct access to or between two or more proposed bikeways or shared-use paths
	1		2	Improves direct access to one proposed bikeway or shared-use path
	0		0	Does not improve access to or between any proposed bikeways or shared-use paths
Network Gaps	2	3	6	Project fills a network gap between two existing facilities
	1		3	Project fills a network gap between an existing and a proposed facility
	0		0	Does not fill a network gap
Connectivity - Parks/Civic Center	2	3	6	Improves direct access to a park or civic center (library, City Hall)
	1		3	Improves secondary access to a park or civic center (within ¼ mile)
	0		0	Does not provide connectivity to any Eagle Mountain parks or civic centers
Connectivity - Schools	2	5	10	Improves direct access to an Eagle Mountain school
	1		5	Improves secondary access to an Eagle Mountain school (within ¼ mile)
	0		0	Does not improve access to an Eagle Mountain school
Connectivity - Churches	2	1	2	Improves direct access to an Eagle Mountain church
	1		1	Improves secondary access to an Eagle Mountain church (within ¼ mile)
	0		0	Does not improve access to an Eagle Mountain church
Connectivity - Commercial Centers	2	3	6	Improves direct access to an Eagle Mountain commercial center
	1		3	Improves secondary access to an Eagle Mountain commercial center (within ¼ mile)
	0		0	Does not improve connectivity to an Eagle Mountain commercial center
Safety	2	4	8	Project addresses a significant safety problem
	1		4	Project addresses a minor safety problem
	0		0	Project does not directly contribute to improve a safety problem
Cost Efficiency	2	2	4	Project provides exceptional value when evaluating its capital cost versus the potential improvement to bicycling and walking conditions
	1		2	Project provides above average value when evaluating its capital costs versus the potential improvement to bicycling and walking conditions
	0		0	Project provides average value when evaluating its capital costs versus the potential improvement to bicycling and walking conditions



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Eagle Mountain

- PHASE ONE PROPOSED SHARED-USE PATHS**
 - Regional Paths
 - Parks & Open Space Paths
 - Sidepaths
- PHASE ONE PROPOSED ON-STREET FACILITIES**
 - Buffered Bike Lanes
 - Bike Lanes
 - Bicycle Boulevards
- PHASE ONE PROPOSED SPOT IMPROVEMENTS**
 - Path Crossing Improvements (At-Grade)
 - Path Crossing Improvements (Grade-Separated)
 - Intersection and Mid-Block Signals & Beacons
 - Other Intersection Improvements
- Project ID Callouts (key on page 74)

- EXISTING**
 - Existing Shared-Use Paths
 - Roads
 - Golf Courses
 - City Parks
 - Waterways

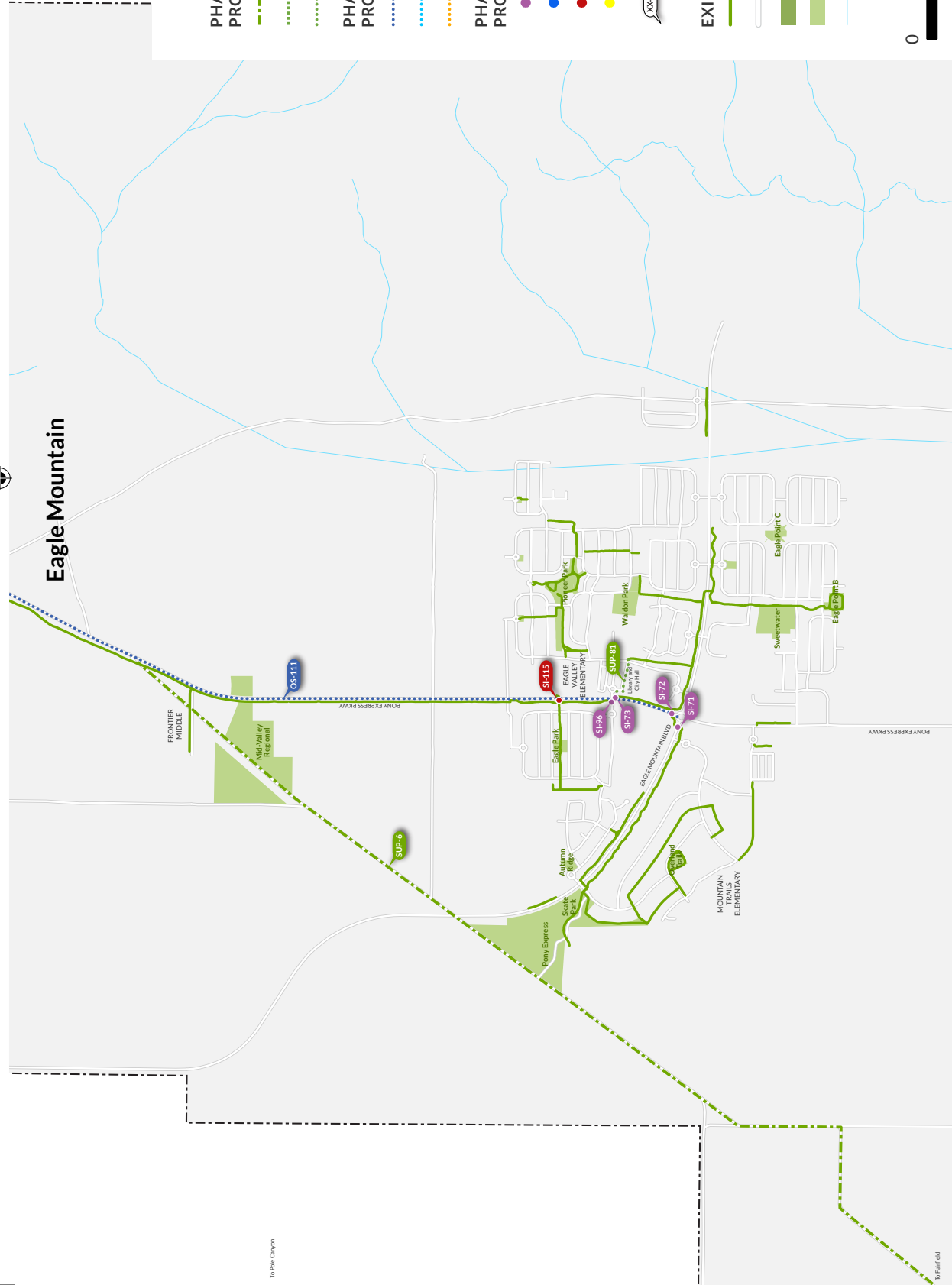


Figure 6.1 Citywide Phase 1 Recommendations Map

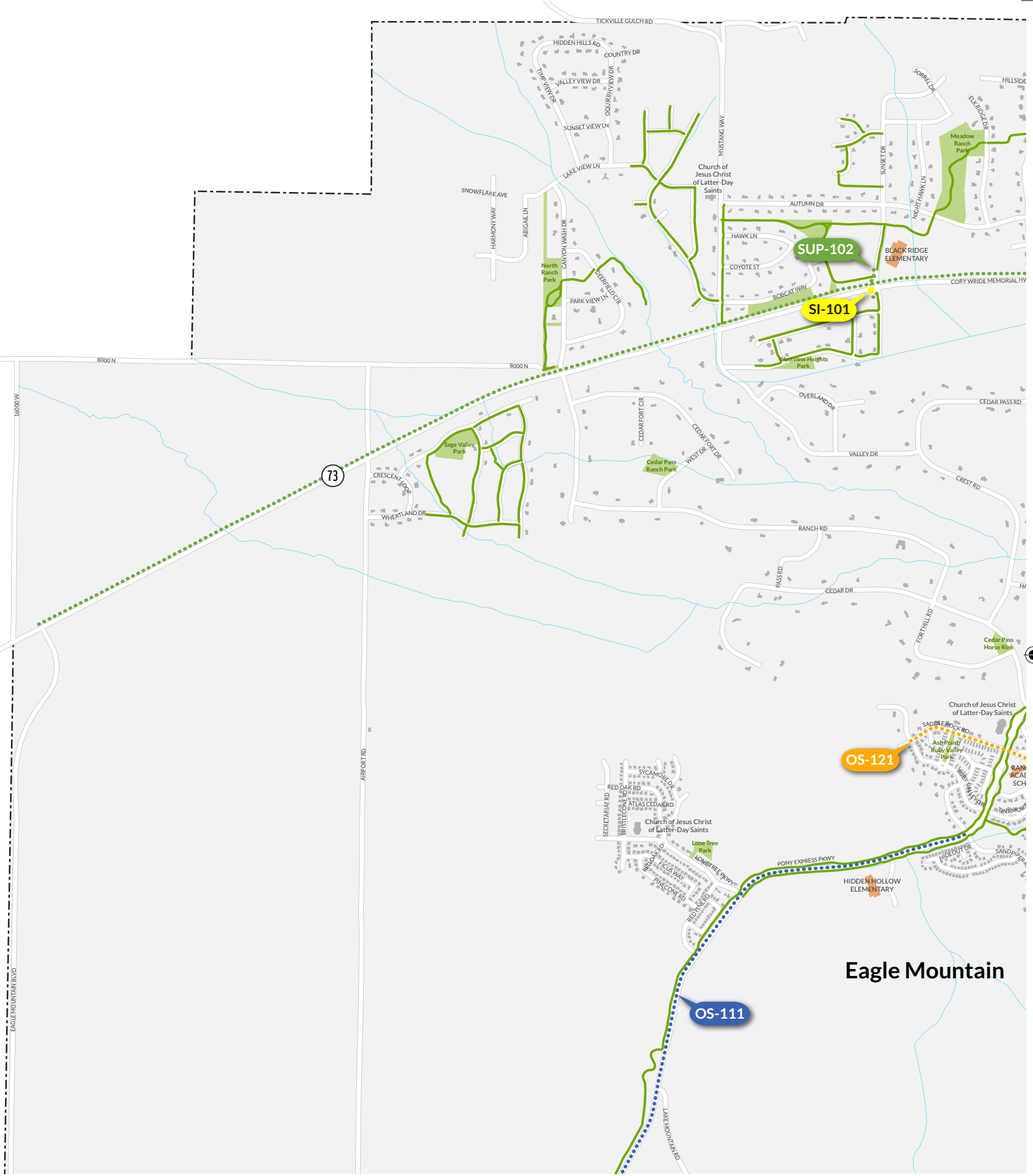
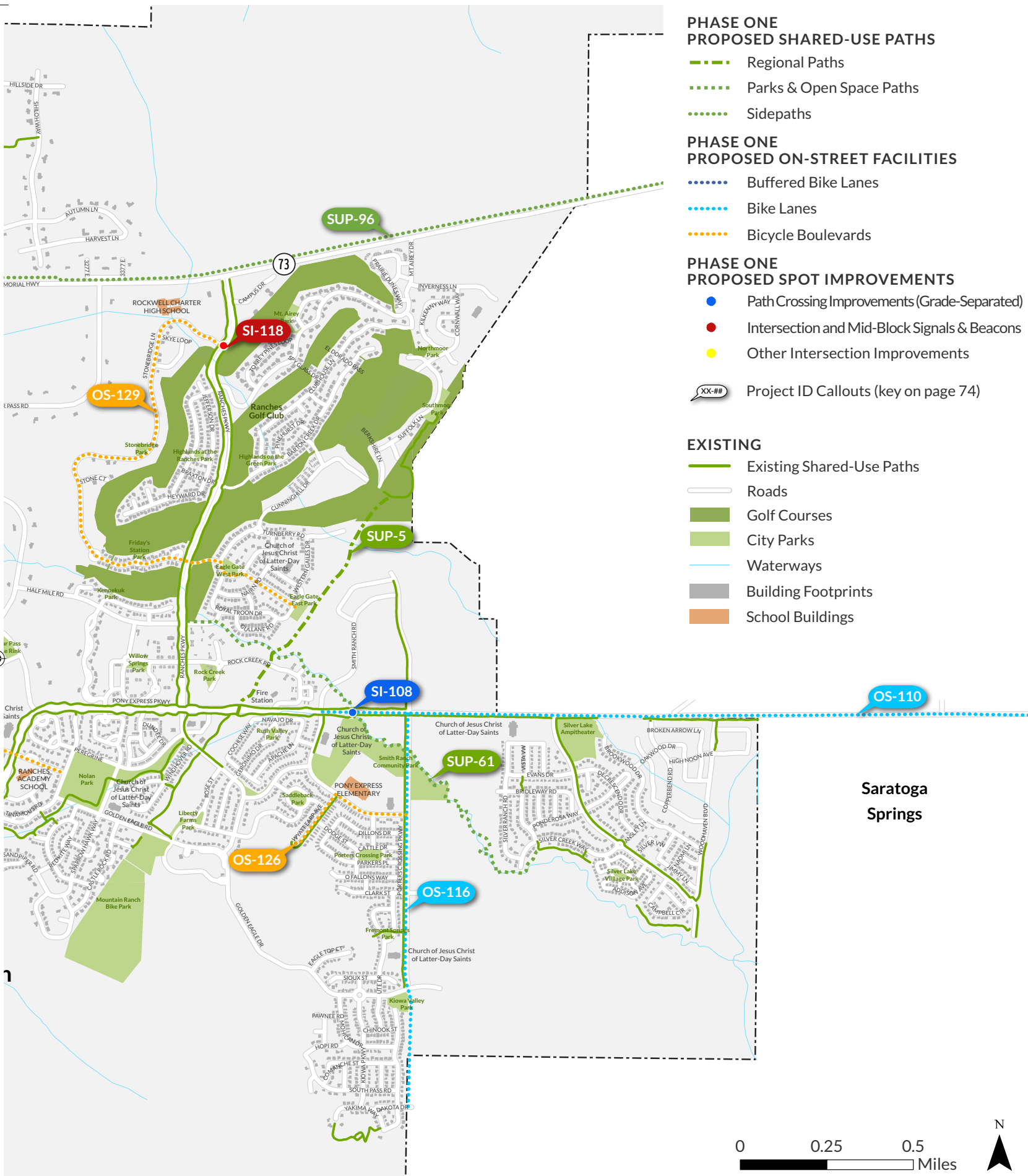


Figure 6.2 Ranches Phase 1 Recommendations Map



**PHASE ONE
PROPOSED SHARED-USE PATHS**

- Regional Paths
- Parks & Open Space Paths
- Sidepaths

**PHASE ONE
PROPOSED ON-STREET FACILITIES**

- Buffered Bike Lanes
- Bike Lanes
- Bicycle Boulevards

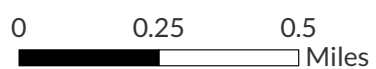
**PHASE ONE
PROPOSED SPOT IMPROVEMENTS**

- Path Crossing Improvements (Grade-Separated)
- Intersection and Mid-Block Signals & Beacons
- Other Intersection Improvements
- Project ID Callouts (key on page 74)

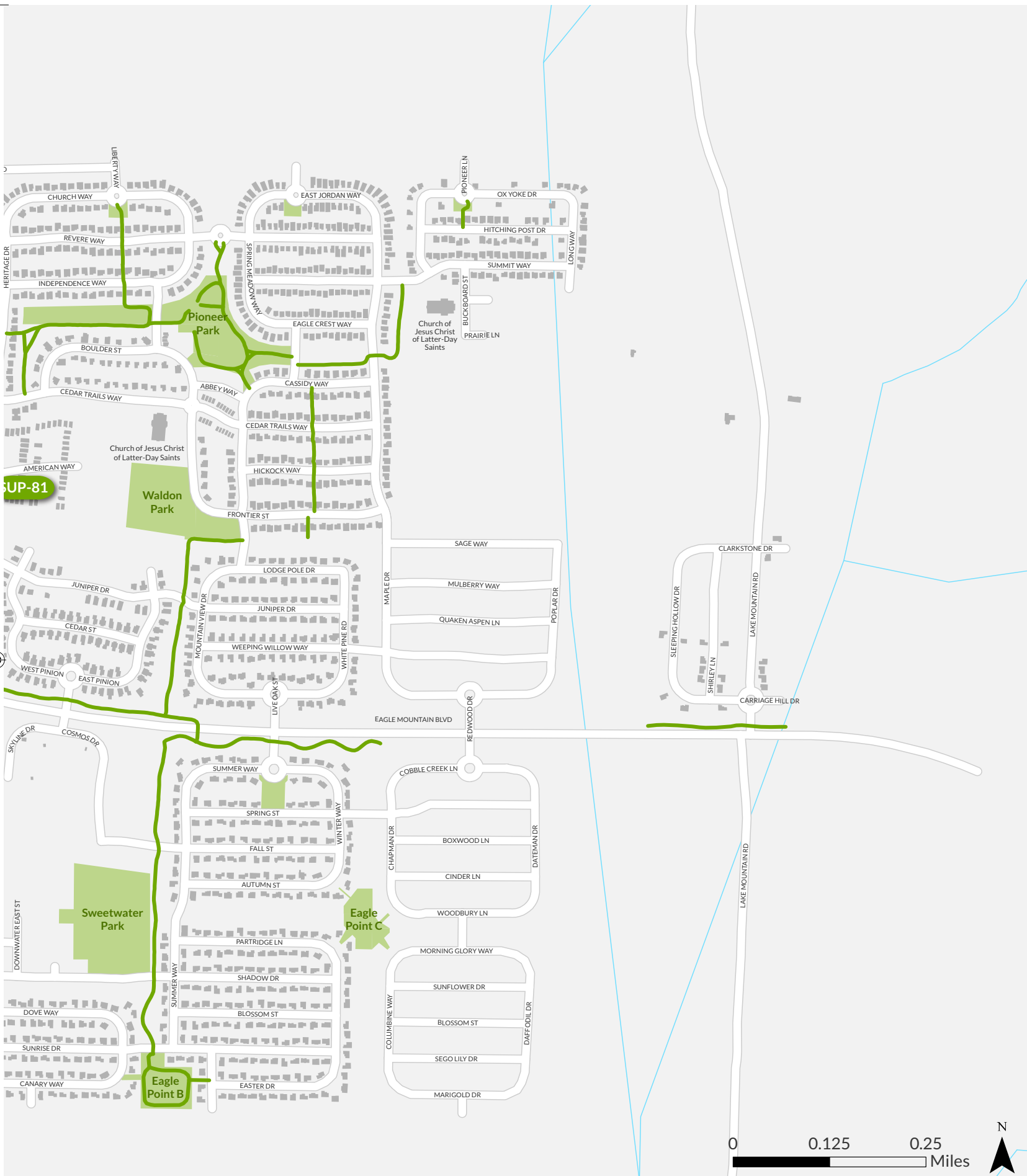
EXISTING

- Existing Shared-Use Paths
- Roads
- Golf Courses
- City Parks
- Waterways
- Building Footprints
- School Buildings

**Saratoga
Springs**







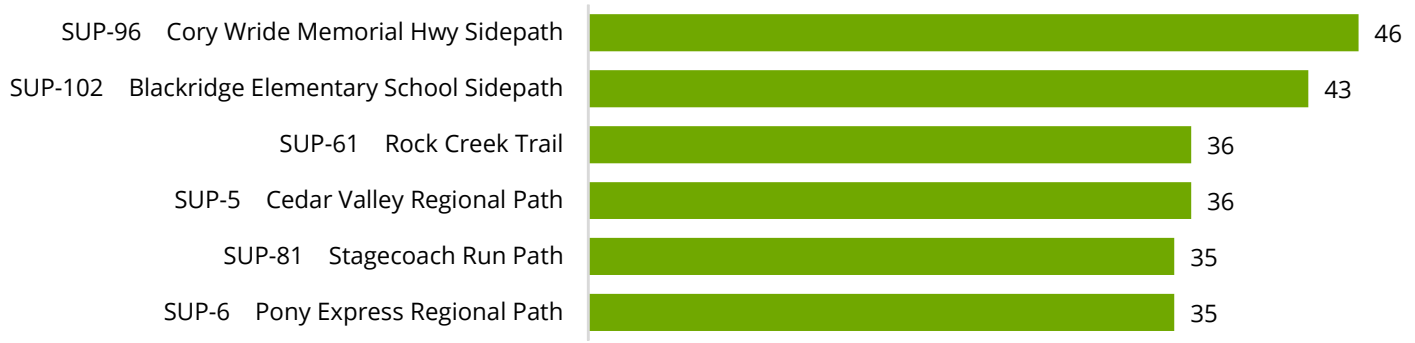


Figure 6.4 Phase 1 Off-street Shared-use Path Projects

Shared-Use Paths

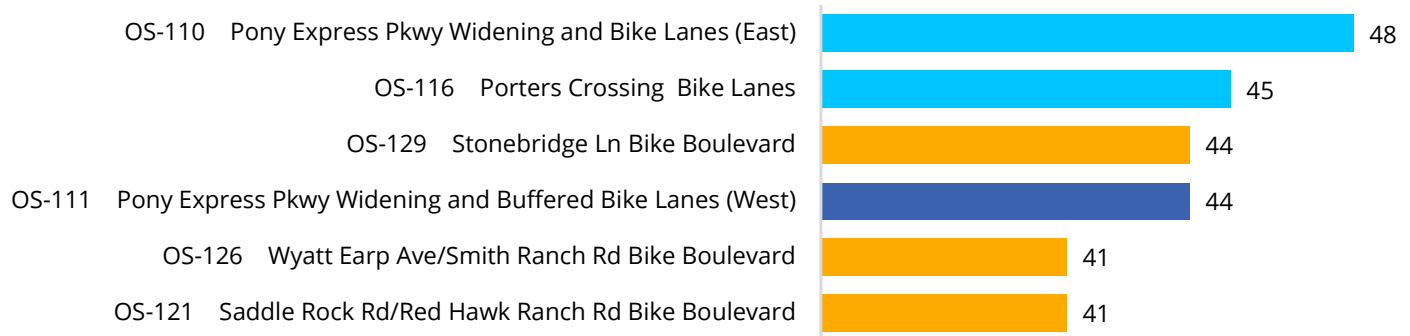


Figure 6.5 Phase 1 On-street Bikeway Projects

Buffered Bike Lanes
Bike Lanes
Bicycle Boulevards

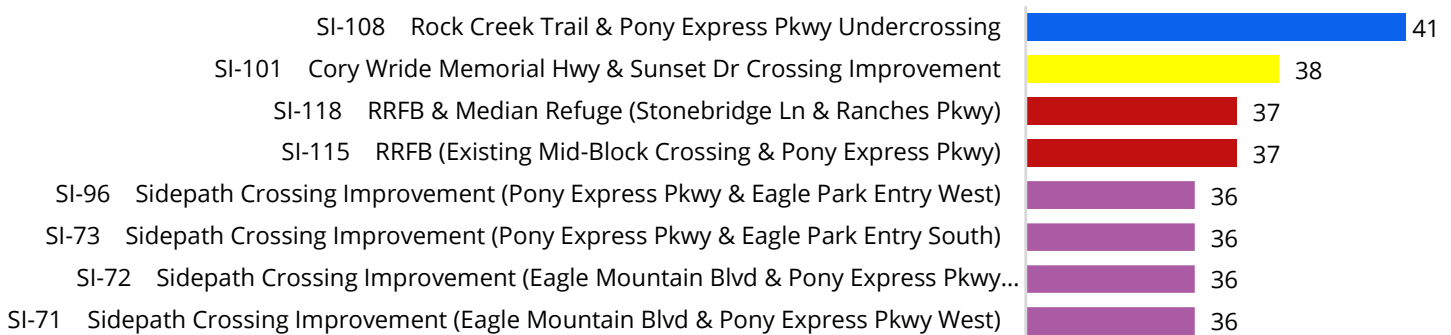


Figure 6.6 Phase 1 Spot Improvement Projects

Path Crossing Improvements (At-Grade)
Intersection and Mid-Block Signals & Beacons
Path Crossing Improvements (Grade-Separated)
Other Intersection Improvements



Implementation Strategies

Implementation of Eagle Mountain Bicycle & Pedestrian Plan will take place incrementally over many years. Due to Eagle Mountain's development patterns, rigid prioritization and phasing of bicycle and pedestrian improvements is unlikely to conform to actual growth and future development. Therefore, flexibility and opportunistic implementation of projects is key to advancing the bicycling and walking system. The following strategies can guide the City toward developing the projects and recommendations identified in this Plan.

IMPLEMENTATION STRATEGY 1. ESTABLISH ACCOUNTABILITY FOR ACTIVE TRANSPORTATION

It is critical to establish accountability for the implementation of the active transportation system to ensure that the Bicycle & Pedestrian Master Plan's recommendations are implemented. In the absence of a staff member dedicated to bicycle and pedestrian planning and implementation, Eagle Mountain City should seek to implement the following organizational processes to help ensure that active transportation issues are being monitored and advanced.

Near Term	Establish an Active Transportation Task Force made up of City staff to include, at a minimum, the Planning Director, the Public Works Director, and the Parks Director. The Task Force should meet quarterly to discuss issues, needs, funding opportunities, and to ensure that program recommendations are being executed.
Mid Term	Consider establishing a citizen-led Bicycle and Pedestrian Advisory Committee as Eagle Mountain continues to grow. Integrate the Bicycle and Pedestrian Advisory Committee into applicable City projects and review processes.
Long Term	Hire a part or full-time bicycle and pedestrian coordinator to monitor the system, pursue funding, manage project implementation, and lead programs within the community.

IMPLEMENTATION STRATEGY 2. ESTABLISH STANDARDS AND LEVERAGE GROWTH

The Eagle Mountain Bicycle & Pedestrian Master Plan defines many strategies for requiring or encouraging development to partner with the City in the implementation of the active transportation network. Planning Commission and City Council approval will be necessary to amend the Transportation Master Plan and City Code to include the new standards in this Plan that address bicycle and pedestrian development.



Near Term	<p>Adopt the Eagle Mountain Bicycle & Pedestrian Master Plan.</p> <p>Adopt/amend the Transportation Master Plan's standard street cross-sections per the recommendations in the design standards of the Bicycle & Pedestrian Master Plan.</p> <p>Adopt the <i>Bicycle & Pedestrian Facility Design Standards (Appendix A)</i> as a supplement to the APWA Standard Drawings and Specifications.</p> <p>Modify the zoning ordinance to include the bicycle parking requirements and recommendations identified in Appendix C.</p>
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IMPLEMENTATION STRATEGY 3. STRATEGICALLY PURSUE PROJECTS

Ideally, Eagle Mountain City staff should pursue capital improvements funding or grant funding for higher priority projects, found in the Phase 1 recommendations, first. However, if grant requirements, or construction or resurfacing in conjunction with another roadway project, make a vision phase project possible, Eagle Mountain City staff should pursue funding sources for that project regardless of priority or ranking.

Near Term	Pursue capital improvements funding or grant funding for Phase 1 projects first.
	In the case where grant requirements or construction in conjunction with another project make a vision phase project possible, pursue funding sources for that project regardless of priority or ranking.

IMPLEMENTATION STRATEGY 4. INCREMENTALLY IMPLEMENT PROJECTS

On-street bikeway or shared-use path projects recommended in Phase 1, Phase 2, or vision phase can be developed incrementally with available resources or in conjunction with other projects until funding is secured to complete the project in full.

Near / Mid / Long Term	Consider developing long and/or expensive projects in either Phase 1, Phase 2, or vision phase incrementally based on available resources and/or funding.
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IMPLEMENTATION STRATEGY 5. REGULARLY REVISIT PROJECT PRIORITIZATION

The project recommendation rankings in this Plan have been developed based upon criteria vetted through the Steering Committee. The City should revisit the Eagle Mountain Bicycle & Pedestrian Plan every two years to evaluate progress on project development and prioritize projects from the vision phase as Phase 1 and 2 projects are implemented. The vision phase projects should be reviewed as necessary, adding new projects, removing completed project, and revising priorities as conditions change.

Mid Term	Regular review and updates to the vision phase project list by Eagle Mountain City staff, with input from the Active Transportation Task Force (defined in Strategy 1)
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Dirt from adjacent development on a shared-use path leading to Black Ridge Elementary

7: Maintenance

Private developers and Eagle Mountain City have invested considerable resources in construction of shared-use paths and sidewalks, both of which provide valuable recreational and transportation benefits to local residents and visitors. However, ongoing maintenance requirements of these bicycle and pedestrian facilities has not yet been fully assessed or planned for. The following maintenance recommendations seek to establish a programmatic approach to maintenance



activities for existing and proposed on and off-street bicycle and pedestrian facilities.

Primary on-street bikeway maintenance activities includes sweeping, maintaining a smooth roadway, and snow removal. As mentioned previously, pavement repaving and overlay projects are a good opportunity to improve bicycle facilities.

Typical off-street bicycle and pedestrian facility maintenance activities include sweeping, pavement management, snow removal, weed abatement, landscaping and mowing.

The physical condition of bicycling and walking facilities like bike lanes, paved shoulders, dedicated shared-use paths, and sidewalks, is an important consideration when residents consider choosing walking or bicycling for transportation or other uses.

Developing a city-wide maintenance management plan will be useful in ensuring that responsibility is assigned to different departments within the City and that regular maintenance is done. The following recommendations provide a menu of options that will improve Eagle Mountain's maintenance regimen. Recommendations should be incorporated into the City's construction standards, development code, master development agreements, design standards, City Code (where applicable), and other zoning and maintenance definitions and standards.



Unswept sidepath in a new development



On-Street Maintenance Activities

While implementing bikeway facilities is important, keeping them in good condition is equally important. On-street bikeways are typically maintained as part of standard roadway maintenance programs, and extra emphasis should be put on keeping bike lanes and roadway shoulders clear of debris and snow, as well as keeping vegetation overgrowth from blocking visibility or creeping into the roadway. Maintenance activities could be driven by a regular schedule or by maintenance requests from the public. Typical maintenance costs for on-street bikeways are shown in Table 7.1.

SWEEPING

When a bicycle lane becomes filled with debris, bicyclists are forced into the motor vehicle lane. Poor bikeway maintenance can contribute to crashes and deter potential bicyclists unwilling to risk flat tires and skidding on roadways.

Eagle Mountain City maintains all streets within city limits except for Cory Wride Memorial Highway (SR-73), which is a UDOT-maintained, state highway facility. Street sweeping is currently contracted to private sweeping companies who sweep all streets once per year and all arterial streets four to five times per year.

Periodic checks should be made of the on-street bikeway network with the majority of work being confined to spot fixes and damage response. Street sweeping of on-street facilities will need to be coordinated with the management agency's roadway maintenance program to ensure that the roadway is cleared curb to curb.

Sweeping Guidance (cont.)

- *Pave gravel driveway approaches to minimize loose gravel on paved roadway shoulders.*
- *Sweeping of off-street paths may require special equipment such as bobcats equipped with sweeping attachments or specialized path sweepers.*
- *Perform additional sweeping in the spring to remove debris that has accumulated during winter.*
- *Perform additional sweeping in the fall in areas where leaves accumulate.*

PAVEMENT SURFACE

Bicyclists are more sensitive to pavement quality than motorists because of reduced speeds, narrower tire widths, and, typically, lack of suspension or dampening systems. Section 15.60.030 of the City Code requires a minimum ½ inch roadway asphalt mix aggregate to be used on all residential streets and minimum ¾ inch aggregate on collector and arterial roads.



Cracks in asphalt shared-use paths can allow weeds and grasses to grow up, worsening the crack and blocking use of the path

Sweeping Guidance

- *Establish a seasonal sweeping schedule that prioritizes roadways with major bicycle routes.*
- *Sweep bikeways whenever there is an accumulation of debris, and at least in the spring to clean debris left over from winter weather*
- *In curbed sections, sweepers should pick up debris; on open shoulders, debris can be swept onto gravel shoulders.*

Compaction is also an important issue after trenches and other construction holes are filled. Uneven settlement after trenching can affect the roadway surface nearest the curb where bicycles travel. Sometimes compaction is not achieved to a satisfactory level, and an uneven pavement surface can result due to settling over the course of days or weeks.



Survey respondents and other comments from the public suggested that rough pavement surfaces and narrow shoulders on city streets were two of the reasons they did not feel comfortable riding on the road. In Chapter 12 "Street Surfacing", Section 12.030 of the Eagle Mountain Engineering Department's 2012 Construction Standards document, the aggregate size is ½ inch for residential streets and ¾ inch for collector roads and above. Eagle Mountain should investigate using a smaller chip size, such as ¼ inch or ½ inch, on the most popular on-street biking routes to improve pavement quality and bicyclist comfort. A seal coat, which is applied after the chip, will greatly improve smoothness of the roadway surface.

Pavement Surface Guidance

- *Maintain a smooth pothole-free surface.*
- *Ensure that on new roadway construction, the finished surface on bikeways does not vary more than ¼ inch.*
- *Maintain pavement so ridge buildup does not occur at the gutter-to-pavement transition or adjacent to railway crossings.*
- *Inspect the pavement 2 to 4 months after trenching construction activities are completed to ensure that excessive settlement has not occurred.*
- *During chip seal maintenance projects, if the pavement condition of the bike lane is satisfactory, it may be appropriate to chip seal the travel lanes only. However, use caution when doing this so as not to create an unacceptable ridge between the bike lane and travel lane.*

PAVEMENT OVERLAYS

Pavement overlays represent good opportunities to improve conditions for on-street bikeways if done carefully. A ridge should not be left in the area where bicyclists ride (this occurs where an overlay extends part-way into a shoulder bikeway or bike lane). Overlay projects also offer opportunities to widen a roadway or to re-stripe a roadway with bike lanes.

Pavement Overlay Guidance

- *Extend the overlay over the entire roadway surface to avoid leaving an abrupt edge.*
- *If the bike lane pavement is of good quality, it may be appropriate to end the overlay at the shoulder or bike lane stripe provided no abrupt ridge remains.*
- *Ensure that inlet grates, and manhole and valve covers are within ¼ inch of the finished pavement surface and are made or treated with slip-resistant materials.*
- *Pave gravel driveways to property lines to prevent gravel from being tracked onto shoulders or bike lanes.*

SNOW REMOVAL

In the event of a snow storm, the City uses its five snow plow trucks to clear streets in the following order, ranked by priority: (1) arterials; (2) collectors; (3) residential roads, school zones, hills and curves; (4) unimproved or unpaved roads. Individual homeowners are responsible for removing snow and ice on sidewalks and private driveways. City Ordinances O-10-2006 and O-29-2004 require that snow is removed from arterial, collector, residential, and unimproved roads "within 24 hours of the end of the snowfall where median snow accumulations exceed four or more (in the case of arterial or collector roads), or six or more (in the case of residential or unimproved roads) inches."

Winter maintenance of bicycle and pedestrian facilities is an important consideration for a city like Eagle Mountain that receives significant amounts of snowfall. The City should expect bicyclists to use the road network year round, even in inclement conditions, and providing safe conditions for bicyclists year round should be a top priority. Some communities prioritize streets with bicycle and pedestrian facilities to be plowed by 7:00 am (starting at 4:00 am), Monday through Friday, to facilitate users' commute to school and work. On-street bike lanes should be plowed at the same time as the rest of the street and should not require a considerable

amount of extra effort. On streets with a planted strip separating the sidewalk from the traveled way this buffer can be used for snow storage.

Much of the proposed Eagle Mountain on-street bikeways are planned for arterial and collector streets and these bikeways will benefit from Eagle Mountain's prioritization of these routes for snow removal. Some bicycle boulevards, however, are proposed along local roads. Eagle Mountain should prioritize snow removal along these routes over other local roads that are not designated as bicycle boulevards. Priority should also be given to bikeways that provide direct access to schools.

Snow removal along off-street paths will require new effort from Eagle Mountain's parks and maintenance departments. Although the Ranches HOA currently performs snow removal for off-street paths and sidewalks in the Ranches, the City should attempt to provide snow removal for paths and sidewalks throughout the rest of the city as the system develops. Immediately clearing snow from all paths will likely not be feasible because of time and budget resources; maintenance staff should establish a prioritization that focuses on 1) identified regional paths, 2) off-street paths that connect to schools, 3) paths that connect to retail/commercial centers and 4) paths that connect to transit stops.

Snow Removal Guidance

- *City should employ a proactive or anti-icing strategy, and have a plan for the removal of de-icing surface material debris that accumulates in and around bike facilities.*
- *A prioritization schedule for snow removal is necessary and should focus on primary routes and destinations that impact the highest volume of bicyclists and pedestrians immediately following snow events.*
- *Plow all the way to the curb to clear bike lanes and rideable shoulders.*
- *Snow removal on off-street paths may require special equipment such as skid steer's equipped with plows or smaller pickup truck plows.*

Off-street Path & Sidewalk Maintenance

Shared-use paths require annual maintenance to provide a quality experience to users. Maintenance of existing and proposed sections of Eagle Mountain's off-street, shared-use path network was a common concern expressed through the public input process. Maintenance activities can generally be categorized into one of two types: **routine maintenance**, which

Table 7.1 Recommended On-Street Bikeway Maintenance Frequency and Cost Opinions

Maintenance Activity	Material	Frequency	Estimated Cost
Pavement sweeping	All	Weekly or monthly as needed	Part of regular street sweeping activities and costs
Snow removal	All	Simultaneous with regular roadway snow removal; otherwise, as needed	Depends on conditions, ~\$150/mile
Tree and shrub trimming	All	5 months to 1 year	Part of regular street sweeping activities and costs
Sign repair and replacement	Signs and poles	Every 10 years	\$300/sign
Bike lane re-stripping	Paint	Every 1 to 2 years	\$3,700/mile
Buffered bike lane re-stripping	Paint	Every 1 to 2 years	\$5,900/mile
Shared lane marking re-painting	Paint	Every 1 to 2 years	\$500/mile

is done annually or more frequently, and **major or capital maintenance**, which involves more intensive activity at a less than annual frequency.

ROUTINE MAINTENANCE

Not every shared-use path will have the same needs and levels of expenditure. It is estimated that for routine maintenance approximately \$500 to \$1,500 annually be budgeted per mile of shared-use path.

CAPITAL MAINTENANCE

Major or capital maintenance activities typically involve more intensive maintenance repairs such as pavement seal coating, pavement overlays, pavement reconstruction, or other structural rehabilitations. Needs can vary widely based upon environmental factors, such as soil conditions, drainage and the quality of initial construction. Any paved path surface will deteriorate over time with asphalt surfaces dropping in quality rapidly after 10 years. Preservation efforts

such as seal coating extend the life of asphalt efficiently and at a lower cost than waiting for the surface to fail requiring expensive reconstruction. Overlays may be needed after multiple seal coats or at approximately 30 years of service. A full reconstruction could be required when needed, typically at 50 years if the seal coat and overlay have been provided.

Concrete paths will require significantly less capital maintenance than asphalt paths. Although they may require isolated jacking or replacement, generally limited capital maintenance expenditures can be expected for upwards of 50 years.

Financial planning for major or capital maintenance can be challenging to budget for. Typically asphalt shared-use paths require greater capital maintenance activities with age and ultimately require full reconstruction at some point. Some jurisdictions stay focused on eventual reconstruction and treat this as a maintenance item to

Table 7.2 Recommended Routine Off-Street, Shared-Use Path Maintenance Frequency and Cost Opinions

Maintenance Activity	Function	Frequency	Est. Annual Cost (per mi.)
Path sweeping	Keep paved surfaces debris free	Twice annually (once in spring and once in fall)	\$140 (x2)
Litter and trash removal	Keep path clean and maintain consistent quality of experience for users	Annually, or as needed	\$70
Mowing path shoulders (native open space areas)	Increases the effective width of the path corridor and helps protect encroachment	Twice annually, in late spring and mid to late summer	\$100 (x2)
Tree and brush trimming	Eliminate encroachments into path corridor and open up sight lines	Annually, or less frequently as needed	\$100
Weed abatement	Manage existence and/or spread of noxious weeds, if present	Twice annually, in late spring and mid to late summer	\$140 (x2)
Safety Inspections	Inspect path tread, slope stability, and bridges or other structures	Annually	\$20
Snow removal	Generally limited to urban sections of the path where year-round bike access is desired	As needed (assume 5 events)	\$120
Sign and other amenity inspection/replacement	Identify and replace damaged infrastructure	Annually (assume 2 sign replacements)	\$100
Crack sealing and repair	Seal cracks in asphalt to reduce long term damage	Annually	\$250
Total			\$1,420

Table 7.3 Capital Off-Street, Shared-Use Path Maintenance 50-Year Scenario

Maintenance Activity	Time	Long Term Capital Costs					
Seal Coat	Year 10	SF	\$0.19	LF	\$1.90	Mile	\$10,000
Seal Coat	Year 20	SF	\$0.19	LF	\$1.90	Mile	\$10,000
Overlay	Year 30	SF	\$2.00	LF	\$20.00	Mile	\$105,000
Seal Coat	Year 40	SF	\$0.19	LF	\$1.90	Mile	\$10,000
Reconstruction	Year 50	SF	\$6.50	LF	\$65.00	Mile	\$343,000

Table 7.4 Annual Capital Budgeting Requirements

	Full Reconstruction	w/o Full Reconstruction	Before Overlay
Total Cost	\$479,000	\$136,000	\$20,000
Cost / Year	\$9,500	\$2,700	\$717

Table 7.5 Capital Unpaved Trail Maintenance 10-Year Scenario

Maintenance Activity	Time	Long Term Capital Costs					
Re-grade	Year 2	SF	\$0.025	LF	\$0.24	Mile	\$1,320
Re-grade	Year 4	SF	\$0.025	LF	\$0.24	Mile	\$1,320
Re-grade	Year 6	SF	\$0.025	LF	\$0.24	Mile	\$1,320
Re-grade	Year 8	SF	\$0.025	LF	\$0.24	Mile	\$1,320
Gravel Overlay	Year 10	SF	\$0.20	LF	\$2.00	Mile	\$10,500
Total Cost / 10 Years							\$15,800
Avg Cost / Year							\$1,580

be budgeted for, whereas some treat this as a separate capital project to be considered at a later date in the future. Depending on the existing age and the level of effort major or capital maintenance can run require an average budget of between \$2,000 and \$7,000. Some years may require more expensive maintenance with others requiring none.

SIDEWALKS

Sidewalks enable residents to safely access friends' homes, commercial areas, community resources, transit stops, and other destinations on foot. Sidewalks are also integral to Eagle Mountain's future economic and village centers as they will provide spaces to meet others, eat, and engage with one's community.

Maintaining sidewalks clear of debris and obstructions is essential to maintaining comfort and safety for pedestrians in Eagle Mountain and limiting liability.

Sidewalk Guidance

- Work with property owners to enforce regular sidewalk maintenance
- Repair and reconstruct sidewalks where necessary because of tree root heaving, settling, deterioration, landslides, or other natural occurrences.



Some paths in The Ranches neighborhoods were constructed and are maintained using home owners association fees

8: Funding

Implementation of the proposed bicycle and pedestrian system will require funding from local, regional, state, and federal sources and coordination with multiple agencies. To facilitate funding efforts, this section presents a brief overview of overall funding strategies.

Funding Sources

Many funding sources are potentially available at the federal, state, regional, county, and local levels for Eagle Mountain to implement the projects in the Bicycle & Pedestrian Master Plan. The majority of non-local public funds for bicycle and pedestrian projects are derived through a core group of federal and state programs. Federal funds from the Surface Transportation Program (STP), Transportation Alternatives (TA), and Congestion Mitigation Air Quality (CMAQ) programs are allocated to UDOT and Mountainland Association of Governments and distributed by those agencies at their discretion. Other programs such as the TIGER (Transportation Investments Generating Economic Recovery) grants can be used for “shovel ready” projects that meet federal transportation goals. County or City funds may also be used to construct bicycle and pedestrian facilities.

Tables 8.1 through 8.5 provide a list of funding sources that may be applicable to projects identified in this Plan. Most of these sources are highly competitive and require the preparation of applications. For multi-agency projects, applications may be more successful if prepared jointly with other local and regional agencies.

The City should also take advantage of private contributions, if appropriate, in developing the proposed system. This could include a variety of resources, such as volunteer labor during construction, right-of-way donations, or monetary donations towards specific improvements.

In addition, the City could develop a dedicated local funding sources for active transportation improvements through a variety of measures. Bonds financing, special taxing districts, or specified sales taxes provide a few avenues for this type of funding. In addition, the recently passed HB 362 bill would allow Utah County voters to choose to impose an additional 0.25% local option sales tax that would fund additional roadway, transit and active transportation projects.



Table 8.1 Municipal Bicycle and Pedestrian Funding Options

Funding Opportunity	Eligible Project Types	Qualifications	Lead Agency	Submittal Specifics
Bond Financing	Varies	Varies	Varies	Bonds can be approved by voters to fund a range of projects. A local successful precedent is the 2012 Parks and Trails Bond in Salt Lake County, which authorized \$47 million in bond funds to complete the Jordan River Parkway, Parley's Trail, and acquire land for and construct new parks throughout the County.
Sales Tax	Varies	Varies	Varies	It is possible to pass a specified sales tax that could be used to fund active transportation improvements. Precedents include the San Diego region, which approves a half-cent sales tax in 2008 to generate funds for highway, transit, and local road (including bicycle and pedestrian) projects; and the Great Rivers Greenway in the St. Louis area, where voters passed a proposition in 2000 to create a 0.1% sales tax for parks, open space, paths, and trails.
Special Assessment or Taxing Districts	Varies	Varies	Local gov't	Local municipalities can establish special assessment districts for infrastructure improvements. For example, Urbandale, Iowa established a special assessment program in 1996 for building sidewalks in existing developments where they were missing. Exception clauses allowed residents to apply for hardship status, or to allow residents to petition for sidewalks on only one side of the street rather than both.
Development Impact Fees	Varies	Varies	Local gov't	Development impact fees are one-time charges collected from developers for financing new infrastructure construction and operations and can help fund bicycle and pedestrian improvements. Impact fees are assessed through an impact fee program.
New Construction	Varies	Varies	Local gov't	Future road widening and construction projects are methods of providing bike lanes. To ensure that roadway construction projects provide bike lanes and walkways where needed, it is important that the review process includes a designated bicycle and pedestrian coordinator. Planned roadway improvements in Eagle Mountain should provide bikeways in the city.

Table 8.2 State Bicycle and Pedestrian Funding Options (Part 1/3)

Funding Opportunity	Eligible Project Types	Qualifications	Lead Agency	Submittal Specifics
ADA Ramps	ADA-related improvements	For missing ADA ramps on State routes only	UDOT	Applications are submitted to the Region Coordinator. Missing ramps can be found in the UDOT database from a recent survey of ramps. (http://udot.utah.gov/main/uconowner.gf?n=13652716548952568)
Safe Sidewalks Program	Sidewalks	Sidewalks on State routes only	UDOT	Applications are submitted to the Region Safe Sidewalk Program coordinator and require scope and cost estimate. Local jurisdiction must agree to maintenance and the sidewalk must be built within one year of money allocation. (http://www.udot.utah.gov/main/uconowner.gf?n=104675223364328443)
Community Development Block Grants – State Administered Program	Street improvements	Best if project benefits low or moderate-income populations and part of a consolidated plan	HUD, State, and Local Gov't	The Grantee for these grants cannot be a principal city of a metropolitan statistical area, a city with more than 50,000, or a county with a population with more than 200,000. Applications are submitted to the State. (https://www.hudexchange.info/cdbg-state/)
State Legislation	Legislation dependent	Legislation dependent	State of Utah	State legislations can create laws that have dedicated bicycle funding components. Two examples of this are the Oregon “bike bill” which requires including bicycle and pedestrian facilities when any road, street or highway is built or rebuilt and the California Bicycle Transportation Account, which provides state funds to cities and counties wishing to improve safety and convenience for bicycle commuters. (http://oregon.gov/ODOT/HWY/BIKEPED/Pages/bike_bill.aspx and http://www.dot.ca.gov/hq/LocalPrograms/bta/btawebPage.htm)
Transportation Alternatives Program	Bicycle and pedestrian improvements	Funds can be used for construction, planning and design of on and off-road facilities.	MAG and UDOT	MAG funds are distributed to projects during the Transportation Improvement Plan project selection process. Most TAP projects will have an 80/20 federal/local match split. Projects can include sidewalks, paths, trails, bicycle facilities, signals, traffic calming, lighting and safety infrastructure, and ADA improvements. Rails-to-trails conversions are also allowed. The Recreational Trails Program is included in Transportation Alternatives, as is the Safe Routes to School program. (http://www.fhwa.dot.gov/environment/transportation_alternatives/)

Table 8.3 State Bicycle and Pedestrian Funding Options (Part 2/3)

Funding Opportunity	Eligible Project Types	Qualifications	Lead Agency	Submittal Specifics
Community Development Block Grants - Entitlement Communities Program	Street improvements	Best if project benefits low or moderate-income populations	HUD and Local Gov't	Grantee is a principal city of a metropolitan statistical area, a city with a population over 50,000, or a county with a population over 200,000. Part of a Consolidated Plan. (http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs/entitlement)
Surface Transportation Program	Bicycle and pedestrian improvements	Generally not used on local minor collectors with exceptions for bicycle/ pedestrian walkways.	UDOT	Concept reports due to MPO for consideration of programming funds. (http://www.fhwa.dot.gov/map21/factsheets/stp.cfm)
Congestion Mitigation and Air Quality	Bicycle and pedestrian improvements	Reduce congestion or improve air quality in non-attainment or maintenance areas by shifting travel demand to non-automobile modes.	MAG	Projects must be included in the TIP. MAG call's for projects from local communities each year. (http://www.fhwa.dot.gov/map21/factsheets/cmaq.cfm)
Land and Water Conservation Fund	Bicycle and pedestrian paths and trails, or acquisition of land for paths and trails	Projects that create outdoor recreation facilities, or land acquisition for public outdoor recreation.	DNR	The Land and Water Conservation Fund (LWCF) provides matching grants to States and local governments for the acquisition and development of public outdoor recreation areas and facilities. The program is intended to create and maintain a nationwide legacy of high quality recreation areas and facilities and to stimulate non-federal investments in the protection and maintenance of recreation resources. 50/50 match is required, and the grant recipient must be able to fund the project completely while seeking reimbursements for eligible expenses. (http://stateparks.utah.gov/resources/grants/land-and-water-conservation-fund)
Federal Lands Access Program	Planning, engineering, construction, and other activities	Projects must be on, adjacent to, or provide access to federal lands.	UDOT	Fund is administered through UDOT in coordination with the Central Federal Lands Highway Division, which develops a Programming Decisions Committee. The Committee prioritizes projects, establishes selection criteria, and calls for projects. Next call for projects is anticipated for 2015. (http://www.cflhd.gov/programs/flap/ut/)

Table 8.4 State Bicycle and Pedestrian Funding Options (Part 3/3)

Funding Opportunity	Eligible Project Types	Qualifications	Lead Agency	Submittal Specifics
Rivers, Trails, and Conservation Assistance Program	Planning assistance for bicycle and pedestrian projects.	Staff support for facilitation and planning.	National Park Service	Projects need to be related to conservation and recreation, with broad community support, and supporting the National Park Service's mission. Applicants must submit National Park Service applications by August 1 annually, including basic information as well as letters of support. The local contact is Marcy DeMillion, at 801-741-1012 or marcy_demillion@nps.gov.
Passenger Enhancements	Sidewalk projects and bicycle infrastructure	Sidewalk must be within half mile and bike infrastructure must be within three miles of a transit stop	UTA	Funding can be completed in two ways – the lead agency will share in the cost of the construction, if the submitting agency has already done design and is planning to construct. If the project is on a priority sidewalk list for UTA, UTA will design and construct.

Table 8.5 Private or Corporate Bicycle and Pedestrian Funding Options

Funding Opportunity	Eligible Project Types	Qualifications	Lead Agency	Submittal Specifics
Cambia Health Foundation Children's Health Program	Programs and possibly infrastructure	Projects must improve access to healthy foods, recreation facilities, and encourage healthy behavior for families.	Cambia Health Foundation	Grants are typically in \$50,000 to \$100,000 range. Focus is on programs. Contact foundation staff at cambiahealthfoundation@cambiahealth.org for additional information. (http://www.cambiahealthfoundation.org/programs/childrens-health)
People for Bikes	Bicycle infrastructure	Projects must improve the bicycling environment	People for Bikes	People for Bikes have awarded 272 grants to non-profit organizations and local governments in 49 states and the District of Columbia, since 1999.
Community Fundraising	All	Small dollar amounts	Local agency or non-profit	Lead agency manages the details, marketing, and range of a community fundraising campaign. Successful examples include use of volunteer labor for path construction in Springdale, Utah. Follow link below for more ideas. (http://www.bicyclinginfo.org/funding/sources-community.cfm)



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Shared-use path (background) and sidewalk between two streets and behind houses in The Ranches

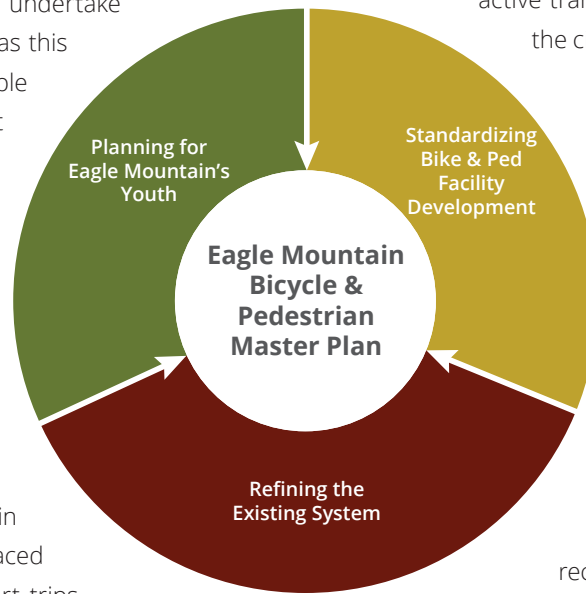
9: Conclusion

The Future of Bicycling and Walking in Eagle Mountain

Eagle Mountain possesses incredible potential to develop into a great city for bicycling and walking. The City's foresight to undertake forward-thinking plans, such as this one, will likely prove invaluable in the future as development pressures continue to mount in Eagle Mountain. Existing residential developments have already recognized the value of paths and trails to improve quality of life and serve as a valuable draw for prospective residents. Additionally, the young and family-oriented population in Eagle Mountain has embraced bicycling and walking for short trips like traveling to school or to neighborhood parks. As land uses evolve and Eagle Mountain develops more job centers, retail, and other non-residential uses, there will be increased opportunities to increase the number of bicycling and walking trips and to improve acceptance of active transportation as a legitimate,

safe, fun, and comfortable mode of transportation and recreation.

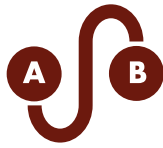
The Eagle Mountain Bicycle & Pedestrian Master Plan's core principles define three key criteria for developing active transportation solutions that meet the city's unique needs.



Eagle Mountain's sizable youth population are accommodated through a comprehensive suite of recommended Safe Routes to School programs outlined in Chapter 4. A broad range of comfortable bicycling and walking facilities are proposed that will accommodate users of all ages and abilities. These recommendations will help

ensure that the **active transportation needs of the nearly 11,000 Eagle Mountain residents under the age of 16** are adequately planned for.





Eagle Mountain has an already impressive network of shared-use paths and trails. However, there is still great opportunities to **improve the existing system**. This Plan diversifies the range of bicycle and pedestrian facilities beyond shared-use paths and sidepaths to appeal to a wider range of users and create new opportunities for pedestrians and bicyclists. Sporadic development patterns have left some neighborhoods and destinations with little connectivity to the rest of Eagle Mountain. Crossing improvements across major streets and short connections to important community destinations are fully described in Chapter 5 and seek to remedy existing connectivity issues with the city.



Finally, the Bicycle & Pedestrian Master Plan seeks to **standardize bicycle and pedestrian facility development** into future growth patterns. Appendix A outlines the bicycle and pedestrian facility design standards that will require future development to partner in the construction of bicycling and walking infrastructure. Sidepaths, bike lanes, and buffered bike lanes along and on future arterial and collector streets will ensure comfortable facilities for bicyclists and pedestrians of all ages and abilities in future development. Codification of support facility recommendations, such as short and long-term bicycle parking generation requirements, are found in Appendix C.

These core principles will allow Eagle Mountain to improve, grow, and develop into a great city for bicycling and walking. Ultimately, the strategies outlined in this Plan serve to make bicycling and walking safe, normal, and daily activities in the lives of those living, working, and recreating in Eagle Mountain.

Acronym Key

Acronym	Full Name	Local or National (if applicable)
AASHTO	American Association of State Highway Transportation Officials	National
ACS	American Community Survey	National
ADA	Americans with Disabilities Act	National
ADT	Average Daily Traffic	
APBP	Association of Pedestrian and Bicycle Professionals	National
APWA	America Public Works Association	National
CMAQ	Congestion Mitigation and Air Quality	National and Local
FHWA	Federal Highway Administration	National
GIS	Geographic Information System	
HAWK	High-intensity Activated crossWalk	
HOA	Home Owners Association	
HUD	Department of Housing and Urban Development	National
ITE	Institute of Transportation Engineers	National
LWCF	Land and Water Conservation Fund	National
MAG	Mountainland Association of Governments	Local
MPO	Metropolitan Planning Organization	
MUTCD	Manual on Uniform Traffic Control Devices	National and Local
NACTO	National Association of City Transportation Officials	National
NHTS	National Household Travel Survey	National
OHV	Off-Highway Vehicle	
NICA	National Interscholastic Cycling Association	National and Local
RRFB	Rectangular Rapid Flash Beacon	
SITLA	School and Institutional Trust Lands Administration	Local
SRTS	Safe Routes to School	National
STP	Surface Transportation Program	National
TAP	Transportation Alternatives Program	National
TIP	Transportation Improvement Program	National
TIGER	Transportation Investment Generating Economic Recovery	National
TRB	Transportation Research Board	National
UDOT	Utah Department of Transportation	Local
UTA	Utah Transit Authority	Local

