City of St. George
Active Transportation Plan

OCTOBER 2016 DRAFT

St.George

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PLANNING + DESIGN

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The project team is especially grateful to the residents who participated by providing original ideas and feedback during the public involvement process and Planning Commission and City Council public hearings.

Cover photo: Southern Utah Bicycle Alliance (SUBA)

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Executive Summary

Chapter 1: Introduction

St. George's location, natural resources, mild weather during most of the year, and extensive existing network of paved and natural surface trails have made walking and bicycling (or active transportation) popular forms of transportation and recreation.

The St. George Active Transportation Plan seeks to improve upon the city's and region's reputations for healthy activity by proposing policies and standards, programs, and infrastructure that will create a more cohesive walking and bicycling network that is comfortable enough for people of all ages and abilities to walk or ride a bike to school or work, shop, visit friends, or exercise.

Walking and bicycling are not niche activities or sports, but rather should be integral pieces of transportation and recreation systems and strategies, allowing St. George residents and visitors to enjoy increased mobility and independence, increased property values, improved health, a safer walking and bicycling environment, and, in general, better quality of life. A city designed to safely and naturally allow everyone to experience these benefits, from an eight-year-old walking to school to an eighty-year-old wanting to visit friends or family, or buy groceries, is a successful city.

Nearly 40%, or a little more than 30,000, of St. George's 78,000 residents are under 16 or over 70 years of age – people who are either unable to or who are less likely to drive an automobile.

The vision for this plan and for walking and bicycling in the city in general is that "St. George will be a place where residents and visitors of all ages and abilities can easily and confidently walk or ride a bicycle for transportation and recreation." Seven goals with sub-objectives and actions accompany this vision:

- Coordination & Planning
- Education, Promotion, & Encouragement
- Funding
- Maintenance
- Network, Facilities, & Design
- Safety
- Other

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A shared-use path gateway to the City

The plan will provide the City with consistent and thoroughly-vetted recommendations, tools, and direction to ensure that all future facilities are predictable and comfortable design for all users.

The Active Transportation Plan is organized into several chapters that address different, yet interrelated, subjects that build on one another and form a comprehensive planning effort.

Chapter 2: Existing Conditions & Needs Analysis

This section of the plan analyzed the makeup and quality of the existing network of bike lanes, paths, and other facilities (which totals more than 150 centerline miles), as well as their approximate usage in order to determine where needs existed and where improvements were necessary.

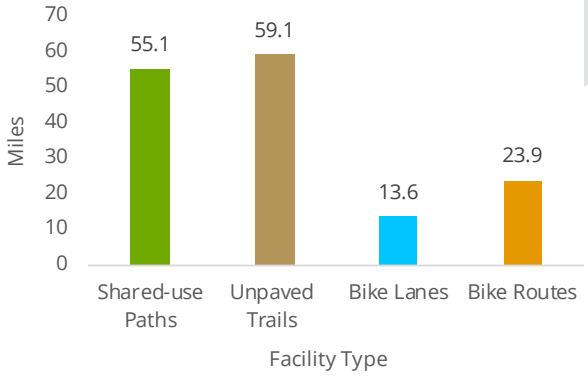

Figure 2.9 *Mileage of Existing Bikeways and Shared-use Facilities (Paths and Trails) in St. George.*

Currently, a combined estimated 6.8% of all trips in St. George, regardless of purpose, are done by people walking and bicycling. More than 40% of all trips in the city are *less than* two miles long, trips more easily converted into walking and bicycling trips than longer, commute trips.

UTAH TRAVEL STUDY

Even though most of the off-street system of trails and paths is connected, the essential on-street network is disconnected by major roadway crossings, natural topographic features like bluffs and washes, or is located on roadways that are not comfortable for people of all ages and abilities to use. Additionally, most crashes since 2010 involving people bicycling or walking have occurred on or near major arterial roadways and/or at intersections. Evidence has shown, however, that increasing the number of bicyclists on the road improves safety for everyone. Cities with higher bicycling rates tend to have lower overall crash rates and benefit from the "safety in numbers" effect.

Even though 6.8% of all trips in St. George are made by walking or bicycling, only 2.8% of all reported crashes between 2010 and 2015 involved people walking or bicycling.

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Improvements to nodes on Tabernacle and Main Streets have made it more enjoyable to walk to and shop at destinations downtown

83 CRASHES INVOLVING **BICYCLISTS**

49 CRASHES INVOLVING **PEDESTRIANS**

3 **FATAL PEDESTRIAN CRASHES (6%)** BUT NO FATAL BICYCLIST CRASHES

TOP 5 CRASH HOTSPOTS

1. Bluff St (17)	**1.** Sunset Blvd (13)
2. St. George Blvd (16)	**2.** Red Cliffs & Green Springs (11)
3. River Rd (14)	**3.** St. George Blvd (10)
4. Red Cliffs & Green Springs (14)	**4.** Bluff St (7)
5. 700 South (10)	**5.** Near Dixie State (7)

Fatal pedestrian crashes occurred on Bluff St, Dixie Dr, and Red Hills Pkwy.

10% OCCURRED WHEN IT WAS **DARK**	**31%** OCCURRED WHEN IT WAS **DARK**
77% OCCURRED AT **INTERSECTIONS**	**71%** OCCURRED AT **INTERSECTIONS**
25% CAUSED BY **ROAD GEOMETRY** (GRADE, BLIND CURVE, ETC.)	**8%** CAUSED BY **ROAD GEOMETRY** (GRADE, BLIND CURVE, ETC.)

Figure 2.10 *Graphic analysis of crashes involving bicyclists and pedestrians in St. George (2010-2015) (Data: UDOT).*

Chapter 3: Public Involvement

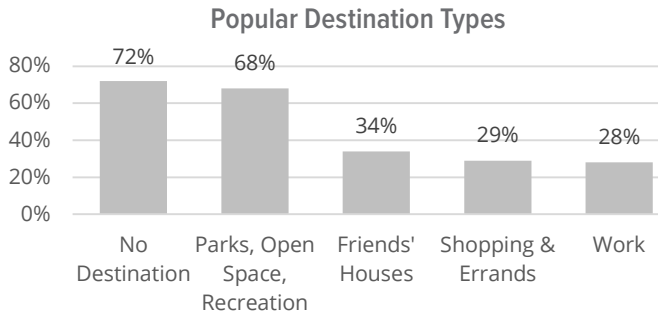
In order to better understand the needs of people who live, work, and recreate in St. George, the project team conducted multiple and diverse public outreach efforts and methods.

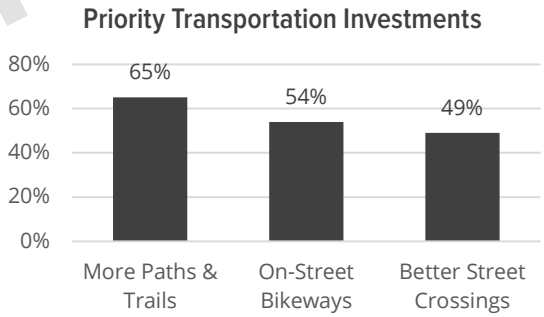
The public were invited to participate in four disitinct ways: take an online survey, draw recommendations on an interactive online map, learn more and provide their insights at the regional Transportation Expo, and ride with project consultants to identify what St. George is doing well and what could be improved.

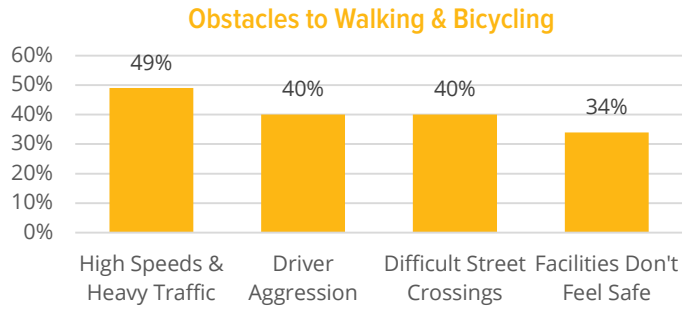
As part of the online survey, respondents indicated the types of destinations to which they do or would ride or walk, what types of investments they would prioritize, and what obstacles exist to walking or riding more often (see graphs).

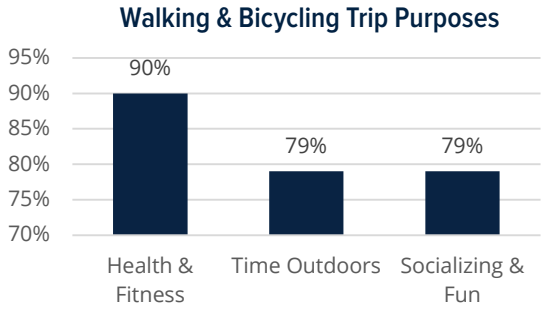
Suggestions made and discussions had during the public involvement process heavily influenced recommendations made throughout this plan.

Nearly 600 people participated during this planning process, in addition to the seven stakeholder groups and many residents who contributed to the Dixie MPO's Regional Active Transportation Plan in 2014 and 2015.









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Chapters 4 & 5: Recommendations

INFRASTRUCTURE IMPROVEMENTS

People who want to walk and ride bicycles vary in their physical abilities, experience levels, and the types of bicycles that they may ride to a greater degree than drivers of motor vehicles. Well-designed streets and dedicated, off-street facilities like paths and trails should be planned and implemented in a way that accommodates these different types of people walking and riding while creating a safe, connected network.

Many streets, like low-speed and/or low-volume local streets, may not need space on the roadway dedicated to people bicycling (shared roadway), while others with higher volumes and speeds may require much more significant infrastructure investments (separated bike lanes, shared-use paths, and some types of spot improvements).

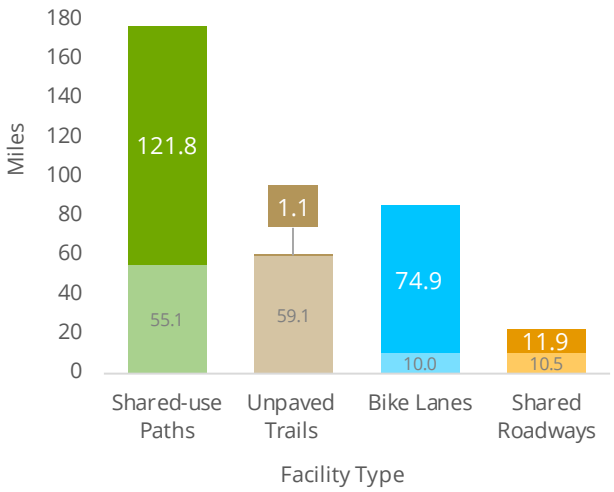


Figure 4.1 *Mileage of Existing Facilities (with the 17 upgraded miles removed from these totals), in lighter colors, and Newly Proposed Facilities (209.8 mi.) within St. George City Limits, in darker colors, by Facility Group Type*

To date, St. George and regional partners have invested primarily in off-street facilities like paths and trails. There are 210 miles of improvements and recommended facilities in the Active Transportation Plan. About 17 miles of existing facilities (mostly bike routes) are recommended to be enhanced in order to provide a better user experience.

In addition to the overall vision and goals, the plan's infrastructure recommendations will fill the needs of people walking and bicycling based on:

- **Popular destinations, barriers to walking and bicycling, and gaps in the existing network identified by the public**
- **Schools and parks**
- **Proximity to existing trailheads, natural surface trails, and paved shared-use paths**
- **Recommendations from the Dixie MPO Regional Active Transportation Plan and the St. George Trails Master Plan**

St. George family before beginning a bike ride together

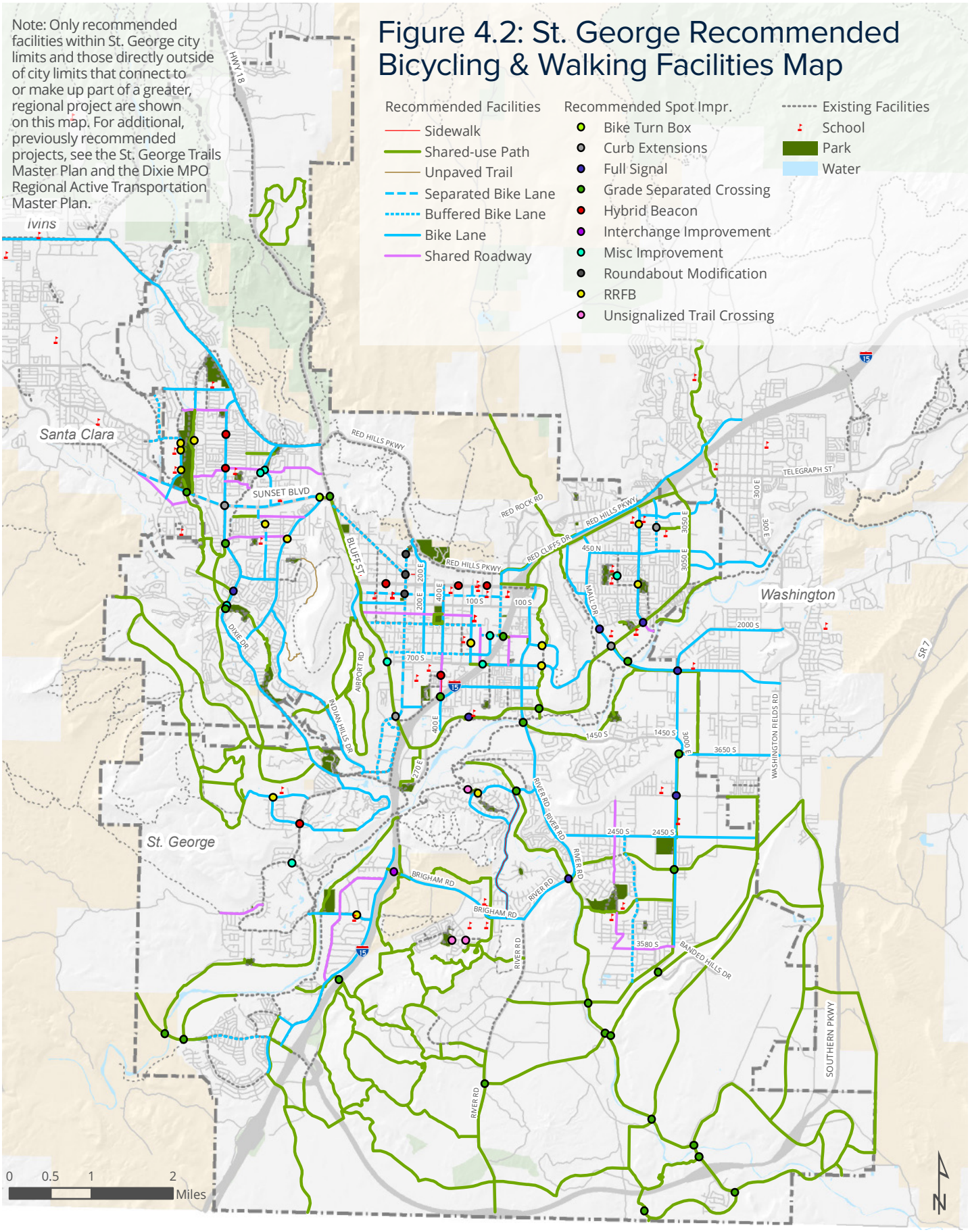
Figure 4.2: St. George Recommended Bicycling & Walking Facilities Map

Note: Only recommended facilities within St. George city limits and those directly outside of city limits that connect to or make up part of a greater, regional project are shown on this map. For additional, previously recommended projects, see the St. George Trails Master Plan and the Dixie MPO Regional Active Transportation Master Plan.

Recommended Facilities
- Sidewalk
- Shared-use Path
- Unpaved Trail
- Separated Bike Lane
- Buffered Bike Lane
- Bike Lane
- Shared Roadway

Recommended Spot Impr.
- Bike Turn Box
- Curb Extensions
- Full Signal
- Grade Separated Crossing
- Hybrid Beacon
- Interchange Improvement
- Misc Improvement
- Roundabout Modification
- RRFB
- Unsignalized Trail Crossing

Existing Facilities
- School
- Park
- Water



Low-stress, or high-comfort, bicycle and pedestrian facilities, like St. George's existing network of shared-use paved paths, sidewalks buffered by street trees, and other recommended facility types, like separated bike lanes and bicycle boulevards (enhanced type of shared roadways), appeal to a more diverse cross section of the public than conventional, on-street facilities like bike lanes (like 300 South and 300 West).

A network of low-stress facilities is essential to helping people walk and ride more often. National surveys indicate that 50-60% of people say they would ride a bicycle if they had access to facilities that provided more separation from traffic, lower traffic speeds, and/or lower traffic volumes. The St. George Active Transportation Plan's online public survey confirms that this is also the case for St. George residents.

Input during the public involvement process indicated a strong demand for more paths and trails, and a swift development of a cohesive network of on-street facilities that provided that same level of comfort but with greater connectivity to destinations.

Attendees at the January 2016 Bicycle Film Festival at the Electric Theater, hosted by SUBA

Some participants in the Salt Lake City Bicycle Collective's youth-focused Earn-a-Bike program (Photo: Bicycle Collective)

PROGRAMS, POLICIES, AND STANDARDS

A network of infrastructure is often only as effective as the programs, policies, and standards underlying and supporting it. There is an often-quoted adage, referring to infrastructure improvements, that "if you build them, people will come". The implementation or adoption of foundational programs, policies, and standards, however, can offer an appendage to that adage: "and if you tell and teach people about them, they will come *in droves*."

Recommended programs are divided into four categories: education, enforcement, evaluation, encouragement. These include open streets events, community bike shops, walk to school programs and safety-focused school assemblies, encouragement and safety-focused media campaigns, police training, counts, targeted crosswalk enforcement, and benchmarking reporting.

Programs will educate and encourage people, help enforce laws, and contribute to the evaluation of the efficacy of built, programmatic, and policy projects and initiatives.

Policies and standards will help to organically create a safe and cohesive network of future walking and bicycling facilities as St. George continues to develop and redevelop. These would require adequate space for active transportation on and near roadways, provide bicycle parking, implement more and higher visibility crosswalks, and ensure that roadway surfaces are smooth enough for bicyclists while maintaining low road noise volumes and high traction for residents and motorists, respectively.

Chapter 6: Prioritization, Implementation, & Evaluation

In addition to the previous recommendations, this section provides guidance on how to select appropriate and context-sensitive linear and spot facilities; how to implement and maintain shared-use paths (especially at intersections and crossings); and the factors that may allow a roadway reconfiguration, wherein excess roadway space is given to other transportation modes or are assigned an otherwise different purpose.

Not all of the recommended programs and infrastructure can or should be implemented all at once. This plan's strategic approach to implementation utilizes the vision and goals as well as residents' values to appropriately prioritize (over a 15 year planning horizon) initiatives that benefit or improve conditions near schools; remedy significant safety issues; improve access to employers, commercial destinations, parks, open space, and community centers; and that are more easily implementable either because of property ownership, low costs, or interagency coordination.

Chapter 7: Funding

As additional investment in active transportation increases so to will the need for additional and more diverse funding sources (i.e. local, regional, state, federal, private).

In addition to subscribing to funding programs' communications, preparing to respond proactively to grant availability, identifying local, school-related transportation and access funding, developing new and diverse and nurturing existing local funding partner relationships, and dedicating a sustainable general and/or CIP funding source from the City, the City of St. George should consult the more than thirty distinct funding sources included in Chapter 7 of the Active Transportation Plan and continue to research and update additional and new resources.

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The existing standard for access control recommends bollards, like this one near a blind corner at Tonaquint Park

Split path treads with low landscaping would prevent ingress from motor vehicles and slow and separate trail users at crossings.

People riding on the Virgin River Trail near Confluence Park

Vision & Goals

"St. George will be a place where residents and visitors of all ages and abilities can easily and confidently walk or ride a bicycle for transportation and recreation."

Goal #1: Coordination & Planning

- Integrate the on-street bikeway, parks and trails, and transit systems.
- Coordinate implementation of active transportation connections to surrounding municipalities and regional destinations.
- Consider active transportation in the decision-making processes of all City departments.
- Increase bicycle capacity on buses.

Goal #2: Education, Promotion, & Encouragement

- Promote the benefits of active transportation to the St. George community.
- Develop campaigns to encourage more people to walk and ride a bike in St. George.
- Educate motorists, bicyclists, and pedestrians about their respective roles, rules, and responsibilities.
- Improve drivers' education courses and encourage safe behavior around bicyclists and pedestrians.
- Promote bicycling and walking for short trips.
- Improve the effectiveness of elementary and middle school Safe Routes to School programs.

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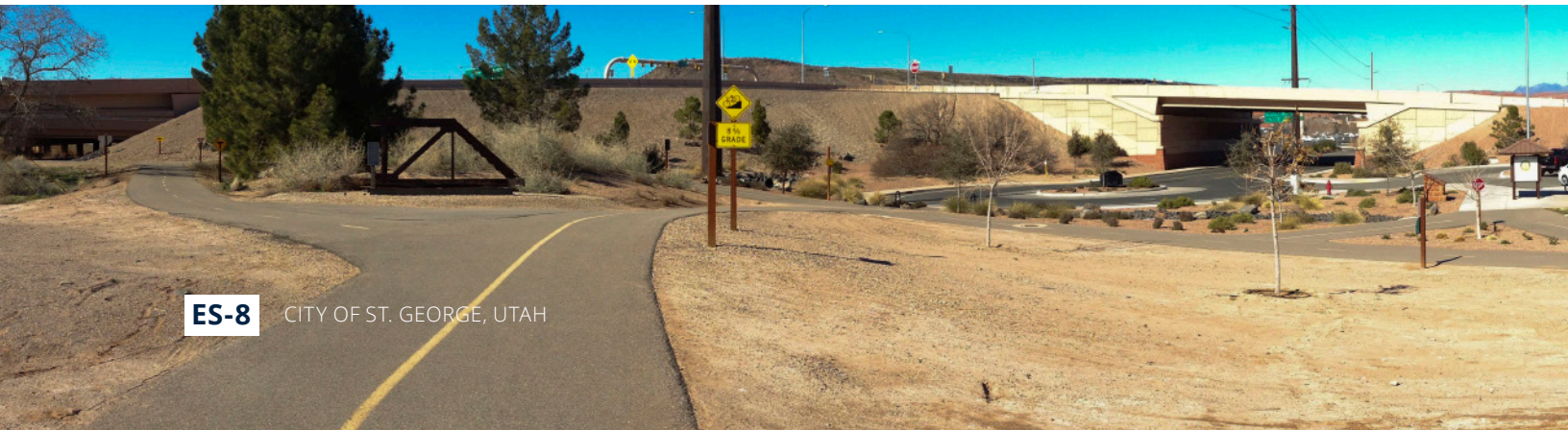

Goal #3: Funding

- Develop or pursue funding for capital construction and maintenance of active transportation facilities.
- Phase active transportation improvements in order to ease burden on funding sources.

Goal #4: Maintenance

- Ensure that the needs of bicyclists and pedestrians are incorporated into pavement management and maintenance practices and policies.

Goal #5: Network, Facilities, & Design

- Connect St. George's key destinations (Downtown, Dixie State, and important recreation destinations) with high quality active transportation facilities.
- Develop a network of comfortable and safe bicycling and walking routes throughout the City.
- Improve connectivity between streets and trails.
- Improve detection of bicyclists and pedestrians at intersections and crossings.
- Transportation infrastructure design should account for use by pedestrians and bicyclists.

Goal #6: Other

- Active transportation should be a critical tool for improving St. George's community health.
- Decrease automobile trips while increasing use of non-motorized transportation modes.
- Achieve League of American Bicyclists (LAB) Bicycle Friendly Community status.

Goal #7: Safety

- Reduce number and severity of conflicts between bicyclists, pedestrians, and motorists.
- Ensure that bicycle and pedestrian facilities are safely designed.

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Red Hills Parkway Trail near Pioneer Park

1: Introduction

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About the Plan

St. George has already invested in many assets that contribute to a quality bicycle and pedestrian environment, such as local parks and open space; sidewalks; and an extensive existing network of unpaved trails and shared-use paths.

As St. George continues to grow, careful planning can ensure that the bicycle and pedestrian system grows in stride with the City. The development of this plan, represents the first step in creating a future where bicycling and walking are safe and normal forms of transportation and recreation for St. George residents. The St. George Active Transportation Plan seeks to achieve this goal through the strategic development of bicycling and walking infrastructure and programs for the next decade.

The plan will provide the City with consistent and thoroughly-vetted recommendations, tools, and direction to ensure that all future facilities are predictable and comfortable design for all users.

The plan, though it may contain policy recommendations, is not regulatory in nature. Instead, it provides a vision and groundwork from which the City can invest resources and time in a prioritized and meaningful way. The implementation of the plan should be flexible so as to take advantage of future projects, capitalize on related investments, and allow the City to develop the recommended facilities and programs as easily as possible.

About St. George

St. George is the most populous city in Southern Utah and the population center of Washington County and the Dixie Metropolitan Planning Organization's region. Located near the southwest corner of Utah, St. George is home to more than 78,000 people, with a population density of about 1,200 residents per square mile (64.4 square miles of land total). Its low density is attributed both to St. George City's large geographic area, which includes many square miles of open space and undeveloped land, and the desert community's suburban development patterns.

The region's climate contributes to St. George's reputation as a haven for snowbirds: older residents who live in St. George at least during the winter. Table 1.1 shows that St. George residents, compared

Table 1.1 *City of St. George, Washington County, & Utah Demographics*

	St. George	Washington County	Utah
Total Population	**78,509***	144,844	2,858,111
Median Household Income	**$48,188**	$49,498	$59,846
Median Age	**33.8**	33.8	29.9
Population Under 16	**24.7%**	26.2%	28.0%
Population 70 & Over	**14.5%**	13%	6.3%
Population in Work Force	**37.4%***	38.1%	49.0%

*Data: American Community Survey (ACS) Five-Year Estimates, 2010-2014; *One-Year Estimates, 2014*

to Utahns as a whole, are typically older, have fewer children, and are less likely to be employed (i.e. more likely to be retired). Though not exclusively a retirement community, St. George and surrounding cities do aim to accommodate people of all ages and abilities.

St. George's character as the population and commercial center of Washington County means that more people come to St. George for their work, shopping, recreation, or entertainment needs than leave to go elsewhere. Of the more than 35,000 jobs in St. George city limits, 54% (~19,000) are held by people living outside of the city. Of the roughly 25,000 St. George residents who are in the workforce, 65% (~16,000) are employed within the city while the remaining ~9,000 work elsewhere, typically north and northeast of St. George (Washington, Hurricane, and Zion National Park.

This means that planning and implementing comfortable and safe walking and bicycling facilities in St. George is not only important for those who live there, but also for those who come from Washington, Ivins, and Santa Clara.

Why Walking & Bicycling Matters

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 why, in addition to improved mobility, active transportation should be integrated with the existing development and future growth of St. George.

MOBILITY, INDEPENDENCE, AND AGING IN PLACE

Nearly 40%, or a little more than 30,000, of St. George's 78,000 residents are under 16 or over 70 years of age. These age groups are either not legally able to drive or are less likely to drive, respectively. The goal of this plan is not simply to support those who are currently regular walkers and bicyclists, but rather encourage all St. George residents, regardless of age and ability to bike and walk more often for a variety of trip purposes. Increased independence for those "under 16" or "70 and over" is just one by-product of creating a more conducive bicycling and walking environment. These benefits also trickle down to the parents and caretakers of these populations by releasing them from the obligation of providing vehicular transportation at least for some trip types. In addition, environmental benefits, improved air quality, reduced traffic congestions, particularly near schools, improved health, all stem from providing youth and seniors with viable active transportation options.

Nearly 40%, or a little more than 30,000, of St. George's 78,000 residents are under 16 or over 70 years of age (Table 1.1). In the U.S. people between the ages of 60-79 are responsible for the greatest gains in bicycle ridership in the past two decades (Figure 1.1).

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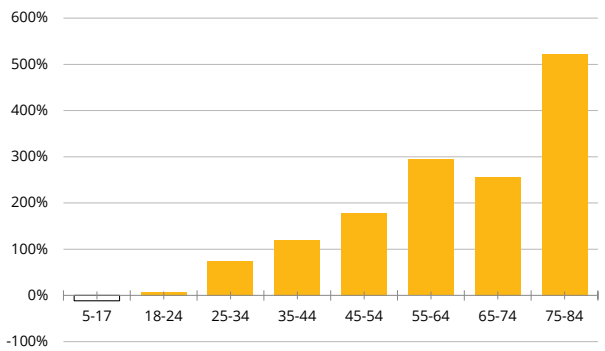

Figure 1.1 *Bicycling Rate Changes by Age Group, 1995 and 2009, show that the greatest growth in bicycling is among the older populations (National Household Travel Survey)*

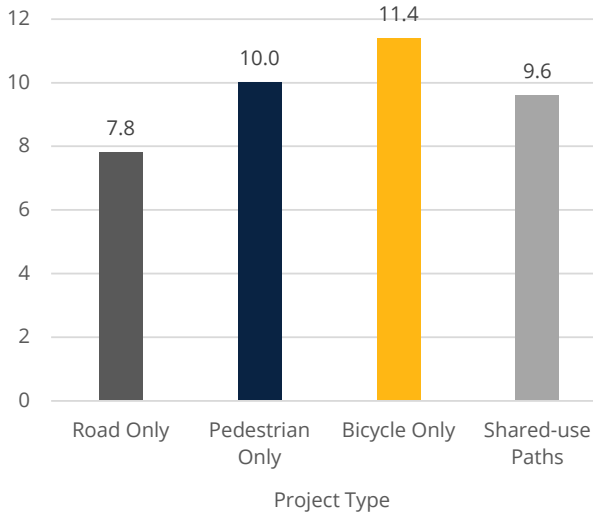

Figure 1.2 *Jobs Created per $1 Million Spent on Construction*

Additionally, younger people are driving less than they ever have an depend on non-motorized transportation for mobility. The rate of people ages 16-24 with a driver's license peaked in 1983 (~85%) and is now at its lowest point (~60%) since 1963 (~70%).[1]

ECONOMICS

Active transportation makes economic sense. Benefits include decreased family transportation costs[2], lower healthcare costs[3], more jobs created by way of capital infrastructure projects[4], and higher property values[5]. For example, bicycling and walking construction projects create more jobs per million dollars spent than roadway projects alone (Figure 1.2).[6]

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 the 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.[7] Americans say that having bike lanes or paths in their community is important to them, and two-thirds of home buyers consider the walkability of an area in their purchase decision.[8] This preference for communities that accommodate walking and bicycling is reflected in property values across the country.[9] Houses in walkable neighborhoods have property values $4,000 to $34,000 higher than houses in areas with average walkability.[10]

Communities that invest in walking and bicycling are more attractive to younger residents who contribute to a vibrant, well-educated workforce and are associated with industries that have not been common in St. George in the past, like technology and development companies. Walkable neighborhoods alone have seen a 26% increase in college-educated populations 25-34 years old.[11]

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9 Racca, D.P. and Dhanju, A. (2006). Property Value/Desirability Effects of Bike Paths Adjacent to Residential Areas. Prepared for Delaware Center for Transportation and the State of Delaware Department of Transportation.

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11 CEO's for Cities. "The Young and Restless in a Knowledge Economy", 2005.

Case Study: Google Headquarters in Mountain View, California

The North Bayshore region in Mountain View, California, where Google's worldwide headquarters are located, had an extensive network of and access to a shared-use path network before the tech firm moved in. They wanted to relocate in the region in order to stay in the midst of Silicon Valley, but later recognized how many employees were riding bikes to work and decided to embrace it as part of their company culture.

Google invested heavily in improving bicycle accessibility, including adding facilities for bicyclists inside buildings (showers, lockers), and ample bike parking outside and inside. They have also invested heavily in the City of Mountain View's planning efforts to fund studies and capital construction of facilities that will make bicycling to work easier and safer for employees. According to survey data, 9% of all Google employees working at their Mountain View campus ride bikes to work (rising to 21% when analyzing trips 9 miles or less.

By reducing demand for parking spaces, Google is able to vastly increase office density beyond what traditional zoning and parking requirements would allow. One important aspect of the tech industry is the flexibility to grow in place. Being able to add 10% more desks to a building means that firms don't have to lease a new building, uproot a department while facilitating a move, nor split a department between two buildings. Being able to facilitate and maintain face-to-face interactions within departments is essential to technology firms' business models because these interactions facilitate breakthroughs. When a company is looking to expand and feels like a large number of employees can or will bicycle to work, they are able to play with more space that would have otherwise been used for parking.

TOURISM

St. George is the heart of tourism in Southern Utah, conveniently located near numerous national parks and federal lands, city and state parks, wildlife areas, and countless other opportunities for outdoor recreation. Residents and visitors are interested in recreation choices, like walking, hiking, road bicycling, and mountain biking.

Table 1.2 *Economic Impact of Bicycling Events in Washington County*

	Direct Impact	Training Impact	Total Impact
Ironman	$6,000,000	$2,000,000	**$8,000,000**
Huntsman Senior Games	$1,250,000	$250,000	**$1,500,000**
Tour del Sol	$1,000,000	$200,000	**$1,200,000**
Tour de St. George (2x per year)	$2,000,000	$350,000	**$2,350,000**
True Grit Epic	$400,000	$175,000	**$575,000**
25 & 6 Hours of Frog Hollow	$750,000	$150,000	**$900,000**
Total	$11,400,000	$3,125,000	**$14,575,000**

Data: Washington County Office of Sports & Outdoor Recreation

In addition to natural attractions, St. George's moderate winters and pleasant falls and springs attract outdoor and sporting events to the area, including world-renowned Ironman triathlons, road races, mountain biking events, marathons, and endurance events. The popularity and economic impact of these events (see Table 1.2) has fostered a growing culture where the ability to walk and bike are seen as key components of St. George's quality of life.

At least 82% of Utahns participate in outdoor activities each year, generating about $12 billion in consumer spending, 122,000 direct Utah jobs, $3.6 billion in wages, and $856 million in state and local tax revenue.[12] Utah ranks 1st in the United States for concentration of outdoor and sporting good jobs as a percentage

12 Outdoor Industry Association. The Outdoor Recreation Economy, Utah.

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of total jobs in the state and 2nd in the total number of such jobs. Washington County, of which St. George is the seat, boasts 7,273 tourism jobs, making it the number one private sector employment group in the county.[13]

Bicycling is also the third most popular vacation activity in the United States with nearly 27 million Americans taking bicycling vacations.

Studies in Grand County, Utah (Moab) in 2000[14] and 2009[15] estimated the total economic value of mountain biking and the economic impact of public lands and tourism-related industries in the Moab area, respectively. These studies found that the investment in mountain biking and bicycling-related tourism by Grand County netted impressive gains for the local economy. The average mountain biking visitor to Grand County spends $585 per trip per person and the tourism industry alone made up 44% of private wage and salary jobs. National parks in Grand County created $53.5 million in total labor income and spending by non-local visitors to Bureau of Land Management (BLM) land created more than $177 million in local output and another $64 million in labor income for Grand County, supporting an additional 2,447 jobs.

ENVIRONMENT

Although air quality is not as much of a problem in St. George as it is along the Wasatch Front, one of St. George's goals is to create "a city that cherishes its clean air and takes appropriate steps to protect it."[16] Promoting active transportation over single-occupant vehicle trips is one way to mitigate possible air quality problems. Vehicles are the primary source of PM 2.5 pollutants, which account for almost half of typical winter workday emissions in Utah.[17] Additionally, replacing two miles of driving per person per day with walking or bicycling prevents 730 pounds of carbon dioxide from entering the atmosphere annually.[18] This reduction minimizes the transportation sector's air quality impacts and decreases public health concerns, such as asthma.

Bicycling and walking also require fewer natural resources than automobile infrastructure. Currently in the U.S., nearly one-third of all developed land is dedicated to roads. Because of the smaller operator and vehicle footprints of pedestrians and bicyclists, the demand for road space, new streets, and parking decreases as more people ride and walk. Hence, less dependence on oil to make roads and more room for public space, buildings, food production, and homes.[19]

QUALITY OF LIFE

Bicycling and walking are also important ways to improve quality of life for existing and prospective St. George residents. Baby boomers, retirees, and millennials alike are trending toward locations where they can ride a bike or walk to access their daily needs.

Cities that invest in active transportation are investing in people and their quality of life. Business decisions are increasingly being made based on quality of life amenities for employees and their families. Comfortable sidewalks, on-street bicycle facilities, shared-use paths, and transit service are important quality of life indicators. They demonstrate a commitment to healthy transportation options and lifestyles.

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13 Washington County Office of Sports & Outdoor Recreation.

14 Chakraborty, Kalyan; Keith, John E. Estimating the Recreation Demand and Economic Value of Mountain Biking in Moab, Utah: An Application of Count Data Models, 2000.

15 Headwaters Economics. The Economic Value of Public Lands in Grand County, Utah, 2009.

16 St. George General Plan.

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

18 Federal Highway Administration. (1992). Benefits of Bicycling and Walking to Health.

19 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, p–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.

SAFETY & HEALTH

Corresponding fatality rates are generally lower in places where more people begin their commutes to work by walking or bicycling. This is in contrast to critics who fear a higher rate of crashes when more bicyclists and pedestrians are using the existing or future on- and off-street system.[20]

Studies show that installing pedestrian and bicycle facilities directly improves safety by reducing the risk of pedestrian-automobile and bicycle-automobile crashes.

Streets with bike lanes (compared to streets with no bicycle facilities) have been shown to be safer not just for bicyclists, but also for pedestrians and motorists.[21] Streets without bicycle facilities may pose a greater collision risk. When walking and bicycling rates double, per-mile pedestrian-motorist collision risk can decrease by as much as 34%.[22]

In addition to the safety benefits that occur when more people are walking and bicycling, active transportation can have many positive impacts on personal and community health issues such as diabetes, heart disease, and obesity. In 2013, 7.1% of Utahns were considered diabetic and 24.1% were obese (part of the 56% that were overweight).[23] 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, obesity, and high blood pressure, and higher percentages of the population meeting recommended weekly physical activity levels.[24]

The Centers for Disease Control and Prevention recommend at least 2.5 hours of moderate exercise each week, yet many people do not have convenient access to places where they can be physically active. Walking and bicycling are some of the most basic forms of physical activity. Improving active transportation facilities, linking people to recreational and daily destinations, would improve access to convenient exercise options. Studies show that people walk more in safe, connected, and aesthetically pleasing places. Improved facilities, like sidewalks, paths, trails, and crosswalks promote physical activity by making active transportation more appealing, easier, and safer.[25]

20 Alliance for Biking and Walking, Bicycling and Walking in the United States, 2014 Benchmarking Report.

21 Ewing, R. and Dumbaugh, E. (2010). The Built Environment and Traffic Safety: A Review of Empirical Evidence. Injury Prevention 16: 211-212.

22 Jacobson, P. (2003). Safety in Numbers: More Walkers and Bicyclists, Safer Walking and Bicycling. Injury Prevention 9: 205-209.

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

24 Annual Survey Data. Behavioral Risk Factor Surveillance System. Centers for Disease Control, 2011; "2014 Benchmarking Report", 0. Alliance for Biking and Walking. http://bikewalkalliance.org.

25 Robert Wood Johnson Foundation. Active Transportation: Making the Link from Transportation to Physical Activity and Obesity. Active Living Research. Research Brief; 2009. Available at http://www.activelivingresearch.org/ files/ALR_Brief_ActiveTransportation.pdf.

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Improvements to nodes on Tabernacle and Main Streets have made it more enjoyable to walk to and shop at destinations downtown

Existing bike lane on 300 South near Dixie State University; this plan recommends upgrading to a paint-buffered bike lane

2: Existing Conditions & Needs Analysis

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This chapter discusses the existing walking and bicycling trends in St. George, frequency and purpose of walking and bicycling trips, and an overview of the city's system of shared-use paths, unpaved trails, bike lanes, and bike routes. The existing system analysis includes an identification of needs and gaps in the system; barriers to walking and bicycling; and crashes involving bicyclists and pedestrians. The purpose of this chapter is to develop a data-based foundation upon which future recommendations can be built.

More than 40% of all trips in St. George are less than two miles long, trips more easily done by walking and bicycling trips than longer, commute trips.

UTAH TRAVEL STUDY

Walking & Bicycling Trends

AMERICAN COMMUNITY SURVEY (ACS) JOURNEY TO WORK DATA

The American Community Survey (ACS) Journey to Work data measures changes in commute mode share over time. The ACS only collects information about the main transportation mode for trips from home to work (only 22.9% of all trips made in St. George and 20.3% in Washington County, according to the Utah Travel Study) and excludes trips made by those outside of the workforce (including children, retirees, unemployed residents, and stay-at-home parents - more than 62% of St. George residents) and those who commute by different means depending on the day, weather, and time of year. The ACS is, however, a consistent benchmark of mode choice over longer periods (5 years or more). It should be noted that the commute trip mode shares shown in Figures 2.1 and 2.2 have a small margin of error, are taken from surveys randomly distributed and averaged throughout the

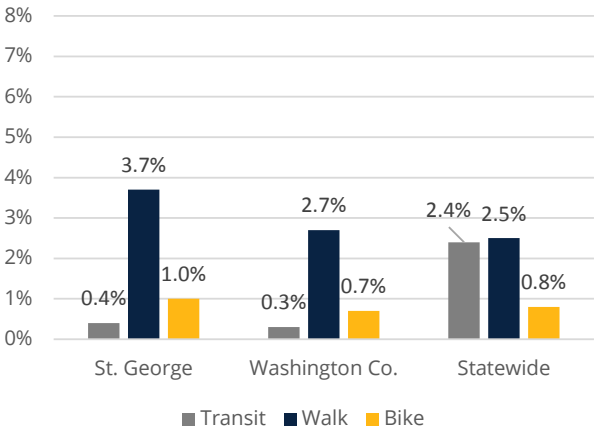

Figure 2.1 *Non-Automobile Mode Share (% of Total Trips) in St. George, Washington County, and State of Utah (American Community Survey, Five-Year Estimates, 2010-2014)*

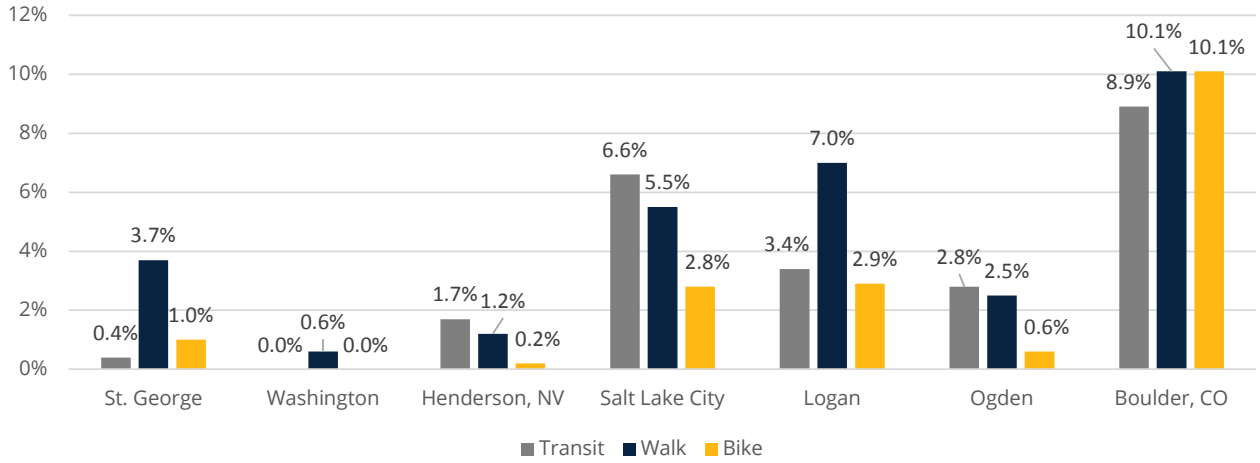

Figure 2.2 *Non-Automobile Mode Share (% of Total Trips) in St. George and Peer Cities (American Community Survey, Five-Year Estimates, 2010-2014). Compared to other communities in the western U.S., St. George's rates of walking and bicycling to work are below average, likely due to the larger retired population whose trips are not included in the ACS data*

year (meaning that during moderate weather for most of the year, these rates may be higher), and are lower than the overall walking and bicycling rates in St. George (from the Utah Travel Study, shown in Figure 2.3). The mode that is more likely to be used for commuting rather than other trips is transit (busses).

NATIONAL WALKING & 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.[1] St. George's bicycling mode share is about equal to national averages, while walking mode share is about half of the national average (likely due to development patterns and hot summer temperatures).

UTAH TRAVEL STUDY

Because the ACS is not a perfect metric of walking and bicycling rates due to the singular focus on commute trips, the Utah Travel Study provides a broader picture of existing travel habits in St. George.

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. Because the surveys may only be reproduced every 8-10 years, the Study's tremendous amount of valuable data cannot be monitored on a year-to-year basis (like the ACS), making the monitoring and reporting of incremental changes more difficult.

A combined estimated 6.8% of all trips, regardless of purpose, in St. George are done by people walking and bicycling.

UTAH TRAVEL STUDY

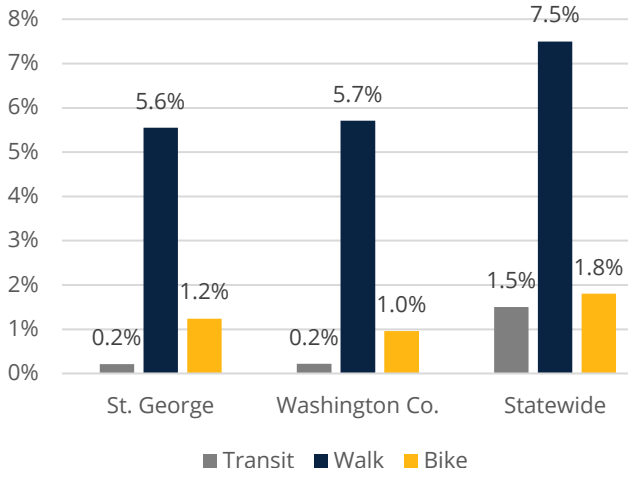

Figure 2.3 *Non-Automobile Mode Share (% of Total Trips, including recreation, regardless of purpose) in St. George, Washington County, and State of Utah (Utah Travel Study)*

1 "Benchmarking", 12-13.

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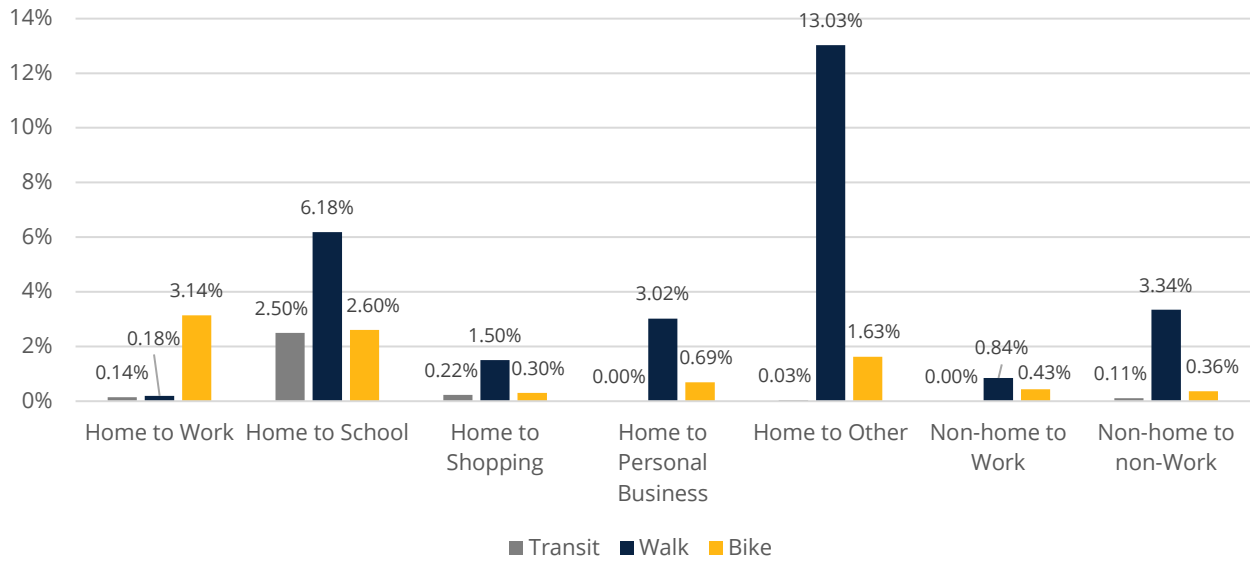

Figure 2.4 *Walking, Bicycling, and Transit Trip Purpose Mode Shares in St. George (Utah Travel Study). The most common trip purposes for walking are to school and "other", which include recreational trips. The most common for bicycling are to work, to school, and "other".*

As shown in Figure 2.3, walking and bicycling trips in St. George are about as frequent as in Washington County and not substantially lower than Utah statewide.

Figure 2.4 identifies why people took walking, bicycling, and transit trips and shows that school and other trips are the most common walking trip purposes, school trips are the most common transit trip purposes, and that work, school, and other trips are the most common bicycling trip purposes. These are trends that do not show up in the general mode share percentages in Figure 2.3.

Although commute trips offer the most consistent measurements to track progress, they are often the most difficult trip to make via bicycling or walking. Many factors including job location, availability of changing rooms, and work schedule may make bicycling and walking commute trips impossible for some people. However, a majority of St. George residents possess the ability to convert shorter trips to schools, recreation areas, churches, or shopping into active transportation trips. Improving end-of-trip facilities, like bicycle storage, lockers, and showers for

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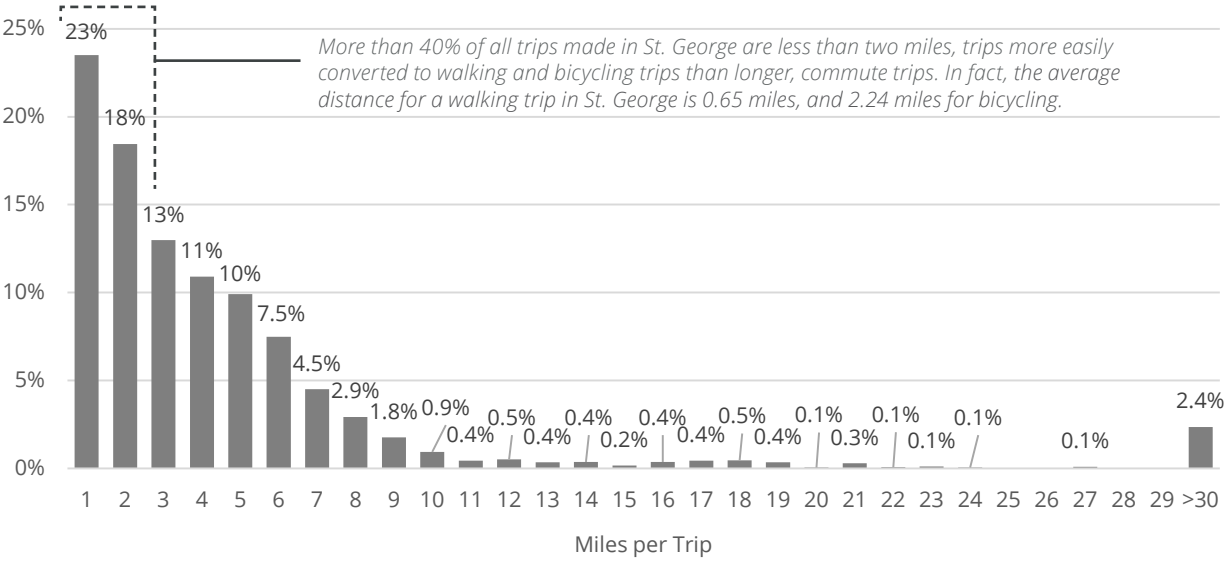

Figure 2.5 *Trip Distances in St. George (Utah Travel Study)*

commuters as well as improving recreational routes for those who are taking "other" trips will make existing users' trips easier and more enjoyable.

It should be noted, however, that the Utah Travel Study's (and the ACS's) data are only representative of those who are currently walking and riding. If and when improvements to the overall system are made, the percentage of people who can choose to walk or bike instead of drive will likely increase and trip purposes will become more varied. Planning and implementation should not only focus on the needs of current users, but also on the needs of the latent population, as well.

Mode Choice by Employment

Because the sample size was too small for St. George, this section uses data from Washington County as a whole. As confirmed by the Utah Travel Study, Washington County (and St. George) residents' travel mode choice changes depending on employment status and stage of life. Those who work full or part time have average rates of walking and bicycling, while students, retired, and unemployed residents are much more likely to ride a bike or walk to their destination.

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DIXIE STATE UNIVERSITY

Dixie State University (DSU) is an important bicycle and pedestrian walking destination in downtown St. George. DSU enrolls approximately 8,500 students and employees many more faculty and staff. In recent years, the University has focused on improvement and redevelopment of the campus. Projects such as the new clock tower project and the Jeffrey R. Holland Centennial Commons demonstrate the campus's commitment to providing a more traditional, pedestrian-oriented campus rather than a commuter school.

In this vein, the campus has also realized the need to create opportunities for its students to walk, bike, and ride public transit to, from, and around the campus. The campus' new housing facilities have bicycle storage lockers for residents and improving walking and bicycling connectivity to and through the campus is one of the University's main priorities. Providing access to the DSU campus is a critical component of the overall success of St. George's active transportation system.

Dixie State University students walking and bicycling to campus

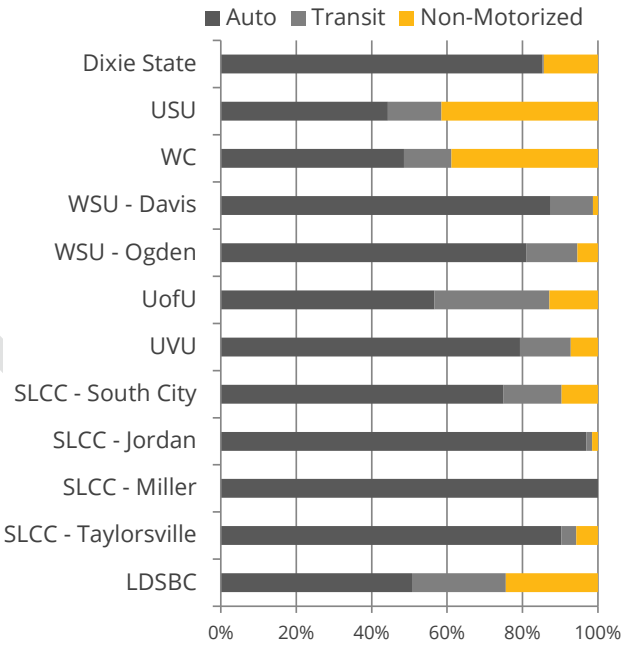

Figure 2.6 *Utah Travel Study College Mode Share Results*

Part of the Utah Travel Study consisted of a College Travel Diary which asked higher education students at select higher education institutions to record their travel habits. Figure 2.6 illustrates the mode by which students make trips to and from their respective schools. Even though the SunTran transit center is at Dixie State, the University has one of the lower bus-to-school rates of twelve campus options in the Travel Study survey. Rates of bicycling and walking (non-motorized) are roughly average when compared with other higher education institution.

Connectivity To Transit

Nearly every transit trip (90%[2]) begins as a walking or bicycling trip. According to the Utah Travel Study, 23% of trips in St. George are one mile or less and 41% are two miles or less (see Figure 2.5). The potential for St. George residents to ride a bike or walk to take transit, especially if first and last mile connections to and from transit, jobs, homes, and recreation areas are improved. According to a recent SunTran survey, more than 100 Dixie State students are taking SunTran each day now that they can use the system for free, a significant increase from before the policy change.

SUNTRAN BUS SYSTEM

Improving end of trip facilities (such as bike parking) and enhancing access to transit stations, will allow transit users to comfortably ride a bike or walk the first or last mile of a transit-centered trip. This makes transit more attractive and feasible for people in St. George.

SunTran currently has six routes that serve St. George and Ivins. Each route runs every day except Sunday, from 5:40 am until 8:40 pm. All routes eventually connect at the SunTran Transit Center located at Dixie State University. Other bus route information is found in Table 2.1.

2 "Benchmarking".

Front-loading bike racks on a SunTran bus in St. George

All busses serving the St. George area accommodate bicycles in front-mounted racks that fit two bicycles at a time. When the racks are full (which is quite common during peak commute hours), a potential rider waiting at a bus stop will need to wait for the next bus. SunTran is currently considering adding more bicycle capacity on their busses.

As St. George's transit system continues to expand, improve, and provide more service, the City and SunTran should improve the bicycling and walking system to integrate with it so that people can more easily access stops, crossings, destinations, and transit hubs.

Future SunTran development should also address secure bicycle parking at transit centers, racks on busses, and other pedestrian and bicycle infrastructure

Table 2.1 *SunTran Bus Routes Serving St. George*

	Name	Frequency	Origin	Destinations Served
1	Red Cliffs Route	Every 40 Min. Beginning 6:00 am	Transit Center	Transit Center, Dixie Regional Medical Center, Harmon's, Deseret Industries, Destinations east of East Black Ridge
2	Riverside Route			Transit Center, Downtown south of Tabernacle St., South Bluff St., Dixie High, Harmon's, Vernon Worthen Park
3	West Side Connector			Transit Center, Downtown north of Tabernacle St., City Hall, St. George Blvd, North Bluff St., Sunset Corners
4	Sunset Route	Every 40 Min. Beginning 5:40 am	Sunset Corners	Sunset Corners, Valley View Dr, Sunset Instacare, Sunset Blvd, Snow Canyon High and Middle Schools
5	Ivins Route	Every 80 Min. Beginning 5:40 am		Sunset Corners, Ivins, Snow Canyon Pkwy, Santa Clara Dr, Sunset Blvd, Canyons Park, Tuachan,
6	Dixie Drive South Route	Every 80 Min. Beginning 6:20 am		Sunset Corners, Sunset Blvd, Valley View Dr, Sunset Instacare, Mathis Park, Tonaquint Park, Bloomington Wal-mart

Data: SunTran

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improvements that will improve connectivity to transit and likely increase ridership.

Main Street, 700 South, 100 South, Sunset Boulevard, Bluff Street, and Mall Drive have high levels of transit access but are relatively underserved by the existing bicycling and walking system.

Natural Obstacles to Bicycling and Walking

Some geologic features in St. George, like the bluffs surrounding Downtown and the river corridors present physical barriers to bicycling and walking. Hot summertime temperatures also present challenges and opportunities to St. George residents bicycling and walking that some communities do not have.

TOPOGRAPHY

St. George's most defining character stems from its red rock formations, bluffs, and river valleys. However, these unique topographic features can be challenging when establishing a connected street or trail network and encouraging short trips. These landforms often increase the average length of trips and limit roadway network connections, often combining all users, bicyclists, pedestrians and vehicles, on same transportation corridors (i.e. Bluff St, Sunset Blvd, Dixie Dr, and Red Hills Pkwy).

WEATHER

Moderate temperatures (including average highs of 50-60 degrees in late fall and winter) and a combined average 1.5 inches of snow annually provide favorable conditions that encourage more active transportation trips in non-summer months. Daytime summer temperatures in Southern Utah routinely hit triple digits, making that season's mid-day bicycling or walking trips less likely. However, a hotter climate does not necessarily mean that bicycling and walking are less viable modes of transportation. Many communities see a shift in peak bicycling and walking times to earlier in the morning and later in the afternoon or early evening during the summer. Combining trips home from work with transit also improves bicycling and walking rates in inclement weather.

Tucson, Arizona, is one example of a western desert community where trips are frequently taken by walking and bicycling (3.4% and 3.5% of commute to work trips, respectively). The City found that their extensive network of more than 700 miles of bike lanes were used less during the summer because the majority of them were on major arterial streets. Arizona's summer heat was exacerbated as the amount of asphalt around bicyclists increased. Since the City has begun to develop their bicycle boulevard network on minor streets with less asphalt, less traffic, more shade trees, and lower ambient temperatures, they have a less dramatic dip in bicycling rates during the summer.

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Red rock formations north of Downtown St. George along Red Hills Parkway

Existing System Analysis

St. George currently has more than 151 total miles of on-street bikeways and off-street, shared-use facilities. Many more miles of bicycling and walking facilities exist in open space outside of city limits, as well as in other, surrounding municipalities (see map of existing system in Figure 2.7).

SHARED-USE PATHS

There are more than 55 miles of paved shared-use paths in St. George. These paths, sometimes called trails, are shared by bicyclists, pedestrians, runners, and other non-motorized modes. Shared-use paths are typically located in their own rights of way separated from roads, but can also be built adjacent to roads. Some of St. George's notable paths include the Virgin River Trail, Sand Hollow Wash Trail, and the Bluff Street Trail.

UNPAVED TRAILS

There are about 59 miles of unpaved mountain biking and hiking trails inside St. George city limits and many more miles outside of, yet still accessible from, the city. Unpaved trails can be dirt, gravel, crushed limestone, and other natural surfaces, and exist in separate rights of way for exclusive use by hikers, mountain bikers, and sometimes equestrians. Unpaved trails can be singletrack or wider and more accessible.

BIKE LANES

This type of bikeway uses striping, symbols, and sometimes signage to assign space on the road to bicyclists. Bike lanes encourage predictable movements by both bicyclists and motorists by assigning each mode separate spaces. St. George currently has nearly 14 miles of bike lanes within city limits, like on Diagonal Street and 300 South.

BIKE ROUTES

Roadways that highlight the legal right of bicyclists to operate in the travel lane, either side by side or in single file depending on roadway conditions, but that do not necessarily have a dedicated facility or space are called bike routes and can be identified by signage and/or pavement markings. There are currently almost 24 miles of bike routes in St. George.

People of all ages enjoying a ride on a shared-use path (Photo: SUBA)

Mountain bike races take place regularly on the unpaved trails in and near St. George (Photo: Red Rock Bicycle Co.)

People riding bikes in a bike lane on Tuweap Drive

Bike Route signs like these identify streets that are friendly or preferred for bicyclists, often as an alternative to a busier road

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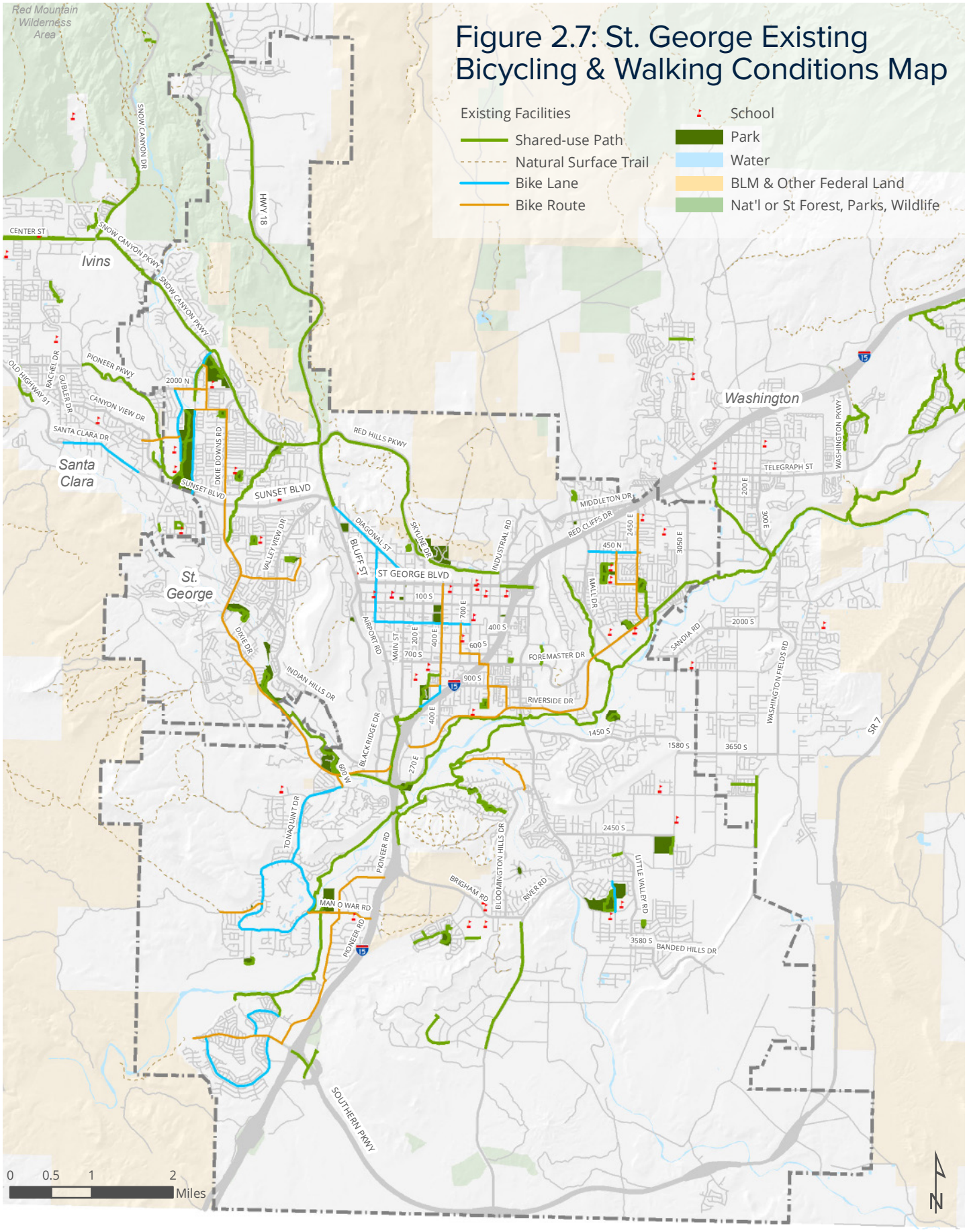
Figure 2.7: St. George Existing Bicycling & Walking Conditions Map
Existing Facilities
Shared-use Path
Natural Surface Trail
Bike Lane
Bike Route
School
Park
Water
BLM & Other Federal Land
Nat'l or St Forest, Parks, Wildlife
Red Mountain Wilderness Area
Ivins
Santa Clara
St. George
Washington
SNOW CANYON DR
CENTER ST
SNOW CANYON PKWY
HWY 18
PIONEER PKWY
2000 N
OLD HIGHWAY 91
RACHEL DR
GUBLER DR
CANYON VIEW DR
SANTA CLARA DR
DIXIE DOWNS RD
SUNSET BLVD
RED HILLS PKWY
DIAGONAL ST
SKYLINE DR
INDUSTRIAL RD
MIDDLETON DR
RED CLIFFS DR
TELEGRAPH ST
WASHINGTON PKWY
200 E
300 E
2450 E
3050 E
450 N
VALLEY VIEW DR
BLUFF ST
ST GEORGE BLVD
100 S
700 E
400 S
600 S
MALL DR
AIRPORT RD
MAIN ST
200 E
400 E
700 S
2000 S
SANDIA RD
DIXIE DR
INDIAN HILLS DR
FOREMASTER DR
900 S
RIVERSIDE DR
WASHINGTON FIELDS RD
SR 7
1450 S
1580 S
3650 S
BLACK RIDGE DR
270 E
600 W
TONAQUINT DR
2450 S
PIONEER RD
BLOOMINGTON HILLS DR
BRIGHAM RD
RIVER RD
LITTLE VALLEY RD
MAN O WAR RD
3580 S
BANDED HILLS DR
SOUTHERN PKWY
0 0.5 1 2 Miles
N

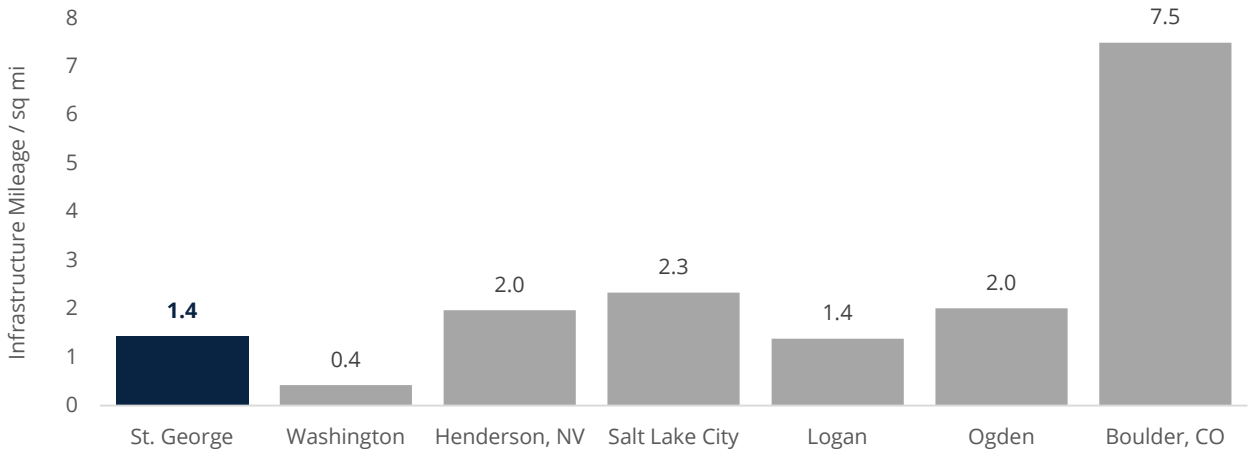

Figure 2.8 *Existing bicycle and shared-use infrastructure density (total system mileage / square miles of land in city limits) in St. George compared to other communities in the western U.S. St. George's infrastructure density is comparable to Henderson, NV and many of the bicycle and walking friendly communities in Utah, and about one-third the density of Boulder, CO, one of the most bicycle friendly communities in the Western United States. Note: densities do not include unpaved trail mileage (which are primarily recreational facilities) so as to preserve the analysis to the active transportation networks.*

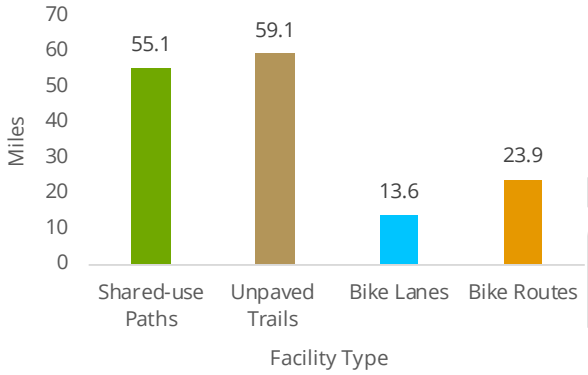

Figure 2.9 *Mileage of Existing Bikeways and Shared-use Facilities (Paths and Trails) in St. George City Limits by Facility Type (Note: To date, St. George and regional partners have invested primarily in off-street facilities like paths and trails and recently in on-street facilities)*

Crashes

Crash data is an important statistic in tracking and analyzing bicycle and pedestrian safety. Crash data for all crashes involving bicyclists or pedestrians in St. George were provided by the Utah Department of Transportation and are referred to as "crashes" in this section.

About 132, or **2.8%**, of the 4,650 total crashes in St. George between January 1, 2010, and November 20, 2015, involved a bicyclist (83; 1.8%) or a pedestrian (49; 1.1%). The purpose of this analysis is not to highlight an inherent risk in bicycling and walking, but rather to identify common locations, trends, and factors that are contributing to crashes in order to mitigate them.

LOCAL TRENDS IN PEDESTRIAN AND BICYCLIST CRASHES

Time

Bicyclist crashes increase in frequency between the morning and afternoon, peaking between 2:00 pm and 4:00 pm. Conversely, pedestrian crashes are much more likely around peak commute times in the mornings and evenings, and the least likely in the early afternoon. Pedestrian crashes occurred most frequently during dawn and dusk. There is also a decrease in pedestrian crashes immediately after daylight savings ends, when the mornings are brighter. Additionally, about one-third of pedestrian crashes occurred when it was dark, compared to only 10% of bicyclist crashes. This could be because people are more likely to walk than ride a bike at night and because bicyclists, when riding at night, can be equipped with lights or reflective clothing.

Even though crash severity has stayed about the same year-to-year, every year since 2010 there have been more crashes than the last.

Even though 6.8% of all trips in St. George are made by walking or bicycling, only 2.8% of all reported crashes between 2010 and 2015 involved people walking or bicycling.

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Speed

Although 34% of traffic fatalities in Utah were speeding-related, excessive speed (exceeding the posted speed limit) was not a contributing factor in any of the crashes identified in this section in St. George. However, even though speeding was not a trend in St. George's crashes, all three fatal pedestrian crashes occurred on higher speed roadways (speed limits between 40-45 mph) with uncomfortable dedicated facilities or no facilities whatsoever for bicycling and/or walking. Figure 2.10 illustrates that most crashes occurred on federal and state highways and busier, collector streets – roadways with higher speeds.

Vehicle Maneuvers

Nearly half (49.4%) of the bicycle and pedestrian crashes occurred when a motor vehicle was turning right, a movement known as a "right hook". Traffic calming, lighting, dedicated right turn lanes to the right of bike lanes, correct lateral positioning of bicyclists, and pedestrian refuges or waiting areas in the line of sight of motorists could reduce these types of crashes.

Location

75% of the 132 total crashing involving bicyclists or pedestrians were intersection related. Even though St. George's extensive off-street bicycling and walking trail network has many intersections with the roadway network, they were not common crash locations.

As seen in Figures 2.11 and 2.12, crashes of any kind (and particularly those causing more serious injury) are clustered at intersections on major roads like River Rd, St. George Blvd, Bluff St, Sunset Blvd, and Riverside Dr. These roads tend to be, wider, have more lanes for traffic, larger intersections, and higher traffic speeds, and do not have dedicated or comfortable facilities for bicycling and walking. The exception to this for pedestrians is St. George Blvd, where sidewalks are lined by trees. The 10 pedestrian-involved crashes on this street occurred at intersections and the majority occurred where the vehicle involved was turning right or left, albeit at slow speeds. Improving visibility for pedestrians at intersections may reduce the likelihood of crashes in the future and encourage more people to walk and shop downtown.

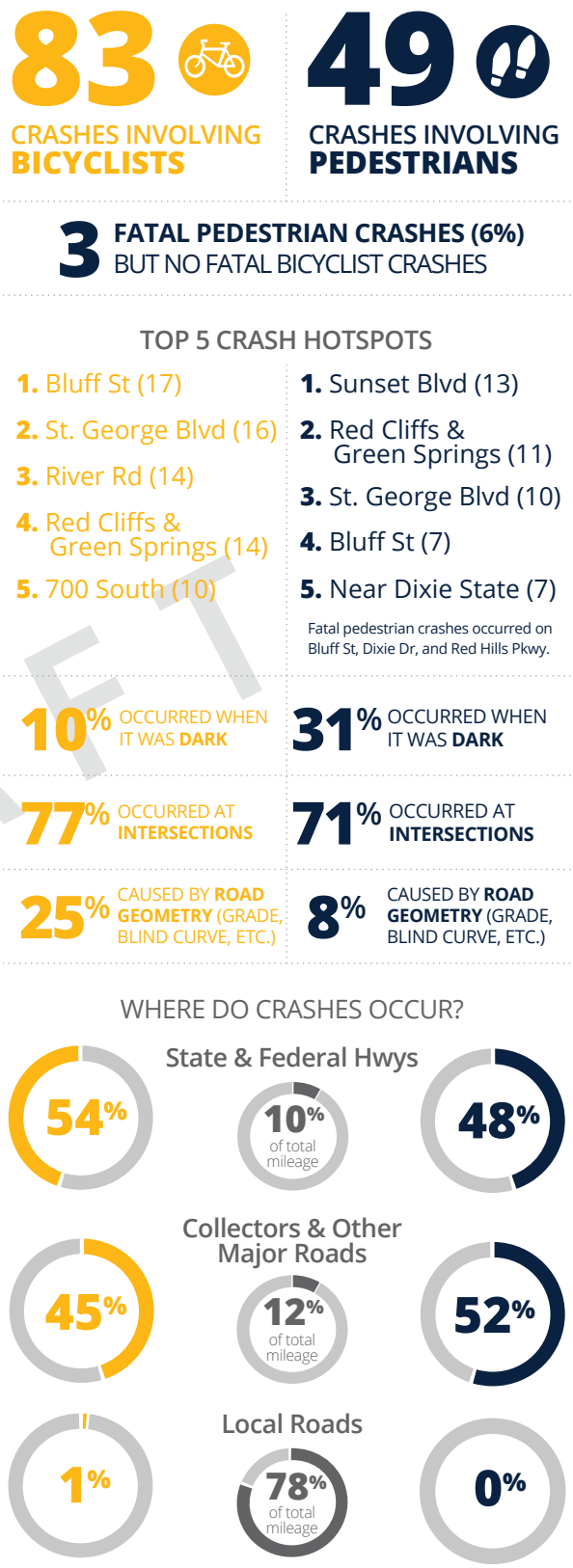

Figure 2.10 *Graphic analysis of crashes involving bicyclists and pedestrians in St. George (2010-2015) (Data: UDOT).*

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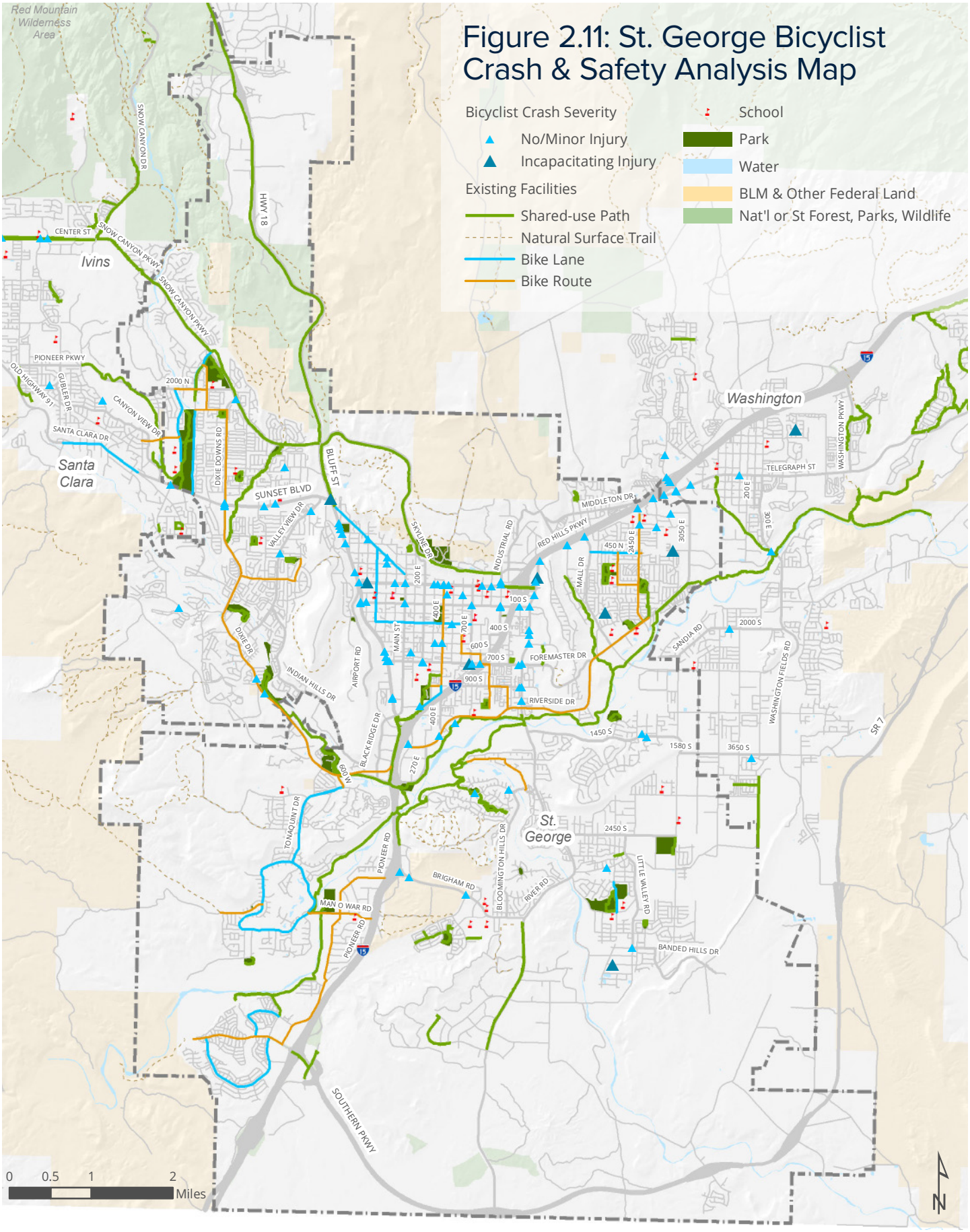
Figure 2.11: St. George Bicyclist Crash & Safety Analysis Map
Bicyclist Crash Severity
No/Minor Injury
Incapacitating Injury
Existing Facilities
Shared-use Path
Natural Surface Trail
Bike Lane
Bike Route
School
Park
Water
BLM & Other Federal Land
Nat'l or St Forest, Parks, Wildlife
Red Mountain Wilderness Area
Ivins
Santa Clara
Washington
St. George
SNOW CANYON DR
SNOW CANYON PKWY
CENTER ST
HWY 18
PIONEER PKWY
OLD HIGHWAY 91
GUBLER DR
CANYON VIEW DR
SANTA CLARA DR
2000 N
DIXIE DOWNS RD
SUNSET BLVD
VALLEY VIEW DR
BLUFF ST
SKYLINE DR
INDUSTRIAL RD
RED HILLS PKWY
MIDDLETON DR
450 N
2450 E
3050 E
MALL DR
TELEGRAPH ST
200 E
300 E
WASHINGTON PKWY
100 S
400 S
600 S
700 S
900 S
200 E
400 E
700 E
MAIN ST
FOREMASTER DR
SANDIA RD
2000 S
DIXIE DR
INDIAN HILLS DR
AIRPORT RD
RIVERSIDE DR
WASHINGTON FIELDS RD
1450 S
1580 S
3650 S
SR 7
BLACK RIDGE DR
400 E
270 E
600 W
TONAQUINT DR
PIONEER RD
2450 S
BLOOMINGTON HILLS DR
LITTLE VALLEY RD
BRIGHAM RD
RIVER RD
MAN O WAR RD
BANDED HILLS DR
SOUTHERN PKWY
0 0.5 1 2 Miles
N

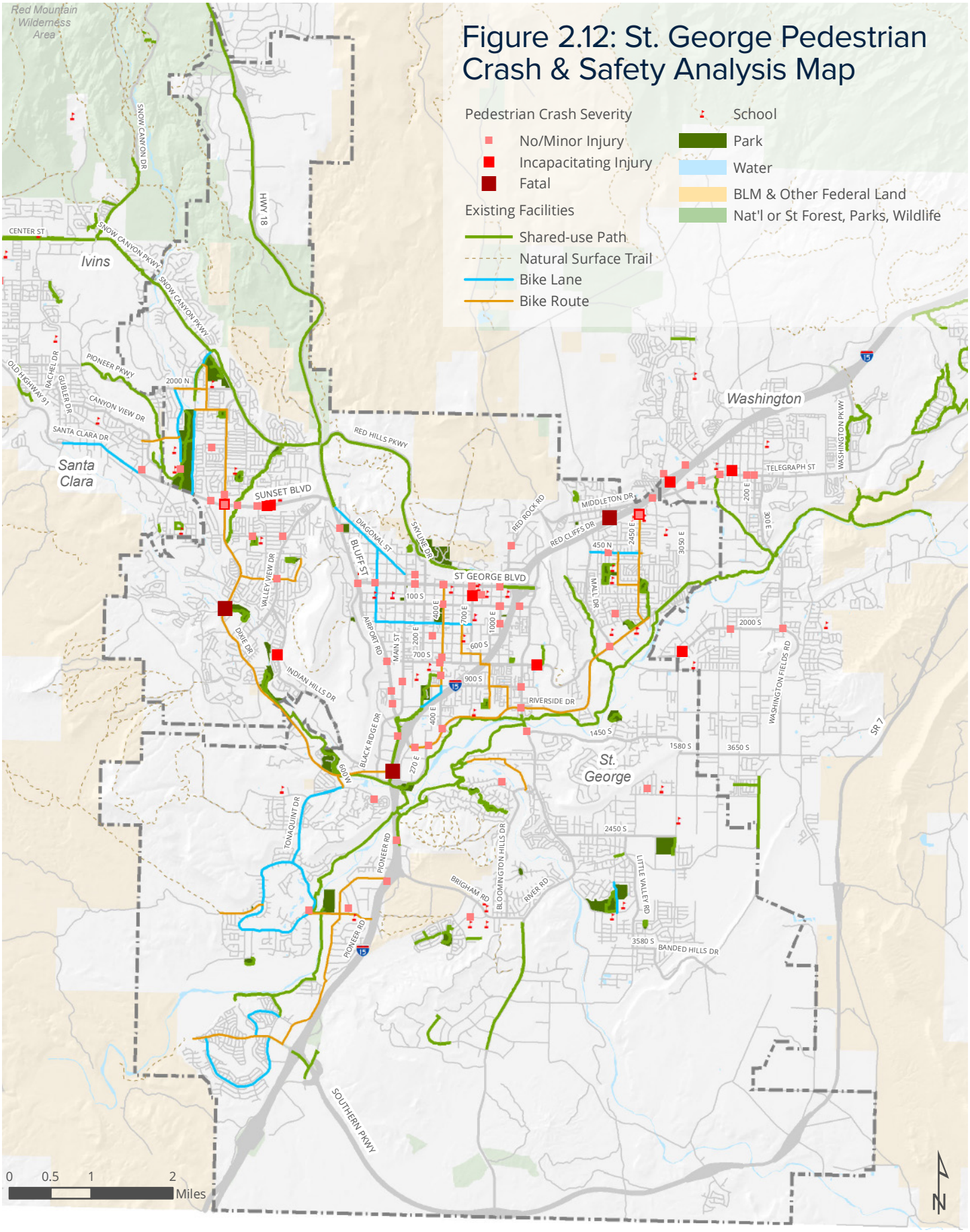
Figure 2.12: St. George Pedestrian Crash & Safety Analysis Map
Pedestrian Crash Severity
No/Minor Injury
Incapacitating Injury
Fatal
Existing Facilities
Shared-use Path
Natural Surface Trail
Bike Lane
Bike Route
School
Park
Water
BLM & Other Federal Land
Nat'l or St Forest, Parks, Wildlife
Red Mountain Wilderness Area
Ivins
Santa Clara
Washington
St. George
SNOW CANYON DR
CENTER ST
SNOW CANYON PKWY
HWY 18
PIONEER PKWY
OLD HIGHWAY 91
RACHEL DR
GUBLER DR
CANYON VIEW DR
SANTA CLARA DR
2000 N
RED HILLS PKWY
SUNSET BLVD
DIAGONAL ST
BLUFF ST
SKYLINE DR
RED ROCK RD
MIDDLETON DR
RED CLIFFS DR
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VALLEY VIEW DR
DIXIE DR
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RIVERSIDE DR
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3650 S
SR 7
BLACK RIDGE DR
400 E
270 E
600 N
TONAQUINT DR
PIONEER RD
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NATIONAL AND STATEWIDE TRENDS

Overall traffic fatalities have decreased by 19% in Utah since 1975 and fatalities per 100 million miles traveled have decreased by 76%. This means that even though there are many more Utahns driving now than in 1975, the raw number of fatalities has actually decreased.[3]

In recent years, the number of bicyclist fatalities in crashes has also decreased overall in the United States (2014 was the only year that had a small and temporary uptick), particularly for bicyclists under 16 years old and those in larger cities and communities that have increased investment in bicycle facilities.[4]

Utah is the 14th safest place to walk (0.97 pedestrian fatalities per 100,000 population) according to a National Highway Traffic Safety Administration (NHTSA) report about traffic safety trends in 2013.[5] Nationally, pedestrian crash and fatality rates have decreased dramatically as walking rates have increased.[6]

Needs, Gaps, Opportunities, & Constraints

EXISTING SYSTEM GAPS & NEEDS

Although the existing bicycling and walking system in St. George is quite extensive, gaps and needs still exist (Figure 2.15), many of which will be addressed by recommendations made throughout this plan. They include areas and roadways identified from the crash and safety analysis maps (Figures 2.11 and 2.12), during the public involvement process, and in the Dixie MPO Regional Active Transportation Plan.

Gaps can be as simple as a lack of connectivity between two existing bicycling and/or walking facilities. They can also be physical and psychological barriers, opportunities, and constraints, like busy roads, intersections, or geographic features.

OPPORTUNITIES & CONSTRAINTS

Many of the constraints, barriers, and hazards in Figure 2.15 were identified by the public in the Utah Travel Study's Barriers and Hazards Survey. These barriers and hazards are also broken down by type and location in Figures 2.13 and 2.14.

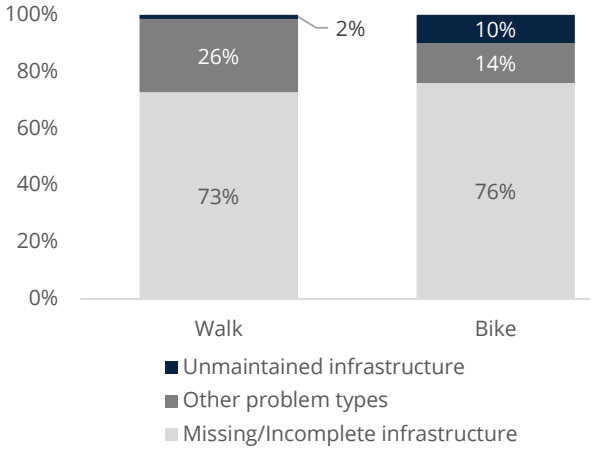

Figure 2.13 *Types of walking and bicycling barriers identified in the Utah Travel Study. Most were gaps in the system*

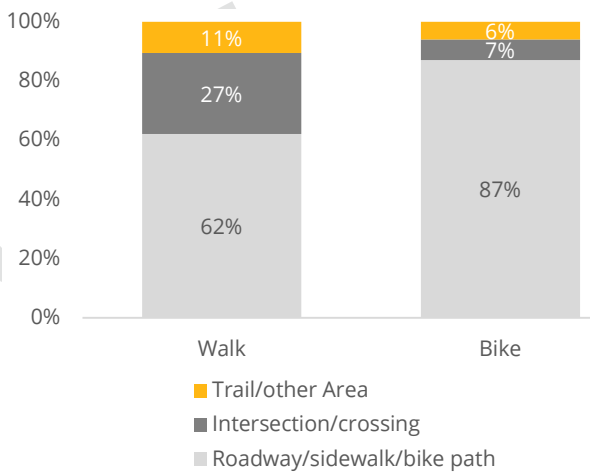

Figure 2.14 *Location of walking and bicycling barriers identified in the Utah Travel Study. Most barriers were located on a roadway, sidewalk, or path*

Opportunities identified in Figure 2.15 differ from gaps because they are opportunities for development of facilities (i.e. an easement through a property or between two properties, parks, available and unused right of way that could be used for a new facility) that are not necessarily missing segments. Constraints can be natural features (like rivers, streams, and mountains or steep grades), freeways, other busy roads, and railroad tracks.

3 *Traffic Safety Facts 2013*. 2015. Washington, DC: National Highway Traffic Safety Administration.

4 Ibid.

5 Ibid.

6 "Benchmarking", 85.

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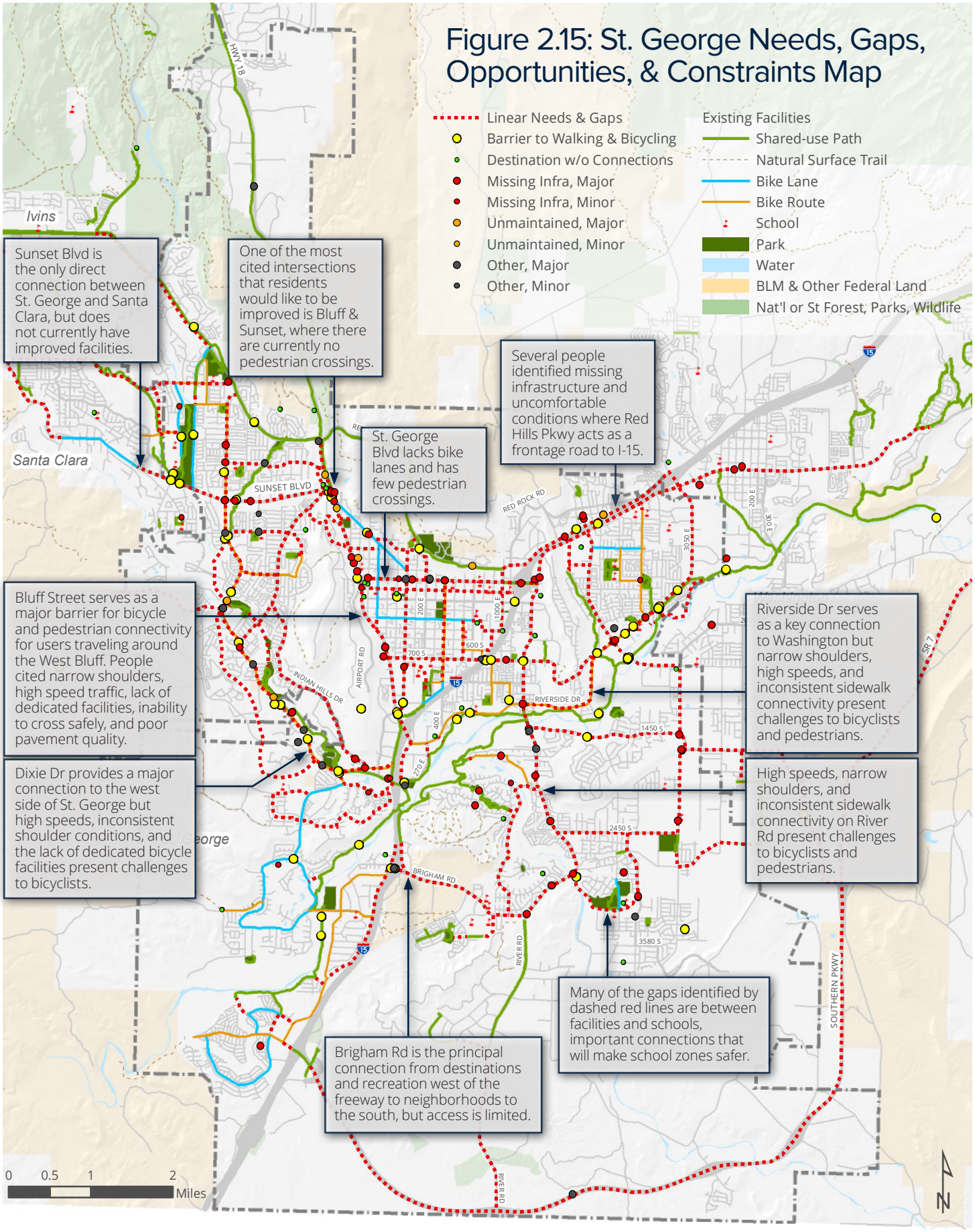
Figure 2.15: St. George Needs, Gaps, Opportunities, & Constraints Map



Existing Plans & Studies

The implementation of the Active Transportation Plan will require coordination with many departments and stakeholders in order to actively promote bicycling and walking within the city and improve connections to regional destinations. Coordination with different planning efforts, past, present, and future, can also increase opportunities to share project resources and leverage greater community value in the future. It is also important to indicate where conflicts between existing plans' recommendations or goals conflict with the purpose, vision, and recommendations of this plan. Those conflicts are identified by plan in Figure 2.16.

A review of relevant, existing documents also summarizes the City's overall vision, planning history, limitations, and direction. With an understanding of this context, the St. George Active Transportation Plan seeks to develop compatible, coordinated goals and recommendations that will improve walking and bicycling in the City and region.

ST. GEORGE GENERAL PLAN (2002)

The City's General Plan addresses a wide range of topics and is designed to serve as an over-arching, guiding document for every subsequent planning effort and every facet of the city. Topics include economics, population, natural resources, land use, downtown development, growth management and implementation.

The vision of the General Plan should drive the development of the walking and bicycling system and implementation of the Active Transportation plan. In addition to the goals listed below, the General Plan includes recommendations on how to make them a reality.

- A **pedestrian-friendly** city where one can easily walk for recreation and to neighborhood destinations (school, church, store).
- **Schools** should be sized and located to enable children to walk or bicycle to them.
- A city where one can walk anywhere **safely after dark**.

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A shared-use path gateway to the City

- An efficient, **multi-modal transportation system** provides easy access throughout the City. Buses, cars, and bicycles are all well-used forms of transportation.
- A city with **shade trees** lining all streets and with well-landscaped commercial centers.
- A city that cherishes its **clean air** and takes appropriate steps to protect it.
- Encourage existing **development** to become increasingly **self-sufficient** with shopping, work places, schools, parks and other facilities within easy walking distance of homes.
- Assure that vehicle travel through neighborhoods will be at **slow, safe speeds**.
- Since new road construction never catches up with traffic demands from sprawl, **reduce per-capita automobile usage** and thereby lessen both congestion and the public cost of new roads.
- Utilize river corridors as linear **greenway passive recreation areas**.
- A **downtown** that is **pedestrian friendly** with attractive walks, planted medians and street 'furniture'.
- Walkable streets enable neighbors to know each other and allow **independence** to those who do not drive, especially the elderly and the young.
- Pedestrian and bike paths form a system of **fully connected and interesting** routes to all destinations.

Several policies in the General Plan are worth exploring further and/or adopting as policy:

- The City will assure that all **new development** provides either off-street bicycle/pedestrian paths, or detached sidewalks, or both, and shall encourage such paths to be designed and located to tie into a Citywide system.
- Bicycle/recreation paths will be included, in all **greenway corridors** wherever physically and environmentally possible.
- Because most...crashes occur at **intersections** with vehicular traffic, connecting points to roadways should be carefully designed.

ST. GEORGE PARKS & TRAILS MASTER PLAN (2015)

The 2015 edition of the Parks & Trails Master Plan updated the existing parks and trails to include those recently built and revised the recommendations to include altered and additional future shared-use paths, natural surface trails, equestrian trails, trailheads, and about 40 pedestrian underpasses (at or under busy or uncomfortable intersections and roadways). The recommendations from the Active Transportation Plan will include those previously identified in the Parks and Trails Master Plan.

ST. GEORGE MASTER TRAFFIC & TRANSPORTATION STUDY (2014)

The 2014 St. George Master Traffic and Transportation Study was an update to the transportation section of the 2002 General Plan and recommended modifications to roadways in St. George in order to

People walking Downtown

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efficiently accommodate projected traffic demands based on a 2040 population of 196,200.

The study includes a brief summary on the inclusion of active transportation as part of the City's broader transportation system. Major recommendations include:

- A recommendation that new streets should be designed as "Complete Streets" to accommodate all roadway users, including bicycles and pedestrians.
- A recognition of the needs of the varying types of bicyclists including recreational users, commuters, and training/competition cyclists.
- Connectivity to key local and regional destinations and integration with transit.
- Use of the latest industry guidance in the planning of bicycle and pedestrian facilities.
- Recognition of the importance of maintenance to the bicycle and pedestrian system.
- The need for education for all roadway users including motorists, bicyclists, and pedestrians.
- The need for community partnerships between public and private agencies to promote, educate and funding active transportation improvements.

ST. GEORGE 2016-2021 ACTION PLAN (2016)

Following up on a pledge, Mayor Jon Pike developed a five-year action plan together with the City Council, and city management and employees. The purpose of the plan is to identify the most important investments that the City will make before 2021 in order to provide more transparency to the residents of St. George.

The purpose of this plan's transportation recommendations and action items is to ensure that whether residents are "riding their bikes, taking the bus, or driving a car", they will have a "safe and enjoyable experience every time they venture out." Projects that will improve bicycling and/or walking comfort, safety, and connectivity are:

- Bluff St & Sunset Blvd intersection reconstruction, grade-separated tunnel and trail connections.
- Active Transportation Plan.

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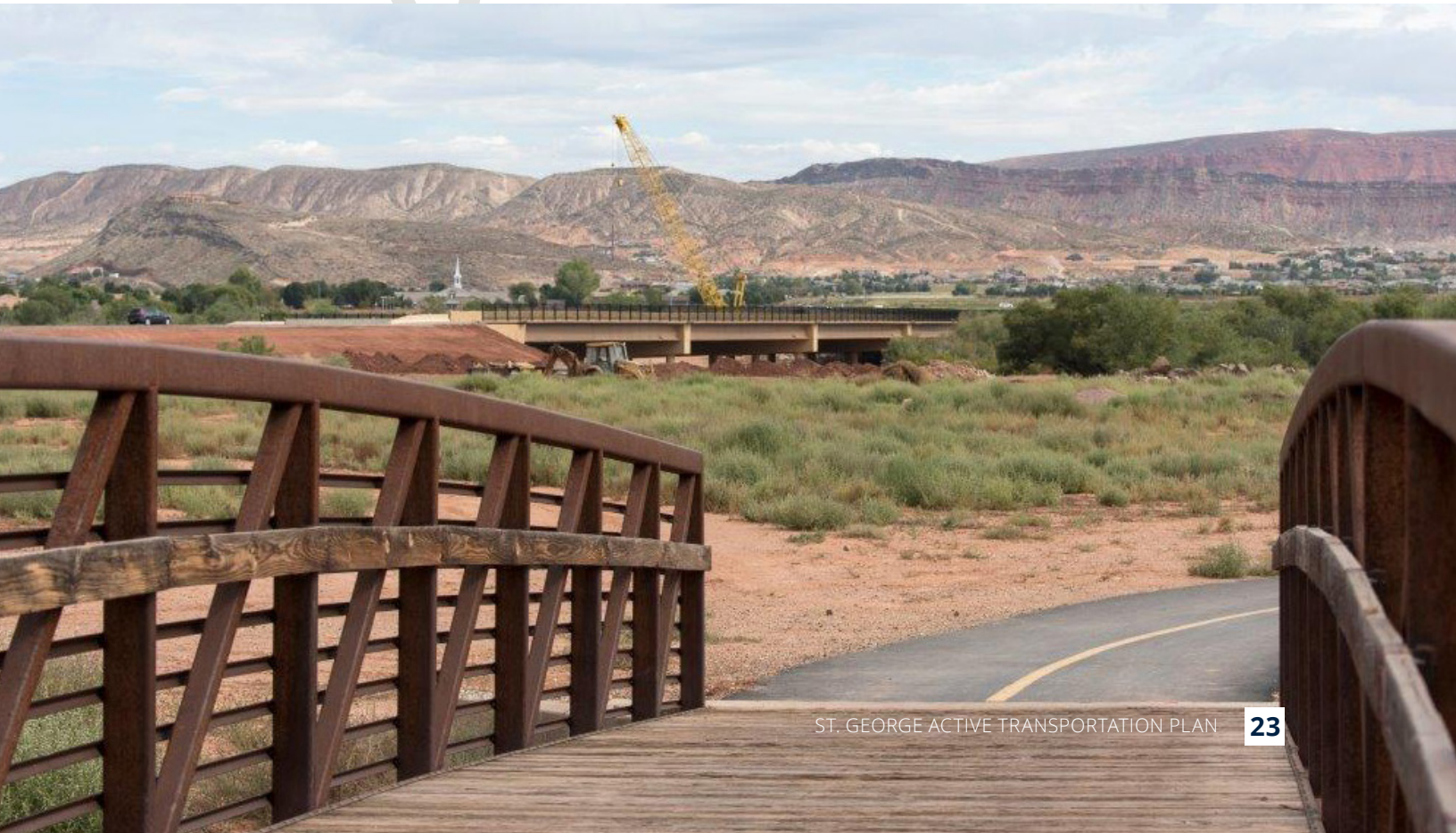
A shared-use path bridge on the Middleton Wash Trail



- Red Cliffs Mall I-15 underpass.
- Constructing new and improving existing neighborhood and community parks.
- Bicycle skills park and other Recreation, Arts, and Parks (RAP) tax projects.
- Adding more connections to and from trails, especially south of the Virgin River, Santa Clara River, gaps, and connections to Little Valley.
- Improved signage, more connections, and better access for outdoor recreation users

Additional information can be found at www.morehappeningahead.org

DIXIE MPO ACTIVE TRANSPORTATION MASTER PLAN (2014)

The Dixie MPO Active Transportation Master Plan sought to promote regional connectivity for bicyclists and pedestrian throughout the Dixie MPO region. Much of the plan's recommendations focused on St. George as the most populous city and major hub for Washington County. It is anticipated that many of the recommendations from the Dixie MPO Plan will be reflected in the St. George Active Transportation Master Plan. However, some routes identified in the regional plan did conflict with the Dixie MPO Regional Transportation Plan's planned roadway needs. These conflicts could not be resolved through at the regional level and it is anticipated that decisions regarding these corridors would ultimately need to be made at the local level.

Specific from the Dixie MPO Active Transportation Plan that will require further study by St. George include:

- Planned bike lanes on 700 South between Main St and 900 E
- Planned bike lanes on Sunset Blvd
- River Road bike lanes

The recommendations from the MPO's plan are included in Figure 2.16 and conflicts with recommendations from the Regional Transportation plan are noted with small, red symbols.

DIXIE MPO REGIONAL TRANSPORTATION PLAN (2015)

The Dixie MPO Regional Transportation Plan (RTP) sought to identify the regional transportation planning needs of the urban areas of Washington County for the next 25 years. A major role of the Dixie MPO and the RTP is facilitation and calibration of the regional transportation model which forecasts transportation needs. The Dixie MPO RTP also acknowledges the importance of active transportation in providing a balanced transportation system and outlines three major goals including:

- Facilitate the appropriate design, construction, and maintenance of bicycle and pedestrian facilities.
- Support a multi-modal transportation system for all new construction and reconstruction projects.
- Encourage policies and programs that improve bicycle and pedestrian safety.

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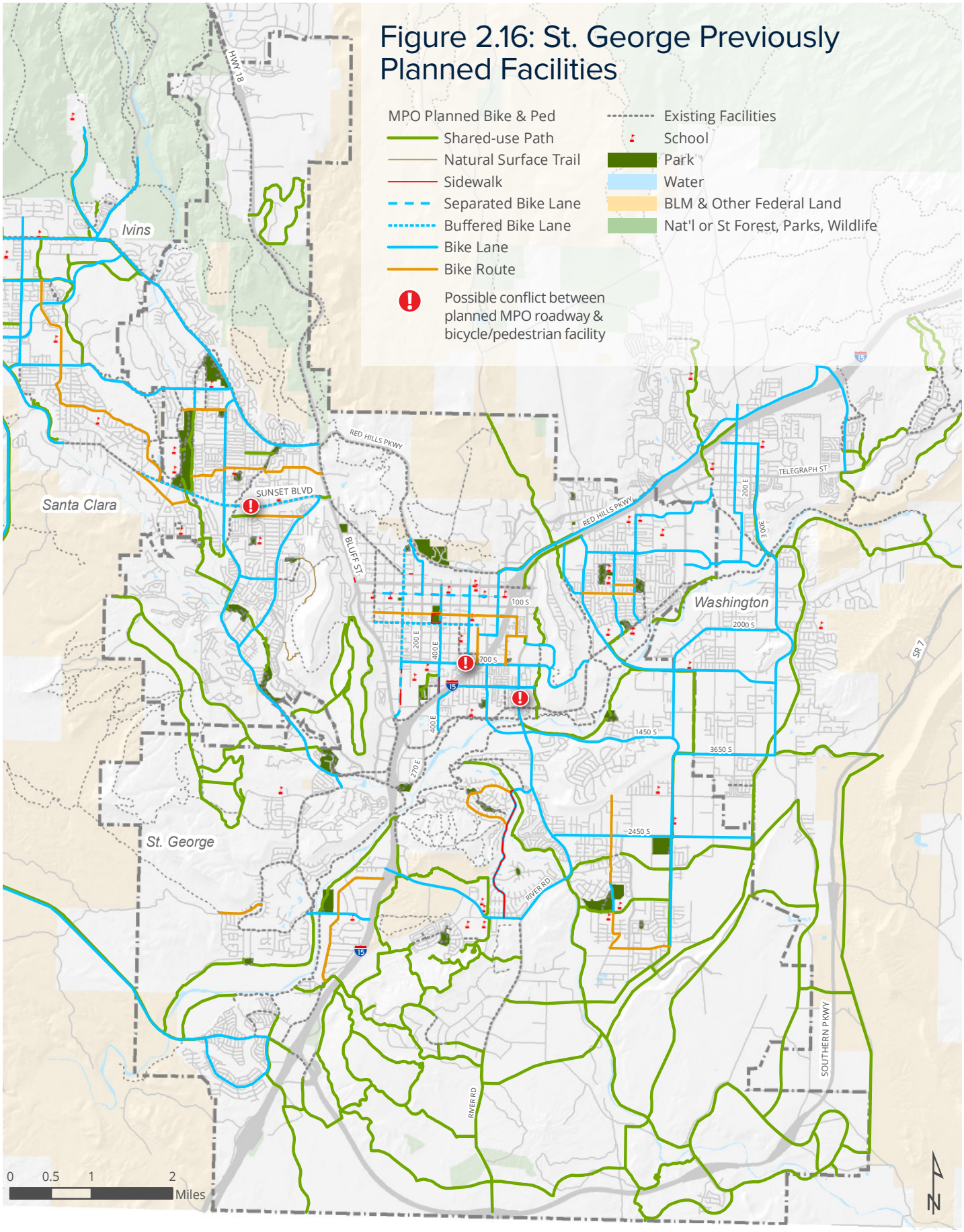

Figure 2.16: St. George Previously Planned Facilities

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Comments from the public on a map of existing conditions in St. George (Dixie Transportation Expo, February 2016)

3: Public Involvement

In order to determine the needs of current and possible bicycling and walking users, multiple public outreach efforts were conducted during the development of this plan in order to better understands the needs of people who live, work, and recreate in St. George. The public were invited to take an online survey, draw recommendations on an interactive online map, ask questions and provide insight at the regional Transportation Expo, and ride with project consultants to identify what St. George is doing well and what could be improved. Suggestions made and discussions had during the public involvement process heavily influenced recommendations made throughout this plan.

Nearly *600 people* participated during this planning process, in addition to the seven stakeholder groups and many residents who contributed to the Dixie MPO's Bicycle & Pedestrian Plan in 2014 and 2015.

Field Investigation Bike Ride

City staff and project consultants rode throughout St. George on February 8, 2016, in order to ground-truth existing data, identify and discuss highlights and deficiencies in the overall walking and bicycling system, and talk about the strategies that will best serve the people of St. George.

Interactive Online Mapping Tool

This mapping tool allowed users to include routes they liked, those they thought needed improvement, their typical destinations, and where gaps in the system or barriers that discouraged them from walking and bicycling more were located. The mapping tool received responses from about 50 unique users.

LINEAR INPUT

Participants drew 143 lines describing roads, paths, and sidewalks that they used and/or that needed improvement. The roads and other linear facilities that were identified most often as needing improvement were River Rd, Dixie Dr, Bluff St, Main St, 1450 South, Brigham Rd, 3000 East, roads around Red Cliffs Mall, the missing section of the Virgin River Trail near Washington, Riverside Dr, and Red Hills Parkway east of downtown and north of I-15.

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SPOT INPUT

In addition to linear suggestions, users included 96 points that they identified as either destinations, gaps, or barriers. These were most common at unsignalized intersections, where people wanted to cross busy roads but couldn't currently, and at other locations along busy roads. Popular destinations included downtown, along the Virgin River Trail, natural surface trailheads, Dixie State University, and roads that are gateways to recreational riding routes.

The needs, gaps, and barriers identified by mapping tool users can be seen in Figure 2.15 in the previous chapter.

Online Public Survey

Nearly 500 people took a short, 6-question online survey about bicycling and walking habits and preferences that was included before the interactive online mapping tool. An additional three optional questions about age, gender, and e-mail address (in order to receive updates about the plan) were included at the end of the survey.

DEMOGRAPHICS

Ages of survey participants roughly mirrored the city's demographics for adults, meaning that the survey received a generally broad distribution. However, there were very few youth responses. 41% of survey respondents were female and 59% were male.

RESPONSES

Most people enjoy walking and bicycling because it allows them to spend more time outdoors, contributes to their health and fitness, and they can socialize and have fun. Respondents' favorite destination types were parks, open space, recreation centers, meeting up at friends' houses, shopping areas, and work.

When asked about what prevents them from walking or bicycling more, nearly all of the comments centered around lack of perceived safety stemming from fast and busy roadways, driver aggression and distraction, and a lack of obedience by motorists to traffic laws.

Respondents' top priorities for transportation investment were increasing the number and length of shared-use paths, adding low-stress on-street bicycle facilities, improving access across major

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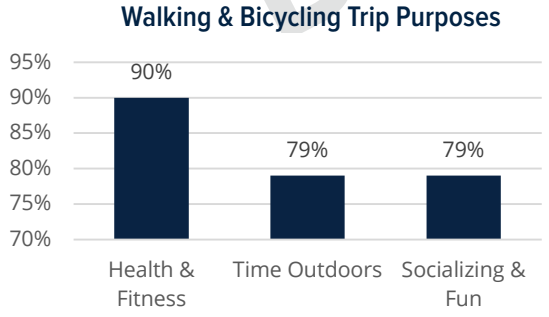
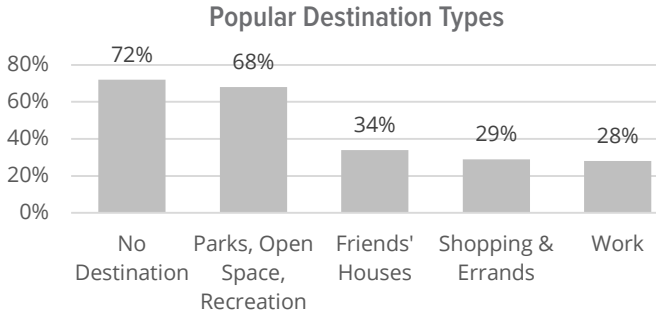
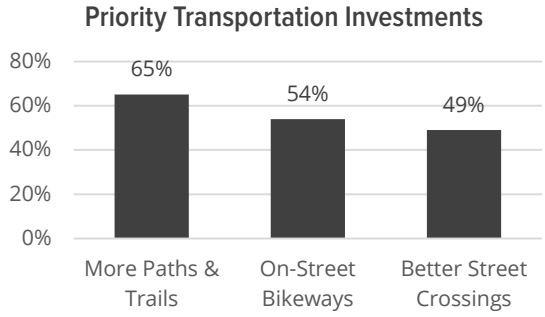
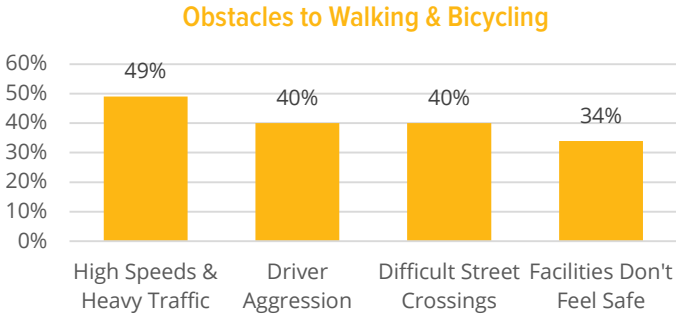








roadways, maintaining pavement quality on paved paths, enforcing laws and educating motorists, and connecting neighborhoods to trailheads.

DISTRIBUTION

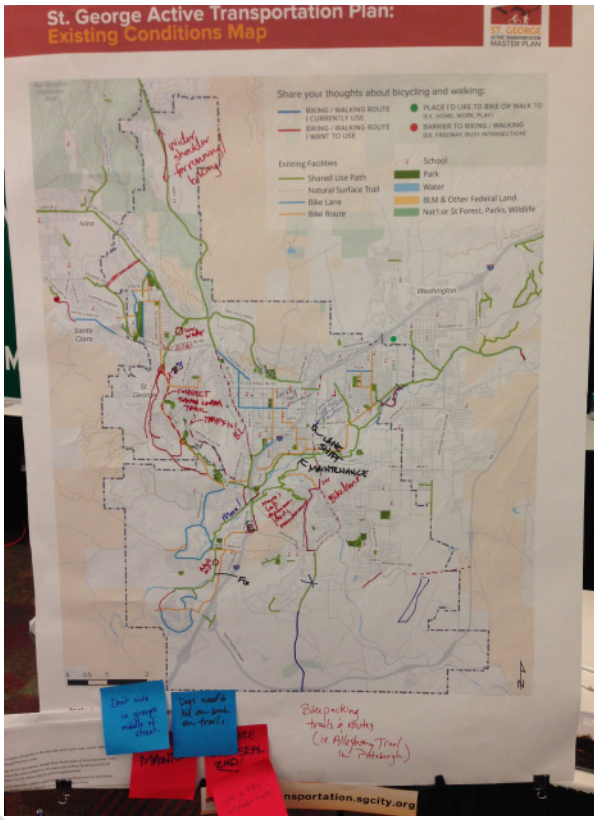
The survey, as well as the mapping tool, was promoted on the City's website and social media accounts, on digital marquees throughout the city, through official City press releases, in several print and digital new media outlets, and via e-mail and Facebook by bike shops, SUBA, Active Transportation Committee members, and others in the community.

Dixie Transportation Expo

Four members of the project team, including City staff and project consultants, collected input from more than 50 people during several hours at the regional Dixie Transportation Expo, held on February 9, 2016, at the Dixie Convention Center.

Some attendees logged their input through the interactive mapping tool while others drew and placed sticky dots on a physical map of the City that showed existing bicycle and walking facilities. People who provided input wrote notes next to the lines they drew and the dots they placed, as well as including additional thoughts on Post-It notes at the bottom of the map.

The Expo was especially helpful because the project team was able to hear from many elderly members of the community who may not have otherwise been included in an all-digital public involvement process.



A snapshot of some of the feedback received on the physical map at the Dixie Transportation Expo

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Recommended improvements included in this chapter will build on the existing bike lane, trail, and path network

4: Recommended Infrastructure Improvements

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Introduction

People who walk and ride bicycles vary in their physical abilities, experience levels, and the types of bicycles that they ride much more so than drivers of motor vehicles do. Well-designed streets and dedicated, off-street facilities should be planned and implemented in a way that accommodates these different types of people walking and riding. Many streets, such as low speed, low volume local streets, may not need special facilities to accommodate active transportation users, while others with higher volumes and speeds may require significant infrastructure investments.

This plan's proposed active transportation system seeks to provide people in St. George viable, convenient, safe, and healthy active transportation choices. The proposed system also enhances regional connectivity by linking St. George to other communities.

To date, St. George and regional partners have invested primarily in off-street facilities like paths and trails. There are 210 miles of improvements and recommended facilities in the Active Transportation Plan. About 17 miles of existing facilities (mostly bike routes) are recommended to be enhanced in order to provide a better user experience.

Development of Recommended Improvements

The recommended linear and spot facilities in this chapter and in Figure 4.2 were developed in an effort to reflect the desires of the community, take advantage of spatial opportunities within existing rights of way and roadways, and build on previous plans' recommendations. This plan's recommendations were influenced by and seek to fill needs based on the following:

- Vision and goals identified at the beginning of this plan
- Popular destinations, barriers to walking and bicycling, and gaps in the existing network identified by the public
- Proximity to schools and parks
- Proximity to existing trailheads, natural surface trails, and paved shared-use paths
- Recommendations from the Dixie MPO Regional Active Transportation Plan
- Recommendations from the St. George Trails Master Plan

Types of Recommended Improvements

LOW-STRESS BICYCLE AND PEDESTRIAN FACILITIES

Low-stress bicycle and pedestrian facilities, like St. George's existing network of shared-use paths and trails, in addition to other facility types like separated bike lanes and bicycle boulevards, appeal to a more diverse cross section of the public than conventional, on-street facilities like bike lanes. They are considered low-stress because of physical protection or separation from traffic; use of low volume, low speed streets (in the case of bicycle boulevards); and optional directional wayfinding signage that directs users to destinations and along specific routes.

A majority of the public would like to walk or ride bicycles more but are discouraged from doing so by perceived safety concerns, lack of facilities, or a lack of knowledge about where the appropriate facilities are located. National surveys show that 50-60% of people say they would ride a bicycle more (or start riding if they do not already) if they had access to facilities that provided more separation from traffic, lower traffic speeds, and/or lower traffic volumes. The public online survey described in the previous chapter confirms that this is also the case for St. George residents.

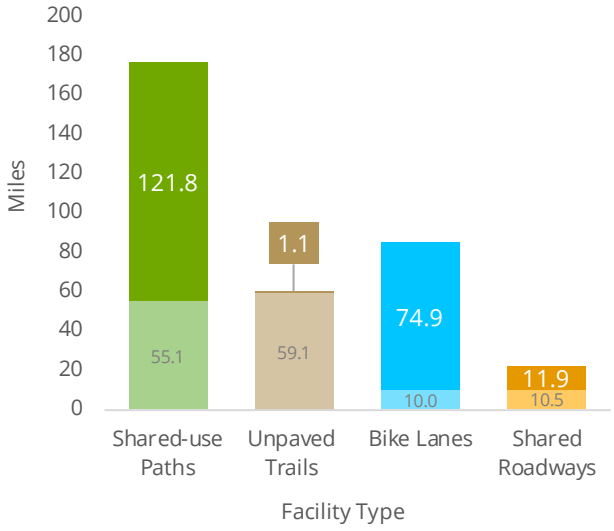

Figure 4.1 *Mileage of Existing Facilities (with the 17 upgraded miles removed from these totals) and Newly Proposed Facilities (209.8 mi.) within St. George City Limits, by Facility Group Type*

Input during the public involvement process indicated a strong demand for more paths and trails, and a swift development of a cohesive network of on-street facilities that provided that same level of comfort but with greater connectivity to destinations.

Separated or traffic-calmed on-street facilities for people riding bicycles, like separated bike lanes or bicycle boulevards, respectively, also create a better pedestrian experience by reducing traffic speeds or, in the case of separated bike lanes, increasing the distance and physical separation between sidewalks and active motor vehicle travel lanes. Additionally, evidence has shown that increasing the number of bicyclists on the road improves safety for everyone. Cities with higher bicycling rates tend to have lower crash rates by benefiting from the effect of "safety in numbers".[1]

Recommendation Categories

Overall recommendations were classified into three categories:

- **Off-street** (shared-use paths, unpaved trails, and sidewalks)
- **On-street** (bike lanes, buffered bike lanes, separated bike lanes, and bicycle boulevards)
- **Spot improvements** (intersection and crossing improvements, signals and beacons, grade-separated crossings, and miscellaneous traffic calming measures)

Although brief descriptions and graphics for each recommended facility type are included in this chapter, more specific guidelines on location selection, widths, implementation, and design considerations can be found in the NACTO *Urban Bikeway Design Guide* and the AASHTO *Guide for the Development of Bicycle Facilities*.

Off-Street Recommendations

SHARED-USE PATHS

Shared-use paths, as discussed in Chapter 2, are facilities separate from roadways for use by bicyclists, pedestrians, and other non-motorized users (i.e. Virgin

1 Marshall, W., and N. Garrick, 2011 - Evidence on why bike-friendly cities are safer for all road users, Environmental Practice, 13, 1

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People of all ages enjoying a ride on a shared-use path (Photo: SUBA)

River Trail). They are frequently found in separate rights-of-way along railroads, utility corridors, parks, and waterways, but can also exist within street or highway rights-of-way with adequate separation (called sidepaths). Due to their proximity to traffic, this latter type requires additional safety considerations, especially at intersections and driveways.

UNPAVED TRAILS

Unpaved trails (dirt, gravel, crushed limestone) are completely separated rights-of-way for exclusive use by bicyclists, hikers, pedestrians and, in some cases, equestrian uses. Unpaved trails can take the form of singletrack trails or wider, more accessible and multi-modal soft-surface trails.

Mountain bike races take place regularly on the unpaved trails in and near St. George (Photo: Red Rock Bicycle Co.)

SIDEWALKS

Although not all missing sidewalks were identified as future improvement projects, sidewalks, especially those identified by the public, are included in the recommendations of this plan.

On-Street Bikeway Recommendations

This section outlines how recommended, on-street bikeways will improve the connectivity to and comfort of St. George's existing and proposed facilities and destinations. In the online survey, the public identified their desire for their City to have more on-street facilities (54% of respondents) as a compliment to the existing off-street system, bike lanes, and bike routes.

Traditional on-street bikeways, like bike lanes, have typically served more experienced bicyclists. However, several of the facility types proposed in this plan, like bicycle boulevards, buffered bike lanes, and separated bike lanes, will cater to a much wider range of existing and potential bicyclists.

RETROFITTING EXISTING STREETS FOR ON-STREET BIKEWAYS

Many streets are characterized by conditions (i.e. high vehicle speeds and/or volumes) for which dedicated on-street bikeways are the most appropriate facility to accommodate people on bicycles.

Much of the guidance provided in this section focuses on effectively reallocating existing street space through striping modifications without the need for widening. Ideally, space for bicyclists could be provided without reducing roadway or parking capacity, however it is often necessary to balance the needs of multiple user groups, especially in consideration of safety.

The three strategies below can be used to accommodate bikeways on St. George's streets. However, many recommendations in this plan are possible without any of these strategies:

Lane Narrowing or Reconfiguring

Many streets in St. George have 12-13' wide travel lanes, wider than minimum specifications prescribed in national roadway design standards. Maintaining lanes as wide as these means that, in some cases, there is not space left on the roadway to implement bicycle facilities. Most national standards allow for the use of 10' or 11' lanes, and the latter width was used as an assumption throughout the recommendations process.

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Parking Reduction

Bike lanes can replace one or more on-street parking lanes on streets where excess parking capacity exists (like where on-street parking is adjacent to redundant off-street lots) and/or the importance of bike lanes outweighs parking needs (like where there are no fronting uses). In some cases, parking may be needed on only one side to meet demand. Eliminating or reducing on-street parking also improves sight distance for bicyclists in bike lanes and for motorists on side streets and driveways.

Roadway Widening

In the absence of curb and gutter, shoulder widening presents a viable option for incorporating dedicated bikeways into an existing street. Where widening is already planned, ensure that recommended bicycle and pedestrian facilities are incorporated into the design.

SEPARATED, OR PROTECTED, BIKE LANES

Separated bike lanes are protected from traffic by a physical barrier of some kind and are also distinct from the sidewalk. Some separated bike lanes are at street level, while others are raised. There are many different types of physical separation that can be used for separated bike lanes: planters, raised curbs, parking, stationary or flexible bollards, and other streetscape elements. The applicability and feasibility of different types of separation depend on traffic volumes, speeds, driveway and cross street frequency, presence and type of on-street parking, maintenance capacity, and pedestrian volumes. Separated bike lanes can be configured for either one-way or two-way travel.

A separated bike lane in Indianapolis, Indiana, made out of a raised, paved surface and planters as a physical barrier

BUFFERED BIKE LANES

Buffered bicycle lanes add a painted buffer to a conventional bike lane (described below) but do not have the physical buffer or separation of a separated bike lane. The painted buffer can provide additional space between the bike lane and the adjacent travel lane and/or parking lane, providing a more comfortable experience for bicyclists. In some cases, buffered bike lanes are an effective tool to discourage motorists from driving or parking in a bike lane that would otherwise be excessively wide, like where the bike lane has replaced a parking lane or a wide shoulder.

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

BIKE LANES

A bike lane provides a striped lane with bicycle pavement markings and optional signage for one-way travel by bicyclists on the street. Many of the bike lane recommendations in this plan will occur in conjunction with pavement resurfacing or roadway reconstruction, while others can be implemented immediately.

BICYCLE BOULEVARDS

Bicycle boulevards are a type of shared roadway, or bike route. They are naturally or artificially-created low-volume, low-speed streets that enhance comfort

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Bicycle boulevard treatments include traffic diversion, calming and speed reduction, and wayfinding signage, among others

for bicyclists as well as residents and pedestrians by using a variety of treatments, such as signage, pavement markings, traffic calming, and/or traffic diversion and intersection modifications.

Bicycle boulevards ensure that traffic volumes and speeds remain at levels that do not compromise bicycle or pedestrian comfort. Many of the improvements intended for bicyclists are also advantageous for pedestrians, schools, and homeowners. Bicycle boulevards create calmer traffic conditions and have been shown to have a positive impact on property values.[2] Bicycle boulevards also often create natural walking corridors and more pleasant streets.

Specific calming techniques and intersections are not included in the recommendations maps or spot improvements data as they will depend on circumstances and existing conditions at each intersection. Some intersections may not need any modifications to be comfortable for use by people on bikes. 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 appropriate for bicycle boulevards.

Spot Improvements

Many of the recommended improvements in this plan are classified as spot improvements, or recommended fixes specific to one location, like a traffic signal, crosswalk, curb ramp, roundabout improvement, bridge, or tunnel. These improvements will refine the existing system as well as help users navigate the proposed system more easily.

GRADE-SEPARATED CROSSINGS

Undercrossings

Undercrossings, or underpasses, are grade-separated crossings for bicyclists and pedestrians, especially useful when crossing streets that have high volumes and/or high speeds. They are more easily implemented when the street(s) to cross are at a higher elevation than the facility going under. Special considerations for cost-benefit, lighting, safety, and topography need to be considered when evaluating potential use of this improvement type.

A grade-separated undercrossing that allows a shared-use path to pass under Bluff St

New overcrossings (bridges) should accommodate pedestrians and bicyclists, both on the structure and on the approaches

2 Rice, E., 2008 - Valuing Bike Boulevards in Portland Through Hedonic Regression, USP 570 Analytical Term Paper

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Overcrossings

Bicycle and pedestrian overcrossings, or bridges, provide critical non-motorized system links by joining areas separated by barriers such as deep canyons, waterways or, in many cases in St. George, major transportation corridors, like I-15.

FULL SIGNALS

Full signals, or signalized intersections, control competing flows of traffic from multiple legs of an intersection. They can be placed at road intersections, pedestrian crossings, and other locations. Full signals alternate right of way between conflicting directions of traffic and user types. Not all new or upgraded full signal recommendations in the plan may be warranted by conventional engineering standards, but often, improvements for bicyclists and pedestrians cannot be measured with traditional methods. Many potential crossing locations attract minimal existing use due to wide multiple fast moving travel lanes. Existing use is not an indication of latent demand.

BEACONS

Hybrid Beacons

A hybrid beacon, or High-intensity Activated CrossWalK (HAWK), consists of a major-street-facing signal head with two red lenses above a single yellow lens. Hybrid beacons were developed specifically to enhance pedestrian and/or bicyclist crossings of major streets in mid-block locations and at minor intersections where side street volumes do not support installation of a conventional traffic signal. It may also be beneficial to consider turning restrictions or other geometric changes.

Hybrid beacon, or HAWK

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 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.

RRFBs are the most common recommended spot improvement facility type in this plan. They are relatively low cost, can be used to alert drivers to yield to bicyclists and pedestrians when they have the right-of-way crossing a road, and have been shown to improve driver yielding compliance up to 95% in most locations.

Rapid Rectangular Flashing Beacons (RRFBs) in Ogden, Utah

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INTERSECTION IMPROVEMENTS

Roundabout Improvements

In single lane roundabouts, it is important to indicate right-of-way, priority, and other circulation rules to motorists, bicyclists, and pedestrians using appropriately designed signage, pavement markings, and geometric design elements like channelizers, bike lane bypasses, and shared-use paths. The roundabout improvement recommendations in the plan are located at existing roundabouts that could be improved for bicycling and walking traffic.

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

Interchange Improvements

Many of the freeway interchanges in St. George either lack comfortable facilities for bicyclists and pedestrians or have substandard facilities that, with some redesign, would provide connections over or under I-15.

Miscellaneous Improvement

A group of improvements with only one recommended instance, such as short sidewalk connections that would not be visible in Figure 4.2, brief travel lane narrowing, and curb ramps designed for bicycles and pedestrians.

TRAFFIC CALMING & OTHER CROSSINGS

Curb Extensions

Curb extensions visually and physically narrow the street creating shorter and safer crossings for pedestrians and bicyclists, increase predictability for all users, and potentially slow motor vehicles at crossings. They can be installed mid-block or at intersections.

Curb extensions shorten crossing distances for pedestrians at intersections or mid-block and can calm traffic (as shown on Sunset Blvd in Santa Clara) without reducing roadway capacity

Curb extensions can be used as standalone traffic calming or in conjunction with other treatments in this chapter. One advantage of curb extensions at signalized intersections is that they reduce the time needed for pedestrian crossings and can thereby increase intersection capacity while reducing wait times for all users. Where curb extensions are installed without a designated pedestrian crossing, like at the beginning of a school zone, they can also act as an extension of the public space on the adjacent sidewalk.

Median Refuge Islands

A median refuge island is located in the middle of the roadway, usually in (replacing) the center turn lane, for bicyclists and pedestrians to use when crossing a street. Median refuge islands also provide added

Pedestrian in a median refuge island as part of the roundabout at Tabernacle St and Main St

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comfort and should be designed to direct users to see oncoming traffic before crossing the remainder of the road, when possible. They reduce crossing distances, allow staged crossing of the roadway, calm traffic, and improve visibility of bicyclists and pedestrians crossing the roadway.

Unsignalized Trail Crossing

This spot improvement facility type indicates a location where a shared-use path or natural surface trail crosses a minor street, but when the crossing does not require signalization. Pedestrian or trail crossing signs, curb ramps that function for bicyclists and pedestrians, and a crosswalk is sufficient.

Bike Turn Box

Bicycle turn boxes are designed to facilitate left turn maneuvers at locations where bicyclists have difficulty crossing multiple lanes of through traffic to reach a left turn lane.

To make a left turn, a bicyclist first proceeds straight through the intersection on a green light and stops in a bike box on the far side of the intersection. The bicyclist then turns 90 degrees to the left, waits for a green light in the cross street direction, and then proceeds through.

This combination of movements allows bicyclists to effectively make left turns without being required to merge across traffic. Care must be taken to align bike boxes with the cross street's bicycle facility and not in front of a turn lane.

Bike turn box on 200 South in Salt Lake City, Utah

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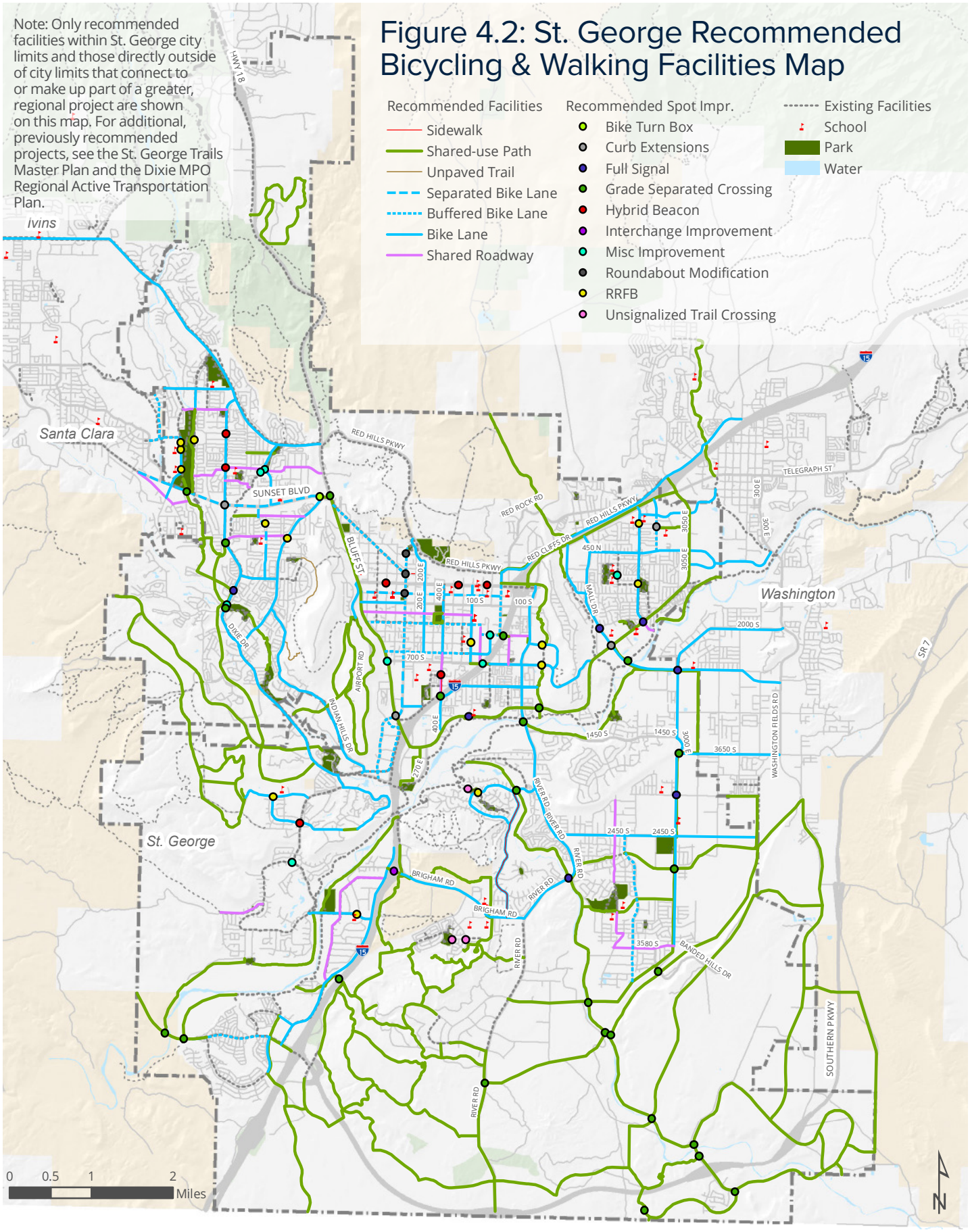
Figure 4.2: St. George Recommended Bicycling & Walking Facilities Map

Note: Only recommended facilities within St. George city limits and those directly outside of city limits that connect to or make up part of a greater, regional project are shown on this map. For additional, previously recommended projects, see the St. George Trails Master Plan and the Dixie MPO Regional Active Transportation Plan.



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A St. George family ready for a bike ride together (Photo: SUBA)

5: Recommended Programs, Policies, & Standards

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Introduction

Many of the non-infrastructure, policy, and programmatic recommendations in this section support the City's goal to encourage more residents and visitors to ride a bicycle or walk.

Programs will support and improve Chapter 4's infrastructure recommendations by educating and encouraging people, enforcing laws, and evaluating the efficacy of built, programmatic, and policy projects and initiatives.

The City should also seek additional ways to modify existing and introduce new land use policies into city codes, development and street cross section standards, plat approval processes, and impact fee processes. These should inherently prioritize walking and bicycling as normal, viable, safe, and comfortable forms of transportation and recreation.

Education Programs

This section presents recommended bicycle, pedestrian, and motorist education programs. In addition to the health benefits campaign in Appendix A, the goals of the programs in this section are to:

- Increase knowledge and understanding of laws affecting bicycling and walking
- Familiarize people with how to use and how to interact with the various bicycle and pedestrian facilities they can use in St. George

Community Bike Shop Program

Currently, the Bicycle Collective is a Wasatch Front-based advocacy and community bike shop organization that is expected to expand statewide. The Collective's mission is to promote bicycling as an sustainable, clean, healthy, and safe form of transportation through its array of programs for eager learners that encompass all user types, including youth, refugees, women, disadvantaged populations, homeless, and people who are less mechanically inclined.

In addition to focused programs, bicycle collectives in Utah offer open community bike shops with shared tools, classes, and volunteer mechanics on hand; refurbished bicycles for nominal resale and charity purposes; bicycle parking at events; and more.

Some participants in the Salt Lake City Bicycle Collective's youth-focused Earn-a-Bike program (Photo: Bicycle Collective)

A branch of the Bicycle Collective in St. George would benefit the entire region and would be a tremendous resource for and because of Dixie State University as well. City staff and local advocates are working with the Bicycle Collective to begin development of a regional shop for Washington County, though a name, structure, and location have not been finalized.

Examples and Resources: Bicycle Collective of Utah

Education Programs for Motorists

Washington County School District's survey data indicates that one of the principal reasons why parents currently do not feel comfortable allowing their children to walk or bike to school is because of poor behavior by and education of motorists and the resulting perceived lack of safe conditions near schools.

An education program for motorists may include improving drivers' education training and ticket diversion classes that involve replace a fine with education about bicycling and pedestrian safety concerns and applicable laws (also applicable to the enforcement programs included later in this chapter).

Examples and Resources: Portland, Oregon's Share the Road Safety Class; Tucson, Arizona's Bicycle Diversion Course; Illinois' Driver Education Video and Curriculum; Wisconsin's Share & Be Aware Driver Education Program

Encouragement Programs

The following programs will encourage St. George residents and visitors to walk and ride more and for different kinds of trips.

Events

Creating and hosting community-wide events that are focused on celebrating bicycling and walking and removing social or psychological stigmas that prevent people from walking and bicycling is key in creating awareness and increasing use and safety in St. George.

The City of St. George and community partners should always strive to incorporate messages of encouragement regarding bicycling and walking into all events by providing bicycle parking, maps on how to get to the event safely on foot or by bike, and providing other incentives to ride or walk as a way of encouraging active modes as normal means of transportation and recreation.

Events focused on bicycling and walking could include:

- **Open Streets Events.** These events simulate what streets would be like if only open to non-motorized transportation and are usually most effective, at their inception, in concentrated areas. The event could also be incorporated with festivals, infrastructure projects, or other street closures.
- **Bicycle Film Festivals.** The City of St. George and SUBA hosted more than 200 people at a film festival at the Electric Theater on

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

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Attendees at the January 2016 Bicycle Film Festival at the Electric Theater, hosted by SUBA

Tabernacle Street in January 2016. Future events could be targeted to people who do not consider themselves bicyclists.

- **Kidical Mass Rides.** This event derives its name from the Critical Mass rides that started in major cities in the United States in the 1990s, however with a much different format. These rides are geared toward children, other youth, and their parents, in an effort to encourage them to use bicycles as a fun and easy form of transportation.
- **Bike Donation Drives for the Bicycle Collective.** Bicycle Collectives often survive and thrive on donated bicycles that can be repaired, given away to the needy, or sold to support other programs. Donation drives are often organized by community groups, scout troops, and individuals. Abandoned bicycles from Dixie State University could also contribute to the Collective's stock of bicycles.
- **Regular Social Walks and Rides.** Ongoing group walks or bike rides can target many groups of people and cover countless topics or themes. In most cases, however, the purpose is the same: to provide a safe, comfortable, and social setting for people who might not be used to active transportation. At social bike rides, new attendees experience riding safely in a group while learning bicycling skills; all riders have the opportunity to meet neighbors, share in a feeling of camaraderie, and build community.

Examples and Resources: Jane's Walk (Citizen-led community walking tours); San Jose Bike Party; Open Streets Project; Tucson, Arizona's Cyclovia

Mapping and Wayfinding

Physical and digital maps, as well as physical wayfinding systems, encourage people to bike and walk on available and dedicated facilities in St. George by letting them know where they are, how to get where they want to go safely and comfortably, and how long those preferred routes will take.

Bicycling and walking maps can be designed and oriented according to destinations, districts, facility type, or level of comfort and are usually most helpful for trip planning before one leaves on a walking or bicycling trip.

Wayfinding signage, however, can give turn by turn directions, mileage, and travel time to users so that they can access districts, destinations, trails, paved paths, and comfortable streets to ride or walk on. The City of St. George is currently updating on-street and trail wayfinding signage citywide.

School-Focused Programs

In addition to the bike and walk to school encouragement campaign outlined in Appendix A, the follow programs and activities encourage more bicycling and walking to schools. Many of these have been done previously through Safe Routes to School programs and more information can be found on the National Center for Safe Routes to School's website.

- School assemblies focused on how to walk and ride a bike to school safely
- "Walk and Roll to School" events

Participation in physical activity is positively related to academic performance in children.

"PHYSICAL ACTIVITY AND PERFORMANCE AT SCHOOL: A SYSTEMATIC REVIEW OF THE LITERATURE INCLUDING A METHODOLOGICAL QUALITY ASSESSMENT", SINGH, A., ET AL., 2012, FROM THE ARCHIVES OF PEDIATRICS & ADOLESCENT MEDICINE.

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- Poster contests
- Classroom competitions for who had the most bicycling and/or walking to school (goes hand in hand with the SRTS Hand Tally Surveys in "Evaluation Programs")
- Walking School Buses and Bicycle Trains
- "Caught Being Good" enforcement program where those who obey laws, look both ways before crossing streets, and lock up their bikes correctly are "ticketed" with a prize

Additionally, some schools within Washington County School District are designated as "no wheel schools", where bicycling or riding other wheeled modes to school is prohibited. The goal is to minimize issues with skateboards and bikes on school grounds, however, schools should look for other ways to manage potential conflicts. These programs have the perhaps unintended consequence of causing more traffic congestion near schools by preventing students from using bicycles or skateboards as transportation options.

Examples and Resources: National Center for Safe Routes to School (NCSRTS) ; UDOT's Safe Routes to School program (SNAP); NCSRTS' Bicycle Train Guide; Atlanta, Georgia's Walk and Roll to School Day; Columbia, Missouri's Walking School Bus Program

Walking school bus means safety in numbers and supervision from adults

Recreational Bicycling Routes

St. George is one of Utah's premier destinations for recreational bicycling due to its temperate winter climate and spectacular natural scenery.

This program seeks to develop and promote St. George's recreational bicycle facilities for residents and tourists alike, highlighting enjoyable rides, vistas, and the City's unique and intimate connection to the natural features on all sides. Named routes, like the Gunlock Loop, would be officially designated, signed, improved, and geared toward recreational cyclists.

A recreational rider enjoying red rock formations and quiet roads (Photo: SUBA)

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Some routes would be either loop or out-and-back rides designed to be completed within a few hours, although regional opportunities may be identified to include multi-day trips.

The routes can be developed with printed publications, online resources (including mobile devices), and route signs (in accordance with the City and County's wayfinding standards). Recreational bike routes may include both road and mountain biking opportunities.

Examples and Resources: Explore Maine by Bike; New York State Bike Routes; U.S. Bicycle Route System; Bike Utah

Enforcement Programs

In order to create a safe bicycling and walking system and encourage more people in St. George to ride a bike and walk, responsible and lawful behavior by all users should be enforced.

Police Training Program

Enforcement of traffic and other laws pertaining to active transportation modes is often only as effective as law enforcement's knowledge and practice of enforcement of those laws. Strengthening bicycling and walking information in police education courses and training can help local police officers and sheriffs improve public safety. As with many other programs, the benefits of police training and improved enforcement will also enhance other program types.

A law enforcement officer training geared toward bicycling and walking (Photo: Salt Lake City Police Department)

Examples and Resources: Chicago, Illinois' Traffic Enforcement for Bicyclists Safety Training Video

Targeted Crosswalk Enforcement

Motorists who routinely fail to yield the right-of-way to pedestrians in crosswalks, as required by law, are unlikely to change their behavior if they perceive that there are no consequences to their actions. Hundreds of communities around the U.S. implement targeted crosswalk enforcement. In Las Vegas, for example, crossing decoys often wear seasonal costumes (such as a turkey at Thanksgiving, or a leprechaun in March) to earn greater media attention. While targeted crosswalk enforcement often results in citations, the greater impact comes through visibility of the program and the media publicity of the event to reinforce the importance of obeying laws pertaining to active transportation.

Evaluation Programs

St. George can track its progress over time through tracking ridership rates, evaluating other programs, performing user and parent surveys, and publishing findings publicly in order to educate, encourage, and provide a basis for future evaluation. All recommended programs in this chapter work together to create a more enjoyable community for walking and bicycling.

Active Transportation User Count Program

Bicycle and pedestrian data collection programs can take many forms. Agencies can choose whether to use volunteers to conduct manual counts, automated counters, or a mixture of the two. Programs that use automated counters use two types of durations to establish a data collection schedule. Short-duration (i.e. two week) counts use automated counters that rotate between several counting sites. Alternatively, continuous or permanent automated counters are

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installed in one location and collect continuous data. The two types of automated data collection methods complement one another; each approach helps the agency accomplish the important goal of estimating active transportation traffic.

AUTOMATED PEDESTRIAN & BICYCLE COUNTS

Automated count programs integrate two approaches to data collection, organized based on count duration:

- Continuous (Permanent) Counting: These programs collect continuous data streams.
- Short-term (Mobile) Counting: Lasting a minimum of seven days, but preferably 14, these programs are used to extrapolate AADT using factors developed from the continuous count sites. The counters are "mobile" since they visit more than one site throughout the program's active phase. Proper scheduling is crucial to ensure that sites are being evaluated against each other at similar times of year and with similar climate conditions.

Automated Program Logistics for Mid-Size Cities

Automated equipment purchasing can involve high, up-front purchase costs that dissuade municipalities from launching such programs. The following low-cost options can help the City of St. George create an automated counting program to supplement manually-collected data.

Should the City choose to pursue an automated counting program, they should ideally establish several initial locations as continuous (i.e. 365 day) counting sites, along with some short-term (i.e. 14 day) counting sites. A recommended implementation plan includes starting with at least five continuous counting sites and progressively upgrading traffic signals to count active transportation users.

Potential Automated Counting Sites

Automated counting sites should be selected to represent a diverse array of locations throughout the city. The long-term site may be installed concurrently with new bicycle infrastructure in order to benefit from media attention related to the new bicycle facility. Long-term sites could also be located along a well-loved bikeway location, such as near Tonaquint Park, at several locations along the Virgin River Trail, on a new, high-profile on-street bikeway like Tabernacle St or Main St, or at the pending bicycle and pedestrian underpass at Bluff St & Sunset Blvd.

MANUAL PEDESTRIAN & BICYCLE COUNTS

Manual pedestrian & bicycle data collection efforts use volunteers or City staff to count active transportation users. Such count programs can capture data across the city or within a defined geographic area, such as a central business district. Manual counts also allow for the collection of roadway user gender, traffic pattern behavior, helmet usage, and other data that are not easily obtained through automated counts. Manual count initiatives can exist as routine, standalone programs, as one-off projects to monitor a specific corridor or intersection, or as supplements to automated initiatives. City staff can also use manual counts to calibrate automated equipment, in order to ensure the devices' accuracy and precision. Most of the recommendations presented in the following section are gathered from the National Bicycle & Pedestrian Documentation Project (NBPD), with additional information from FHWA Traffic Monitoring Guide 2013 (TMG).

Manual Program Logistics

A citywide manual counting effort can help the city build relationships with bicycle advocates and other volunteers who conduct such counts. The effort can build enthusiasm for bicycle and pedestrian data collection projects and highlight the need to maintain political support for active transportation projects. Manual data collection programs can be planned and implemented quickly and can rely on volunteer or intern labor to complete data collection field work.

Time of Year and Day of Week

NBPD guidelines specify that counts should occur in September during NBPD-established national count days and in January, May, and July for supplemental counts to collect seasonal data.[1]

NBPD and FHWA TMG 2013 recommend counting on Tuesdays, Wednesdays, and Thursdays, days when active transportation traffic volumes are

1 "National Bicycle and Pedestrian Documentation Project" (ND), http://bikepeddocumentation.org

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Table 5.1 *Program Logistics for Continuous (Permanent) and Short-Term (Mobile) Counters*

	Qualities Unique to Continuous (Permanent) Counting	Qualities Unique to Short-Term (Mobile) Counting
Frequency & Duration	Active phase is one year.	The counters' active phase should be 14 days.
Time of Year	Year round	Seasonal variation in activity levels should be considered when creating a rotation schedule. Adjustment factors per NBPD should be applied when interpreting results.
Number of Locations	Often dependent on budget within a program's initial stages. The number of continuous counters is dependent on the number of factor groups within the city. For initial purposes, City of St. George may use three factor groups representing recreational trips, commute trips, and other utilitarian trips. Experience from other city shows success when using several permanent counter locations per factor group.	The number of counter devices required to rotate to every site, depends on the following equation: Number of data collection weeks ÷ active summer counting duration of 14 weeks Example: 6 sites chosen, 2 week duration per site = 12 weeks of data collection. 12 weeks ÷ 14 weeks = 0.85 = ~ 1 counter Find the number of data collection weeks by multiplying the desired number of sites by the duration per site (two weeks).
Location Choice Methodology	Do not simply select locations with the highest levels of walking and biking. Sites must have at-least moderate active transportation traffic levels, but be indicative of the region's travel patterns. Sites with less than 100 pedestrian or bicycling events per day may not be appropriate .	It is more acceptable to use high activity level sites during short-term monitoring. Although this may cause biased results across an entire city, short-term locations are often chosen due to areas of professional interest, where ped/bike collisions are high, or where the agency will make future improvements .
Technology/ Equipment Selection	Potential continuous count technology: • Existing 2070 or 170 traffic controllers, updated to count active transportation users • Inductive loop (paired with passive infrared to count pedestrians and bicyclists separately) • Thermal sensor to detect bicyclists. The equipment does not detect pedestrians.	Potential short-duration count technology: • Pneumatic tubes to detect bicyclists. • Active infrared to detect pedestrians. • Video cameras to detect either road user. Miovision suppliers offer rentable equipment. They then process the video for an additional charge.
Reporting	See "Time of Year".	See "Time of Year". Time of year should be reported so that NBPD adjustment factors can be applied.

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Table 5.2 *Suggested Manual County Frequency and Timing*

Recommended Season	Recommended Days	Recommended Times
Fall and Spring	• At least one weekday: Tuesdays, Wednesdays, or Thursdays • One weekend day: Saturday (preceding or following the weekday counts)	• Two hour morning "peak time" data collection: 7 am – 9 am (weekdays) • Two hour evening "peak time" data collection: 4 pm – 6 pm (weekdays) • Two hour "peak time" collection: dependent on region (weekends)

Table 5.3 *Suggested Number of Locations Based on Population*

Population	Recommended Counting Locations
< 25,000	2 - 3 (statistically robust only where there is a high level of bicycling and/or walking)
25,000 - 50,000	3 - 4
50,000 - 100,000	***4 - 6***
100,000 - 150,000	6 - 9
150,000 - 200,000	8 - 12

Data: Strong, Mark (2006), "Practical Monitoring of Cycling. Transport Practitioners' Meeting 2006", slide 15.

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Table 5.4 *Manual Count Program Time & Costs*

Item	Time Required
Counter Training	• Approx. 1-2 hours to assemble NBPD training materials, approx. 2-6 hours coordination with other agencies/partners, approx. 2-3 hours to create final presentation • Approx. 1-2 hours per presentation • Approx. 1 hour for set-up/breakdown per presentation
Counting Field Work	• 2 hours, as per NBPD guidance. This time frame is recommended for programs exclusively using manual counts as a data collection method as well as programs that use manual counters to calibrate equipment.
Count Data Processing & Analysis	• Budget at least 2 hours per site. Budget for count data processing and analysis is usually represented as 15% of the total estimated cost.

not statistically significantly different. Using one weekday count day and one weekend count day per count period is recommended, in order to represent multiple types of active transportation trips.[2] Past active transportation user counts in St. George have recorded more users on Saturdays than on weekdays.

Duration

Data should be collected during two hour increments during peak commute periods in the morning and

2 "NBPD: Conducting Counts" (ND), http://bikepeddocumentation.org

evening. FHWA TMG recommends one minimum four to six hour period, coinciding with the area's heaviest active transportation traffic flow. This duration may be unrealistic for many agencies, hence the two hour time frame recommended by NBPD and used by most jurisdictions.

Number of Locations

Two methods for determining the correct number of manual counting locations are described below. The same methods are relevant for automated counting, as well. Each method was originally developed to monitor bicycle traffic, although the basic principles apply for pedestrians. Counting bicycles and pedestrians in the same location helps compare mode share and reduces travel time during field work.

- Population-based method: Table 2 illustrates the suggested number of counting locations based on a given area's population. Given the population of the City of St. George, an estimated 4-6 counting locations are recommended. Table 2 highlights the recommended number of counting locations.
- Factor group method: A factor group is a presumed category of bicycle users such as 'recreational riders', 'commuters', or 'parents and children going to school'. For instance, Colorado DOT recommends installing 3-7 count locations or automated counters per factor group.

Volunteer Recruitment, Training, and Reporting

Training can follow the NBPD training materials and forms, available through the main project website.

Although manual volunteers can simultaneously count pedestrians and bicyclists, agencies should be prepared to assign multiple volunteers per one location so they can accurately count both pedestrians and bicyclists. Agencies could also organize separate data collection days to count each type of road user.

Integrating Technology with Manual Counts

Some mobile and web-based traffic counting software[3] allows users to conduct screenline counts for active transportation and motorized roadway users. Asking volunteers to use this type of software could result in increased counting efficiency and more nuanced data. St. George staff should make sure that all volunteers who wish to participate in the count have access to mobile devices or other technology with which to use the software. Otherwise, paper and pen options should be made available.

Manual Program Cost Estimates

Program costs vary depending on the number of counting locations selected throughout the City. Volunteer and/or intern labor can help defray costs associated with staffing a manual count program. Table 3 identifies staff hours required to run a manual count data collection program.

Citywide Surveys

Administering a survey annually or every few years, in addition to counts, allows agencies to understand active transportation travel behavior and residents' attitudes related to walking and bicycling. Potential topics could be similar to the FHWA National Household Travel Survey (NHTS), which asks why, how, and when one travels. Survey questions should explicitly ask about all trips, including recreational walking and bicycling. A citywide survey could also assess perceived comfort and safety when using on-street and off-street facilities, and gauge the extent to which people might walk or ride a bicycle more if conditions improved.

User intercept surveys, in which surveyors ask a passerby to complete a brief questionnaire, are useful to gain information about a specific corridor or intersection, or to understand the characteristics of existing users. They can also ask questions more similar to general community-wide surveys. Given the time required for volunteers to collect this information, the tactic is most useful along high-interest roadways with moderate to high active transportation traffic volumes.

MANAGING AND UTILIZING COUNT DATA

Creating citywide data management policies would help create uniform data fields that standardize data sets from all St. George count efforts. The standardization would enable a comparison of count

3 Example: "CounterPoint" (ND), http://counterpointapp.org

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results across geographies. FHWA TMG 2013 Chapter 7.10: Active Transportation Count Data Format provides an overview for creating a CSV template to log all bike/pedestrian count data within a variable length, fixed field record. The content within active transportation data records differ from those used for motorized data records. Records contain information on the type of count (i.e. bike, pedestrian, both), latitude, longitude, type of sensor, presence of precipitation, temperature, date, and other information. Count data per desired time interval (i.e. 15 minutes, one hour, 120 minutes) is entered as a separate entry per field.[4]

Benchmarking Report

This plan establishes a vision statement, goals, and performance measures defining the desired outcomes of the planning process and measuring success. Regularly publishing a report (annual, biennially, or every three years) that measures accomplishments and performance against goals, utilizing the performance measures, is a useful strategy to track progress and maintain momentum for the plan's implementation.

Reports should include relevant bicycling and pedestrian metrics (count results, new bikeway, trail, path, and sidewalk facility miles; major completed projects; bicycle and pedestrian-involved crashes and, hopefully, a reduction compared to previous years; results of organized events; etc.). They may also include information on user satisfaction, public perception of safety, or other relevant qualitative data that has been collected. A complete list of performance metrics can be found in Chapter 6 and should serve as the basis for the report.

The report can be assembled through a joint effort between the City of St. George, its Active Transportation Committee, and SUBA. Every time the report is published, the ATC should present the findings and recommendations about key efforts for the coming years to the City Council and Mayor.

4 USDOT FHWA, Traffic Monitoring Guide 2013, http://www.fhwa.dot.gov/policyinformation/tmguide/tmg_fhwa_pl_13_015.pdf, 7-87 (Table 7-39 Active transportation count record example)

Examples and Resources: Billings, Montana's 2013 Complete Streets Benchmark Report; Bicycle Coalition of Greater Philadelphia's Annual Reports; San Francisco, California's Annual Reports

Safe Routes to School Surveys

PARENT SURVEYS

Parent surveys help Safe Routes to School programs 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.

Examples and Resources: Safe Routes to School Coalition's Sample Parent Survey

HAND TALLIES SRTS

Student hand tallies are a quick and effective way of gathering data about students' transportation mode for a Safe Routes to School program. Hand tallies are often required for Safe Routes to School (SRTS) funding. Teachers, program staff, and/or volunteers simply go to classrooms at participating schools and ask students how they get to/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.

Examples and Resources: Safe Routes to School Coalition's Sample Student and Class Travel Tallies

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Policies & Standards

Policies and standards ensure predictability and uniformity in how a city looks and functions. This section will include:

- New policies and standards that will foster completion of the active transportation plan's vision and goals
- Review of policies and standards, where they exist, that apply to and significantly affect walking and bicycling
- Recommendations on how to improve those that exist

Sidewalk & Crosswalk Infill Policy and Program

Some of St. George's neighborhoods have limited sidewalk connectivity. Completing missing sidewalk links can be challenging and expensive, especially in older residential areas where residents have developed fencing and landscaping within the public right-of-way and may consider those areas to be part of their personal space. Some residents may also not want traditional sidewalks due to the perceived rural nature of their neighborhoods, and potential impacts to mature landscaping and trees. Regardless, the public right-of way that is generally located on either side of the paved driving and parking area is intended for walking, whether or not a sidewalk currently exists.

The City of St. George should consider a Sidewalk Infill Policy and Program where City staff periodically inventory the street network to identify sidewalk gaps, and then develop strategies, project prioritization criteria, and creative funding strategies for completing these gaps.

Suggested prioritization criteria for evaluating potential projects can be found in Chapter 6.

NEW CONSTRUCTION OR REHABILITATION IN THE CITY'S RIGHT OF WAY

The City should coordinate improvements and bid out sidewalk, crossing, and signal construction and other rehabilitation projects once a year at as high of a volume as can be accommodated for the best prices and efficiency. Sidewalks near schools should be prioritized first, followed by gaps that would greatly enhance the overall connectivity of the network.

SIDEWALK REPLACEMENT AND EXPANSION

The City should continue or begin to implement the following sidewalk strategies, programs, or policies to encourage sidewalk rehabilitation and construction where property owners are involved.

- Offer no-interest (for partly-financed repairs) and low-interest (for entirely-financed repairs) loans to property owners who wish to replace or rehabilitate sidewalk that fronts their property. The City should ensure that funding for the no- or low-interest rate loans is available each year
- Dedicate funding to an expanded sidewalk replacement or expansion program through a 50/50 cost sharing sidewalk replacement program where sidewalk construction costs are divided evenly between the City and the property owner, or, implement a "Health Insurance" model sidewalk replacement policy in which the financing model is based on the concept used in the health insurance industry. This policy allows property owners to pay in a fair amount regardless of property size or frontage length.

CROSSWALK POLICY

The City should adopt a crosswalk policy that establishes appropriate crosswalk types for specific roadway crossing types. High-visibility, continental-style marked crosswalks should be installed at any

Sidewalk and driveway crossing near Dixie State University that does not follow standard design

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marked crosswalk, with priority given to school crossings, busy intersections, downtown, and mid-block crossings. Crosswalks are especially important where sidewalks are or will be present. ADA-compliant curb ramps should also always be provided when crosswalks are installed.

Examples and Resources: Helena, Montana's Neighborhood Transportation and Volunteer Sidewalk Program; Missoula, Montana's Health Insurance Model Sidewalk Financing Program

Roadway Resurfacing Policies and Test Installations

St. George's roads are typically maintained with a chip seal treatment, which combines an oil base and an aggregate to create a new, thin layer on top of existing pavement. Maintaining roads regularly in this manner is a desirable, cost effective, and useful pavement management strategy, without which the City's roadway infrastructure would quickly deteriorate.

In the past, however, St. George's standard roadway resurfacing practices has included large aggregate (rock) sizes in a chip seal treatment. Although large aggregate typically requires less frequent maintenance, it produces a rough road surface for motorists and bicyclists alike.

Common complaints about the current chip seal from residents, business owners, and bicyclists include:

- Excess chip that doesn't stick to the base layer of oil and/or comes loose from the seal coat is often not swept back up
- The base layer of oil isn't thick enough for the chip to adhere to it, causing premature roadway surface degradation
- The driving and riding surface is rough and causes significant abrasions if fallen on
- The rough roadway increases road noise
- Increased incidents of broken windshields and other body damage
- Chip seal that is not covered in a seal coat is often dusty, disturbing residents and other property owners

Recently, St. George's Engineering and Public Works Departments have begun experimenting with a ¼ inch aggregate size in order to mitigate some of the drawbacks of traditional chip seal and provide a smoother surface for all users that still provides traction and longevity.

The City of St. George should continue to investigate smaller and smoother standard paving aggregate chip size, ideally ¼ inch. If the chip alone is not sufficient to create smooth and uniform surface with minimal chip migration, a top seal or fog coat should be applied after the chip is spread on roadways, especially on those that are or may be used by bicyclists. Smaller and smoother chip sizes and shapes lay flat without the need for years of compaction. The use of a top seal coat (an additional coat of oil applied after the chip) can, in some cases, improve pavement smoothness, chip longevity, and bicyclist comfort.

It is also recommended that the City assess the type of use present (or desired or planned) on different roadways and roadway types, as well as the surface treatments that will best meet those needs. Roads with significant active transportation users may be good candidates for spending more money on a smoother, more enjoyable surface, which will encourage more people to ride a bicycle.

In addition to investigating alternatives to chip seal, including slurry seals, the City should also consider the following pavement management strategies:

- Maintain a smooth, pothole-free surface
- Ensure that the finished surface on bikeways does not vary more than ¼ inch on new roadway construction
- Maintain pavement so ridge buildup does not occur at the gutter-to-pavement transition
- Inspect the pavement 2 to 4 months after trenching construction activities are completed to ensure that excessive settlement has not occurred

Examples and Resources: Washington State DOT Pavement Surface Condition Field Rating Manual for Asphalt Pavements; Wyoming Pathways' Chip Seal Tests and Analysis

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CASE STUDY: Wyoming Pathways' Tour de Chip Seal

In 2013, Wyoming Pathways, a bicycling and walking advocacy and promotion organization that serves the state and parts of eastern Idaho, visited four test sites of different application techniques and chip sizes in chip seal resurfacing projects in Teton County, Idaho and Teton County, Wyoming. In an effort to develop recommendations for the resurfacing roads used by people on bicycles, Wyoming Pathways published their observations and findings.

Recommendation: Use a fog seal, such as GSB-88, more frequently in order to retain and add life to the aggregate in the existing roadway surface, thus extending time before a new wear surface (such as a chip seal, slurry seal, or micro seal) is needed. When new aggregate is needed, use as smooth a treatment as possible, like slurry, micro, or 1/4" chip seals. Factor in maintenance costs over 10-15 years versus only the short-term cost savings of chip seal.

Table 5.5 *Observations from Five Chip Seal Test Sites in Wyoming and Idaho*

Location	Pre-Treatment	Treatment	Notes & Observations
#1 Old Jackson Highway - Mountainside Village (North Section)	Complete asphalt reconstruction 10 years prior	1/4" chip with GSB-88 fog seal	While not as smooth as asphalt, bicyclists reported that this is one of the best chip seals to ride on, even immediately after application. Almost no chip migration to the road edges, chip held in well by fog seal. Some surface wear from snow plows, but this did not affect bonding of fog seal.
#1 Old Jackson Highway - Moose Creek (South Section)		1/4" chip with no fog seal	Does not ride as smoothly as north section (only difference was additional fog seal; see above), though still a reasonable traditional chip seal alternative. Not very rideable for some time after application. Some chip migration to side of road, as well as some loose chips and sand still present on top of the road.
#2 Fish Creek Road - Wilson	Not mentioned	3/8" chip with CSS-1H fog seal	Rides better than an undocumented section without fog seal, but the larger chip means that it is not as smooth as the 1/4" tests. Different type of fog seal which did not last very long (significant wear after one winter).
#3 2000 South - East of Highway	Expansion/ compression cracks fixed. Wear surface in good condition, no new chip needed	No chip, only GSB-88 fog seal over old surface (unknown type)	Smooth surface, good for bicyclists. Fog seal has ability to penetrate surface and rebind aggregate.
#4 South 4500 West (Cedron Loop)	Road base rebuilt several years earlier	Otta Seal bituminous surface treatment applied annually for two years before. Used on roads that need more than a standard chip seal or that need a cheaper, asphalt substitute.	During first few months, Otta Seal is rough for bicycling, but very smooth and enjoyable after one summer and winter of use. Season-long impact on bicycling. Otherwise, roadway holds together well and maintenance needs are low.

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Bicycle Parking Policy and Development Regulations

Bicycle parking is an important component of the bicycle network. Secure, short and long-term end-of-trip facilities encourage people to travel by bicycle. Other than a recent increase in bike rack installations downtown as part of a joint project with Eagle Scout candidates, the City does not have bicycle parking standards or a bicycle parking program.

St. George should adopt the Association of Pedestrian and Bicycle Professionals' (APBP) Bicycle Parking Guidelines into Title 6 of its municipal code (see section later in this chapter) and as part of its development standards in addition to a standalone economic development and business outreach Request-a-Rack bicycle parking program. This two-pronged approach will address proper rack design, placement, and quantity of bicycle parking. The former will ensure that future development or redevelopment includes secure parking for people arriving by bicycle while the latter can offer reduced cost bike racks to requesting businesses. The latter program will also promote riding to commercial destinations, reduce parking demand, and mitigate the number of bicycles locked to trees, signs, and posts.

Increasing the comfort of bicycling to a commercial district makes its real estate more productive, because six bicycles or more can park in the square footage required by one car. In a Melbourne, Australia study of dollars spent per minute by various shoppers, used bicycle parking brought in 69 cents per hour per square foot, while used auto parking brought in 19 cents.

"BIKE PARKING IN SHOPPING STRIPS", ALISON LEE, 2007, UNIVERSITY OF MELBOURNE.

Bicycle parking installed in 2015 at Tabernacle and Main Streets in Downtown St. George

SunTran may also adopt a similar policy for long-term bicycle parking at major transit stops and at the Dixie State University/SunTran Bus Center.

Examples and Resources: APBP's Bicycle Parking Guidelines; APBP's "Essentials of Bike Parking: Selecting and Installing Bike Parking that Works"

NACTO Design Guides

The National Association of City Transportation Officials, a national organization of transportation planners and elected officials, currently publishes three design guides: the Urban Bikeway Design Guide, the Urban Street Design Guide, and the newly unveiled Transit Street Design Guide. All three guides include state-of-the-practice direction and examples for how to effectively design for pedestrians and bicyclists in many different contexts and in cities of varying sizes.

It is recommended that the City of St. George formally endorse and adopt these three NACTO Guides into the City's standards and practices as official design guidance. The City should also apply to become a member city or affiliate member, which will elevate St. George's reputation as a bicycling and walking-friendly city and which will also foster idea and information sharing, data collection, and a support network of similar cities in North America.

Examples and Resources: NACTO Urban Street Design Guide; NACTO Urban Bikeway Design Guide; NACTO Transit Street Design Guide

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Complete Streets Policy

Streets are an integral part of everyday life and public space in St. George. The term "Complete Streets" refers to the practice of designing streets so that people of all ages and abilities can choose their travel mode and not be confined to one choice. These choices may include taking transit, using a wheelchair or other mobility device, driving a car, walking, bicycling, or a combination of more than one of these.

The City of St. George should adopt a Complete Streets approach, policy, or ordinance. "Complete Streets" does not mean that every street in the city has to perfectly accommodate all transportation modes, ages, and abilities. Instead, an approach, policy, or ordinance will ensure, with differing degrees of rigidity, that, at the least, all users are considered with each opportunity for change of and investment in St. George's roads.

Many jurisdictions around the country have adopted Complete Streets policies and they can be used as model starting point. A Complete Streets policy is one way to institutionalize the goals of this plan within the City.

Examples and Resources: Smart Growth America Resources Page; Salt Lake City, Utah's Ordinance; Salt Lake County, Utah' Ordinance; Wasatch Front Regional Council (WFRC) Vision, Mission, and Principles

Existing Code, Policy, & Standard Review and Recommendations

St. George's codes, policies, and standards support a thriving city and preserve its distinct identity. This section reviews several of these that apply to walking and bicycling, either directly or indirectly, and recommends changes (underlined) that will improve them even more.

These documents, policies, standards, and codes were not reviewed in Chapter 2 because, unlike the adopted plans included in that chapter, modifications to them are recommended in the following sections.

DESIGN STANDARDS (SECTION 3) FROM "THE STANDARD SPECIFICATION FOR DESIGN AND CONSTRUCTION" (2000)

The standards in this document are meant to be considered minimums and should not prohibit the "design and construction of higher type improvements, as approved by the City Engineer" nor "restrict professional judgment".

In Section 3, the standards include several points applicable to bicycling and walking:

- Use of cul-de-sacs should be reduced. Doing so will encourage walking and bicycling trips by likely reducing trip distances (especially important during the summer) and reducing traffic on collector streets.
- Pedestrians and bicycle traffic should be considered in the planning and design of all developed streets.
- Sidewalks, handicap ramps, curb, and gutter shall be constructed and street lighting shall be provided or upgraded to standard on all streets as "improvements".
- Minimum sidewalk widths of 4' on residential streets, 5' on residential collectors, and 6' on major collectors and higher (Table 3.1). Section 3.2.4.6 specifies that sidewalk width may be increased in areas of high pedestrian traffic.
- Optional planter strip between back of curb and front of sidewalk would increase distance and physical protection between motor vehicle traffic (Table 3.1). Consider making the planter strip a minimum requirement (per Table 5.7).
- Block lengths shall not exceed eight hundred feet (800') on local road networks and accesses should not be allowed too often or not often enough. Consider a standard prioritizing pedestrians in discussions about block length, driveways, and accesses to businesses so as to ensure safety of and ease of use by vulnerable users.
- Ensure that the standards' minimum intersection spacing recommendation does not severely restrict pedestrian access across roadways, especially on busier roads.
- Pedestrians are considered when choosing the design of the storm water inlet, so that water remaining on or near the roadway does not compromise their safety.

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- Ensure that drainage design for flooding events does not adversely affect bicyclists in the roadway. Consider specifying that standard storm water inlets be designed so as to prevent bicycle wheels from getting stuck, potentially harming the user. This is especially important where inlets are present in existing or proposed on-street bike lanes.
- Ensure that manhole covers , where present in existing or proposed on-street bike lanes, also do not severely adversely affect the smoothness of the lane (considering bicycle tire width) by specifying maximum differences between roadway surface and cover.
- Consider adding bicycle level of service and comfort index to the Traffic Impact Study requirements and Level of Service scores.

ACCESS MANAGEMENT POLICY (2008)

St. George's AMP, adopted in 2008, includes the same roadway cross sections standards as the Standard Specification for Design and Construction from 2000. Modifications to the tables found in both documents is found in Table 5.7. Additionally, the recommendations from the review of the 2000 document (previous section) also apply to this Policy.

One of the goals of access management, according to this Policy, is to enhance pedestrian and bicycle facilities. Beyond inherent impacts of accesses to the quality of these facilities, the Policy also encourages reducing the number of accesses along roadways proportionate to speed limit increases and roadway classification upgrades.

The recommended signalized intersection spacing on page 6 of the AMP impacts pedestrian connectivity and the ability for both pedestrians and bicyclists to cross major arterial streets. If recommendations from the Policy are adopted, the City may wish to establish required mid-block pedestrian crossings to break up overly long blocks along major arterials.

The AMP recommends medians on any roadway with a speed limit of 40 mph or greater and states that they should also provide a pedestrian refuge at all major intersections. This recommendation is in line with the vision and goals of this plan and should be implemented.

Some standards in the AMP promote maintaining excess speed of motor vehicles turning into driveways and off-street lots across bike lanes and sidewalks, which causes a significant hazard to pedestrians and bicyclists on or near the roadway. Turn lane approaches and driveways should be designed so as to prioritize and maintain comfort for pedestrians who may be crossing any access.

The AMP also recommends that turning lane approach width be no less than 12'. However, narrow lanes often translate into slower turning traffic and reduced conflict magnitude between non-motorized and motorized traffic. Provision for narrower turn lanes approaches should be included in the Policy, especially when used near shopping districts, schools, and in other areas that do or may have high pedestrian traffic.

The Policy also provides the City excellent guidance on bicycle and pedestrian access, especially to and between developments, in an effort to reduce the number of motorized trips, and therefore congestion.

Existing and Recommended Cross Sections

Existing roadway cross sections, which outline required right of way designs, are outlined in the table on page 5 in St. George's Access Management Policy and *2000 Standard Specification for Design and Construction* ("Existing" on the following pages). Some of the cross sections, however, do not require adequate sidewalk width, do not allow enough room on the roadway for bicycle facilities, or, where there is sufficient space, do not require them.

The following pages also illustrate suggestions for how to improve the existing right of way cross sections within the same total right-of-way width. These suggestions were partially derived from the AMP table's 'Optional Section" columns. Overall, the City of St. George should begin to require that sidewalks be at least five feet wide, not including curb (per FHWA, U.S. Access Board/PROWAG, NACTO). Individual roadway design should be evaluated on a case-by-case basis; these illustrations offer some guidance on how this might be accomplished. On higher classification roads (i.e. arterials), separated bicycle facilities and wider sidewalks are desirable because of high volume and high speed vehicle traffic, two of the main concerns expressed by online public survey respondents.

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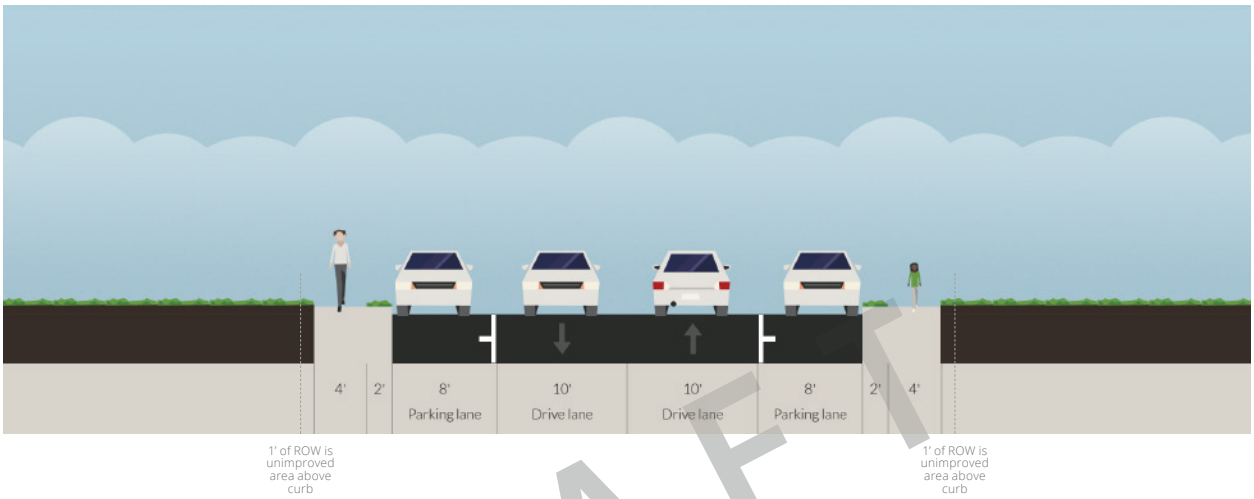
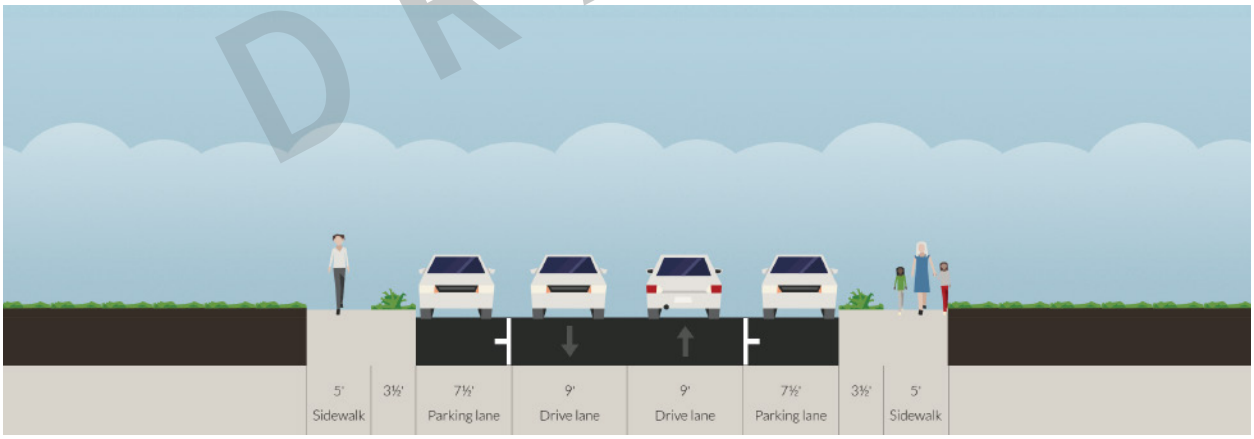
RESIDENTIAL LOCAL

50' ROW *<500 ADT*

Existing



Recommended



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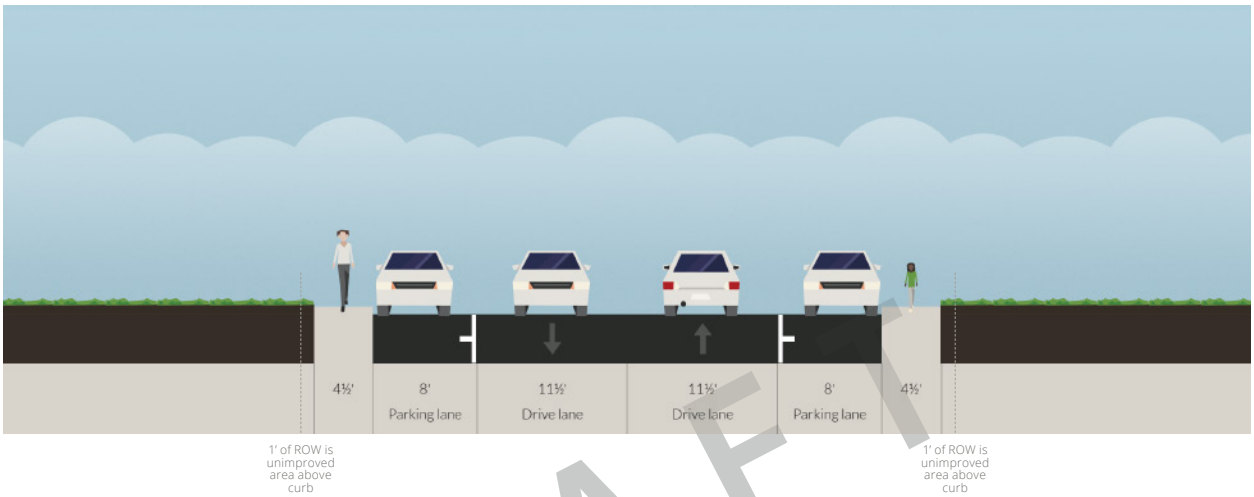
Notes

Pavement width is measured from curb face to curb face; the outside travel lane, bike lane, or parking lane includes the 24" gutter pan in its width. Sidewalks or planter strips (whichever is next to the street) include the 6" curb in their width. According to the AMP, a four-foot planter strip shall be placed between back of curb and front of sidewalk, even though existing residential and some other cross sections do not show them. A planter strip may be required between back of sidewalk and any wall, fence, hedge, etc. (not shown). This area can be private or public. If public, additional right-of-way will be required.

RESIDENTIAL STANDARD

50' ROW *510 to 1,250 ADT*

Existing



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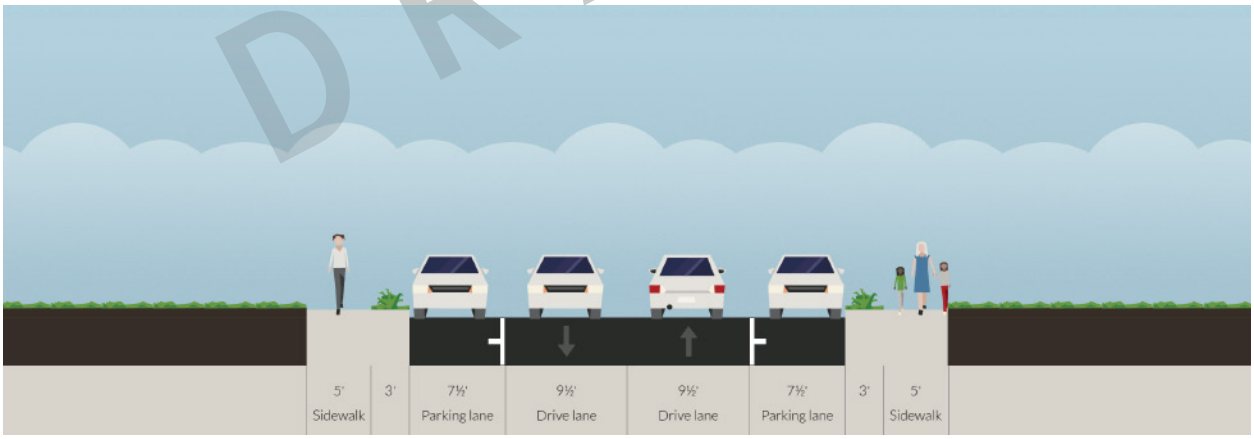

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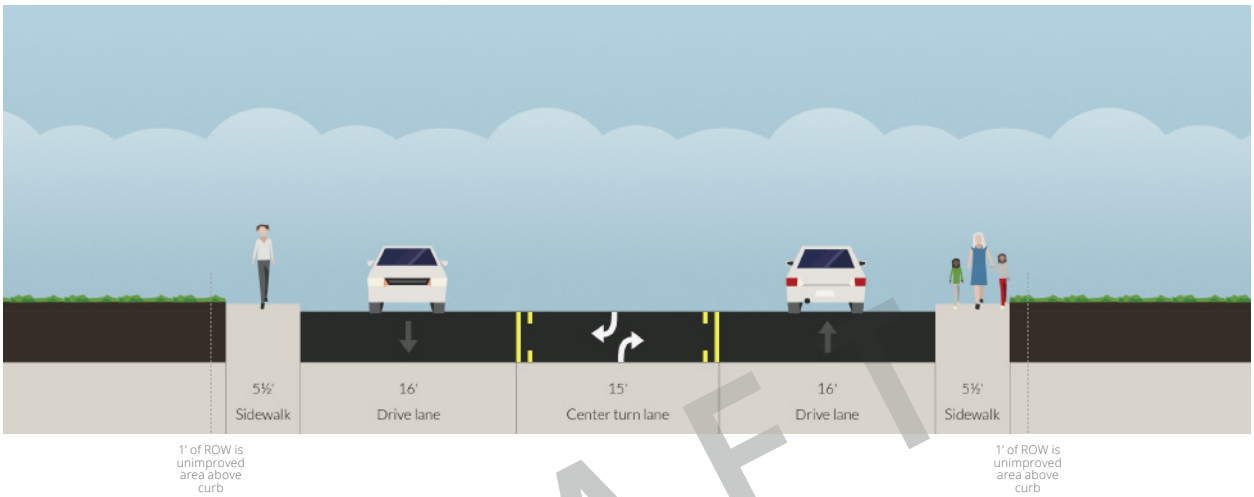
RESIDENTIAL COLLECTOR

60' ROW *1,260 to 2,000 ADT*

Existing



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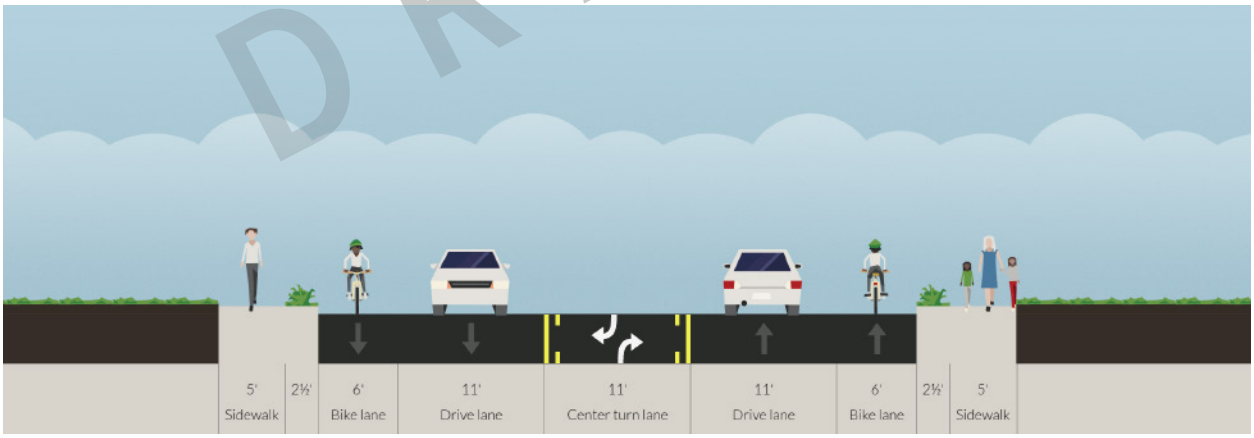

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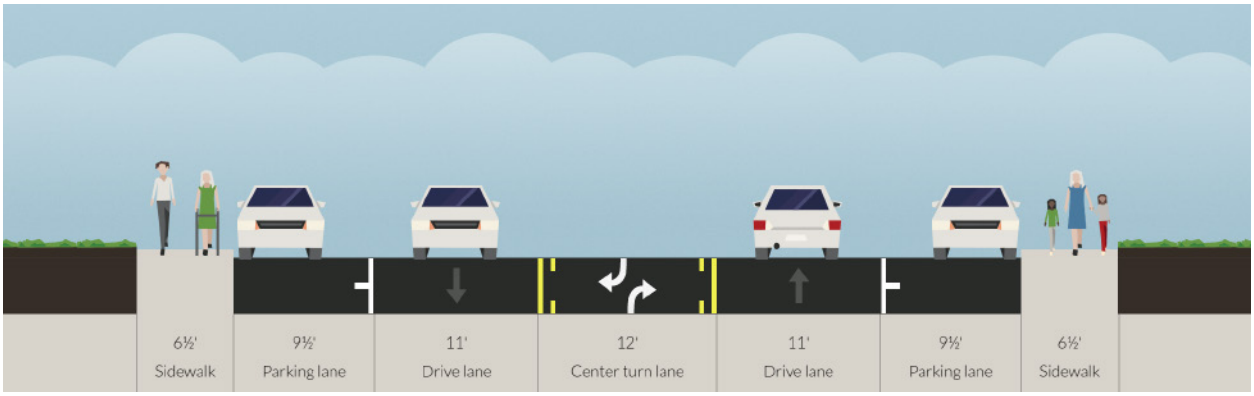
Notes

Pavement width is measured from curb face to curb face; the outside travel lane, bike lane, or parking lane includes the 24" gutter pan in its width. Sidewalks or planter strips (whichever is next to the street) include the 6" curb in their width. According to the AMP, a four-foot planter strip shall be placed between back of curb and front of sidewalk, even though existing residential and some other cross sections do not show them. A planter strip may be required between back of sidewalk and any wall, fence, hedge, etc. (not shown). This area can be private or public. If public, additional right-of-way will be required.

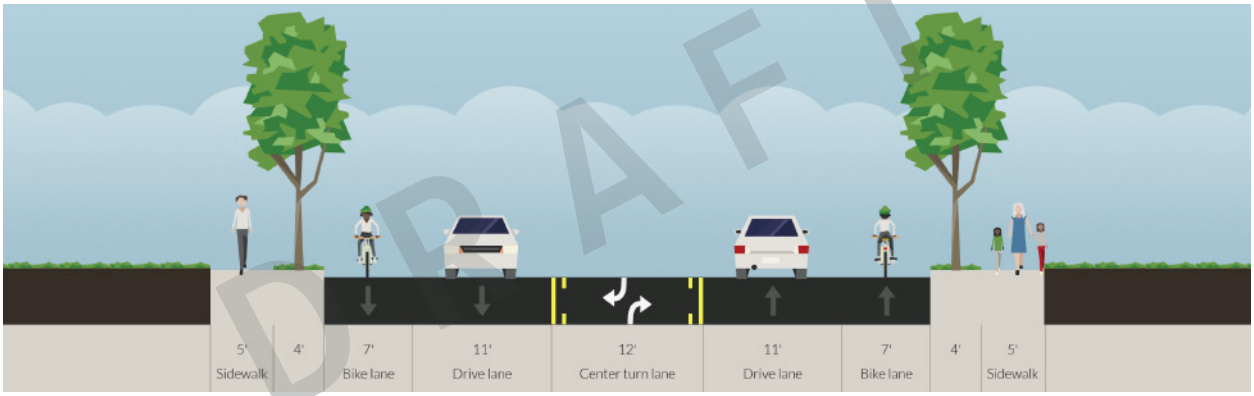
MAJOR COLLECTOR

Existing

66' ROW *2,010 TO 6,000 ADT*



Recommended (Option 1 - Center Turn Lane and Planting Strip)



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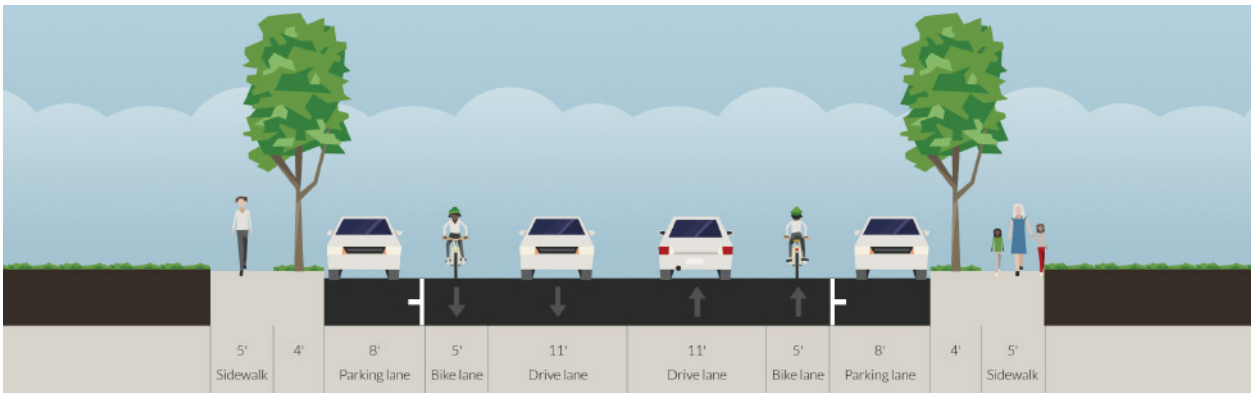
Recommended (Option 2 - Parking and Planting Strip)



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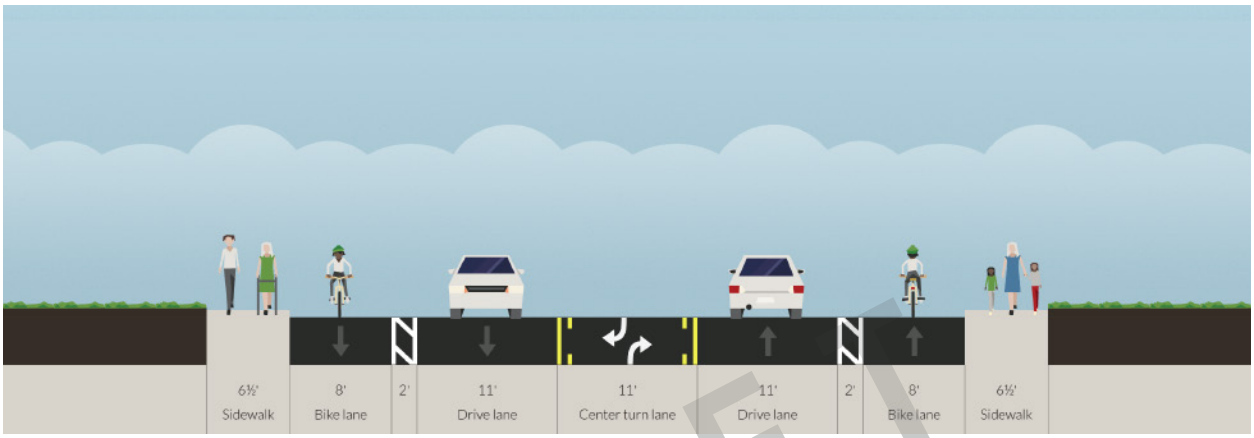
Configurations of major collector and higher classifications may be adjusted with proper justification and approval of City Engineer. May require widening at intersections for turning movements. Where on street parking is allowed, additional width and other considerations may be required.

MAJOR COLLECTOR (cont.)

66' ROW *2,010 TO 6,000 ADT*

Recommended (Option 3 - Center Turn Lane and Buffered Bike Lanes)



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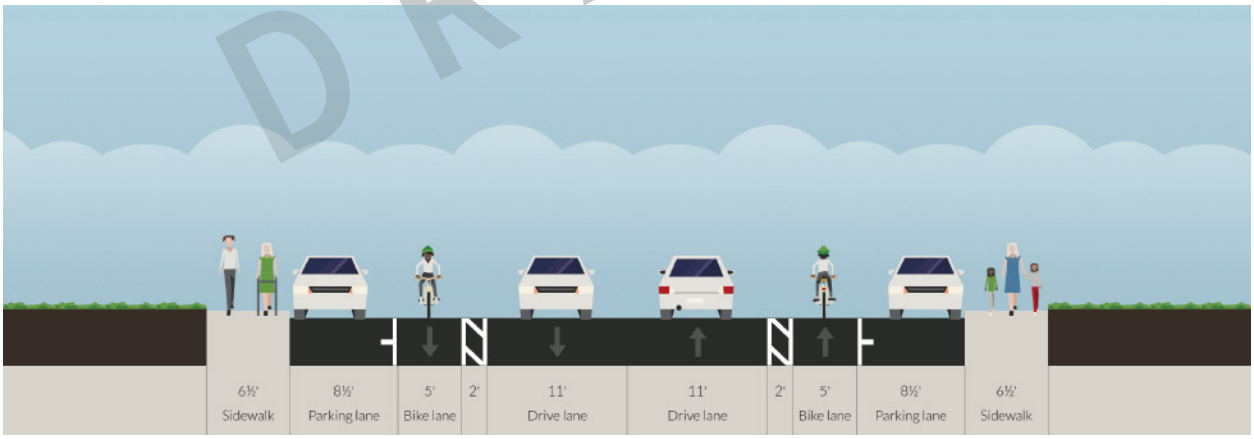
Recommended (Option 4 - Parking and Buffered Bike Lanes)



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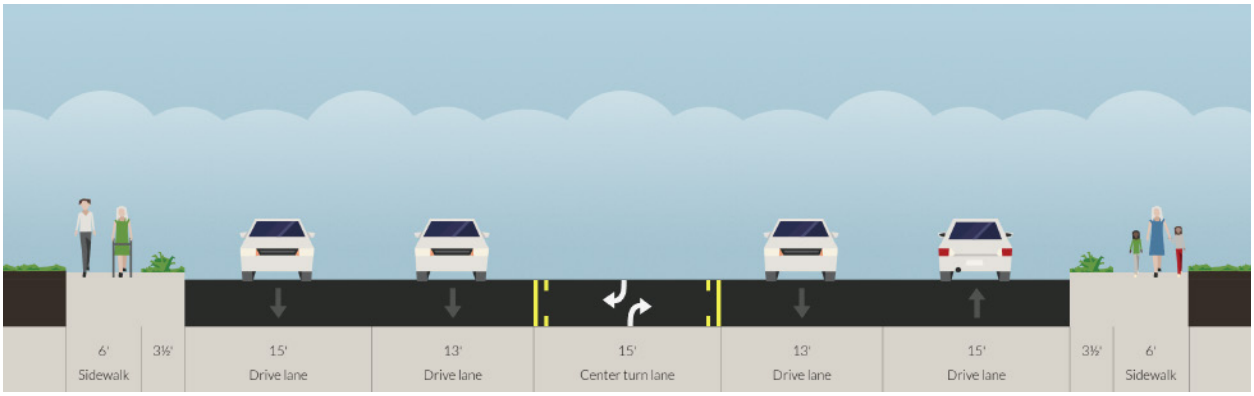
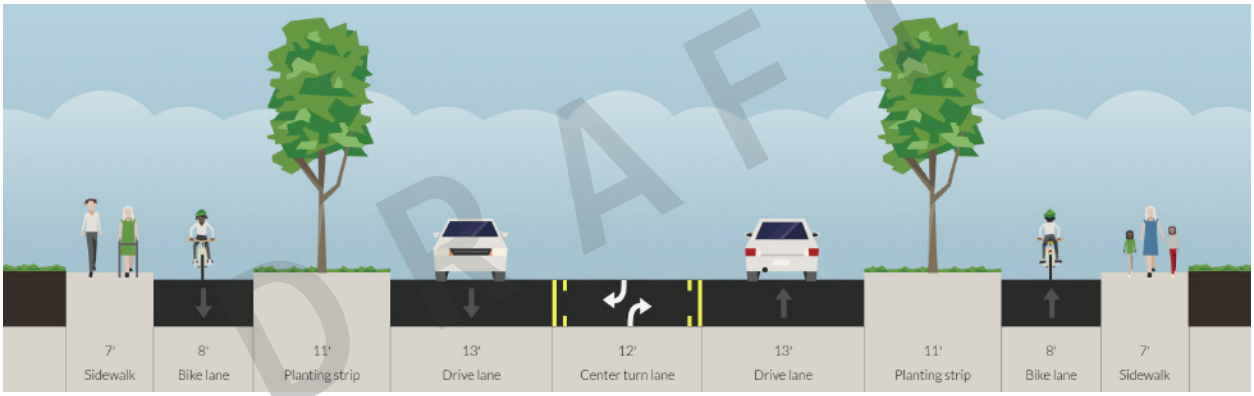
MINOR ARTERIAL

Existing

90' ROW *6,000 TO 15,000/20,000 ADT*



Recommended (Option 1 - 6,000 to 15,000 ADT)



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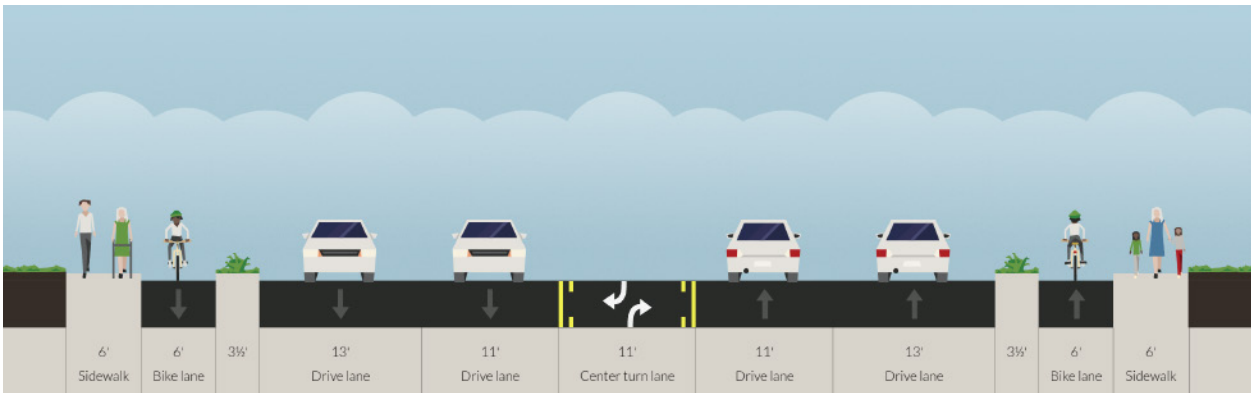
Recommended (Option 2 - 15,000 to 20,000 ADT)



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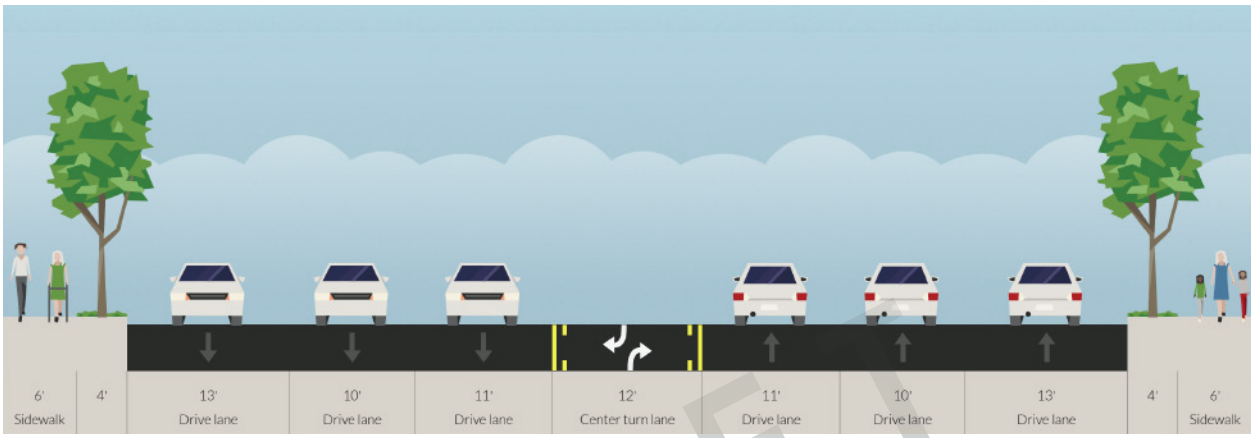
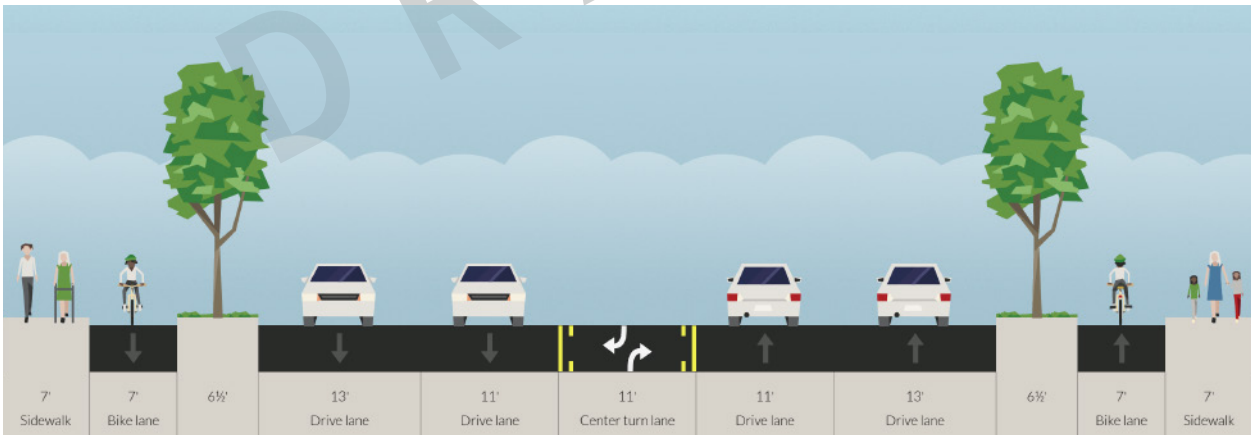
ARTERIAL MAJOR

>100' ROW *>20,000 ADT*

Existing



Recommended



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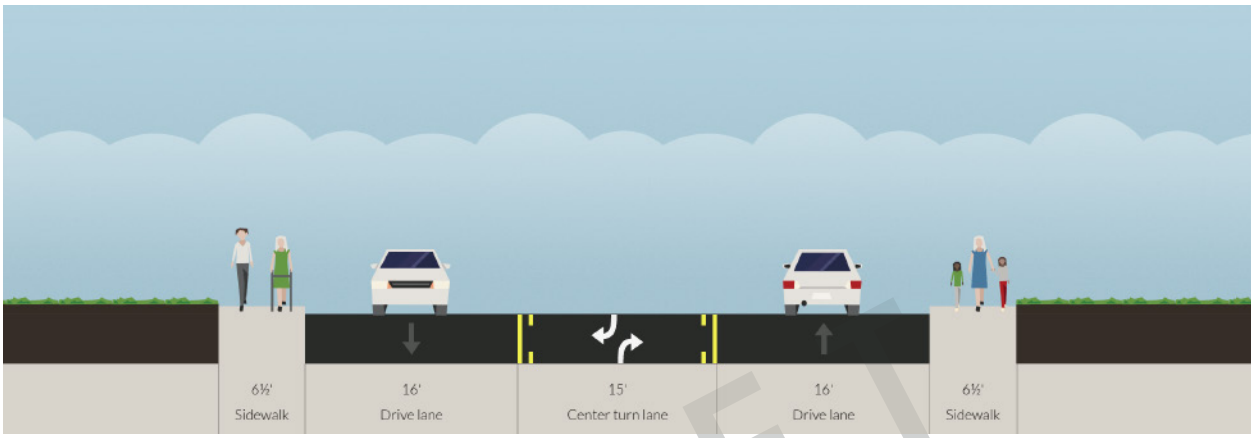
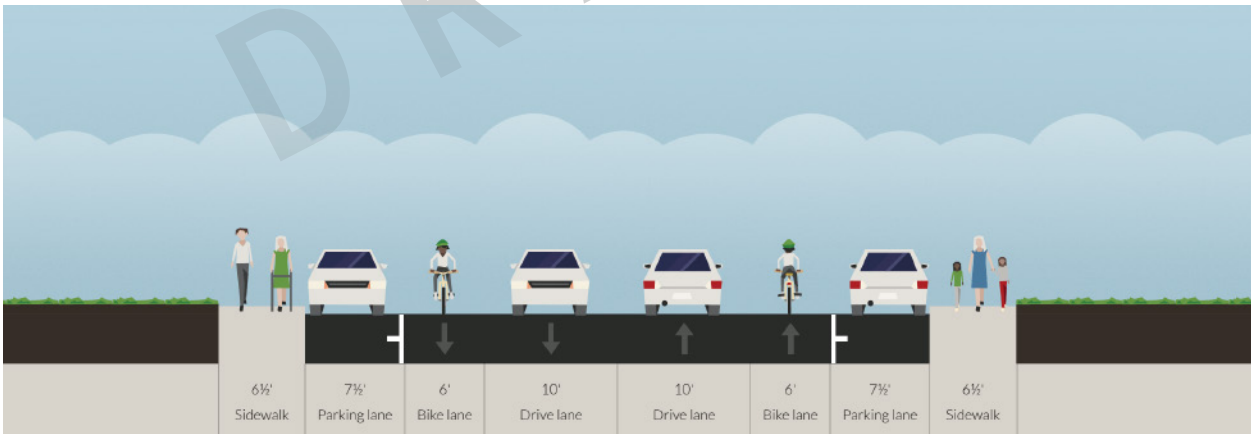
COMMERCIAL LOCAL

60' ROW

Existing



Recommended



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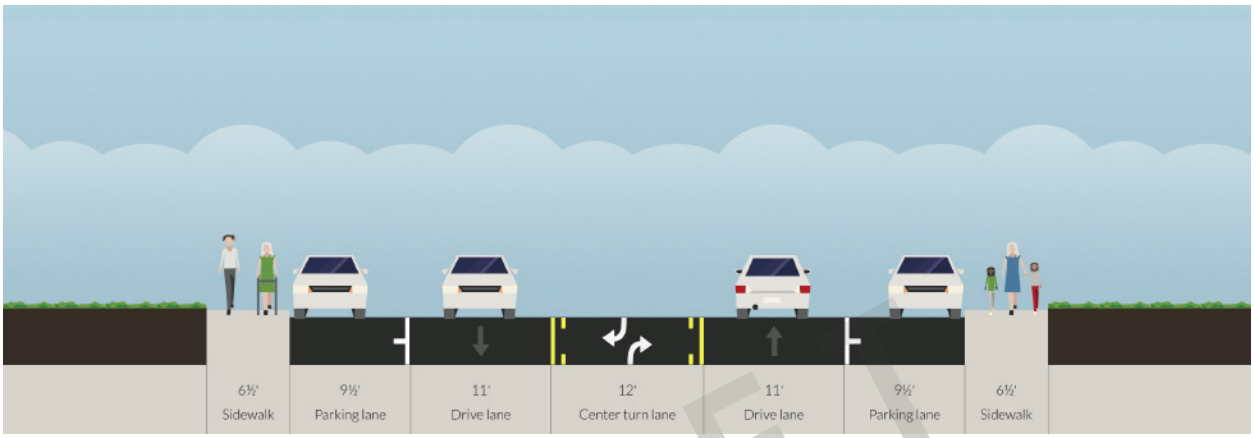
The minimum right of way and pavement width is shown. Each may be increased when required by a traffic impact study.

INDUSTRIAL LOCAL

66' ROW

Existing



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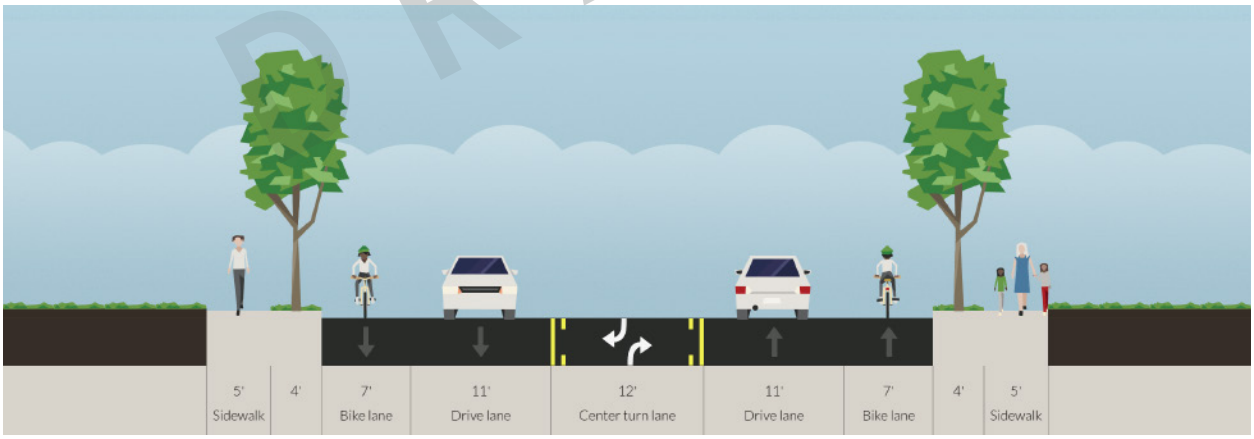
Recommended (see also Major Collector options 1-4)



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The minimum right of way and pavement width is shown. Each may be increased when required by a traffic impact study.

DESIGN GUIDELINES FOR THE HISTORIC DOWNTOWN OF ST. GEORGE, UTAH (2008)

The purpose of these design guidelines is to "preserve, rehabilitate, and restore the historic character of the streetscape" in historic downtown St. George, which is defined on page 4 as nearly everything within two to three blocks from the intersection of St. George Blvd and Main St. A harmonious look and feel in the most historically significant area of downtown can be achieved, according to this document, as home owners and new construction follow these guidelines.

Planting Strips

A planting strip increases the distance between moving or parked automobiles and pedestrians as well as reduces sound pollution experienced by pedestrians and fronting businesses. The minimum width of a planting strip in residential areas of Historic Downtown is 6', to be planted with lawn and street trees. For non-residential uses, the planting strip is a minimum 3' wide.

Street Trees

Trees with sufficient foliage not only contribute to the established, historic nature of the district but also encourage pedestrian traffic by providing shade, an amenity that is especially desired in the summer.

Irrigation Ditches

Though not particularly beneficial to people walking or riding, the design guidelines state that all active irrigation ditches that flow in city gutters in the historic downtown core should be preserved and maintained. This stipulation may affect several streets where bicycling and pedestrian recommendations are made, including Tabernacle Street, which has one of the few active irrigation ditches still running along it.

Sidewalks

Historic Downtown's sidewalks should preserve the sense of walkability in downtown St. George through the use of adequate widths and the methods described in previous sections. Integrated curb and sidewalks, which appeared in the 1970s, are discouraged in historic residential areas. In residential areas, 5' to 6' wide sidewalks are preferred. In urban areas or where storefronts are close to the sidewalk, they shall be 6', at a minimum, and 10', preferred. A planting strip that is at least 3' wide is required between the sidewalks and the curb.

Look and feel of sidewalks, street trees, and planting strips in a residential area of historic downtown

Historic irrigation ditch on Tabernacle Street, looking east

Example of historic downtown sidewalk design guidelines where new development has occurred

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Bike Racks

Fluted, bollard bike racks are recommended for use in Historic Downtown because they are consistent with other site features, such as light poles and drinking fountains. However, the design guidelines should be modified to also specify that any bicycle parking in the historic district serve the same support and security functions as other racks, as described in the APBP Bicycle Parking Guidelines.

Fluted bollard bike rack that would be consistent with other site features in Historic Downtown (Photo: Inhabitat)

CITY CODE

If the City wishes to develop a bike corral parking program, which replaces one motor vehicle parking space with parking for multiple bicycles, it may wish to clarify the apparent contradiction between **Section 6-2-17 Line B and Line D**, which simultaneously disallow and allow parking a bicycle on the roadway.

Section 6-5-2 dictates that any person operating a personal motorized mobility device (powered wheelchair or other mobility device) on a sidewalk must be supervised by a parent or guardian. This statute may restrict mobility and freedom of youth who have disabilities and the City may wish to revise this section of the code to clarify its intent, which is to ensure safe use of sidewalks by all users.

Section 7-1-6 states that it is the financial responsibility of the property owner to keep the sidewalk in good repair and free from obstruction, though the repairs will or can be made by the St. George Public Works Department. Sidewalk construction, management, and maintenance programs help renew and expand sidewalk networks that, due to myriad reasons, are current fragmented, disconnected, or poorly maintained.

It is recommended that a solid funding source of $50,000 be provided to match property owners' costs in a 50/50 cost share split. This program is a model that splits the cost of sidewalk replacement and/or construction between the property owner and the local agency. Funding sources can be diverse and do not necessarily have to come directly from the City's revenue; they can include federal funding, voter-approved taxed or bond measures, fuel taxes, parking tolls, and others.

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Dixie State University students walking to class; projects that provided connectivity to DSU received points in the prioritization exercise

6: Prioritization, Implementation, & Evaluation

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Introduction

Prioritization, implementation, and performance measure strategies for St. George's active transportation plan require a blend of careful planning, prioritization, performance measurement, and opportunistic decision-making.

Performance Measures

The wide range of suggested performance measures in this section (Tables 6.1 through 6.6) are important for assessing the success of the plan; how well it is working to make bicycling and walking safe, normal, and popular choices in St. George; keeping tabs on changing transportation demographics and safety citywide; and whether the City is meeting the plan's vision and goals (included before Chapter 1: Introduction) over time. The City may choose to utilize any combination of suggested measures in their benchmarking report going forward. These measures highlight the need for adjustments and determine how effectively funding is being allocated and spent. The outcomes of these measures can also help the City celebrate successes, small and large, and keep momentum moving forward.

TYPES OF MEASURES

These performance measures are generally outcome-based and the intent of these types of measures is to prioritize investments that do the best job of achieving desired plan outcomes, as opposed to output-based metrics that are more dependent upon available resources that may fluctuate year to year. As often as possible, performance measures should be based on rates rather than raw numbers in order to accurately and effectively show change over time (i.e. a 30% increase in walking trips rather than 20,000 new walking trips). When possible, measures should also strive to focus on outcomes rather than strictly on outputs.

The performance measures in the plan were selected based on data that, when collected and used, can help inform project selection and design, the development and success of education and encouragement programs, safety improvements, and other factors. While performance measures are focused on assessing progress over the long-term, data on these measures should be collected on a regular basis to help track continuing progress.

TRENDS

Tracking trends, like increases in the percentage of trips taken by walking and bicycling, miles of bicycling and walking facilities completed from the plan's recommended facilities, new or improved connections to Dixie State University, crosswalks added, or dollars spent on sidewalk replacement, are effective, positive performance measures. Some performance measures focus on downward trends like fewer crashes or lower speeds on selected roadways.

Tracking and reporting the progress of some performance measures over time will give the City of St. George more transparency while building more momentum and public support in the community. Measures can be evaluated either by meeting performance targets, trending in the desired direction, or both.

RESPONSIBILITIES

Tracking and analyzing performance measures should not be restricted to one or two departments within the City. The City of St. George can collaborate with other organizations or departments within and outside the City government, such as the City Council, Dixie MPO, UDOT, Washington County, SUBA, St. George's and other cities' Active Transportation Committees, tourism and recreation organizations, Division of Air Quality, Southwest Utah Health Department, Dixie State University, SunTran, Washington County School District, regional and state law enforcement agencies, emergency responders, and others that will encourage higher level policy-related and programmatic changes.

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Table 6.1 *Coordination & Planning Performance Measures (Goal #1)*

Performance Measure	Baseline Measurement	Changes in Data Collection	Partner Organizations	Performance Target	Desired Trend
Bicycling and walking connections to adjacent communities	n/a	n/a	Dixie MPO, Washington County, Washington, Ivins, Santa Clara	n/a	Increase
Transit stops accessible via sidewalks and curb ramps	n/a	n/a	SunTran	100% by 2026	Increase
Bicycle capacity on buses	n/a	n/a	SunTran	100% of buses with three bike capacity by 2026	Increase

Table 6.2 *Education, Promotion, & Encouragement Performance Measures (Goal #2)*

Performance Measure	Baseline Measurement	Changes in Data Collection	Partner Organizations	Performance Target	Desired Trend
Reach of and participation in existing programs and those recommended in the plan	n/a	n/a	DSU, Washington County School District, St. George ATC, SUBA	Increased awareness and knowledgability	Increase
Awareness within City of St. George departments about statutes, standards, and laws pertaining to active transportation	n/a	n/a	All City departments	Increased awareness and knowledgability allowing them to execute the intent of this plan	Increase
Bicycling and walking share of trips, including trips under two miles	2012 Utah Travel Study	Coordinate with future Utah Travel Study surveys (possible 2018-2020)	Dixie MPO	25% of trips under two miles completed by walking or bicycling	Increase
People riding a bicycle on key corridors	Future baseline based on automated or manual counts program	n/a	St. George Engineering, SUBA, Dixie State Univ	n/a	Increase
School participation in pedestrian and bicycle education, promotion, and encouragement programs	n/a	n/a	Washington County School District, SUBA, St. George ATC	Increased awareness and knowledgability	Increase
School age residents walking or bicycling to school	n/a	SRTS hand tallies and parent surveys	Washington County School District, DSU, SUBA, St. George ATC	40% of trips to school done by walking or bicycling	Increase

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Table 6.3 *Funding Performance Measures (Goal #3)*

Performance Measure	Baseline Measurement	Changes in Data Collection	Partner Organizations	Performance Target	Desired Trend
Funding spent on capital and maintenance projects for bicycling and walking (include Complete Streets projects in a separate category)	n/a	n/a	St. George Public Works, Engineering, Park Planning, SunTran	Funding percentages equal to or greater than rates of walking and bicycling (i.e. 10% of funding for 10% walk mode share) by 2026	n/a

Table 6.4 *Network, Facilities, & Design Performance Measures (Goal #5)*

Performance Measure	Baseline Measurement	Changes in Data Collection	Partner Organizations	Performance Target	Desired Trend
Neighborhoods with bicycle facilities and pedestrian facilities, or both	n/a	GIS analysis as system is improved	St. George Public Works, Engineering, GIS	100% of neighborhoods with internal facilities and external connections to adjacent neighborhoods by 2025	Increase
Percentage of the recommended bicycle and pedestrian network from the Active Transportation Plan completed	n/a	n/a	St. George Public Works, Engineering, and Park Planning	60% of system constructed by 2026; 100 percent by 2036	Increase
Percentage of households within 1/2 mile of a low stress, all ages and abilities bicycling facility and walking facility, or both (i.e. shared-use path)	n/a	GIS analysis as system is improved	St. George GIS	100% of households within 1/2 mile of these types of facilities by 2036	Increase
Percentage of high demand locations (offices, restaurants, stores, parks) with convenient bicycle parking	n/a	GIS analysis as system is improved	St. George GIS, Chamber of Commerce; St. George Historic Downtown	75% of locations with bicycle parking by 2026	Increase
Sales tax revenue on streets improved for bicycling and walking	n/a	Analyze sales tax revenue after bicycle and/or pedestrian facilities are implemented or improved	St. George Chamber of Commerce, St. George Historic Downtown	Economic development caused by people walking and bicycling	Increase
Number of bicyclists and pedestrians counted at locations throughout St. George	2012 Utah Travel Study survey counts; regular or automated counts in the future will create new baselines	Regular annual count and data analysis and/or install automated trail and signal-related bicyclist and pedestrian counters to automate process, improve data quality and quantity	St. George Public Works, Engineering, and Park Planning, Dixie MPO	300% increase in bicycle ridership and 50% increase in walk mode share by 2026 at all count locations	Increase

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Table 6.5 *Other Performance Measures (Goal #6)*

Performance Measure	Baseline Measurement	Changes in Data Collection	Partner Organizations	Performance Target	Desired Trend
Self-reported physical activity	Southwest Utah Health Department figures	Increase reach and quality of reporting by teaming with SWUHD	Southwest Utah Health Department	More physical exercise	Increase
Automobile Trips Generated (ATG), Vehicle Miles Traveled (VMT), and Single Occupancy Vehicle (SOV) trip reduction	UDOT ATG, VMT, and/or SOV data	Supplement state data with future local data collection, if available and necessary	UDOT, Utah Department of Environmental Quality, Southwest Utah Health Department	Reduce single-occupant vehicle (SOV) trips and trips under two miles by motor vehicles	Decrease

Table 6.6 *Safety Performance Measures (Goal #7)*

Performance Measure	Baseline Measurement	Changes in Data Collection	Partner Organizations	Performance Target	Desired Trend
Bicycle and pedestrian collisions	Existing UDOT and St. George Police Department crash data	Track or gain access to more detailed crash information through UDOT's Numetric system (i.e. time of day, fault, vehicle speeds, location, intersection- or crosswalk-related)	St. George Police Department, UDOT, DPS	Reduce reported bicycle and pedestrian crashes by half (50%) by 2026	Decrease
Number of serious injuries and fatalities	Existing UDOT and St. George Police Department crash data	Track or gain access to more detailed crash information that will identify the severity of crashes and associated injuries (same as above)	St. George Police Department, UDOT, DPS	Zero incapacitating and fatal injuries for bicyclists or pedestrians by 2020	Decrease
Percentage of St. George residents who identify safety as a major impediment to bicycling or walking	n/a	Begin market research phone surveys; coordinate with future Utah Travel Study surveys	Dixie MPO, SUBA, St. George ATC	Remove real or perceived safety impediments to bicycling and walking	Decrease
Intersections enhanced with signal timing, medians, count down timers, bulb outs, and other improvements	n/a	GIS analysis as system is improved; intercept surveys	UDOT, St. George Public Works, Engineering, GIS and Park Planning, Dixie MPO	Improve perceived comfort at intersections	Increase

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Project Prioritization Criteria

The plan's 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, Washington County School District, Dixie MPO, Washington County, adjacent communities, or SunTran).

On-street projects, like bike lanes, can often be implemented quickly and efficiently when coordinated with planned roadway projects or pavement management activities like asphalt overlays or seal coats. Conversely, shared-use path projects may require more extensive easement negotiations, permitting, or fund raising to reach construction.

Scoring was established based on criteria and weighting agreed upon by the project's Steering Committee, including City staff, for each project identified as part of the proposed system. 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:

- **Off-street projects** (shared-use paths, unpaved trails, and sidewalks)
- **Spot Improvements** (intersection and crossing improvements, signals and beacons, grade-separated crossings, etc.)
- **On-street projects** (bike lanes, buffered bike lanes, protected bike lanes, and bicycle boulevards)

The project prioritization framework relies on category-based criteria and will be applied to each recommended facility, which will be assigned a numeric value to the degree it meets the criteria requirements. The criteria multipliers were determined by the Steering Committee and can be adjusted by City staff in the future to align with St. George's values and priorities.

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Bike lane implemented in conjunction with a road resurfacing project (Photo: SUBA)

PROJECT GOALS & OBJECTIVES

The following prioritization criteria reflect the goals and objectives that are included at the beginning of this plan and which direct all of its recommendations.

Reflects Public Input

Public input is an important criterion when evaluating potential bicycle and pedestrian facility improvements. Throughout the St. George Active Transportation Plan process, the City received feedback from more nearly 600 people via an online public survey and interactive mapping tool. Projects recommended by survey takers, map users, project steering committee members, City staff, and previous planning efforts are included in this scoring category.

Access to Existing or Funded Facility

Creating connectivity to existing or funded (to be completed soon) bicycle or pedestrian facilities enables more trips to be made and provides bicyclists or pedestrians multiple routes for reaching their destinations. Facilities that connect to an existing or funded path, bike lane, sidewalk, or other dedicated facility and that complete or extend the overall network will receive points for this scoring criterion, even if the existing or funded facilities are outside of St. George City limits.

Fills Gaps in the Network

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. Facilities that fill gaps in the existing bicycling and walking network (existing facilities exist on both ends of the recommended project) will qualify for this criterion.

Access to Parks, Open Space, Community Centers

Increasing accessibility to parks, open space, and community center (i.e. City Hall, recreation centers, libraries) was one of the most commonly requested improvement in the public involvement process. Projects that add or improve upon connectivity to these destinations qualify for this criterion.

Access to Commercial Destinations

Red Cliffs Mall, Downtown, grocery stores, and other moderate to large commercial centers represent major destinations used by residents and visitors every day. Increasing bicycle and pedestrian connectivity to these destinations will allow many trips to them to be converted into walking and bicycling trips, thereby reducing automobile parking demand and congestion.

Access to Elementary, Middle, High Schools

About 25% of St. George residents are under the age of 16 and cannot drive themselves to school. Even those who are 16 and older, able to drive, and attending high school, walking and bicycling to school can improve their own academic performance and health, and safety around secondary schools. Reducing the number of students who are driven or bussed to school will reduce traffic volumes and congestion and will help St. George maintain its air quality. In an effort to encourage more students to walk and ride a bicycle to school and to help parents and guardians feel comfortable allowing their children to do so, proposed facilities that directly connect to or are within ¼ mile of any K-12 school qualify for this prioritization criterion.

15-25% of morning traffic near schools is generated by parents driving students to school. Improving safe and comfortable connections to schools will encourage more bicycling and walking to school while reducing congestion, conflict potential, and air pollution.

SAFE ROUTES TO SCHOOL NATIONAL PARTNERSHIP'S HEALTHY COMMUNITIES FACTS and TRANSFORM.CA'S BRINGING SAFE ROUTES TO SCALE

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Access to Major Employer or University

Commute trips to major employers (i.e. Downtown office buildings, City Hall, major hospitals) and higher education institutions (i.e. Dixie State University) in and near St. George can be converted into bicycling and walking trips, especially when combined with transit. Bicycling and walking facilities that connect to major employment centers and universities, and thereby allow employees and students to get to work and school more easily on foot or by bike, respectively, qualify for this criterion.

Access to Transit

People are much more likely to use transit if they can get there easily, comfortably, and safely by bike or on foot. Improving connections to transit stops and routes, Park and Ride lots, and transit centers, like the SunTran Transit Center at Dixie State, will improve perceived safety and comfort, and encourage people to ride transit more. Facilities that provide this connectivity to transit qualify for this criterion.

Addresses Safety Issues

Maintaining or improving safety is a prerequisite for all bicycle and pedestrian projects. Safety is also the primary concern cited by St. George residents when choosing between active transportation and driving. Projects that address or remedy existing, known safety issues for bicyclists and/or pedestrians and/or projects located at the location or within 1/8 mile of a crash that involved a bicyclist or pedestrian qualify for this criterion.

Low-Stress Facility

Low-stress bicycle and pedestrian facilities, like St. George's shared-use paths and trails, and proposed facility types like separated bike lanes and bicycle boulevards, appeal to a more diverse cross section of the public than conventional, on-street facilities like painted bike lanes. Input during the public involvement process indicated a strong demand for more paths and trails, and a swift development of a cohesive network of on-street facilities that provided that same level of comfort but with greater connectivity to destinations.

IMPLEMENTATION

These three prioritization criteria reflect the ease or difficulty with which projects can be implemented.

Within City-Controlled Property

This criterion considers which agency or agencies own the right-of-way in or land on which projects are proposed and whether or not the project is within or outside of City limits. Projects that are mostly within public right of way and/or inside the City of St. George's municipal boundary will qualify for this criterion.

Quick Wins & Cost Efficient

Projects that require relatively little capital investment, where resources needed for the project have already been secured, and/or those that possess few barriers to implementation will receive points for this implementation criterion. These are attractive projects for immediate implementation following adoption of this plan because they demonstrate progress and foster momentum for difficult or costly improvements in the future.

Interagency Coordination

This category will help to prioritize projects where design, construction, and maintenance can take advantage of resource-sharing, regional network development through the Dixie MPO's Bicycle and Pedestrian Master Plan, work by adjacent municipalities, interdepartmental coordination within the City of St. George, and other interagency coordination. For example, on-street bicycle facilities like bike lanes, buffered bike lanes, and separated, or protected, bike lanes can more easily be installed when a street is scheduled to be resurfaced, seal coated, or widened.

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Table 6.7 *Prioritization Criteria, Weights, and Scores for Recommended Facilities*

Criteria	Goal	Score	Weight	Total	Description
Reflects Public Input	1; 2	2	4	8	Identified by the public very often as a future facility, or, previously planned
		1		4	Identified by the public less often as a future facility , or, reasonable demand
		0		0	Not identified for a future facility during this or prev. public involvement processes
Access to Existing or Funded Facility	1; 5	2	3	6	Provides access to an existing or funded (near future) facility
		0		0	Does not directly or indirectly access an existing of funded facility
Fills Gaps in the Network	1; 3	2	5	10	Fills a network gap between two existing facilities
		1		5	Fills a network gap between an existing and a proposed facility
		0		0	Does not fill a network gap
Access to Parks, Open Space, Community Centers	1; 5	2	4	8	Direct access to a park, open space area, community center (library, City Hall)
		1		4	Secondary access to a park, open space area, community center (within ¼ mile)
		0		0	No access to any parks, open space areas, community centers
Access to Commercial Destinations	1; 5	2	4	8	Direct access to commercial destinations
		1		4	Secondary access to commercial destinations (within ¼ mile)
		0		0	Does not provide any connectivity to commercial destinations
Access to Elem, Middle, High School	1; 2; 5; 7	2	5	10	Direct access to a primary or secondary school
		1		5	Secondary access to a primary or secondary school (within ¼ mile)
		0		0	Does not directly or indirectly access a primary or secondary school
Access to Major Employer or University	1; 5	2	4	8	Direct access to a major employer or university
		1		4	Secondary access to a major employer or university (within ¼ mile)
		0		0	Does not provide any connectivity to a major employer or university
Access to Transit	1; 5	2	3	6	Provides access to a SunTran stop, Park and Ride, or transit center
		1		3	Provides access to a SunTran route
		0		0	Does not provide any connectivity to transit
Addresses Safety Issues	5; 7	2	5	10	Addresses a significant safety problem or is the location of a crash
		1		5	Addresses a minor safety problem
		0		0	Does not directly contribute to improving a known safety problem
Low-Stress Facility	5; 7	2	3	6	New low-stress facility
		0		0	Not a low-stress facility
Within City-Controlled Property	1; 3; 5	2	1	2	Project within public right of way and inside St. George's municipal boundary
		1		1	Project within public right of way or inside St. George's municipal boundary
		0		0	Project not within public right of way or in St. George
Quick Wins & Cost Efficient	1; 3	2	1	2	Project resources secured; modest investment; or few barriers to implementation
		0		0	Long-term project; significant investment; many barriers to implementation
Interagency Coordination	1; 3; 4; 5	2	2	4	Part of upcoming planned maintenance or other agencies' projects
		0		0	Project will probably be implemented as a standalone project

Project Goals & Objectives

Implementation

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Goal #1: Coordination & Planning
Goal #2: Education, Promotion, & Encouragement
Goal #3: Funding
Goal #4: Maintenance
Goal #5: Network, Facilities, & Design
Goal #6: Other
Goal #7: Safety

Shared-use Path Best Practices

MAINTENANCE

The City, County, and other agencies have invested considerable resources in the construction of shared-use paths along washes, through neighborhoods, and along riparian corridors. These paved paths provide valuable recreational and transportation benefits to local residents and visitors. Maintenance of existing and proposed sections of St. George's off-street, shared-use path network was a common concern expressed by area residents throughout the public input process.

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

Typical off-street bicycle and pedestrian facility maintenance activities include sweeping and after-flood cleanup, pavement management, weed abatement, landscaping, and mowing. The following maintenance recommendations seek to establish a uniform approach to maintenance activities for existing and proposed paved, off-street bicycle and pedestrian facilities.

Maintenance activities can generally be categorized into one of two types: **routine maintenance**, which 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.

Table 6.9 *Recommended Routine Off-Street, Shared-Use Path Maintenance Frequency and Estimated Costs*

Maintenance Activity	Function	Frequency	Est. Annual Cost (per mi.)
Path sweeping	Keep paved surfaces debris free	At least twice annually (once in spring and once in fall); more often if necessary due to flooding	$180 (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
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			**$1,380**

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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, flood potential, drainage, and the quality of initial construction.

Any asphalt-paved path surface will deteriorate over time with asphalt surfaces dropping in quality rapidly after 10 years. Preservation efforts within 5-10 years, 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 after initial construction. A full reconstruction could be required when needed, typically at 50 years if the seal coat and overlay have been provided.

Concrete paths, which are a more significant capital investment, will require significantly less capital maintenance than asphalt, are currently used in Southern Utah where paths and washes intersect, and, due to a lighter color, may reduce surface temperatures in the summer. This paving method may be considered given the flooding potential of rivers and washes near St. George's shared-use paths. Concrete paths may require isolated jacking or replacement, but generally limited maintenance expenditures should be expected for a life of upwards of 50 years.

Financial planning for major or capital maintenance can be challenging to budget for. Some jurisdictions stay focused on eventual reconstruction and treat this as a maintenance item to be budgeted for, whereas others 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 require an average budget of between $2,000 and $7,000 per mile per year. Some years may require more expensive maintenance with others requiring little to none.

ACCESS CONTROL & INTERSECTION DESIGN

Improving access control and shared-use path design at intersections and mid-block crossings throughout St. George's extensive off-street network will improve comfort and predictability for users along the system as well as visibility to motorized users on the roadways that paths cross. The recommendations in this section apply when the shared-use path continues on the far side of the intersection and may not apply when the path ends at a T-intersection with a street or sidewalk.

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People riding on the Virgin River Trail near Confluence Park

The existing standard for access control recommends bollards, like this one near a blind corner at Tonaquint Park

The above example shows a curve in the trail alignment that creates a near perpendicular crossing and perpendicular pavement markings that visually and tactilely slow trail users before the intersection. Creating an artificial curve in the trail alignment will slow trail users and improve crossing safety by bring the crossing closer to perpendicular to the roadway. Crossings should be, at a minimum, 60, and ideally, 90 degrees

Split path treads with low landscaping

Bollards

Although restricting motor vehicle access to the trail is necessary for the safety of trail users, St. George's current trail design guidelines recommend that this be accomplished with a solid bollard on all trails. However, many are located around blind corners and several serious conflicts have been reported by residents. Unless there is a documented problem, "No Motorized Vehicles" signs are normally sufficient. Requiring bollards should be rescinded as the standard.

Other Access Control Methods

There are several methods that the City could test at different locations in order to control trail and cross traffic, roadway user speeds as well as increase awareness of trail users at intersections. Before, during, and after test installations, the City may poll users to identify the most effective access control. Additional measures and detail can be found in the AASHTO *Guide for the Development of Bicycle Facilities*.

- **Lateral shift of or curve in trail alignment.** Introducing an artificial lateral shift or curve in the path alignment will slow users to the desired speed, depending on curve radii.
- **Perpendicular pavement markings.** Install thermoplastic or other raised pavement markings perpendicular to the trail with increasingly less space between each one as the trail approaches a crossing. Consider how some materials may react to the heat and moisture.
- **Perpendicular pavement cuts.** A similar technique to pavement markings, but using negative space to provide a tactile warning for trail users approaching a crossing. Ensure that the cuts do not negatively affect the pavement quality or longevity.
- **Split path with landscaping.** Split the path tread into two directional sections separated by low landscaping.
- **Large informational pavement markings.** Place larger "Trail X-ing" markings on trails and trail approaches that capture trail users' and motorists' attention and slow them down.

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Shared-Use Sidepath Intersection Treatments

Curb ramps transition between a street-level crosswalk and a curb separated shared-use sidepath. It is important that curb ramps on paths (as well as sidewalks) meet the dimension, width, and slope requirements of the American Disabilities Act to ensure that persons with disabilities have clear, direct and legible access to the route.

There are many locations in St. George where shared-use sidepaths (wide paved paths that normally replace a sidewalk next to a roadway and allow for use by bicyclists and pedestrians) funnel all users through a diagonal ADA-accessible curb ramp that is designed primarily for pedestrian use, which is much narrower than the path itself. The current orientation, type, and size of these curb ramps may cause confusion and safety issues for persons with disabilities and bicyclists, especially given the operating speed and vehicle choice of the latter. Additionally, where sidepaths intersect with cross-streets and large driveways, there is often no indication or warning to motorists entering onto and exiting from the roadway paralleling the sidepath of the potential conflict points and that bicycle and pedestrian traffic on the path have priority. The City of St. George, in partnership with SUBA and the Ironman Foundation, has corrected some curb ramps along sidepaths in the city on a case-by-case basis.

This section offers best practice guidance for the City and community partners on how to retrofit existing sidepath curb ramps and marked crossings at cross streets and large intersections in order to alert motorists, design for path users' needs, and increase perceived comfort and safety for all users. In addition to the guidance in this section, St. George City Code specifies that no obstruction (i.e. trees, bushes) in excess of 3' in height or within the 30' sight line from the intersection can be placed at a corner (Title 10, Chapter 18, Section 3, Subsection B), which increases visibility for sidepath users as well for motorists.

The design and construction details of curb ramps can influence the utility and functionality other users, as well, and special consideration should be given to the curb ramp design of shared-use sidepaths. The AASHTO *Guide for the Development of Bicycle Facilities* states that the opening of a shared-use path at the roadway should be *at least the same width as the shared-use path itself*, not including any side flares. Shared-use paths are typically 8 to 12 ft (2.5-3.3 m) wide and, at a minimum, the ramp should match this width.

Apron-style curb ramps are configured with flares to transition between the ramp and a walkable furnishing zone. These flares may provide additional navigation space within the ramp area, but this benefit is reduced when configured adjacent to a non-walkable landscaped, turf, or gravel furnishing zone.

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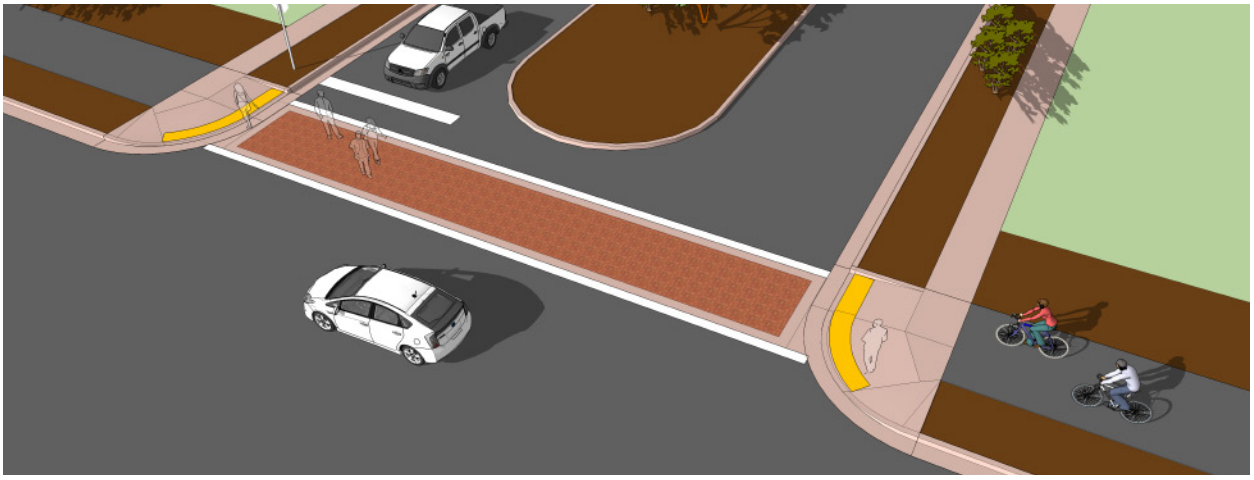


Perspective view of sidepath crossing treatments. Where possible, laterally offset the sidepath in anticipation of the cross street, driveway, or other intersection. This will create a setback crossing, increasing visibility and minimizing the speed differential of possible conflicts.

Sidepath crossing treatments as seen from the edge of the roadway, looking down the path

Curb return style ramps define the edge of the ramp with a vertical curb. These should only be used adjacent to a non-walkable furnishing zone surface, such as landscaping, grass, or gravel. For paths, vertical curb-return style ramps are preferred when possible to clearly direct and delineate the path of travel for path users. If used, an additional 1 foot of shy distance should be added to the ramp width to prevent interference with bicycle pedals.

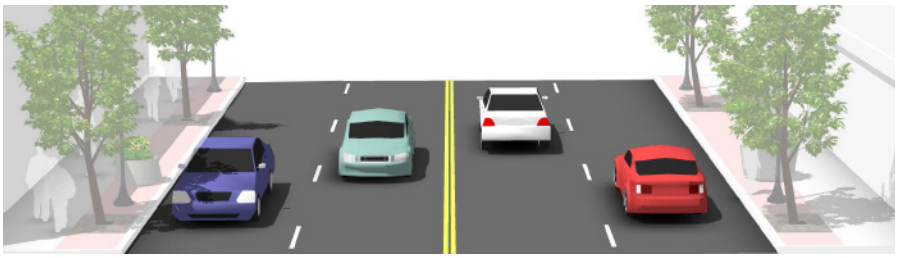
The proposed curb ramp style for shared-use sidepaths in St. George would **combine these styles**, which would maintain the existing built corner on the paralleling street side and require rebuilding and expanding the curb ramp to function as a curb return on the side of the path of the sidepath. Additionally, adding a stop bar to the existing cross street stop sign, a continental or piano key crosswalk to all sidepath crossings, and signs that combine the MUTCD's R10-11 and R10-15 in order to alert motorists of the need to yield to people on bike and on foot will reduce motor vehicle encroachment into the sidepath crossing and increase awareness and visibility of sidepath users, respectively.

Roadway Reconfigurations

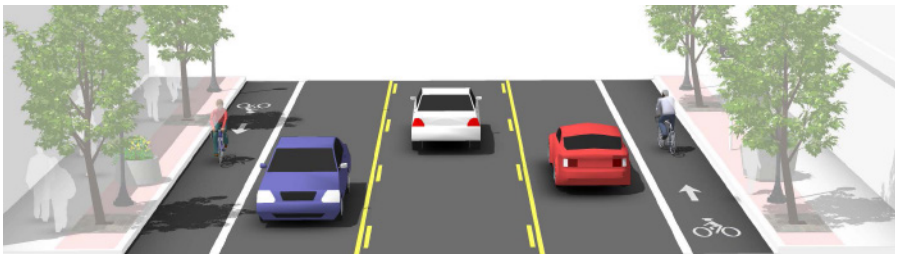
Roads are often overbuilt in order to accommodate future, predicted traffic demand and to reduce future capital expansion costs. However, overbuilt roads can have significant drawbacks for all users, especially bicyclists and pedestrians, including increased crossing distances; poor visibility; high traffic speeds; narrow, unprotected, and/or unbuffered bicycling and walking facilities; increased maintenance costs; and higher surface and ambient temperatures.

Also known as road diets, right-sizings, lane reconfigurations, roadway optimizations, street balancing, or complete street retrofits, roadway reconfigurations remove at least one travel lane and are one method of mitigating the negative effects of overbuilt streets and providing necessary space and making the roadway function efficiently for all users, especially for active transportation users (i.e. bike lanes, median refuge islands, wider sidewalks, vegetated buffers).

In many places, roadway reconfigurations have also been shown to move more people, reduce automobile speeds and crashes, increased sales tax receipts for small businesses, and improve pedestrian safety. The crash analysis summarized in Chapter 2 showed that pedestrian crashes are overrepresented on arterial roadways and multi-lane roadways, some of which are roadway reconfiguration candidates.



BEFORE: A four-lane cross section with planter strip and sidewalks before roadway reconfiguration



AFTER: A three-lane cross section with a center turn lane and bike lanes after roadway reconfiguration

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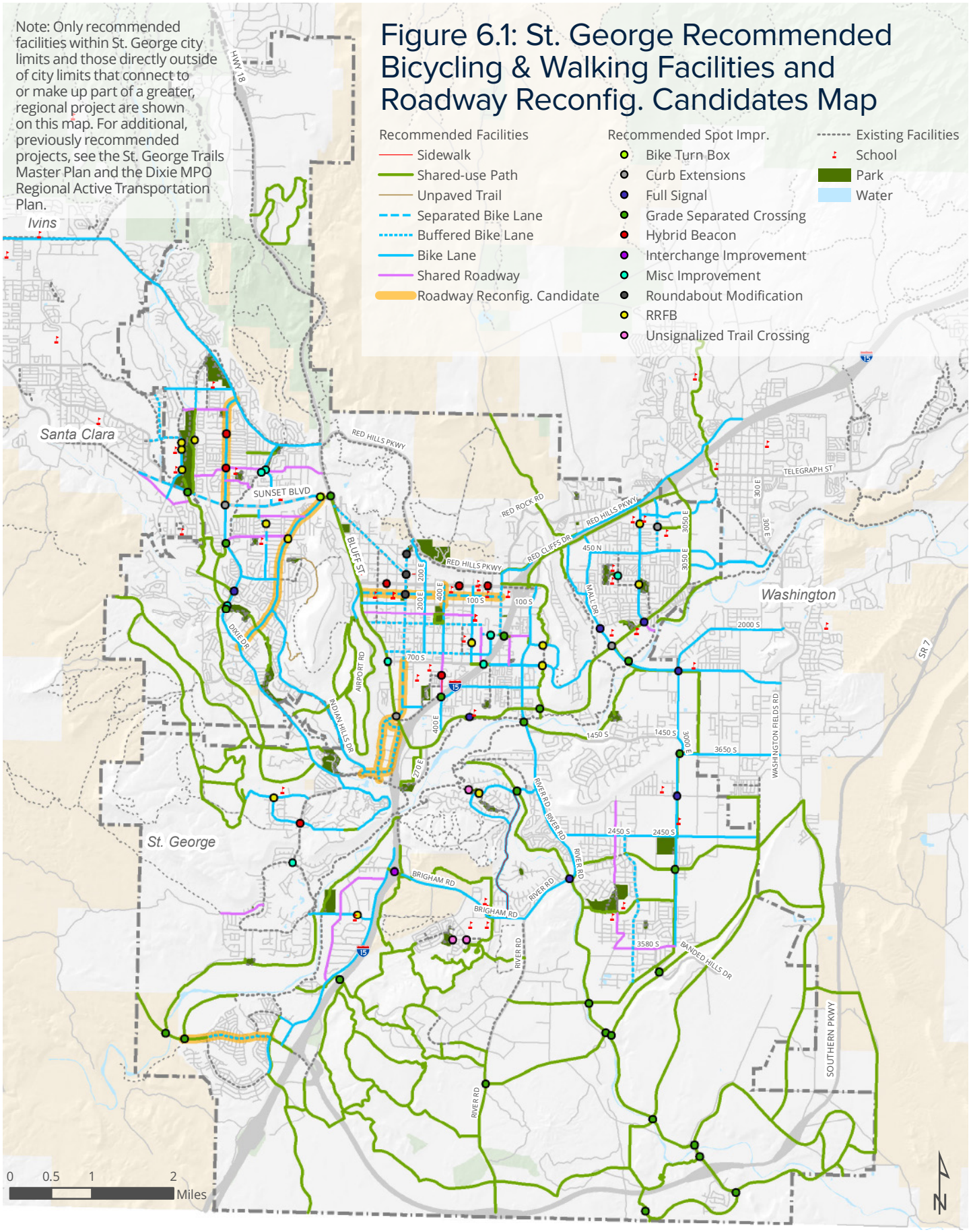
Figure 6.1: St. George Recommended Bicycling & Walking Facilities and Roadway Reconfig. Candidates Map

Note: Only recommended facilities within St. George city limits and those directly outside of city limits that connect to or make up part of a greater, regional project are shown on this map. For additional, previously recommended projects, see the St. George Trails Master Plan and the Dixie MPO Regional Active Transportation Plan.

Recommended Facilities
- Sidewalk
- Shared-use Path
- Unpaved Trail
- Separated Bike Lane
- Buffered Bike Lane
- Bike Lane
- Shared Roadway
- Roadway Reconfig. Candidate

Recommended Spot Impr.
- Bike Turn Box
- Curb Extensions
- Full Signal
- Grade Separated Crossing
- Hybrid Beacon
- Interchange Improvement
- Misc Improvement
- Roundabout Modification
- RRFB
- Unsignalized Trail Crossing

Existing Facilities
- School
- Park
- Water



TRAFFIC COUNT THRESHOLDS

Typically, the total number of lanes on a roadway can be reduced from five or four to three (one in each direction with a center turn lane and/or median) or two (one in each direction) if there are fewer than 20,000 cars in both directions per day (or AADT). Some cities have successfully implemented roadway reconfigurations on streets with up to 23,000 cars per day (see San Francisco's Valencia St as an example).

Typically, the maximum AADT threshold for reducing the total number of travel lanes from seven or six to five (two in each direction with a center turn lane and/or median) or four (two in each direction) is 30,000.

These thresholds are not standards and may be lower or higher depending on the presence, frequency, and turnover rates of parking; density of driveways and intersections; presence of right and left turn lanes; speed limit; proximity of alternate routes; whether the road is part of a larger grid system; freight usage; and bus routes and stops.

CANDIDATES IN ST. GEORGE

Potential roadway reconfiguration candidates (part of, if not the whole, road) identified by the Active Transportation Plan's steering committee and City staff include Dixie Downs Drive, Hilton Drive, Black Ridge Drive, Sun River Parkway, and Main Street.

Examples and Resources: FHWA's "Road Diet Informational Guide"; FHWA's "Incorporating On-Road Bicycle Networks into Resurfacing Projects" Report; Kentucky Transportation Center's (KTC) "Guidelines for Road Diet Conversions" Manual; Report on the Economic Effects of Traffic Calming (and the Valencia Street Road Diet in San Francisco, CA) on Urban Small Businesses; Highway Safety Information System and FHWA's Summary Report on the Effect of Road Diets on Crashes

Pedestrian & Bicycle Crossing Type Selection Tool

The specific type of treatment at a pedestrian and/or bicycle crossing may range from a marked crosswalk to a full traffic signal or grade separated crossings. Pedestrian and/or bicycle crossings should not be used indiscriminately, and appropriate selection of crossing treatments should be evaluated before it is installed. The evaluation should consider the number of lanes, presence of a median, distance to nearby signalized intersections, pedestrian and/or bicycle volumes and delays, average annual daily traffic (AADT), posted or statutory speed limit and 85th-percentile speed, roadway and intersection geometry of the location, possible consolidation of multiple crossing points, availability of street lighting, and other appropriate factors.

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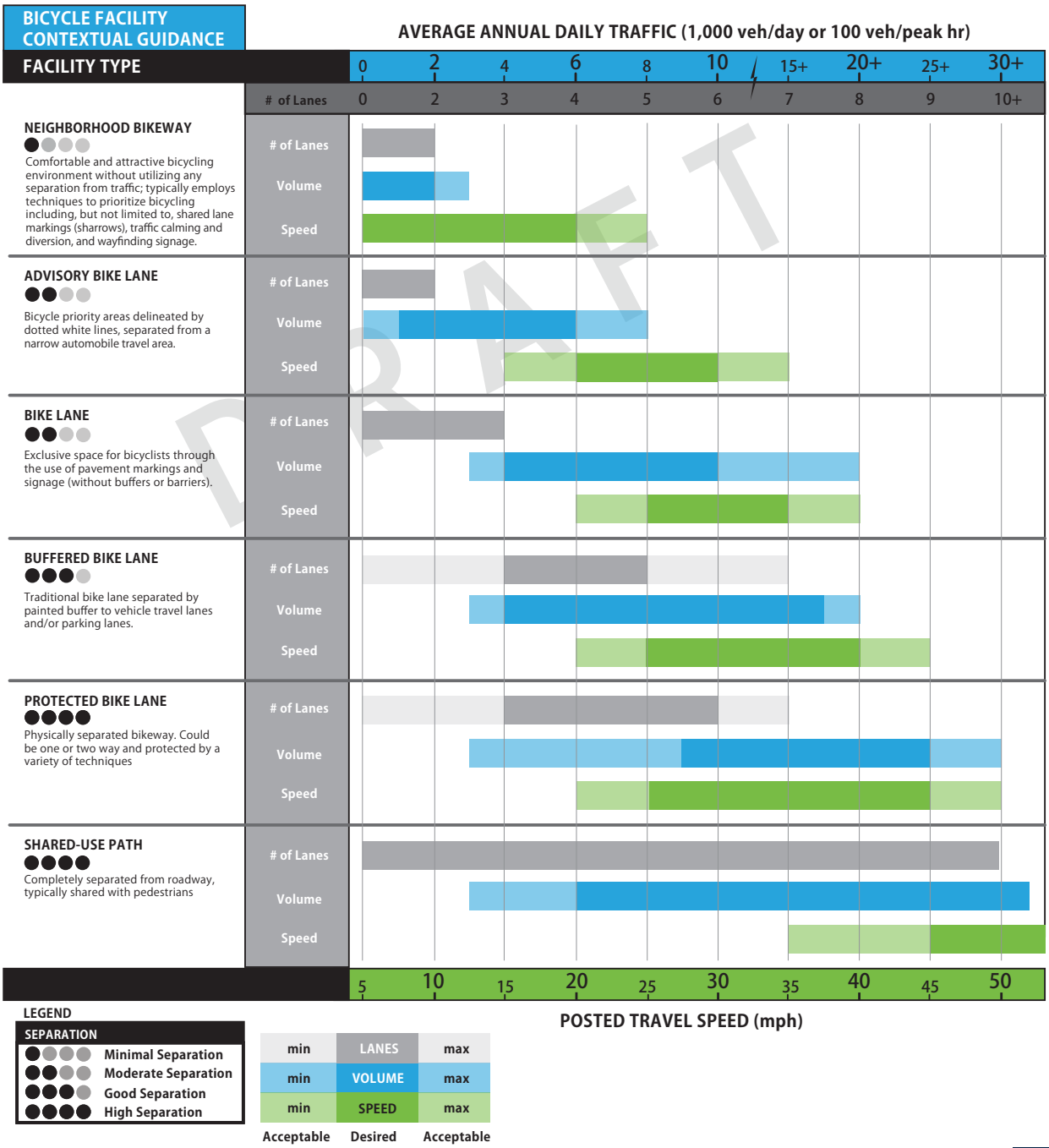
PEDESTRIAN & BICYCLE CROSSING GUIDANCE at unsignalized locations	Local Streets 15-25 mph		Collector Streets 25-30 mph			Arterial Streets 30-45 mph							
FACILITY TYPE	2 lane	3 lane	2 lane	2 lane with median refuge	3 lane	2 lane	2 lane with median refuge	3 lane	4 lane	4 lane with median refuge	5 lane	6 lane	6 lane with median refuge
Crosswalk Only (high visibility)	✓	✓	EJ	EJ	X	EJ	EJ	X	X	X	X	X	X
Crosswalk with warning signage and yield lines	EJ	✓	✓	✓	✓	EJ	EJ	EJ	X	X	X	X	X
Active Warning Beacon (RRFB)	X	EJ	✓	✓	✓	✓	✓	✓	X	✓	X	X	X
Hybrid Beacon	X	X	EJ	EJ	EJ	EJ	✓	✓	✓	✓	✓	✓	✓
Full Traffic Signal	X	X	EJ	EJ	EJ	EJ	EJ	EJ	✓	✓	✓	✓	✓
Grade separation	X	X	EJ	EJ	EJ	X	EJ	EJ	EJ	EJ	EJ	✓	✓

LEGEND	
Most Desirable	✓
Engineering Judgement	EJ
Not Recommended	X

Bicycle Facility Type Selection Tool

The following tool is for use by the City of St. George on roads that do not have recommendations attached to them as part of this plan. Selecting the most appropriate bicycle facility type for a given roadway can be challenging, due to the range of factors that influence comfort and safety for people riding bicycles. For example, when the speed differential between motor vehicles and people on bicycles is high, comfort is significantly reduced. The following tool can be used to determine the most appropriate facility type based on three roadway characteristics. Other factors that affect facility selection (beyond speed, volume, and number of lanes) include traffic mix of automobiles and heavy vehicles, presence of on-street parking, intersection density, surrounding land use, and roadway sight distance. These factors are not included in the facility selection chart below but should be considered in the design process.



Demonstration, Pop-up, Temporary, and Low Cost Facility Implementation Strategies

Demonstration facilities, also known as do-it-yourself urbanism, incremental placemaking, tactical urbanism, pop-up projects, and temporary urbanism, allow people to see what a project might look like and experience what it might feel like in the near-term through use of temporary, moveable, low-cost materials before a final or permanent design is implemented. Through feedback surveys and observation, the project team and City staff may also learn what about the design needs to be changed before a more permanent installation is completed and to evaluate impacts and results of the project. Demonstration projects allow more flexible and responsive design practice and represent a low risk implementation strategy with the possibility of high reward. They can be implemented as standalone projects or rolled into a larger event or ride (i.e. George Streetfest, Bike Month, Tour de St. George).

These types of projects may also allow the City of St. George and community partners to develop social capital and community trust while refining designs and materials. According to the Alliance for Biking & Walking, demonstration or temporary infrastructure for walking and bicycling is "a popular and effective way to build support for permanent street changes."

Because the public often demands results faster than limited funding, regulations, and processes may allow, demonstration projects are also effective and relatively inexpensive methods of earning the trust of neighbors; stakeholders; future users; and City staff and elected officials before more expensive and permanent facilities are implemented.

TYPES OF MATERIALS

Pop-up demonstration projects have used many different types of materials to convey the design intent and proper use of a particular facility type or redesign to the public. Low cost options include traffic cones, hay bales, duct tape, colored butcher paper, plastic planter boxes, construction barricades, rope, barrels,

Even materials like temporary paint, 2x4s, and traffic control posts can create a simulated separated bike lane

A temporary boardwalk or similar installation can simulate wider sidewalks for pedestrians and/or additional seating space for diners and business patrons

Pop-up separated bike lane in Atlanta, Georgia using paint and planters

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Pop-up installations can be a community-engaging activity, too

and A-frame signs. Slighter higher cost and more permanent options that are still relatively inexpensive and/or easy to add and remove include stenciled, painted designs on the roadway; more robust planter boxes; bollards; tables and chairs; astro turf; fencing; and public art.

TRANSITIONING FROM TEMPORARY TO PERMANENT

Because final project implementation processes often last several years (during which political will, public sentiment, and stakeholder enthusiasm may wane or shift), demonstration, temporary, and semi-permanent projects can extend initial public support, maintain public interest, and allow designers to adjust to these changing influences through the often complex development period.

The NACTO *Urban Street Design Guide* offers the following guidance:

"While interim design strategies can be effective and instrumental towards realizing certain projects, they may not be appropriate at all locations nor for all communities. Cities should assess how an interim design will be received by local stakeholders in order to avoid derailing a project that might have been better received in its capital phase.

"While many cities have branded the interim design as a pilot or test phase for a project, others view the design as equivalent to a permanent reconstruction. The level of permanence depends on the individual project, but should always be communicated at the outset."

Examples and Resources: "Interim Design Strategies" Chapter in the NACTO *Urban Street Design Guide*; WalkBoston's Guide for Improving Pedestrian Safety Through Low-Cost Traffic Calming; "Quick Builds for Better Streets: A New Project Delivery Model for U.S. Cities" (People for Bikes); Alliance for Biking & Walking's "Tipsheet: From Pop-Up to Permanent"; The Better Block Foundation; Broadway Dress Rehearsal Pre-Installation Existing Conditions Report, LADOT; LADOT Project Evaluation Manual; Explain Your Lane: Lessons for Cities, from Cities, on Building Green Lanes; Better Naito Parkway Summary Report; Trailnet (St. Louis, MO) Slow Your Street: A How-To Guide for Pop-up Traffic Calming; Boulder, Colorado's Living Lab; Protected Bike Lane Demonstration Project in Saskatoon, Saskatchewan; 2nd Avenue Protected Bike Lane Demonstration Project in Seattle, Washington

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1160 South bike lane near J.C. Snow Park

7: Funding

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Implementation of the proposed bicycle and pedestrian system will often 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 different funding sources and strategies.

Strategies

The following strategies will help St. George take advantage of funding sources:

- Subscribe to state and federal funding programs' communications and be prepared to respond proactively to grant availability
- Identify local funding sources for capital and non-infrastructure bicycle, pedestrian, and Safe Routes to School projects
- Compare high priority recommended projects with funding sources in Tables 7.1 through 7.7 to find potential complementary matches
- Develop diverse relationships with local partners, such as health, safety, economic development agencies and advocates to identify mutually supportive projects and develop grant proposals
- Dedicate a funding source for active transportation projects in annual operations and capital improvement program budgets (i.e. a dedicated portion of general fund dollars, bond financing, special improvement districts, or specific local sales taxes)
- Coordinate Capital Improvement Program (CIP) project development and review so that planned roadway and maintenance projects include pedestrian and bicycle facilities, wherever possible

Sources

Most funding sources are 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 majority of non-local public funds for bicycle and pedestrian projects are derived through a core group of federal and state programs. In addition to federal, state, and regional funding sources, the City could develop a dedicated local funding source for active transportation improvements through a variety of measures. The City should also take advantage of private contributions, if appropriate. This could include a variety of resources, such as volunteer or in-kind labor during construction, right-of-way donations, outreach, planning and design, or monetary donations towards specific improvements.

Table 7.1 *Municipal Bicycle and Pedestrian Funding Options*

Funding Opportunity	Eligible Project Types	Qualifications	Lead Agency	Submittal Specifics
Bond Financing	Varies	Varies	Varies	Bonds are a financing technique and not a funding source. Money is borrowed against a source of revenue or collateral (i.e. parcel tax revenue). Bonds do not increase total funding, but rather shift investment from future to present. A successful precedent is the voter-approved Salt Lake County 2012 Parks and Trails Bond, which authorized $47M to complete the Jordan River Parkway, Parley's Trail, acquire land, and build parks.
Special Assessment or Taxing Districts	Varies	Varies	Local Gov't	Local municipalities can establish special assessment districts to pay for improvements. Urbandale, Iowa, established a special assessment program 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 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 bicycle and pedestrian projects. To ensure that roadway construction projects provide infrastructure where needed, it is important that the review process includes a designated bicycle and pedestrian coordinator or similarly assigned liaison at the City. Planned roadway improvements in St. George should include bikeways and walkways.

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Table 7.2 *Regional, State, and Federal Bicycle and Pedestrian Funding Options (Part 1/5)*

Funding Opportunity	Eligible Project Types	Qualifications	Lead Agency	Submittal Specifics
Highway Safety Improvement Program (HSIP)	Infrastructure and program safety improvements	Public road with a correctable crash history, expected to reduce crashes, positive cost-benefit ratio, or, a systemic safety project	UDOT Traffic & Safety	Program purpose is to reduce fatalities and serious injuries on public roads through infrastructure and programs. Like SSIP, HSIP can fund low cost, systemic improvements if benefit-cost is met. (http://www.udot.utah.gov/main/f?p=100:pg:0:::1:T,V:2933,)
Spot Safety Improvement Program (SSIP)	Infrastructure and program safety improvements	Location is crash-frequent, similar quals to the HSIP	UDOT Traffic & Safety	Because SSIP is only state, and not federal, money, spending can be more flexible to fix crash-prone locations. (http://www.udot.utah.gov/main/f?p=100:pg:0:::1:T,V:575,)
Transportation Infrastructure Finance and Innovation Act (TIFIA) Loans	Large projects	Varies	USDOT	Like bonds, these loans are not a funding source but do provide financing options, including credit assistance in the form of direct loans, loan guarantees, and standby lines of credit for large, surface transportation projects of national or regional significance, as well as public-private partnerships.

Table 7.3 *Regional, State, and Federal Bicycle and Pedestrian Funding Options (Part 2/5)*

Funding Opportunity	Eligible Project Types	Qualifications	Lead Agency	Submittal Specifics
Bond Financing	Varies	Varies	Varies	See description in Table 7.1.
Sales Tax	Local roadways, transit, bicycle and pedestrian projects	Varies	Davis County, varies	Voters can approve a sales tax increase to fund bicycle and pedestrian projects, as was done in more than 10 counties in Utah in 2015. Other 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.
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)
Recreation, Arts, and Parks (RAP) Tax	Parks, trails, recreational facilities	Varies	Wash. Co.	The Recreation, Arts, and Parks (RAP) tax, is a local option sales tax approved by the voters administered by Washington County and municipalities. Funds generated support the development or improvement of parks, trails, and recreational facilities within the County's municipalities and unincorporated areas.

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Table 7.4 *Regional, State, and Federal Bicycle and Pedestrian Funding Options (Part 3/5)*

Funding Opportunity	Eligible Project Types	Qualifications	Lead Agency	Submittal Specifics
State-Administered Community Development Block Grants (CDBG)	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 cannot be a principal city of a metropolitan statistical area, a city with more than 50,000 population, or a county with a population with more than 200,000 (which would qualify Washington Co. to apply). Applications are submitted to the State. (https://www.hudexchange.info/cdbg-state/)
Community Development Block Grants (CDBG) - 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 (like St. George), 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 Block Grant Program (STBGP)	Bicycle and pedestrian improvements, among others	Varies	DMPO and UDOT	In the new 2016 federal transportation act (FAST), the former STP is now known as the Surface Transportation Block Grant Program (STBGP) and includes the TAP (below). Dixie MPO (DMPO) accepts concept reports for consideration of programming funds. This program has a state and an MPO component.
Transportation Alternatives Program (TAP)	Bicycle and pedestrian improvements only	Funds can be used for construction, planning and design of on and off-road bicycle and pedestrian facilities	DMPO and UDOT	In the new 2016 federal transportation act (FAST), the former TAP (which included the former Recreational Trails and the Safe Routes to School programs) will be part of the STBGP (above). Though program requirements will stay roughly the same, total funding has been slightly increased. Most projects have an 80/20 federal/local match split and can include sidewalks, paths, trails (including Rails-to-trails), bicycle facilities, signals, traffic calming, lighting and safety infrastructure, and ADA improvements.
BLM Challenge Cost Share (CCS) Grant Program	**Recreation projects or projects that protect resources**	Helps manage cultural, recreation, and wildlife resources; enhances recreation experiences	BLM, Dep't of Interior	Grants between $500 and $200,000. Program's goal is to promote cost-share partnerships with non-federal entities that would benefit public land management; can fund construction or maintenance (http://www.grants.gov/web/grants/view-opportunity.html?oppId=283135). Local contact is Grants Management Specialist Melanie Beckstead, who can be reached at (801) 539-4169 or mbeckstead@blm.gov.
UDOT Long Range Plan	Bicycle and pedestrian improvements	Varies	UDOT	As part of the 2011-2040 Long Range Plan (LRP), bicycle improvements are included as capacity projects along State highways. Together with UDOT and DMPO, identify opportunities for implementation of active transportation facilities as capacity improvements.

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Table 7.5 *Regional, State, and Federal Bicycle and Pedestrian Funding Options (Part 4/5)*

Funding Opportunity	Eligible Project Types	Qualifications	Lead Agency	Submittal Specifics
Land and Water Conservation Fund (LWCF)	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	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)
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.
Transportation Investments Generating Economic Recovery (TIGER)	Shovel ready, surface transportation projects	Positive estimated cost-benefit ratio meeting federal transportation goals, benefitting country as a whole	USDOT, State and Local Gov'ts	Approvals for the eighth round of TIGER, totalling $500 million, were signed into law in 2015 and applied for in 2016. Pre-application and final application required. Projects involving highways, bridges, bicycle and pedestrian facilities, transit, rail, and intermodal are eligible.
State Legislation	Legislation dependent	Legislation dependent	State of Utah	State legislation 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 Active Transportation Program grants, which provide state funds to cities and counties wishing to improve safety and convenience for bicyclists and pedestrians. (http://oregon.gov/ODOT/HWY/BIKEPED/Pages/bike_bill.aspx; http://www.dot.ca.gov/hq/LocalPrograms/atp)
Federal Lands Access Program (FLAP)	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. (http://www.cflhd.gov/programs/flap/ut/)

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Table 7.6 *Regional, State, and Federal Bicycle and Pedestrian Funding Options (Part 5/5)*

Funding Opportunity	Eligible Project Types	Qualifications	Lead Agency	Submittal Specifics
FAST Act Safety Program	Safety improvements	States where >15% of fatal crashes involve bicyclists or pedestrians	UDOT	Over the last five years, 17.7% of fatal crashes in Utah have involved bicyclists and/or pedestrians, even though crashes involving these user types are only 2.8% of the total crashes. The FAST Act will create a safety program to fund projects that improve safety for bicyclists and pedestrians, administered through the state DOT.
Partnership for Sustainable Communities Grants	Based on five Livability Principles, including bicycling/ walking infrastructure	Varies	PSC	Joint project of the EPA, HUD, and USDOT. Aims to "improve access to affordable housing, more transportation options, and lower transportation costs while protecting the environment in communities nationwide" (http://www.sustainablecommunities.gov).

Table 7.7 *Private, Non-Profit, 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 in families	Cambia Health Foundation	Grants are typically $50,000-$100,000, focusing on programs (http://www.cambiahealthfoundation.org/programs/childrens-health; cambiahealthfoundation@cambiahealth.org).
People for Bikes Green Lane Project Grants	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.
People for Bikes Community Grants	Paths, rail trails, mountain bike trails, bike parks, BMX, advocacy	Project funding should leverage federal funding and build momentum for bicycling	People for Bikes	People for Bikes have awarded more than $2.9 million in grants, leveraging nearly $670 million in public & private funding. This grant program is funded by partners in the bicycle industry.
REI Grants	Preservation and restoration	Non-profit, partner with local store	REI	REI has awarded $4.2 million in grants to more than 300 non-profits for preservation and restoration projects in 650 locations. After a store/non-profit relationship is established, REI asks the non-profit to apply for grant funding. Unsolicited grant applications are usually not considered.
Community Fund Raising	All	Small dollar amounts	Local Gov't, agency, or non-profit	Lead agency manages the details, marketing, and range of community fund raising campaign. Successful examples include use of volunteer labor for path construction near Zion National Park in Springdale, Utah (http://www.bicyclinginfo.org/funding/sources-community.cfm).

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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
CIP	Capital Improvement Program	Local
DMPO	Dixie Metropolitan Planning Organization	Local
EPA	Environmental Protection Agency	National
FHWA	Federal Highway Administration	National
GIS	Geographic Information System	
HAWK	High-intensity Activated crossWalK	
HUD	Department of Housing and Urban Development	National
LWCF	Land and Water Conservation Fund	National
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
RRFB	Rectangular Rapid Flash Beacon	
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
UDOT	Utah Department of Transportation	Local

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St.George

Appendix A: Additional Information on Programs and Campaigns

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MEMORANDUM

8 E Broadway, Suite 203
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To: Monty Thurber and Marc Mortensen, City of St. George

From: Tom Millar, Alta Planning + Design

CC: David Foster, Alta Planning + Design

Date: April 13, 2016

Re: Final Education/Promotion Campaign Messaging and Infographics (St. George ATP)

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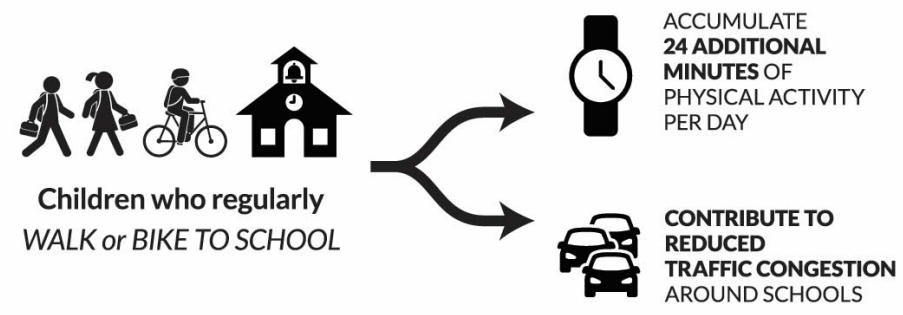
Introduction & Campaign Purpose

The purpose of developing a set of infographics for two campaigns is to simply and effectively communicate the health benefits of active transportation and the general benefits of children walking and bicycling to school to a wide range of audiences using multiple platforms. The attached "web ready" infographics can easily be incorporated into existing communications channels such as social media posts, print ads, posters, kiosks, etc. These powerful graphics will have the ability to stimulate conversation, engage local leaders, and encourage the public to adopt more sustainable transportation habits that result in increased levels of physical activity. The following sections include a set of infographics for the health benefits of active transportation and the benefits for children walking and biking to school.

Health Benefits of Active Transportation



The first infographic highlights the health benefits of bicycling and walking for 30 minutes per week, which is recommended by the World Health Organization. This infographic can be used in the following formats and settings:

- Print pieces for newspapers and magazines
- Posters that can be placed at local parks, community and recreation centers, outdoor kiosks, employer sites, local businesses, farmer's markets, etc.
- Images for targeted social media posts (e.g., Facebook and Twitter)
- Images for websites, newsletters, digital advertisements, and press release

Example taglines for the Health Benefits of Active Transportation infographic include:

Walk and Bike To Achieve Good Health:

- Small amounts lead to big benefits
- Commit to be fit
- Exercise your body and mind
- Live longer and prosper
- Find your healthy inspiration

Suggested talking points to align with the infographic message:

- Positive health benefits can be achieved by walking, bicycling, and using public transportation. These benefits include: lower risk of developing heart disease, high blood pressure, and diabetes; cuts risk of falling and bone fractures; helps manage discomfort of arthritis; develops and maintains strong bones, muscles, and joints; improves mood and sense of well-being; and helps control weight (1).
- The World Health Organization recommends getting at least 30 minutes per day of physical activity. Meeting and exceeding those levels benefits overall health in both women and men (2).
- People who use public transportation regularly meet the daily recommended levels of physical activity (3).
- Incorporating physical activity into your transportation choices is a great way to get your daily recommended exercise. Try walking or biking for short trips to the store or a local restaurant.
- Increased levels of walking and cycling in your community translates to:
  - Increased contact with your neighbors
  - Calmer and safer roads
  - More "eyes on the street"
  - "Safety in numbers"
- Enhanced neighborhood economic vitality can be achieved through transportation systems that support multimodal travel (walking, cycling, wheeling, and public transit, automobile) and connectivity by providing lower-cost transportation options and safe access to jobs and businesses (4).

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Talking Points Sources

1. Better Health Channel. Victoria State Government. Retrieved from https://www.betterhealth.vic.gov.au/health/healthyliving/walking-for-good-health on 4/8/16.

2. Systematic review and meta-analysis of reduction in all-cause mortality from walking and cycling and shape of dose response relationship. Kelly P, Kahlmeier S, Gotschi T, et al. International Journal of Behavioral Nutrition Phys Act. 2014;11(1):132.

3. Walking to Public Transit. Steps to Help Meet Physical Activity Recommendations. *Lilah M. Besser, MSPH, Andrew L. Dannenberg, MD, MPH.. American Journal of Preventative Medicine. 2005.*

4. FHWA Guidebook for Developing Pedestrian and Bicycle Performance Measures. Retrieved from http://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/performance_measures_guidebook/page02.cfm on 4/8/16.

Infographic Sources

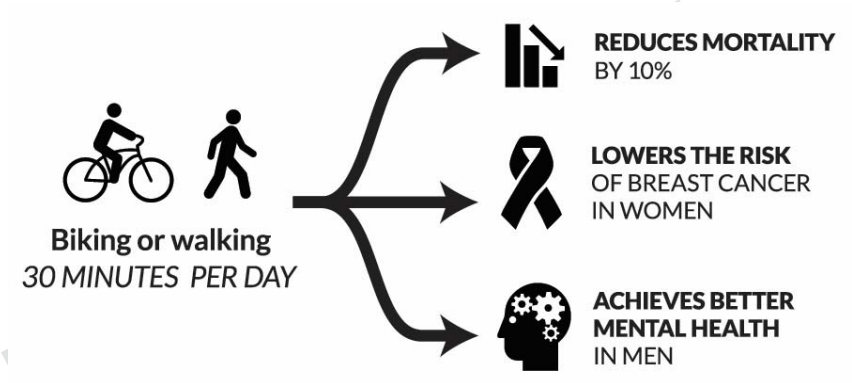
5. For people who cycle or walk for any purpose at a level corresponding to World Health Organization (WHO) recommendations for physical activity (i.e., 150 minutes / week), the risk of mortality for all causes is reduced by about 10 percent**.** *Kelly P, Kahlmeier S, Gotschi T, et al. Systematic review and meta-analysis of reduction in all-cause mortality from walking and cycling and shape of dose response relationship. International Journal of Behavioral*

Nutrition Phys Act. 2014;11(1):132. Woodcock J, Franco OH, Orsini N, Roberts I. *Non-vigorous physical activity and all-cause mortality: systematic review and meta-analysis of cohort studies. International Journal of Epidemiology. 2011;40(1):121-138.*

6. A 30 minute round trip bicycle commute is associated with better mental health in men. *Ohta, M., et al., 2007 - Effect of the physical activities in leisure time and commuting to work on mental health, Journal of Occupational Health, 49, 46-52.*

7. Women who walk or bike 30 minutes a day have a lower risk of breast cancer**.** *Luoto, R., et al., 2000 - The effect of physical activity on breast cancer risk: A cohort study of 30,548 women, European Journal of Epidemiology, 16, 973-80.*

Children Walking and Bicycling to School



The second infographic highlights health and community benefits when children walk and bike to school. This infographic can be used in the following formats and settings:

- Take-home "backpack" materials for parents
- Signs for school yards and playgrounds
- Postcards mailed to households within close proximity to schools
- Posters that can be placed around schools, community centers, playgrounds, sports complexes, farmer's markets, kiosks, etc.
- Images for school websites, newsletters, and social media posts

Example taglines for the Children Walking and Biking Regularly to School infographic are as follows:

Walking and Biking to School is Good For Everyone:

- Exercise keeps children healthy
- Be more active in your neighborhood
- Set healthy habits early

Suggested talking points to align with the infographic message:

- When appropriate and safe, walking and bicycling to school is an experience that can help children develop a sense of independence and confidence in their abilities (8).
- Walkable neighborhoods are strong neighborhoods (9).

- Driving to the neighborhood school is sometimes the only option. But driving to school creates congestion, carbon emissions and parking challenges, and keeps children from exercising their bodies and minds (10).
- Within one generation, the percentage of children walking and biking to school dropped from 48% to 13% (10).
- The walk to school can provide opportunities for physical activity, as well as time outdoors and near nature (11).
- There are many potential benefits of physical activity for youth including:
    - Weight control
    - Reducing blood pressure
    - Raising HDL ("good") cholesterol
    - Improved cardiorespiratory endurance, muscular fitness and bone health
    - Reduction in the risk of diabetes and some kinds of cancer
    - Improved mental health (12)
- Girls who walk or bike to school perform better on tests. Longer commutes were associated with higher test scores, regardless of how much exercise students got outside of school (13).
- Participation in physical activity is positively related to academic performance in children (14).
- Exposure to nature and free outdoor play can have additional health benefits including stress reduction, relief of ADHD symptoms in children, and increased cognitive and motor functioning (15).
- When trying to keep children safe from the rarest of crimes (abduction), parents subsequently face a host of other challenges, including higher risk obesity and diabetes (16).

Talking Point Sources:

8. Safe Routes to School. North Carolina Department of Transportation. Retrieved from https://connect.ncdot.gov/projects/BikePed/Documents/NCDOT_SRTS_Description.pdf on 4/8/16.
9. Strong Towns. February newsletter. Retrieved from http://www.strongtowns.org/journal/2016/2/22/why-walkability on 4/8/16

10. Safe Routes to School. City of Tigard. Retrieved from http://www.tigard-or.gov/redirect/index.php

11. Children and Nature Network. Retrieved from http://eclkc.ohs.acf.hhs.gov/hslc/tta-system/teaching/eecd/nature-based-learning/Research/childrens-contact-w-outdoors.pdf on 4/8/16

12. Office of Disease Prevention and Health Promotion. Retrieved from http://health.gov/paguidelines/guidelines/chapter2.aspx on 4/8/16

13. Girls who walk or bike to school perform better on tests. Longer commutes were associated with higher test scores, regardless of how much exercise students got outside of school. *Martinez-Gomez, D., et al., 2010 - Active commuting to school and positive cognitive performance in adolescents: The AVENA study, Archives of Pediatrics and Adolescent Medicine.*

14. Participation in physical activity is positively related to academic performance in children. Singh, A., et al., 2012 - *Physical activity and performance at school: A systematic review of the literature including a methodological quality assessment, Archives of Pediatrics & Adolescent Medicine, 166, 1.*

15. Children of Nature. Retrieved from http://eclkc.ohs.acf.hhs.gov/hslc/tta-system/teaching/eecd/nature-based-learning/Research/health-benefits-from-outdoor.pdf on 4/8/16

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16. The risks from abduction or a car crash are being far outweighed by the dramatic rise in obesity, type 2 diabetes, asthma, cancers, heart disease, depression and other problems caused by inactivity and air pollution. From Be Active Decatur. Retrieved from https://beactivedecatur.com/2009/08/13/bicycling-and-walking-to-school-makes-healthy-kids-and-healthy-communities/

Infographic Sources

17. Fifth-grade students who regularly bike or walk to school accumulate 3% more minutes of moderate-to-vigorous physical activity per weekday, or about an additional 24 minutes/day. *Sirard, J., et al., 2005 - Physical activity and active commuting to elementary school, Medicine & Science in Sports & Exercise, 37, 2062-9*

18. Between 15 and 25 percent of morning traffic is generated by parents driving students to school. *Quick Facts and Stats, Safe Routes to School National Partnership.* Retrieved from http://saferoutespartnership.org/healthy-communities/101/facts and Bringing Safe Routes to Scale http://www.transformca.org/sites/default/files/bringing-safe-routes-to-scale.pdf

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Appendix B:
Project Information

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Spot Improvements

Proj ID	Name	Address	Improvement Type	Partner Agencies	Future Dev.	Prev. Planned	Feas. Study	Action	Project Information
49	Bike Turn Box	Sunset Blvd & Valley View Dr	Bike Box	UDOT	0	1		Install bike turn box	Bike turn box to access proposed sidepath on the north side of Sunset Blvd. from Valley View to Bluff St.
93	2720 East / 750 North	2720 East & 750 North	Curb Extensions		0	0		Install curb extensions	Calm this unsignalized intersection so that people walking and bicycling have priority and so that traffic turning in and out of the high school lots is as calm as possible.
6	Bluff St / Black Ridge Dr Curb Extensions	Bluff St & Black Ridge Dr	Curb Extensions	UDOT	0	1		Install curb extensions	Install curb extensions to both sides of all four corners to shorten pedestrian crossing distances and provide a refuge for pedestrians.
53	Riverside Dr / Mall Dr Curb Extensions	Riverside Dr & Mall Dr	Curb Extensions		0	0		Install curb extensions	Shorten crossing distance for pedestrians and bicyclists from trail.
13	Sunset Blvd / Dixie Dr Curb Extensions	Sunset Blvd & Dixie Dr	Curb Extensions	UDOT	0	1		Install curb extensions	Implement extensions to shorten crossing distances and improve pedestrian comfort and perceived safety. Ensure that extensions are designed with proposed bike infrastructure in mind.
89	2000 South / 3000 East	2000 South & 3000 East	Full Signal		0	0		Install signal; timing	When warranted, a future full signal should ensure that design and timing accommodate people, especially students, crossing.
39	Trail Undercrossing	2000 South & Future Trail 68	Full Signal		0	1		Install signal; timing	Future signal location.
67	Dixie Dr / Stonebridge Dr Crossing Improvement	Dixie Dr & Stonebridge Dr	Full Signal		0	0		Install crosswalk, hybrid beacon, curb ramps	Connects the previously planned Sand Hollow Wash Trail Extension to and across Dixie Dr and provides opportunities for people living on both sides of Dixie Dr to access one another's neighborhoods. Future possible signal location.
94	Riverside Dr / Heritage Elementary Midblock Crossing Improvements	Riverside Dr & Morningside Dr	Full Signal		0	0		Install crosswalk, hybrid beacon, curb ramps	Connects existing Virgin River Trail to Heritage Elementary either at Morningside Drive or at mid-block, the latter of which would eliminate as much walking/bicycling through parking lots. Future signal location TBD.
35	Trail Undercrossing	Fort Pierce Wash Trail & River Rd	Full Signal		0	1		Install signal; timing	Future signal location.
90	Mall Dr / 270 South	Mall Dr & 270 South	Full Signal		0	0		Install signal; timing	When warranted, a future full signal should ensure that design and timing accommodate people, especially students, crossing. Include traffic calming, especially on east leg.
74	Riverside Dr / 2450 East Full Signal	Riverside Dr & 2450 East	Full Signal		0	0		Install signal; redesign intersection	Will allow access across Riverside Rd to the new and existing sections of the Virgin River Trail south of Riverside. Will also improve vehicular access and slow down traffic on Riverside Dr, which is otherwise unimpeded.
19	400 East & I-15 Undercrossing	400 East & I-15	Grade Separated Crossing	UDOT UDOT	0	1	Freeway; undercrossing	Dig under I-15	Study future potential grade-separated bicycle and pedestrian crossing connecting 400 E across I-15.
10	400 South & I-15 Undercrossing	400 South & I-15	Grade Separated Crossing	UDOT	0	1	Freeway; undercrossing	Dig under I-15	Study future potential grade-separated bicycle and pedestrian crossing connecting 400 S across I-15. Alternative proposed at 200 South.
64	Bluff St / Sunset Blvd Undercrossing	Bluff St & Sunset Blvd	Grade Separated Crossing	UDOT	0	1	Undercrossing	Dig under Bluff St	Already planned and nearing construction. Ensure that there are curb ramps and access to the trail to allow for on-street to off-street connectivity.
58	Dixie Dr / Halfway Wash Undercrossing	Dixie Dr & Halfway Wash / Mathis Park	Grade Separated Crossing		0	0	Undercrossing; riparian	Dig under Dixie Dr	Will provide an extension of the current path to the south that will serve as an alternative to Dixie Dr. These grade-separated crossings are required in order to continue low-stress feeling of trail.
82	Future Trail 141 & I-15 Undercrossing	Future Trail 141 & I-15	Grade Separated Crossing	UDOT	0	1	Undercrossing	Dig under I-15	Study future potential grade-separated bicycle and pedestrian crossing extending Future 141 under I-15.

Spot Improvements

Proj ID	Name	Address	Improvement Type	Partner Agencies	Future Dev.	Prev. Planned	Feas. Study	Action	Project Information
7	Rim Rock Wash Trail Extension / Riverside Dr Undercrossing	Rim Rock Wash Trail Extension & Riverside Dr	Grade Separated Crossing		0	1	Undercrossing	Dig under Riverside Dr	Grade-separated connection between two proposed trails.
4	Trail Undercrossing	Western Corridor Trail & Virgin River Trail Bloomington 2	Grade Separated Crossing		1	1	Undercrossing		
5	Trail Undercrossing	Western Corridor Trail & Bloomington Sun River Trail	Grade Separated Crossing		1	1	Undercrossing		
9	Trail Undercrossing	Misc. south block future developments	Grade Separated Crossing		1	1	Undercrossing		Develop undercrossing in conjunction with future development and recommended shared-use path.
24	Trail Undercrossing	Dixie Dr & 540 North	Grade Separated Crossing		0	1	Undercrossing		Highly requested improvement to existing trail crossing of Dixie Dr without any existing markings. Interim may include hybrid beacon.
26	Trail Undercrossing	Misc. south block future developments	Grade Separated Crossing		1	1	Undercrossing		
27	Trail Undercrossing	Misc. south block future developments	Grade Separated Crossing		1	1	Undercrossing		
29	Trail Undercrossing	Misc. south block future developments	Grade Separated Crossing		1	1	Undercrossing		
30	Trail Undercrossing	Misc. south block future developments	Grade Separated Crossing		1	1	Undercrossing		
31	Trail Undercrossing	Misc. south block future developments	Grade Separated Crossing		1	1	Undercrossing		
32	Trail Undercrossing	Misc. south block future developments	Grade Separated Crossing		1	1	Undercrossing		
33	Trail Undercrossing	South River Road Sidepath & Future Trail 68	Grade Separated Crossing		1	1	Undercrossing		
34	Trail Undercrossing	Fort Pierce Dr Bike Lane & Fort Pierce Wash Trail	Grade Separated Crossing		0	1	Undercrossing		
36	Trail Undercrossing	3000 East & Future Trail 101	Grade Separated Crossing		0	1	Undercrossing		
37	Trail Undercrossing	Sand Hollow Wash & Sunset Blvd	Grade Separated Crossing		0	1	Undercrossing		
38	Trail Undercrossing	3000 East & Future Trail 68	Grade Separated Crossing		0	1	Undercrossing		
41	Trail Undercrossing	Mall Dr & Virgin River Trail	Grade Separated Crossing		0	1	Undercrossing		
46	Trail Undercrossing	Misc. south block future developments	Grade Separated Crossing		1	1	Undercrossing		
47	Trail Undercrossing	Misc. south block future developments	Grade Separated Crossing		1	1	Undercrossing		
48	Virgin River Trail / River Rd Bridge	Virgin River Trail & River Road	Grade Separated Crossing		0	1	Overcrossing	Build bridge adjacent to existing structure	Construction a dedicated pedestrian bridge over the river linking the northern and southern Virgin River Trails. Ensure bridge width is 12' min.

Spot Improvements

Proj ID	Name	Address	Improvement Type	Partner Agencies	Future Dev.	Prev. Planned	Feas. Study	Action	Project Information
68	1230 North / Dixie Downs Dr Crossing Improvement	1230 North & Dixie Downs Dr	Hybrid Beacon		0	0		Install crosswalk, hybrid beacon, curb ramps	One of the major intersections on Dixie Downs. May require significant redesign during roadway reconfiguration (lane reduction) to accommodate bicyclists and pedestrian first and turning traffic second.
95	1575 North / Dixie Downs Dr Crossing Improvement	1575 North & Dixie Downs Dr	Hybrid Beacon		0	0		Install crosswalk, hybrid beacon, curb ramps	One of the major intersections on Dixie Downs. May require significant redesign during roadway reconfiguration (lane reduction) to accommodate bicyclists and pedestrian first and turning traffic second.
2	200 West / St. George Blvd Crossing Improvement	200 West & St. George Blvd	Hybrid Beacon	UDOT	0	1		Install crosswalk, hybrid beacon, curb ramps	Eliminate the existing left turn lanes at 200 W. Construct new median linking existing medians to the east/west. Implement a crossing for bikes/peds with hybrid beacon. Coordinate signal timing with rest of St. George Blvd. Possible 300 W to Main St.
80	400 East / 840 South Cir Crossing Improvement	400 East & 840 South Cir	Hybrid Beacon		0	0		Install crosswalk, hybrid beacon, curb ramps	Near high school, many ped crashes. Hybrid beacon would allow crossing at mid-block where peds are already crossing, but not doing so safely.
43	550 East St. George Blvd Midblock Crossing Improvement	550 East St. George Blvd	Hybrid Beacon	UDOT	0	1		Crosswalk, hybrid beacon, curb ramps, rem. lands.	Eliminate visibility-obstructing landscaping and construct mid-block crossing with hybrid beacon. Coordinate signal timing with others on St. George Blvd. Location between 400 East and 700 East.
81	850 East St. George Blvd Midblock Crossing Improvement	850 East St. George Blvd	Hybrid Beacon	UDOT	0	1		Crosswalk, hybrid beacon, curb ramps, rem. lands.	Eliminate visibility-obstructing landscaping and construct mid-block crossing with hybrid beacon. Coordinate signal timing with others on St. George Blvd. Location between 700 East and 1000 East.
62	Tonaquint Dr / 2370 South Crossing Improvement	Tonaquint Dr & 2370 South	Hybrid Beacon		0	0		Install crosswalk, hybrid beacon, curb ramps	Because of the speeds and travel lanes on Tonaquint, especially because of the hill, a hybrid beacon is proposed to improve access to and from elementary school to the northwest.
16	Consider DDI interchange at Brigham Rd	Brigham Rd & I-15	Interchange Improvement	UDOT	0	1	Other	Interchange Redesign	When designed well, DDI intersections can yield less conflicts for bicyclists and pedestrians.
17	1400 West / Halfway Wash Street Connections	1400 West & Halfway Wash Trail	Misc Improvement		0	1		Construct	Connect the Halfway Wash Trail to the at-grade street network at undercrossings.
73	2200 East / 130 North Crossing Improvement	2200 East & 130 North	Misc Improvement	Washington County School District	0	0		Redesign parking lot entrance; analyze crossing	Improves access to two schools from neighborhoods to south and east, as well as to the park and trail west of the school. Bulbouts and driveway redesign possible to calm traffic by school.
76	400 South / 900 East Intersection Redesign	400 South & 900 East	Misc Improvement		0	0		Redesign intersection, narrow roadways	Intersection redesign to prioritize ped and bike movements, slow down turning motorists, reduce conflicts. Could create an entire raised intersection. A lot of peds all the time, but especially at peak during school session.
77	700 South / Bluff St Intersection Redesign	700 South & Bluff St	Misc Improvement	UDOT	0	0		Redesign intersection	Intersection redesign to prioritize ped and bike movements and slow down turning motorists, reduce conflicts, especially those accessing proposed trail.

Spot Improvements

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8	700 South Bike Ramps and Enhanced Sidewalks	700 South & I-15	Misc Improvement	UDOT	0	1		Widening	Widen 700 South sidewalks below overpass, install bike ramps on either side of overpass to receive proposed bike lanes.
25	Flood Control on Halfway Wash Trail	~1230 North & Halfway Wash Trail	Misc Improvement		0	0		Reconstruct	Improve elevation to avoid flooding of the Halfway Wash Trail.
22	Halfway Wash Bridge Redesign	Halfway Wash Bridge & Dixie Dr	Misc Improvement		0	1		Build sideapths and bike ramps; lane narrowing	Narrow travel lanes, improve sidewalks to wide sidepaths, add bike ramps on either side of bridge to access widened sidepaths; pursue bridge widening long term
69	Tonaquint Dr / Bloomington Dr Intersection Redesign	Tonaquint Dr & Bloomington Dr	Misc Improvement		0	0		Redesign intersection	Intersection redesign to prioritize ped and bike movements and slow down turning motorists, reduce conflicts. Currently, intersection design leaves right of way up in the air and lacks predictability.
55	200 North / Main St Roundabout Mod	200 North & Main St	Roundabout Modification		0	0		Improve visibility	Modify to accommodate future and/or proposed bicycle facilities; remove or alter landscaping at road side to improve pedestrian visibility.
57	Hope St / Main St Roundabout Mod	Hope St & Main St	Roundabout Modification		0	0		Improve visibility	Modify to accommodate future and/or proposed bicycle facilities; remove or alter landscaping at road side to improve pedestrian visibility.
56	Tabernacle / Main St Roundabout Mod	Tabernacle St & Main St	Roundabout Modification		0	0		Improve visibility	Modify to accommodate future and/or proposed bicycle facilities; remove or alter landscaping at road side to improve pedestrian visibility.
92	2450 East / 750 North Cir	2450 East & 750 North Circle	RRFB		0	0		Install crosswalk, RRFB, curb ramps	Interim school crosswalk and RRFBs to improve crossing to and from school until boundaries change. Ensure that any traffic calming does not impede people in bike lane on 2450 East. Location requires analysis and possible relocation. Prioritize RRFB rec's where ped volumes are highest.
50	700 East / East Elementary Crosswalk with RRFB	700 East & 500 South	RRFB		0	1		Install crosswalk, RRFB, curb ramps, median	Construct new midblock crossing with RRFBs on 700 East, providing access to East Elementary School. Also, install median refuge island. Possible school closure; reevaluate with future DSU only use. Prioritize RRFB rec's where ped volumes are highest.
61	Curly Hollow Dr / 1300 West Crossing Improvement	Curly Hollow Dr & 1300 West	RRFB		0	0		Install crosswalk, RRFBs, curb ramps	Provides a beacon-controlled access to school from neighborhood, and vice versa. Will also act as traffic calming for future roadway extension. Exact location TBD 1200-1300 W pending new park. Prioritize RRFB rec's where ped volumes are highest.
0	East Park Crossing Improvements	130 North & 2450 East	RRFB		0	1		Install crosswalk, RRFBs, curb ramps	Crosswalk with median refuge and RRFB. Helps to finish the on-street improvement on 130 North. Prioritize RRFB rec's where ped volumes are highest.
20	Fort Pierce Dr Midblock Crossing	Larkspur Park Trail & Fort Pierce Dr	RRFB		0	1		Install crosswalk, RRFBs, curb ramps	Midblock crossing with curb extensions for existing trail crossing. Prioritize RRFB rec's where ped volumes are highest.
66	Lava Flow Dr / Snow Canyon High School	Lava Flow Dr & Snow Canyon HS Seminary Bldg	RRFB		0	0		Install crosswalk, RRFBs, curb ramps	Provides access from/across Lava Flow Dr, high school, middle school, and neighborhoods and trails to the east. May require a new section of sidewalk on west side of road near parking lot entrances. Prioritize RRFB rec's where ped volumes are highest.

Spot Improvements

Proj ID	Name	Address	Improvement Type	Partner Agencies	Future Dev.	Prev. Planned	Feas. Study	Action	Project Information
14	Lava Flow Dr / Snow Canyon HS Crossing Improvements	Lava Flow Dr & Snow Canyon HS	RRFB		0	1		Install crosswalk, RRFB, curb ramps, median	Crosswalk, beacons, and pedestrian refuge in median. Provides connectivity between high school, middle school, and existing and proposed trails. Prioritize RRFB rec's where ped volumes are highest.
75	Lava Flow Dr / Snow Canyon Middle School	Lava Flow Dr & Snow Canyon MS Parking Lot South Sidewalk	RRFB		0	0		Install crosswalk, RRFBs, curb ramps	Will provide access from and across Lava Flow Dr, middle school, high school, and trails to the east. Existing trail is close to roadway on east side of Lava Flow Dr and should be connected. Prioritize RRFB rec's where ped volumes are highest.
86	Man of War Rd / Swaps Dr	Man of War Rd & Swaps Dr	RRFB		0	0		Install crosswalk, RRFB, curb ramps	School crosswalk and RRFBs to improve crossing to and from school. Ensure that any traffic calming does not impede people in bike lane on 2000 North. Prioritize RRFB rec's where ped volumes are highest.
12	Rim Rock Wash Trail Extension / Foremaster Dr Crossing Improvement	Rim Rock Wash Trail Extension & Foremaster Dr	RRFB		0	1		Install crosswalk, RRFBs, curb ramps, median	Crosswalk, beacons, and pedestrian refuge in median. Provides connectivity between existing and proposed sections of the Rim Rock Wash Trail. Prioritize RRFB rec's where ped volumes are highest.
95	Rim Rock Wash Trail Extension / Medical Center Dr Crossing Improvement	Rim Rock Wash Trail Extension & Medical Center Dr	RRFB		0	1		Install crosswalk, RRFBs, curb ramps	Provides connectivity between existing and proposed sections of the Rim Rock Wash Trail.
65	Tuweap Dr / Apartment Complex Entrance Crossing Improvement	Tuweap Dr & 500' North of 1420 North	RRFB		0	0		Install crosswalk, RRFBs, curb ramps	Will provide access from and across Tuweap Dr and neighborhoods to the east with the Wash Trail and Snow Canyon High School. Prioritize RRFB rec's where ped volumes are highest.
59	Valley View Dr / 540 North Crossing Improvement	Valley View Dr & 540 North	RRFB		0	0		Install crosswalk, RRFBs, curb ramps	Improves crossing of Valley View Dr even when the same is reconfigured to a three-land cross section. Will allow safer access to Sunset Elementary and connect neighborhoods. Prioritize RRFB rec's where ped volumes are highest.
1	Westridge Dr / 670 North Crossing Improvements	Westridge Dr & 670 North	RRFB		0	1		Install island, crosswalk, RRFB, curb ramps	Install curbed right turn island, crosswalk, RRFB, and pedestrian ramps to shorten crossing distance. Prioritize RRFB rec's where ped volumes are highest.
52	3510 South / Desert Hills Dr Crossing	3510 South & Desert Hills Dr	Unsignalized Trail Crossing		0	0		Install crosswalk, signs, curb ramps	Allows access between trails to the east and park and trails to the west. Crossing Desert Hills is key to the success of this connection.
51	3510 South / Price Hills Dr Crossing	3510 South & Price Hills Dr	Unsignalized Trail Crossing		0	0		Install crosswalk, signs, curb ramps	Allows access between trails to the east and park and trails to the west. Crossing Price Hills is key to the success of this connection.
21	Larkspur Rd Midblock Crossing	St. James Trail & Larkspur Rd	Unsignalized Trail Crossing		0	1		Install crosswalk, signs, curb ramps	Midblock crossing with curb extensions for existing trail crossing.

Off-Street Recommendations

Proj ID	Name	North/West Limit	South/East Limit	Improvement Type	Partner Agencies	Future Dev.	Prev. Planned	Feas. Study	Action	Length (mi.)	Project Information
117	1375 North Powerline Trail	1650 West	Halfway Wash Trail	Shared Use Path		0	1	Power line	Construct	0.34	Construct a shared use path in the utility corridor linking 1650 West to Royal Oaks Park.
312	270 South Connector Path	270 South	Slick Rock Park Path	Shared Use Path		0	0			0.08	Connects two existing streets and an existing and planned/future park, which will provide bicycling and walking access for students especially.
276	400 South Path	1000 East	1100 East	Shared Use Path	UDOT	0	1	Freeway	Dig under I-15	0.12	Path connecting east and west side of I-15 to connect students to Dixie State Univ and residents to downtown.
198	700 South I-15 Path	700 East	900 East	Shared Use Path	UDOT	0	1	Freeway	Path under I-15	0.24	Coordinate widening of existing raised sidewalks and improve them to be shared use side paths, either when I-15 is improved and/or bridge is widened/improved.
128	750 North Halfway Wash Connector Trail	Halfway Wash Trail	Westridge Dr	Shared Use Path		0	1		Construct	0.29	Develop a shared use path along the canal linking Halfway Wash to the proposed 750 North shared roadway/bicycle boulevard.
372	750 North Path	2720 East	3050 East	Shared Use Path	Washington County School District	0	0			0.41	Path will connect both sides of high school through the school, but may not be public/open all the time. Conventional sidepath next to roadways; attractive facility through high school that goes beyond just asphalt, with priority for students.
94	Astragalus Dr Sidepath Extension	Existing Path	Proposed Path	Shared Use Path	UDOT	1	1			0.36	Develop shared use path in conjunction with future development.
129	Bloomington Sun River Trail	Virgin River Trail	Sun River Pkwy	Shared Use Path		0	1	Riparian	Construct	0.98	Construct a shared use path from the end of the existing Virgin River Trail at Sun River Golf Club to Sun River Pkwy.
107	Bloomington Sun River Trail Extension	Bloomington Sun River Trail	Webb Hill Trail	Shared Use Path	UDOT	1	1	Freeway, Riparian Corridor	Route under I-15	1.56	Construct a shared use path from Bloomington Park to the Webb Hill Trail.
307	Bluff Street Path	Sunset Blvd	Riverside Dr	Shared Use Path	UDOT	0	0			3.21	Important missing link. Preferred on east side because of high irrigation costs on west. Several crossing improvements at E-W streets needed. Not part of upcoming project but could be implemented later. Location TBD, Bluff Street South Corridor Plan.
385	Brigham Rd Path under/near I-15	Pioneer Rd	I-15	Shared Use Path	UDOT	0	1		Construct	0.16	Accommodate bicycles and pedestrians through interchange area on a shared-use path, prioritizing on-ramp crossings for non-motorized traffic.
327	Canal Trail	City Limit	Future Trail 101	Shared Use Path	Washington City	0	1		Construct	0.31	Construct a shared use path along the historic canal alignment.
64	Commerce Dr Sidepath	River Rd	3580 South	Shared Use Path		1	1			1.99	Develop shared use path in conjunction with future development.
302	Confluence Park Connector Trail	Riverside Dr	Confluence Park Entrance	Shared Use Path	UDOT	0	0			0.68	Connects proposed sidepath on Riverside Dr with Confluence Park through hotel and convention areas.
81	Fort Pierce Wash Trail	St James Ln	Future Trail 21	Shared Use Path		1	1		Construct	6.05	Construct a shared use path along Pierce Wash from the St. James Trail / South Virgin River Trail to the airport.

Off-Street Recommendations

Proj ID	Name	North/West Limit	South/East Limit	Improvement Type	Partner Agencies	Future Dev.	Prev. Planned	Feas. Study	Action	Length (mi.)	Project Information
110	Future Trail 100	Fort Pierce Wash	2350 East	Shared Use Path		0	1			0.65	Construct a shared use path between Rustic Dr. and Coyote Springs Dr. linking to the proposed Pierce Wash Trail and the existing trail at 2350 E.
111	Future Trail 101	South Block Future Development		Shared Use Path	Washington City	1	1			1.78	Develop shared use path in conjunction with future development/roadway improvements.
119	Future Trail 141	Bloomington Sun River Trail	Proposed Path	Shared Use Path	UDOT	1	1	Freeway	Dig under I-15	1.77	Develop shared use path in conjunction with future development/roadway construction in South Block.
120	Future Trail 141	South Block Future Development		Shared Use Path		1	1			0.62	Develop shared use path in conjunction with future development/roadway construction.
331	Future Trail 19	South Block Future Development		Shared Use Path	Washington County	1	1			0.15	Develop shared use path in conjunction with future development.
390	Future Trail 19	South Block Future Development		Shared Use Path	Washington County	1	1			0.36	Develop shared use path in conjunction with future development.
85	Future Trail 20	South Block Future Development		Shared Use Path	UDOT; Washington County	1	1	Freeway	Dig under Southern Pkwy	4.92	Develop shared use path in conjunction with future development.
86	Future Trail 20	South Block Future Development		Shared Use Path		1	1			0.50	Develop shared use path in conjunction with future development.
87	Future Trail 20	South Block Future Development		Shared Use Path		1	1			0.16	Develop shared use path in conjunction with future development.
335	Future Trail 20	South Block Future Development		Shared Use Path	Washington County	1	1			0.50	Develop shared use path in conjunction with future development.
88	Future Trail 21	Ft. Pierce Wash Trail	Future Trail 20	Shared Use Path		1	1			0.42	Develop shared use path in conjunction with future development in South Block.
89	Future Trail 22	South Block Future Development		Shared Use Path	UDOT	1	1	Freeway	Dig under Southern Pkwy	2.91	Develop shared use path in conjunction with future development.
90	Future Trail 22	South Block Future Development		Shared Use Path		1	1			0.04	Develop shared use path in conjunction with future development.
91	Future Trail 22	South Block Future Development		Shared Use Path		1	1			0.30	Develop shared use path in conjunction with future development.
92	Future Trail 23	South Block Future Development		Shared Use Path		1	1			0.82	Develop shared use path in conjunction with future development.
93	Future Trail 23	South Block Future Development		Shared Use Path	UDOT	1	1	Freeway	Dig under Southern Pkwy	6.61	Develop shared use path in conjunction with future development.
95	Future Trail 25	South Block Future Development		Shared Use Path		1	1		Construct	4.83	Develop shared use path in conjunction with future development.
96	Future Trail 26	Arch Angel Drive	Proposed Path	Shared Use Path	UDOT	1	1	Freeway	Dig under I-15	1.23	Develop shared use path in conjunction with future development/roadway construction in South Block.
98	Future Trail 28	South Block Future Development		Shared Use Path		1	1			1.05	Develop shared use path in conjunction with future development / roadway construction
62	Future Trail 59	South Block Future Development		Shared Use Path	UDOT	1	1			3.05	Develop shared use path in conjunction with future development.

Off-Street Recommendations

Proj ID	Name	North/West Limit	South/East Limit	Improvement Type	Partner Agencies	Future Dev.	Prev. Planned	Feas. Study	Action	Length (mi.)	Project Information
66	Future Trail 68	South Block Future Development		Shared Use Path	Washington City	1	1			8.01	Develop shared use path in conjunction with future development / roadway construction including Mall Dr.
67	Future Trail 71	South Block Future Development		Shared Use Path		1	1			3.22	Develop shared use path in conjunction with future development.
68	Future Trail 71	South Block Future Development		Shared Use Path		1	1			0.40	Develop shared use path in conjunction with future development.
69	Future Trail 71	South Block Future Development		Shared Use Path		1	1			0.53	Develop shared use path in conjunction with future development.
70	Future Trail 71	South Block Future Development		Shared Use Path		1	1			1.21	Develop shared use path in conjunction with future development.
71	Future Trail 75	South Block Future Development		Shared Use Path		1	1			1.95	Develop shared use path in conjunction with future development.
72	Future Trail 75	South Block Future Development		Shared Use Path		1	1			0.17	Develop shared use path in conjunction with future development.
73	Future Trail 75	South Block Future Development		Shared Use Path		1	1			0.46	Develop shared use path in conjunction with future development.
74	Future Trail 77	South Block Future Development		Shared Use Path		1	1			0.74	Develop shared use path in conjunction with future development.
75	Future Trail 77	South Block Future Development		Shared Use Path		1	1			1.98	Develop shared use path in conjunction with future development.
76	Future Trail 77	South Block Future Development		Shared Use Path		1	1			0.18	Develop shared use path in conjunction with future development.
77	Future Trail 77	South Block Future Development		Shared Use Path		1	1			0.05	Develop shared use path in conjunction with future development.
78	Future Trail 78	South Block Future Development		Shared Use Path		1	1			0.56	Develop shared use path in conjunction with future development.
79	Future Trail 79	South Block Future Development		Shared Use Path		1	1			0.03	Develop shared use path in conjunction with future development.
80	Future Trail 80	South Block Future Development		Shared Use Path		1	1			0.44	Construct a looped shared use path from the Bear Claw Dr / Price Hill Dr intersection.
82	Future Trail 82	South Block Future Development		Shared Use Path	Washington City	1	1			3.15	Develop shared use path in conjunction with future development.
328	Future Trail 82	South Block Future Development		Shared Use Path	Washington City	1	1			2.03	Develop shared use path in conjunction with future development.
83	Future Trail 83	South Block Future Development		Shared Use Path	Washington County; Washington City	1	1			1.00	Develop shared use path in conjunction with future development.
333	Future Trail 83	South Block Future Development		Shared Use Path	Washington County	1	1			0.43	Develop shared use path in conjunction with future development.
343	Future Trail 98	South Block Future Development		Shared Use Path	Santa Clara	1	1		Construct	0.44	Develop shared use path in conjunction with future development/roadway construction.

Off-Street Recommendations

Proj ID	Name	North/West Limit	South/East Limit	Improvement Type	Partner Agencies	Future Dev.	Prev. Planned	Feas. Study	Action	Length (mi.)	Project Information
291	Green Valley Neighborhood Trail North	Halfway Wash to Mathis Park Connector Trail	City Limit	Shared Use Path	Santa Clara	0	0		Construct	1.70	Will serve as both a neighborhood path in Green Valley and as an off-street alternative to Dixie Dr on the west side of the road.
341	Green Valley Neighborhood Trail South	City Limit	Dixie Dr	Shared Use Path	Santa Clara	0	0		Construct	1.09	Will serve as both a neighborhood path in Green Valley and as an off-street alternative to Dixie Dr on the west side of the road.
290	Halfway Wash to Mathis Park Connector Trail	Halfway Wash Trail Extension	Dixie Dr	Shared Use Path		0	0	Undercrossing	Construct	0.68	Will provide an extension of the path that will serve as an alternative to Dixie Dr and will require crossings of th same street.
115	Halfway Wash Trail Extension	City Limit	Dixie Dr	Shared Use Path	Santa Clara	0	1	Undercrossing	Construct	0.59	Construct a shared use path extension from Dixie Dr to the proposed Sand Hollow Wash Trail (outside of city limits).
109	Horseman Park Dr Trail	Fort Pierce Wash	3000 East	Shared Use Path		1	1		Construct	1.24	Develop shared use path in conjunction with future development/roadway construction.
63	Middleton Wash Trail Extension North	Northern City Limit	Red Hills Pkwy / Mall Dr Underpass	Shared Use Path	UDOT	1	1	Freeway	Construct	1.89	Develop shared use path in conjunction with future development. Tie in to new Mall Dr underpass.
384	Middleton Wash Trail Extension South	Red Cliffs Dr	Existing Middleton Wash Trail	Shared Use Path	UDOT	1	1	Freeway	Construct	0.37	Develop shared use path in conjunction with future development. Tie in to new Mall Dr underpass via Red Cliffs Dr path.
108	Old Airport Loop Trail			Shared Use Path		0	1		Construct	3.74	Construct a shared use path loop around the old airport site.
99	Plantation Dr Path			Shared Use Path	Santa Clara	1	1		Construct	0.83	Develop shared use path in conjunction with future development. One path with different segments broken up by city boundary.
101	Plantation Dr Path	Green Valley Neighborhood Trail South	Santa Clara River Trail	Shared Use Path	Santa Clara	1	1		Construct	0.79	Develop shared use path in conjunction with future development. One path with different segments broken up by city boundary.
102	Plantation Dr Path			Shared Use Path	Santa Clara	1	1		Construct	0.31	Develop shared use path in conjunction with future development. One path with different segments broken up by city boundary.
103	Plantation Dr Path			Shared Use Path		1	1		Construct	1.71	Develop shared use path in conjunction with future development. One path with different segments broken up by city boundary.
104	Plantation Dr Path			Shared Use Path		1	1		Construct	0.42	Develop shared use path in conjunction with future development. One path with different segments broken up by city boundary.
105	Plantation Dr Path			Shared Use Path	Santa Clara	1	1		Construct	2.91	Develop shared use path in conjunction with future development. One path with different segments broken up by city boundary.
106	Plantation Dr Path			Shared Use Path		1	1		Construct	0.45	Develop shared use path in conjunction with future development. One path with different segments broken up by city boundary.

Off-Street Recommendations

Proj ID	Name	North/West Limit	South/East Limit	Improvement Type	Partner Agencies	Future Dev.	Prev. Planned	Feas. Study	Action	Length (mi.)	Project Information
339	Plantation Dr Path			Shared Use Path	Santa Clara	1	1		Construct	1.70	Develop shared use path in conjunction with future development. One path with different segments broken up by city boundary.
133	Red Cliffs Dr Path	St. George Blvd	City Limit	Shared Use Path	UDOT; Washington City	0	1		Construct	2.08	Construct a sidepath along the north and west edge of Red Cliffs Dr. Route the path behind the shopping center and connect to the center sidewalk through the contra-flow interchange. Coordinate with UDOT and shopping center owners.
65	Red Hills Pkwy Trail Extension	1000 East	1700 East	Shared Use Path		1	1		Construct	1.07	Upgrade existing sidewalks to a sidepath in conjunction with future development/redevelopment.
121	Rim Rock Wash Trail Extension North 1	100 South	Medical Center Dr	Shared Use Path		0	1	Riparian	Construct	0.59	Construct a new shared use path along the Rim Rock Wash from the existing trail at Medical Center Dr. north to 100 South.
283	Rim Rock Wash Trail Extension North 2	1000 East	100 South	Shared Use Path	UDOT	0	0		Widen sidewalk to path	0.82	Low-stress connection over I-15 and through interchange to connect trail to St. George Blvd and downtown.
118	Rim Rock Wash Trail Extension South	Foremaster Dr	Virgin River Trail	Shared Use Path		0	1	Riparian	Construct	0.71	Construct a shared use path south from the existing Rim Rock Wash Trail at 700 South to the Virgin River Trail.
304	Riverside Dr Connector Trail	Virgin River Trail	Riverside Dr	Shared Use Path		0	0		Construct	0.03	Connector path near Morningside Dr between Riverside Dr and existing Virigin River Trail in order to provide more connectivity between existing and proposed and to increase ease of access to and from trail.
308	Riverside Drive / 3050 East Path	I-15 East Ramps	City Limit	Shared Use Path	UDOT; Washington City	0	0			5.49	Because Riverside Drive's AADT is likely to increase and is a viable connection to eastern St. George, a separated path or two-way separated bike lane next to a sidewalk is recommended. Other facilities on the street will attract confident bicyclists.
122	Sand Hollow Wash Connector	Sand Hollow Wash Trail	Sunset Blvd	Shared Use Path		0	1		Construct	0.16	Construct shared use path connecting from proposed undercrossing to existing trail.
346	Sand Hollow Wash Trail Extension North	1800 North	Sunset Blvd	Shared Use Path		0	1	Undercrossing	Construct	1.11	Construct a shared use path extension along Sand Hollow Wash from 1800 N to Sunset Blvd.
116	Sand Hollow Wash Trail Extension South	City Limit	Mathis Park	Shared Use Path	Santa Clara	0	1	Undercrossing	Construct	1.59	Construct a shared use path extension along Sand Hollow Wash from Sunset Blvd to the Mathis Park trails.
114	Santa Clara River Trail	Mathis Park	Cottonwood Cove Park	Shared Use Path		0	1	Riparian	Construct	0.82	Construct a shared use path from Mathis Park along the Santa Clara River to Cottonwood Cove Park.
379	Sir Monte Dr Connector Path	Current end of Sir Monte Dr	Current end of Sir Monte Dr	Shared Use Path		0	0		Construct	0.17	Provides access to school and to proposed connection through golf course and to existing Virgin River Trail. One of several pieces.
134	Sky West Connector Sidepath	400 South	Medical Dr	Shared Use Path		0	1		Construct	0.07	Construct a sidepath on west side of River Rd linking the Medical Center Drive bike lane and 400 South shared roadway
135	Snow Canyon High Connector	Lava Flow Dr	Sand Hollow Wash Trail	Shared Use Path		0	1		Construct	0.05	Provide a direct connection to the Snow Canyon High School main entrance from the existing Sand Hollow Wash Trail.

Off-Street Recommendations

Proj ID	Name	North/West Limit	South/East Limit	Improvement Type	Partner Agencies	Future Dev.	Prev. Planned	Feas. Study	Action	Length (mi.)	Project Information
125	South River Road Sidepath	Enterprise Drive	Southern Pkwy	Shared Use Path	UDOT	1	1			2.00	Develop shared use path in conjunction with future development.
97	Sun River Pkwy Future Trail 27	Arrowhead Canyon Drive	Existing Path under I-15	Shared Use Path	UDOT	1	1			0.31	Develop shared use path in conjunction with future development.
136	Sunset Blvd Sidepath	Valley View Dr	Bluff St	Shared Use Path	UDOT	0	1			0.14	Construct sidepath on north side of Sunset to link the proposed bike lane to the west to the Bluff St trail. Roadway cross section doesn't allow an on-street facility. May not be included in upcoming project. Possible with shoulder and existing sidewalk.
270	Vernon Worthen Park Path			Shared Use Path		0	1			0.34	Construct path around the perimeter of Vernon Worthen Park, in accordance with that park's plan.
112	Virgin River South Trail	River Rd	Springs Park	Shared Use Path		0	1	Riparian	Construct	1.19	Construct a shared use path along the south side of the Virgin River linking the existing trail at River Rd to Springs Park.
113	Virgin River South Trail	Springs Park	Mall Dr	Shared Use Path		0	1	Riparian	Construct	0.81	Construct a shared use path along the south side of the Virgin River linking Springs Park to Mall Dr.
325	Virgin River Trail	Existing Virgin River Trail	City Limit	Shared Use Path	Washington City	0	1	Riparian	Construct	0.09	Construct a shared use path along the Virgin River to Waterfront Park.
137	Virgin River Trail Bloomington 1	Christensen Park	Man O War Rd	Shared Use Path		0	1		Construct	1.32	Construct a shared use path along the Virgin River from Man of War Rd to Christensen Park.
138	Virgin River Trail Bloomington 2	Future Western Corridor	Christensen Park	Shared Use Path		1	1		Construct	1.53	Develop a shared use path along the Virgin River from Christensen Park in Bloomington to the proposed Western Corridor.
139	Web Hill Trail Extension	Web Hill Trail	Brigham Rd	Shared Use Path		0	1		Construct	0.37	Extend the Web Hill Trail south to Brigham Rd.
124	West Ridge Airport Connector Trail	Future Trail 98	Old Airport Loop Trail	Shared Use Path		1	1		Construct	0.94	Develop shared use path in conjunction with future development.
338	Western Corridor Trail	City Limit	Angel Arch Dr	Shared Use Path		1	1		Construct	1.13	Construct in conjunction with the proposed Western Corridor roadway project.
269	200 North / 100 East Sidewalk Gap	~50 East	100 East	Sidewalk		0	1		Construct	0.04	Construct missing sidewalk segment on 200 North west of 100 East.
268	400 East Sidewalk	840 South Cir	1160 South	Sidewalk		0	1		Construct	0.18	Construct sidewalk on the east side of 400 E.
264	Bloomington Hills Dr Sidewalk	Fort Pierce Dr	Brigham Rd	Sidewalk		0	1		Construct	1.70	Construct sidewalk on the western side of Bloomington Hills Dr connecting to sidewalk on Fort Pierce Dr.
266	Bluff Street / St. George Blvd Sidewalk Gap	~150 North	St. George Blvd	Sidewalk		0	1		Construct	0.05	Construct missing sidewalk on west side.
260	Temple Quarry Trail Connector	Indian Hills Dr	Temple Quarry Trail	Unpaved Trail		0	1	Slope	Construct	0.44	Connects on-street network to the existing Temple Quarry Trail on the bluff.
263	Temple Quarry Trail Extension	North end of Temple Quarry Trail	Stone Mountain Dr	Unpaved Trail		0	1	Slope	Construct	0.70	Connects on-street network to the existing Temple Quarry Trail on the bluff.

City of St. George	32.49
Future Development	88.58
UDOT	3.87
Total	**124.94**

On-Street Recommendations

Proj ID	Name	North/West Limit	South/East Limit	Improvement Type	Partner Agencies	Future Dev.	Prev. Planned	Feas. Study	Action	Length (mi.)	Project Information
206	100 North Bike Lane	Dixie Dr	Valley View Dr	Bike Lane		0	1		Remove parking	0.46	Remove on-street parking on one side to accomodate bike lanes.
316	100 South Bike Lane	Bluff St	Main St	Bike Lane	UDOT	0	0		Restripe, narrow lanes	0.54	Narrow travel lanes to 11'. Unless future traffic volumes go down on 100 South east of 700 E, bike lanes may not be possible without widening. Analyze which (parking or center turn lane) will need to be removed.
310	1160 South Bike Lane	Main St	JC Snow Park / Dixie High Access	Bike Lane		0	0		Restripe	0.24	Stripe existing shoulder in order to accommodate bike lanes.
377	1300 West / 2370 South Bike Lane	Curly Hollow Dr	Tonaquint Dr	Bike Lane		0	0		Restripe	0.59	Provides access to school and to proposed connection through golf course and to existing Virgin River Trail. One of several pieces.
359	1400 West Bike Lane	Snow Canyon Pkwy	Sunset Blvd	Bike Lane	UDOT	0	0		Double yellow striping, bike lane striping	0.80	Maintain parking and two travel lanes with 6' bike lanes. Analyze which (parking or center turn lane) will need to be removed.
184	1680 East Bike Lane	Red Cliffs Dr	Mall Dr	Bike Lane		0	1		Remove parking; restripe and Stencil	0.72	Eliminate parking both sides of road.
177	200 East Bike Lane	200 North	600 South	Bike Lane		0	1		Restripe	0.93	Stripe 6' bike lanes in wide shoulder.
185	2000 North Bike Lane	City Limit	Snow Canyon Pkwy	Bike Lane		0	1		Remove parking	0.69	Eliminate parking one side to accomodate bike lanes.
179	2350 East Bike Lane	Mountain Ledge Dr	Horseman Park Dr	Bike Lane		0	1		Lane narrowing and restripe	0.37	May require lane narrowing (11' travel, 14' center turn) to accomodate bike lanes.
180	2450 East Bike Lane	Red Cliffs Dr	Riverside Dr	Bike Lane		0	1		Remove parking, restripe	1.41	Eliminate parking one side of the street to accomodate bike lanes.
181	2450 South Bike Lane	River Rd	City Limit	Bike Lane		0	1		Restripe	2.46	Stripe wide shoulders as bike lanes. Future additions of lanes may require removal of on-street parking or lane width reductions.
325	2720 East Bike Lane	Red Cliffs Dr	850 North	Bike Lane		0	0		Restripe	0.19	Will provide connection to high school and a more buffered alternative to 2450 East.
182	3000 East Bike Lane	1450 South	3580 South	Bike Lane		1	1			2.55	Construct bike lane in conjunction with development/roadway improvements.
375	3650 South Bike Lane	3000 East	City Limit	Bike Lane	Washington City	1	1			0.23	Implement in conjunction with adjacent development/road widening.

On-Street Recommendations

Proj ID	Name	North/West Limit	South/East Limit	Improvement Type	Partner Agencies	Future Dev.	Prev. Planned	Feas. Study	Action	Length (mi.)	Project Information
190	400 East Bike Lane	100 South	600 South	Bike Lane		0	1		Restripe	0.59	Stripe 6' bike lane.
194	450 North Bike Lane	Mall Dr	3050 East	Bike Lane		0	1		Remove parking; restripe	1.96	Eliminate on-street parking one-side of street to accomodate bike lanes
320	600 South / 900 East Bike Lane	700 East	400 South	Bike Lane		0	0		Restripe	0.45	Important connection on the south side of DSU campus that connects downtown and neighborhoods to football and baseball fields, LDS Institute, and the proposed improvements near I-15 on 400 South.
195	600 West Bike Lane	Dixie Dr	Tonaquint Dr	Bike Lane		0	1		Pave; restripe	0.16	Expand/pave shoulders to accomodate 5' bike lanes.
196	700 East Bike Lane	St. George Blvd	700 South	Bike Lane		0	1		Restripe	0.94	Stripe 5-6' bike lanes in wide shoulder/parking area.
199	700 South Bike Lane	900 East	River Road	Bike Lane	UDOT	0	1		Remove parking; restripe	0.65	Remove shoulder/on-street parking on one side of street to accomodate bike lanes.
188	850 North Bike Lane	2450 East	City Limit	Bike Lane	Washington City	0	1		Restripe	0.95	Wide shoulder and lack of need for parking due to adjacent lots means that it can include a bike lane.
202	900 South / 400 East Bike Lane	Riverside Dr	Rim Rock Wash Trail Extension	Bike Lane		0	1		Remove parking	2.20	Eliminate on-street parking on one side to accomodate bike lanes. In some places, shared roadway, if traffic calmed, may be enough. Evaluate parking removal.
288	Airport Rd Bike Lane	Bluff St	Proposed Path	Bike Lane		0	0		Restripe	0.47	Stripe existing wide shoulder and maybe narrow travel lanes slightly. Integrate with Bluff St and St. George Blvd proposed facilities.
203	Arrowhead Canyon Dr / Angel Arch Dr Bike Lane	Sun River Pkwy	Existing Bike Lane	Bike Lane		0	1		Restripe; possible widening	0.43	Stripe existing shoulders as bike lanes, widen where necessary.
204	Bloomington Hills Dr Bike Lane	Fort Pierce Dr	Brigham Dr	Bike Lane		0	1		Widen; remove parking; restripe	1.66	Restrict parking. Stripe bike lanes on existing shoulders. Widen shoulders adjacent to golf course to provide needed width for bike lanes.
274	Bluegrass Way Bike Lane	Arrowhead Canyon Dr	Pioneer Rd	Bike Lane		0	0		Restripe	0.19	Extends existing bike lane to the west in this underdeveloped segment to Pioneer Rd, where new bike lanes are also proposed.
205	Brigham Rd Bike Lane	I-15	River Rd	Bike Lane		0	1		Narrow lanes	1.68	Narrow travel lanes to 11' to accommodate bike lanes.
299	Curly Hollow Dr Bike Lane	Plantation Dr Sidepath	Tonaquint Dr	Bike Lane		0	0		Restripe	0.84	Accommodates students traveling to and from school and to connect to future development to the west.

On-Street Recommendations

Proj ID	Name	North/West Limit	South/East Limit	Improvement Type	Partner Agencies	Future Dev.	Prev. Planned	Feas. Study	Action	Length (mi.)	Project Information
207	Dixie Downs Rd Bike Lane	Snow Canyon Pkwy	Sunset Blvd	Bike Lane	UDOT	0	1		Narrow lanes and/or roadway reconfiguration	1.32	May require 10-11' travel lanes and/or roadway reconfiguration to accommodate bike lanes. Roadway reconfiguration candidate selected by City.
208	Dixie Dr Bike Lane	Sunset Blvd	City Boundary (North)	Bike Lane	UDOT; Santa Clara	0	1	Shoulder space	Widening or lane narrowing	2.76	Conduct feasibility study to determine areas with deficient shoulder space. Widen shoulders and/or narrow travel lanes where needed to accomodate bike lanes.
342	Dixie Dr Bike Lane	City Limit	600 West	Bike Lane	Santa Clara	0	1	Shoulders	Widen shouders or narrow lanes	0.96	Conduct feasibility study to determine areas with deficient shoulder space. Widen shoulders and/or narrow travel lanes where needed to accomodate bike lanes.
209	Foremaster Rd Bike Lane	Rim Rock Trail	Riverside Dr	Bike Lane		0	1		Restripe	0.95	Stripe existing shoulders as bike lanes.
210	Fort Pierce Dr Bike Lane	Bloomington Hills Dr	River Rd	Bike Lane		0	1		Remove parking; restripe	0.30	Provides connectivity to parks, existing paths, and neighborhoods. Restrict parking on both sides in order to stripe bike lanes.
243	Fort Pierce Dr Bike Lane	Bloomington Hills Dr	Bloomington Hills Dr	Bike Lane		0	1		Remove parking; restripe	1.25	Provides connectivity to parks, existing paths, and neighborhoods. Restrict parking on both sides in order to stripe bike lanes.
300	Indian Hills Dr Bike Lane	Valley View Dr	Hilton Dr	Bike Lane		0	0		Restripe; repave	2.55	Stripe existing shoulder (widened in 2015) as a bike lane. Repaving or resurfacing may be necessary because of degrading chip seal treatment.
324	Industrial Dr Bike Lane	Deseret Dr	City Limit	Bike Lane	Washington City	0	1		Narrow lanes, remove parking, restripe	0.07	Narrow center turn lane, restrict parking both sides, stripe bike lanes.
309	Lava Flow Dr Bike Lane	Little League Dr	Sunset Blvd	Bike Lane	Santa Clara	0	0		Restripe	0.62	Restripe with 11' lanes and 8' bike lanes including buffer. Continuation of bike lane on Lava Flow Drive after widening to build out.
211	Mall Dr / 2500 South Bike Lane	Riverside Dr	City Limit	Bike Lane	Washington City	0	1		Lane narrowing; shoulder widening; restripe	1.18	Narrow lanes/widen shoulders as needed to accomodate bike lanes. Implement bike lanes on unimproved or unbuilt segments as development/roadway construction occurs.
212	Mall Dr Bike Lane	Red Cliffs Dr	Riverside Dr	Bike Lane		0	1		Lane narrowing	1.42	May require 10' travel lanes to accomdate bike lanes.
213	Man O' War Rd Bike Lane	Bloomington Dr	Pioneer Rd	Bike Lane		0	1		Restripe	0.79	Stripe existing shoulders as bike lanes.
214	Medical Center Dr Bike Lane	River Rd	Foremaster Dr	Bike Lane		0	1		Remove parking; restripe	0.63	Stripe existing shoulders as bike lanes, restrict parking on one or both sides.
348	Pioneer Pkwy Bike Lane	City Limit	Lava Flow Dr	Bike Lane	Santa Clara	0	1		Restripe	0.14	Stripe bike lanes in existing shoulders.

On-Street Recommendations

Proj ID	Name	North/West Limit	South/East Limit	Improvement Type	Partner Agencies	Future Dev.	Prev. Planned	Feas. Study	Action	Length (mi.)	Project Information
275	Pioneer Rd Bike Lane	Northern Terminus of Pioneer Rd	Sun River Pkwy	Bike Lane		0	0		Widen; restripe	2.88	Widen where necessary (north of Man O' War).
189	Red Hills Pkwy / Buena Vista Bike Lane	1000 East	City Limit	Bike Lane	Washington City	0	1		Lane narrowing; restripe	2.25	Narrow lanes as needed to accommodate bike lanes
215	River Rd Bike Lane	Foremaster Dr	Brigham Rd	Bike Lane		0	1		Lane narrowing; restripe	3.51	Stripe bike lane in wide shoulders. Selective lane narrowing (10-11') may be needed to accommodate bike lanes in some areas.
314	River Rd Bike Lane	St. George Blvd	Foremaster Dr	Bike Lane	UDOT	0	0		Lane narrowing; restripe	0.98	Stripe at least 6' bike lanes after narrowing travel lanes to at most 11'.
351	Sandia Rd / 2000 South Bike Lane	City Limit	1450 South	Bike Lane	Washington City	0	1		Restripe	0.94	Stripe bike lanes in wide shoulders. Implement bike lanes on unimproved roadway segments as development/roadway widening occurs.
380	Sir Monte Dr Bike Lane East	Current end of Sir Monte Dr	2025 South Cir	Bike Lane		0	0		Remove parking or lane narrowing; restripe	0.61	Provides access to school and to proposed connection through golf course and to existing Virgin River Trail. One of several pieces. Remove parking from one side of street or narrow lanes.
378	Sir Monte Dr Bike Lane West	Tonaquint Dr	Current end of Sir Monte Dr	Bike Lane		0	0		Restripe	0.56	Provides access to school and to proposed connection through golf course and to existing Virgin River Trail. One of several pieces. Parking may need to be removed on east end of segment.
349	Snow Canyon Pkwy Bike Lane	West City Boundary	Bluff St	Bike Lane	UDOT; Ivins	0	1		Lane narrowing, restriping	3.07	May require 1-3' of lane narrowing or roadway widening, specifically where medians exist. Improve connectivity to Bluff St and Red Hills Pkwy paths.
298	Tonaquint Dr / 2025 South Cir Bike Lane	600 West	Sir Monte Dr	Bike Lane		0	0		Restripe	0.61	Provides access to school and to proposed connection through golf course and to existing Virgin River Trail. One of several pieces.
217	Tuweap Dr Bike Lane	2000 North	1800 North	Bike Lane		0	1		Remove parking; restripe	0.25	Restrict parking. South of Pioneer Pkwy implement in conjunction with development/road improvements. Match to existing striping to the south.
192	Valley View Dr Bike Lane	Sunset Blvd	Dixie Dr	Bike Lane	UDOT	0	1		Roadway reconfiguration	2.16	Evaluate lane reconfiguration to accomodate bike lanes. Potential reconfiguration to 3 lane cross-section would open up additional room for bike lane or buffered bike lane.
360	Westridge Drive Bike Lane	360 North	100 North	Bike Lane		0	0		Restripe	0.31	Maintain parking and two lanes with 5' bike lanes. May require lanes narrower than 11'.
371	2720 East Buffered Bike Lane	850 North	450 North	*Buffered Bike Lane*		0	0		Restripe	0.43	Will provide connection to high school and a more buffered alternative to 2450 East.
153	300 South Buffered Bike Lane	Bluff St	Dixie State Univ	*Buffered Bike Lane*		0	1		Restripe	1.42	Stripe 6' bike lane with 3' buffers. Connection to DSU, Downtown, and Bluff St.

On-Street Recommendations

Proj ID	Name	North/West Limit	South/East Limit	Improvement Type	Partner Agencies	Future Dev.	Prev. Planned	Feas. Study	Action	Length (mi.)	Project Information
156	400 East Buffered Bike Lane	St. George Blvd	100 South	*Buffered Bike Lane*		0	1		Restripe	0.23	Implement 5' bike lane with 3' buffers. Consider lane reconfiguration if traffic calming is desired.
193	400 South / 1000 East Buffered Bike Lane	St. George Blvd	800 East	*Buffered Bike Lane*	UDOT; DSU	0	1		Restripe	0.82	Stripe 6-7' buffered bike lanes. Work with University on ped and parking issues.
319	600 South Buffered Bike Lane	Bluff St	700 East	*Buffered Bike Lane*		0	0		Stripe or construct	1.06	Bike lane with buffers to narrow travel lanes to standard width, and/or install a landscaped center median to improve neighborhood by adding shade and traffic calming. Alternative to 700 South. Reconfigure stop signs for efficient bike movements.
374	Black Ridge Drive Buffered Bike Lane	Bluff St	Dixie Dr	*Buffered Bike Lane*		0	0		Roadway reconfiguratio n	0.86	A roadway reconfiguration is possible because of low traffic volumes and desire of the city to make this a good on-street connection between Dixie Dr and Bluff St west of I-15. Remove lane(s) of traffic where necessary and add buffered bike lanes.
353	Diagonal St Buffered Bike Lane	Bluff St	Main St	*Buffered Bike Lane*		0	0			1.23	After reconstruction of roadway because of existing rippling. Narrow travel lanes and possibly remove one side of parking to create wider, buffered bike lanes. Consider parking side buffer.
373	Hilton Drive Buffered Bike Lane	North Roundabout	Dixie Dr	*Buffered Bike Lane*		0	0		Roadway reconfiguratio n	1.06	Where needed, a roadway reconfiguration is possible because of low traffic volumes and desire of the city to make this a good on-street connection between Dixie Dr and Bluff St west of I-15. Remove lane(s) of traffic where necessary.
294	Little League Dr Buffered Bike Lane	City Limit	Lava Flow Dr	*Buffered Bike Lane*	Santa Clara	0	0		Restripe	0.20	Provides connection between Santa Clara neighborhoods and park and schools to the east in St. George. Travel lanes may need to be narrowed/defined.
279	Little Valley Rd Bike Lane	2450 South	Commerce Dr	*Buffered Bike Lane*		0	1			1.74	May require widening in short sections, but most is ready to stripe now
154	Main Street Buffered Bike Lane	Northern Terminus	700 South	*Buffered Bike Lane*	UDOT	0	1		Restripe	1.36	11' travel lanes/7.5' bike lane and buffer/8' parking
216	Sun River Pkwy Buffered Bike Lane	Western End of Sun River Pkwy	Arrowhead Canyon Dr	*Buffered Bike Lane*		0	1		Roadway reconfiguratio n	1.09	Study lane narrowing to accomodate bike lanes within existing right of way. Or, reduce the total number of lanes and replace outside travel lane with a buffered or separated bike lane.
152	1000 East Climbing Bike Lane	Red Hills Pkwy	St. George Blvd	Climbing Bike Lane	UDOT	0	1		Restripe	0.17	Provide a 6-7' wide climbing bike lane on the uphill side and shared lane markings on the downhill lanes
151	200 East/Skyline Drive Climbing Bike Lane	Red Hills Pkwy	200 North	Climbing Bike Lane		0	1		Restripe	0.51	Provide a 6' wide bike lane on the uphill side and shared lane markings on the downhill side of 200 East/Skyline Dr.

On-Street Recommendations

Proj ID	Name	North/West Limit	South/East Limit	Improvement Type	Partner Agencies	Future Dev.	Prev. Planned	Feas. Study	Action	Length (mi.)	Project Information
246	Main St Separated Bike Lane	700 South	Bluff St	**Separated Bike Lane**	UDOT	0	1		Roadway reconfig and construct	0.69	Evaluate lane reconfiguation to reduce travel lanes to one in each direction. If lane configuration is determined to be feasible, construct one-way separate bike lanes along Main St.
155	Sunset Blvd Separated Bike Lane	West of Santa Clara Pkwy	Valley View Dr	**Separated Bike Lane**	UDOT; Santa Clara	0	0	Lane Increase	Stripe/Construct	2.00	Eliminate on-street parking. Interim solution may be striped shoulder areas as buffered bike lane. Check the inputs of the MPO traffic model to determine timeframe for converting Sunset Blvd to 7 lanes and if still necessary.
247	Tabernacle St Separated Bike Lane	Bluff St	1000 East	**Separated Bike Lane**	UDOT	0	1		Roadway reconfig, remove parking, and construct	1.73	Implement one-way separated bike lanes on both side of street. Eliminate parking on one side of street and consolidate driveways where possible. Design should incorporate historic irrigation ditches.
361	Westridge Dr Separated Bike Lane	Sunset Blvd	360 North	**Separated Bike Lane**		0	0		Construct; remove parking	0.60	Excellent access to school. Requires removal of parking on both sides.
358	1100 North / 1620 West Bicycle Boulevard	Dixie Downs Dr	Halfway Wash Trail	Shared Roadway		0	0		Traffic Calming	0.35	Direct access to Dixie Sun Elementary School from Dixie Downs and from Halfway Wash Trail. Add wayfinding signage on Dixie Downs Drive with directions to Halfway Wash and other destinations.
234	1200 North Bicycle Boulevard	Tuweap Dr	Bluff St	Shared Roadway		0	1			1.72	Install wayfinding signage and shared lane markings to offer an east-west alternative to Sunset Dr. Add wayfinding signage on Dixie Downs Drive with directions to Halfway Wash and Bluff Street Trail, other destinations.
236	1800 North Shared Roadway	Lava Flow Dr	Dixie Downs Dr	Shared Roadway		0	1		Symbols or calm traffic	0.54	Implement shared lane markings at the least and bicycle boulevard at most.
237	200 South Bicycle Boulevard	Bluff St	700 East	Shared Roadway	UDOT	0	1		Calm traffic	1.37	Prioritize bicycles along the route, reinforce wayfinding with signage, and calm traffic. Improved crossings at significant cross streets. I-15 undercrossing needed to fully implement this route. Incorporate in park redesign.
238	2350 East Shared Roadway	2070 South	Mountain Ledge Dr	Shared Roadway		0	1		Symbols or calm traffic	0.98	Implement shared lane markings at the least and bicycle boulevard at most.
286	2450 East Shared Roadway	Riverside Dr	Virgin River Trail	Shared Roadway		0	0		Symbols	0.16	Short on-street connection between trail and Riverside Dr and points north. Install shared lane markings.
239	2350 East Bicycle Boulevard	Horseman Park Dr	3000 East	Shared Roadway		0	0		Calm traffic	1.29	Provides connectivity between school and neighborhoods.
191	400 East Bicycle Boulevard	600 South	1160 South	Shared Roadway		0	1		Signing and symbols, calm traffic	0.48	Temporary solution. Expand to BL or SBL when undercrossing is completed and road improved/widened.

On-Street Recommendations

Proj ID	Name	North/West Limit	South/East Limit	Improvement Type	Partner Agencies	Future Dev.	Prev. Planned	Feas. Study	Action	Length (mi.)	Project Information
241	400 South / 1100 East Shared Roadway	700 South	River Rd	Shared Roadway		0	0		Symbols or calm traffic	0.60	Alternative route to River Rd and 700 South. Also provides a connection to and from the proposed 400 South undercrossing of I-15, which is a critical link for student housing and other neighborhoods east of I-15.
293	540 North Bicycle Boulevard	Dixie Dr	Valley View Dr	Shared Roadway		0	0		Calm traffic	0.78	Improves the roadway for people walking and bicycling, especially students accessing school, as well as local residents.
227	750 North Bicycle Boulevard	Westridge Dr	Valley View Dr	Shared Roadway		0	1		Calm traffic	0.56	Implement shared lane markings and signage to guide bicyclists as an east-west alternative to Sunset Blvd. Add wayfinding signage to future trail.
242	800 East Shared Roadway	Northern Terminus of 800 East	700 South	Shared Roadway		0	1		Symbols or calm traffic; restripe parking	0.43	Implement shared lane markings at the least and bicycle boulevard at most. Restripe angle parking to reverse angle parking near DSU.
244	Navajo Shared Roadway	Trailhead	Bloomington Dr	Shared Roadway		0	1		Symbols	0.55	Implement shared lane markings and wayfinding to connect bike lanes to trailhead.
245	Sugar Leo Rd Shared Roadway	Pioneer Rd	Pioneer Rd	Shared Roadway		0	1		Symbols	1.75	Implement shared lane markings.
									City of St. George	81.31	
									Future Development	2.78	
									UDOT	2.65	
									Total	**86.74**	