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Reinventing the Wheel

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Reinventing the Wheel

City of Redmond, Oregon

Bicycle Refinement Plan

June 11, 2011

b:spoke
planning + design



Our Team

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planning + design

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Green Plow Coffee Roasters, LLC

Taproot Program

Elton Gregory and Obsidian Middle Schools

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What is Reinventing the Wheel?

Background

Redmond, Oregon is located in Deschutes County, the fastest-growing county in the state. Founded in 1910, the city has a proud history reflected on the official city seal as “The Hub of Central Oregon”. The name originates from the city’s historical function as the primary industrial and agricultural center of the county, and a main crossroads for railroad lines and irrigation canals.

Redmond, like much of Central Oregon, has experienced rapid growth and change in the last two decades. The population of Redmond has increased 366 percent between 1990 and 2010, from 7,163 to 26,215. With one

projection estimating that the Redmond population will grow to 65,894 by 2030, it is imperative that the city plan for the future needs of the community.

Transportation is a particular area of concern as oil prices rise and congestion increases on Redmond’s highways and streets. Diversifying modes of transit beyond the now-dominant personal vehicle could improve quality of life in the city and prepare Redmond for future changes.

The Bicycle Refinement Plan

The Reinventing the Wheel project is the process of developing a Bicycle Refinement Plan for the City of Redmond. A group of volunteer urban & regional planning graduate students from Portland

Executive Summary



State University, known as b:spoke Planning & Design, has been charged with developing strategies to increase bicycle ridership and remove barriers to transit options in Redmond.

The project is a “refinement plan”, as it involves the refinement of and building upon existing City plans such as the Transportation Systems Plan (TSP), Bicycle Master Plan, and Parks & Recreation Trails Master Plan.

Project Phases

The Reinventing the Wheel plan consists of an assessment of existing conditions, community outreach, strategy development and evaluation, and recommendations.

The assessment of existing conditions involved a review of previous plans, such

as the TSP and Parks Master Plan, and a field survey of transportation infrastructure and built environment. In addition, the b:spoke team conducted a review of best practices for bicycle infrastructure and programming.

Community outreach was conducted using the following methods:

- Formation of a Stakeholder Advisory Group (SAG), interviews and mapping exercises with members
- Redmond Reinvents the Wheel survey (online and print)
- b:spoke tabling at local events
- Workshops with middle school youth via Taproot program
- Focus group mapping exercise

Alternative Strategies

A menu of alternative strategies were developed with goals of increasing bicycle

ridership. These strategies were based on the results of best practices research, public participation and observations.

Alternative Strategies:

- Continue with Bicycle Master Plan
- Measure and monitor ridership
- Brand the system
- Events
- Develop Dry Canyon-based on-street loop routes
- Implement a “Bike Boulevard” system
- Focus on the key crossings
- Implement separated bike facilities
- Adopt a Complete Streets policy
- Adopt a pro-bicycling maintenance & repair policy
- Establish a Redmond Bicycle-Pedestrian Action Committee



Final Recommendations

After evaluating these strategies according to criteria such as cost, maintenance and timeline, a final set of recommended strategies for phased implementation.

Immediate Recommended Strategies:

- Continue with the current Bicycle Master Plan
- Increase Redmond's presence on the Deschutes County Bicycle Pedestrian Action Committee
- Foster a local user network
- Implement a branding program identifying the system to users and non-users alike
- Develop community supportive bicycling events
- Adopt policies that implement a Complete Streets policy
- Adopt a pro-bike maintenance plan

Near-term Recommended Strategies:

- Identify a bike route system on low-traffic streets, prioritize investment along this route.
- Establish baseline ridership counts and make improvement targets

Long-term Recommended Strategies

- Improve key crossings
- Implement separated facilities.

Included in this plan are illustrated scenarios of implementation actions that meet these recommendations.







Redmond, Oregon

Redmond, Oregon is a city of 26,215 residents in Deschutes County, on the east slope of the Cascade Range in Central Oregon. Established in 1910, the city became a nexus for main canal and railroad lines, leading to its nickname and official city seal, "The Hub of Central Oregon." A community with its historical economic roots in agriculture and timber, the economy has become diversified by a primary airport serving the region, a firefighting training center, aerospace and medical parts manufacturing, a major telecom call center, and a nearby destination resort. The population of Redmond has grown rapidly in recent decades, up 366 percent from 7,163 in 1990. Young families, representing 38 percent of households, are attracted to

the city's high quality of life, affordability, scenic beauty, and outdoor recreation. According to the 2004 Deschutes County Coordinated Population Forecast, the population of Redmond is projected to grow to 65,894 in 2030.

In 2010 Redmond celebrated its centennial, and now looks forward to the next cycle of growth and development with an eye on changing demographics and long-term sustainability. In order to achieve its vision of being the model for Northwest communities by being innovative in the creation of a high quality of life, ample family wage jobs and a safe environment in which to raise and educate families, the City of Redmond is interested in a Bicycle Refinement Plan that provides recommendations and solutions for achieving the strategies

Introduction



outlined in the Bicycle Master Plan in the 2008 Transportation System Plan (TSP), with a focus on increasing ridership. The City of Redmond has identified the need to provide safe, continuous and accessible bicycle facilities for cyclists. Some of the strategies outlined in the Bicycle Master Plan are enhanced bicycle parking at key destinations, bicycle facilities that are separated from roadways, connectivity to schools, parks, employment, and activity centers, state-of-the-art signage and maintenance program, etc. National studies show that most communities' bicycle facilities are used primarily by dedicated bicycle enthusiasts or advanced cyclists, as described in Redmond's Bicycle Master Plan. Typically this represents 10 to 15 percent of citizens. The City of Redmond would like to increase ridership in its community to promote public health, encourage alternative

**Team
b:spoke
visiting
Elton
Gregory
Middle
School**



mobility practices and build a foundation for long-term economic and community development growth.

b:spoke

b:spoke, a volunteer graduate student team from Portland State University, has been recruited to support the mission of the Community Development Department, "to uphold the community

by promoting quality development now and in the future." b:spoke will develop a range of recommendations and solutions for the City to consider, in response to stated community needs, physical conditions, and implementation opportunities. The City of Redmond has provided b:spoke with technical assistance, facilitated community outreach, and provided advisory guidance during the project.



b:spoke has been charged with identifying the types of bicycle facilities and programs best suited to the community of Redmond to achieve its strategic objectives identified in the TSP Bicycle Master Plan. This involves the development of a comprehensive bicycle/pedestrian pathway system that connects local landmarks, schools, community centers, amenities, and other major destination points with existing and planned bicycle infrastructure. The proposed pathway system will also provide connectivity to regional bicycle networks in Central Oregon.

b:spoke has focused on increasing ridership in the City of Redmond through a comprehensive approach that targets specific user groups, identifies program development opportunities, establishes metrics for success, and ultimately

recommends a set of strategic actions to guide Redmond forward.

General Approach

This document represents a final deliverable, a Bicycle Refinement Plan that consists of recommendations and solutions for achieving the strategies outlined in the Bicycle Master Plan that are not already identified in the TSP Action Plan. Among these strategies are identified pathway connections, the types of facilities to be employed, a wayfinding program, and a “Bike Redmond” campaign as part of a phased implementation plan.

The Refinement Plan outlines community goals, metrics, and identifies action steps for the City of Redmond and community stakeholders to increase ridership in

accordance with the Bicycle Master Plan. The Refinement Plan is provided in print and digital formats and available online through the City of Redmond website. In June of 2011, b:spoke will present Reinventing the Wheel to the Planning Commission and the City Council for adoption and implementation.

The Reinventing the Wheel project followed five (5) general phases as detailed in a signed Memorandum of Understanding between b:spoke and the City of Redmond:

1. project scoping and initiation;
2. assessing current conditions;
3. reporting on needs, opportunities & constraints;
4. developing alternatives/strategies; and
5. recommendations in the final refinement plan







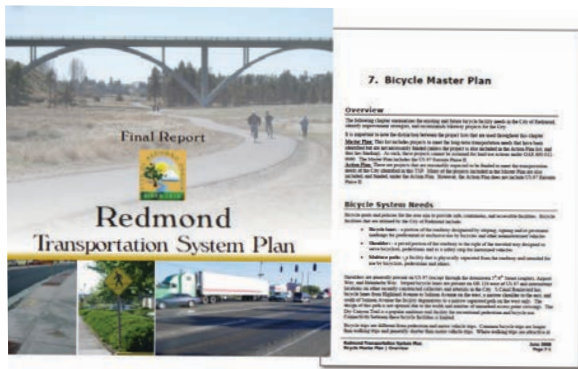
The process of Reinventing the Wheel began with an assessment of existing conditions in Redmond, including existing plans, transportation infrastructure, zoning & land use, and types of built environment. This took the form of closely reviewing plans such as the City of Redmond Transportation Systems Plan (TSP) and extensive surveying and photography throughout the city. These findings were used in the creation of new maps representing existing conditions in Redmond.

Another piece of the assessment is the review of best practices for bicycle infrastructure and programming. These practices informed our community outreach process and strategies development.

Assessment



Existing Plans



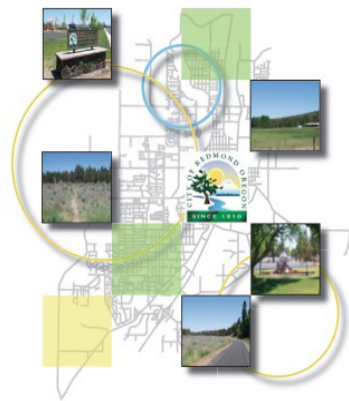
Transportation System Plan (TSP)

In 2008, the City of Redmond adopted its Transportation System Plan (TSP) update that included an analysis of existing conditions for the roadway network as well as prioritization of future upgrades to the transportation infrastructure. The TSP includes both Master and Action plans to meet identified long-term transportation needs, but only those listed in the

Action plan are reasonably expected to be funded within the TSP's 2030 planning horizon. The TSP includes the City's Bicycle Master Plan that outlines future investments for bicycle lanes on arterials and collectors as well as multi-use off-street paths.

2030 PARKS MASTER PLAN UPDATE

CITY OF REDMOND
JANUARY 2008



2030 Parks Master Plan

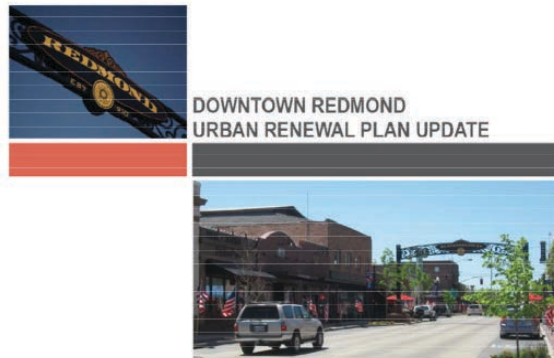
The City of Redmond's Parks Master Plan 2008 Update includes the development of a Trails Master Plan that calls for completion of the Dry Canyon Trail, new trails along the right-of-way of irrigation canals, a trail along the Bonneville Power Administration power lines west of the city, and on-street bicycle lanes and sidewalks.

2020 Comprehensive Plan

The City of Redmond's 2020 Comprehensive Plan, released in 2006, is a "guide to the future growth, development and redevelopment of the Redmond urban area within a framework of goals and policies consistent with the physical characteristics, ideas and resources of the community". This plan indicates the need for a public trail system that connects



schools and major points of interest, improved access to the Dry Canyon, the construction of multi-use paths along canal right-of-way, and a greenway/bikeway within one-quarter mile of every home.



DOWNTOWN REDMOND
URBAN RENEWAL PLAN UPDATE

PREPARED FOR
Redmond Urban Renewal Agency
City of Redmond
Downtown Urban Renewal
Advisory Committee

**TWELFTH AMENDMENT TO THE
REDMOND DOWNTOWN URBAN
RENEWAL PLAN
(DRAFT)**

A Substantial Amendment Increasing the
District Boundaries and Raising the Maximum
Indebtedness.

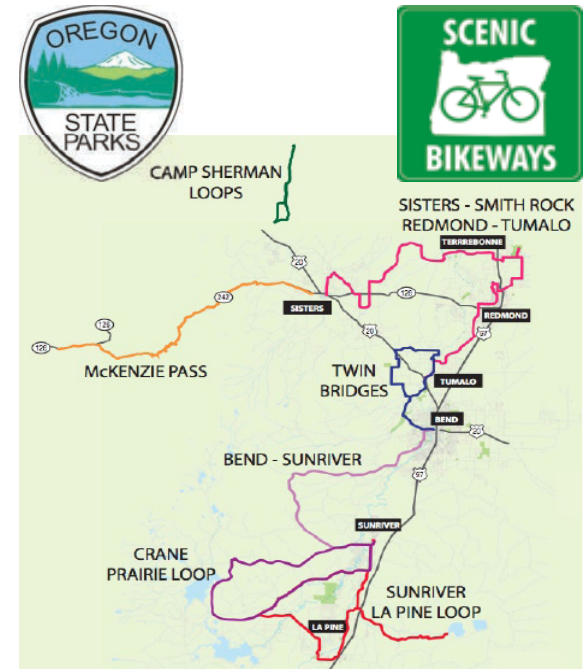
TEAM
Leland Consulting Group
Will Pacific
Robert Yakus Design
GEL Oregon, Inc.



January 2011

Downtown Redmond Urban Renewal Plan

In January of 2011, the City of Redmond's Downtown Urban Renewal Advisory Committee released a 12th Amendment to their plan, which expanded the Downtown Urban Renewal Area to include blighted areas. The plan calls for sidewalk construction and improvements, a system of interconnected trails, more parks and green space, improved east-west circulation, additional bicycle routes, and improved maintenance of existing bicycle infrastructure.



Central Oregon Scenic Bikeways

In 2011, Oregon Parks and Recreation Department identified a segment of the Three Sisters Regional Bikeway that will run through Redmond, connecting the city with Smith Rock and Sisters. This route would be part of the Oregon Scenic Bikeways larger network of Central Oregon regional trails that would connect Redmond with La Pine, Sunriver, Bend, Sisters, and Terrebonne.



Existing Built Environment

This is a summary of the built environment assessment. A full report of findings can be found in Appendix A: Transportation on page 47, and Appendix B: Land Use and Built Form on page 55.

Transportation

The city of Redmond lies to the east of the Cascade Range in Central Oregon, with an estimated 2010 population of 26,215. The town encompasses 10.2 square miles in area. While the city's postwar population remained steady for several decades, in the early 2000s the city, along with its neighbor Bend to the south, experienced a rapid growth period with the population almost doubling within a 10-year period. With such rapid growth, it was imperative that the city



Figure 1. US Route 97 and rail lines

plan for the influx of new residents and their transportation needs.

The city is bisected east and west by US Route 97 and the railroad, which parallel each other throughout the city (Figure 1). US 97 connects Redmond to Portland in the north via US 26, connects to Bend in the south, and to regional destinations such as Madras (in the north) and La Pine (in the south).

The thoroughfare functions as the city's backbone; recent growth has largely spread north-south along the roadway. In addition, Oregon Route 126 is the primary facilitator for east-west travel to towns such as Sisters, Prineville and Eugene.

These major arterials intersect within Redmond's historic downtown. SW Glacier and SW Highland Avenues form



a one-way east-west couplet as OR 126, while prior to 2008, US 97 was routed along NW/SW 5th and 6th Streets on a one-way north-south couplet. Due to the natural and man-made barriers such as Dry Canyon and the US 97 bypass/ railroad, east-west mobility faces greater constraints than north-south travel.

Bicycle/Pedestrian Infrastructure

In accordance with the statewide Transportation Planning Rule, cities are required to add sidewalks and bicycle facilities to existing collectors and arterials. In addition, any newly built collectors and arterials must be built with these facilities included. To that end, the TSP provides a list of projects that would retrofit existing roadways with sidewalks and bicycle facilities (bike lanes in the majority of cases).



Figure 2. On road bike/pedestrian infrastructure

There are currently intermittent bicycle lanes and shoulders along Airport Way and Veterans Way in SE Redmond, as well as several other east-west roadways such as Highland Avenue, Maple Avenue, and Antler Avenue. There are also bicycle lanes present along US 97 throughout Redmond. Moreover, Rimrock Way/19th Street features an adjacent separated multi-use path for much of its length.

The city has highlighted proposed east-west connections as especially important to providing access to major trails that primarily run north-south. Proposed on-street trails are envisioned for Maple, Hemlock, Antler, Highland, Obsidian, and Salmon Avenues west of Dry Canyon. Deschutes and Dogwood Avenues are slated for upgrades within Redmond's downtown.

Moreover, on-street bikeways are also planned on several north-south thoroughfares such as NW/SW 7th Street, NW/SW 27th Street and SW Canal Boulevard. As of 2008, the total length of the proposed on-street trail system was 18.2 miles.

The Dry Canyon Trail is a 3.4 mile pedestrian/bicycle trail that runs north-south from Spruce to Quartz Avenues. The trail meanders within Dry Canyon and several linear parks to the south and allows for largely grade-separated connections between the north and south ends of the city, acting much like a “bicycle freeway”. The trail is popular with locals and visitors alike, who enjoy its scenic beauty, numerous parks and trails, and family-friendly bike path segregated from cars. The Dry Canyon, however, acts as a barrier to east-west mobility, due to



Figure 3. Multi-use paths

the steep walls in the deeper parts of the canyon.

The city has intermittent trails along the right of way of previously used irrigation canals. A few sections exist along the Pilot Butte Canal that is owned by Central Oregon Irrigation District and runs between SW Canal Boulevard and US 97 throughout Redmond. An additional trail exists west of 27th Avenue between Hemlock and Antler Avenues. However, these trails are not suitable for daily commuter use and are more appropriate for recreational cycling. Public access easements will be necessary to allow public use of the canal trails.

When completed, the continuous Powell Butte Canal trail would total 5.3 miles, with an additional 7 to 9 miles of trails along other canals. The city is



also interested in completing a 4.5 mile trail to the west of the city along the Bonneville Power Administration (BPA) transmission lines. The BPA easement is between 125-200 feet in width; public access easements would be required to allow for development of this trail.

Best Practices

Davis, California, Portland, Oregon, and Minneapolis, Minnesota are cities routinely cited as having the highest level of bicycle usage in the United States. (Ridership is defined either as a share of commute trips or of all trips.) Planners in Davis and Minneapolis began modern bicycle infrastructure development in the 1970s (City of Minneapolis, 2010) (Buehler, 2007). Similarly, Copenhagen, Denmark began to target improvements

for bicyclists in the 1970's and now enjoys a bicycle mode share of over 30%.

While most jurisdictions may not have the resources of major cities like Minneapolis or Copenhagen, there are small and medium towns that are encouraging active transportation in their communities. Appendix C: Best Practices on page 67 presents the common practices of a sample of small and medium jurisdictions such as Billings, Montana and Cedar Falls, Iowa (see Table 6 on page 68 for full list) that have received certification as a "Bicycle Friendly Community" by the League of American Bicyclists. Additional examples of particularly innovative practices are shown from cities and towns across North America.

Bicycle planning commonly follows a "Four E" approach:

- Education
- Encouragement
- Engineering
- Enforcement

More recently, "Evaluation" has been added as a fifth category.

Planning practice for these categories are elaborated in Appendix C: Best Practices in the following groupings:

Planning: How jurisdictions approach bicycle planning

Engineering: The types of physical infrastructure being planned and implemented.

Education/Encouragement/

Enforcement: Programmatic activities that help grow a bicycling constituency.







Community input is central to a thorough planning process and to successful strategy implementation with public endorsement. In developing a community outreach strategy to reach Redmond residents, the b:spoke team targeted a variety of user groups and stakeholders. Supplementing the project's technical analysis, the b:spoke project team embarked on an extensive public outreach process to better understand the needs of pedestrians and bicyclists in Redmond. The team conducted four outreach types, including tabling at public events, an online survey, middle-school engagement through the Taproot program, and a focus group.

Special efforts were made to reach out to all kinds of stakeholder groups, including families with school-aged children, the downtown Redmond business community, cycling advocacy groups, senior citizens, and the youth community. Overall, the outreach strategies engaged approximately 400 people. The following summaries outline the outreach efforts, emerging issues, and themes in broader detail.

Community Outreach





Stakeholder Summary

Reinventing the Wheel outreach strategies were targeted to reach the following user groups:

Children & Families (Age <13yrs)

This group has a wide range of transportation needs and configurations from routine weekly tasks, individual and group travel, as well as a key educational & training component for emerging walkers and cyclists.

Youth (Age 13-18)

Beyond getting to school and gaining access to employment opportunities & extracurricular activities, biking and walking can expand the independence of youth and help to establish biking and walking as preferred modes of travel.

Elder & Aging

We recognize that in order to keep existing riders and to attract additional riders, we must consider how the different needs of cyclists and pedestrians in different life-cycle stages. Special areas of focus include to encourage elder riders include visibility, perception of safety, speed and level of service.

Utilitarian

Beyond just getting to and from work, these users run errands, meet up with friends and engage in community through the bicycling/walking.

Recreational

These users utilize open space amenities within Redmond and the surrounding communities. Access to natural areas,

neighborhood parks, and regional trails is important to this group.

Visitors

Periodic users need increased wayfinding to mark key connections, increase perception of safety and participate in local/regional bike culture.

Methodologies

Interviews

b:spoke conducted individual interviews with Stakeholder Advisory Group (SAG) members to identify major themes, inform project scope, and begin to identify community needs, priorities, opportunities and challenges. Comments from SAG members generally fell into one of





three broad thematic categories including; confidence, connectivity, and creativity.

Key themes include:

1. Increasing comfort of transportation users can ease anxiety about users traveling by bicycle.

- Expand the ability/comfort for various user groups to cycle
- Explain the rules of the road to vehicles, pedestrians and cyclists
- Educate cyclists to encourage predictable cycling behavior
- Increase the perception of safety and increase experiences using facilities
- Develop connections that support convenience - knowledge that daily needs can be met via bicycle and pedestrian connections

- Continue to attract new riders
- Retain existing riders
- Ensure facilities are youth and elder friendly

2. Increasing connectivity can support greater access to destinations, recreation opportunities and link Redmond to surrounding communities.

- Expand physical connections
- Connect user groups through programming
- Early engagement with planning and infrastructure projects leads to the best outcomes and community ownership
- Dry Canyon and Forked Horn Butte exist as both assets and barriers
- Expand east-west connections
- Increase access to parks/schools and employment centers

- Expand pedestrian infrastructure
- Network development and prioritization should happen in ways that make key connections and serve vulnerable users
- Increase access to recreation, classroom space, & play facilities
- Attract daily riding and access to regional trails
- Integrate consistent signage to meet needs of different users

3. Finding creative solutions to competing demands within the right-of-way and prioritizing improvements with limited funds will require creative solutions.

- Respond to specific user group needs and maximize the utility of public investment
- Continue to build and maintain bike culture





- Develop facilities that will bring people into Redmond
- Utilize community capital to mobilize volunteers and advocates for alignment of shared goals
- Increase competitiveness for grants
- Incorporate bicycling opportunities into existing events like SunFEST, Music on the green, Music in the Canyon, and Munch & Movie
- Expand on community cycling events and programming

Redmond Reinvents the Wheel Survey

An online survey (also made available in print form) was distributed and collected from April 3 - April 25, 2011. A total of 90 surveys were collected.

Key themes identified include:

- While many feel Redmond is a safe place to walk and bike, many respondents did not choose these modes for commuting, shopping, or meeting weekly needs

- The Redmond community has a strong desire for separated facilities and off road paths

b:spoke Tabling at Local Events

A mobile Reinventing the Wheel tent was utilized to participate in Redmond's Walk the Art Beat, Redmond's Classic Car Show, and Earth Day. The tent served as an open house to provide information on best practices and solicit participation from a broad range of stakeholders.

The tent included raffle prizes for a multi-tool, cycling book, and nighttime





LED wheel lights. Also displayed were informational posters about different facility types, signage, branding, and a citywide map to capture destinations and desired routes.

Groups and individuals were prompted to respond to the posters and discuss concerns and perceptions about existing and potential facility types, governmental and community actions, and perceptions about walking and cycling in Redmond.

Key themes identified include:

- General comfort with bike lanes, desire for more facilities along busy streets
- Strong desire for development of trails and off-street separated facilities
- Difficulty navigating key crossings such as Veterans Way at US 97
- Need for increased signage & way-finding to increase awareness of system and visibility of riders
- Need for more bicycle parking throughout the City of Redmond
- More visible cycling community, stronger communication about events and opportunities
- Desire for an expanded and better-connected bicycle system citywide, consisting of diverse facility types (e.g., bike lanes, bicycle boulevards, shared use paths, etc.)
- Many cyclists feel uncomfortable riding along Redmond's major arterials due to higher vehicle speeds and volumes, and want alternative routing options on lower-volume local streets



- Desire for on-street paths separated from motorists and pedestrians to reduce user conflicts
- Interest in improved crossing conditions at intersections, such as bicycle detection and/or bicycle-only phases at signalized crossings

(two each at Elton Gregory and Obsidian Middle Schools) were engaged through this series. Students were involved in mapping exercises and streetscape visioning as a framework for a broader discussion about perceptions of pedestrian and cyclist safety, parent attitudes, and the youth experience when walking or biking. Youth were also asked to draw their ideal street for cycling, and to discuss and share with their classmates.

Key themes identified include:

- Lack of parking facilities at key destinations
- Need for education around bike safety/rules of the road
- Sense of overconfidence has led to parental fears
- Lack of knowledge about rules of the road, peer pressure, and lack

of visibility contribute to sense of danger

- Established sense of community among BMX/sport riders
- Many trips happen in groups (to library, grocery stores, etc.)
- Desire for bike bridges over Dry Canyon

Youth Engagement - Taproot Program

b:spoke's classroom engagement utilized a curriculum-based outreach exercise targeting middle schools, functioning much like a focus group. The Taproot Program provides a captive audience for direct, in-the-classroom engagement. One-hour visioning exercises enabled activities and discussions about the youth experience bicycling in Redmond.

Through a series of interactive work sessions, four middle school classrooms

Focus Group Mapping Exercises

b:spoke facilitated mapping work sessions at a meeting of the Deschutes County Bicycle Pedestrian Advisory Committee (BPAC) and with a focus group of bicycle enthusiasts at Green Plow Coffee Roasters, to help identify specific needs of targeted user groups.

Both sessions involved identifying destinations, facility type preference, and building a bicycling constituency. All stakeholders in attendance at the Green Plow focus





group were enthusiastic and confident riders. Key stakeholder interests were access to downtown, supporting businesses districts, and connections to surrounding communities.

Key themes identified include:

- Stimulation of broad community support/action around bicycling and pedestrian issues will shape the sense of participation in making Redmond a bike/ped friendly community
- Residents are supportive of events that engage businesses and highlight visibility of bicyclists and pedestrians - demonstration projects can generate broader interest
- Need for a Redmond bicycling map, preferably with a digital format (smart phone compatible)

Findings

Survey

The following section will outline key destinations, interests, and conflicts to summarize key findings.

While there is general consensus that Redmond is a good place for active transportation, overall bicycle ridership remains low. The majority of survey respondents and community members engaged throughout the outreach process agree that Redmond is a good place for walking and bicycling (see Figure 5 on page 20). However, interested users do have concerns that limit walking and bicycling as a primary transportation mode choice.

Likewise, vulnerable user groups, especially youth and elder-aging groups, have

different perceptions around safety & security, connectivity, and ultimately experience a lower level of service.

The survey indicated a substantial gender gap in perceived safety on streets (see Figure 4 on page 20). Previous research indicates that if women are disproportionately concerned about the safety of bicycling on street facilities, it is often an indicator that bicycle infrastructure and programming are not meeting the needs of the community (Dill & Giebe, 2008).

Intra-neighborhood and recreational trips are the most visible and most stated destinations of current bike riders. Both of these destinations ranked at the top of the survey response for cyclists and pedestrians (see Figure 6 on page 21). From this, Redmond has the opportunity

Figure 4. Which of the following best describes how you feel about bicycling on streets in the City of Redmond?

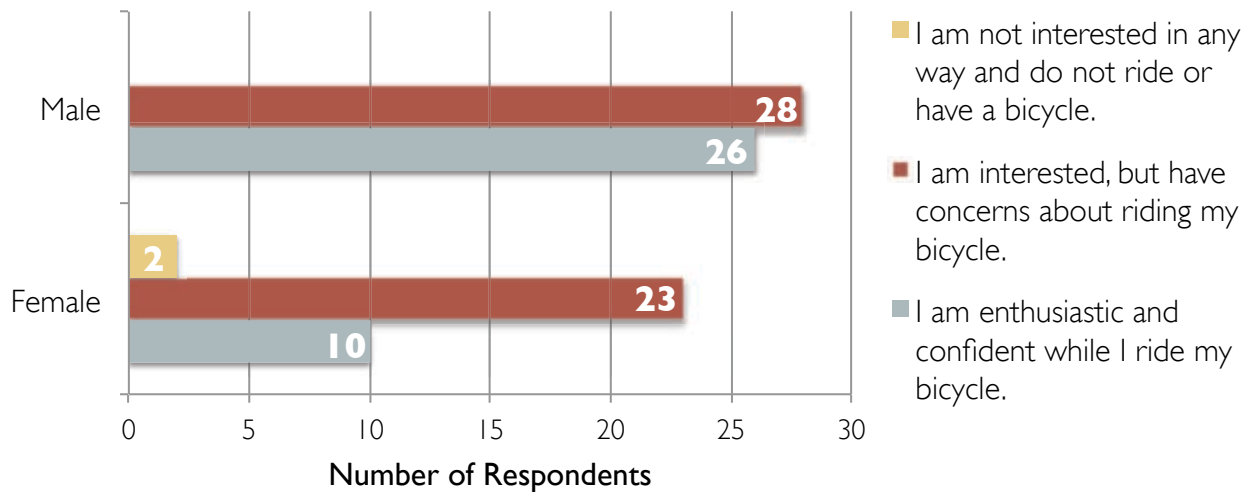
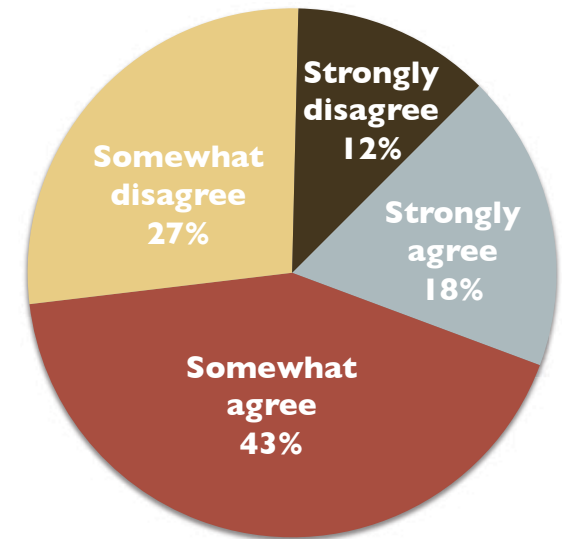


Figure 5. Redmond is a good place for riding a bicycle.



with the Dry Canyon Trail to continue to serve and attract new users for recreation. Access into and across the Canyon is important for recreational uses but also for reaching other key destinations.

Workplaces and schools stand out as the next most frequented destination while commercial activity hubs and neighbors home fall closely behind. These areas

stand to gain additional user trips from both existing and new riders by focusing on the experience getting to these destinations.

Weather (84%), convenience (85%), and distance (80%) are the top 3 factors impacting mode choice for active users. While little can be done to combat inclement weather, facility and network

development can alter the perceptions of convenience and distance.

For cyclists, the following actions would make it more likely that residents would ride a bike to get around (from Table 8 on page 71):

1. Off-street paths (87%)



Figure 6. How often do you ride a bike from your home to each of the following places?

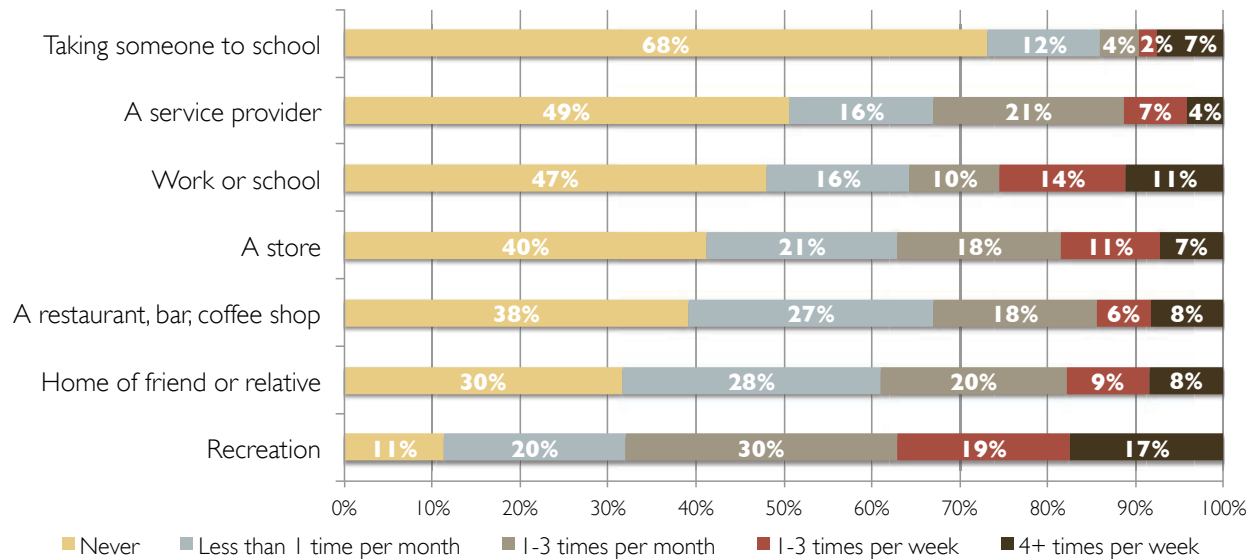
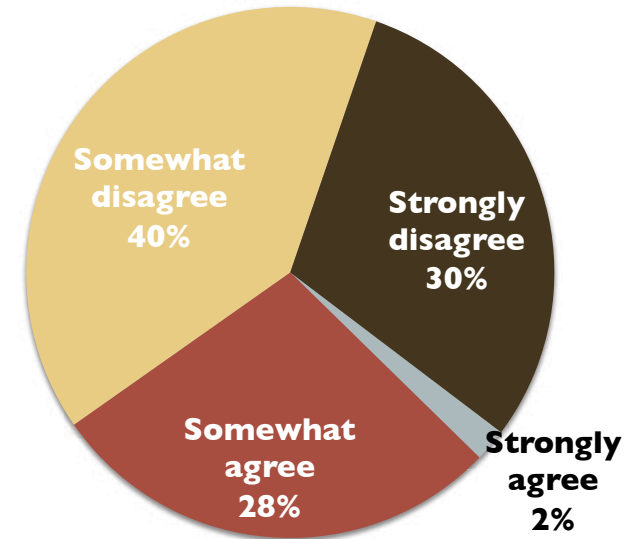


Figure 7. As a parent, I feel my child(ren) is safe from traffic bicycling along streets in Redmond.



2. More bike lanes on busy streets (71%)
3. On-street bike paths separated from traffic by parked cars or a curb (68%)
4. More destinations in my neighborhood (65%)

5. Neighborhood streets that give bicyclists and pedestrians priority (58%)

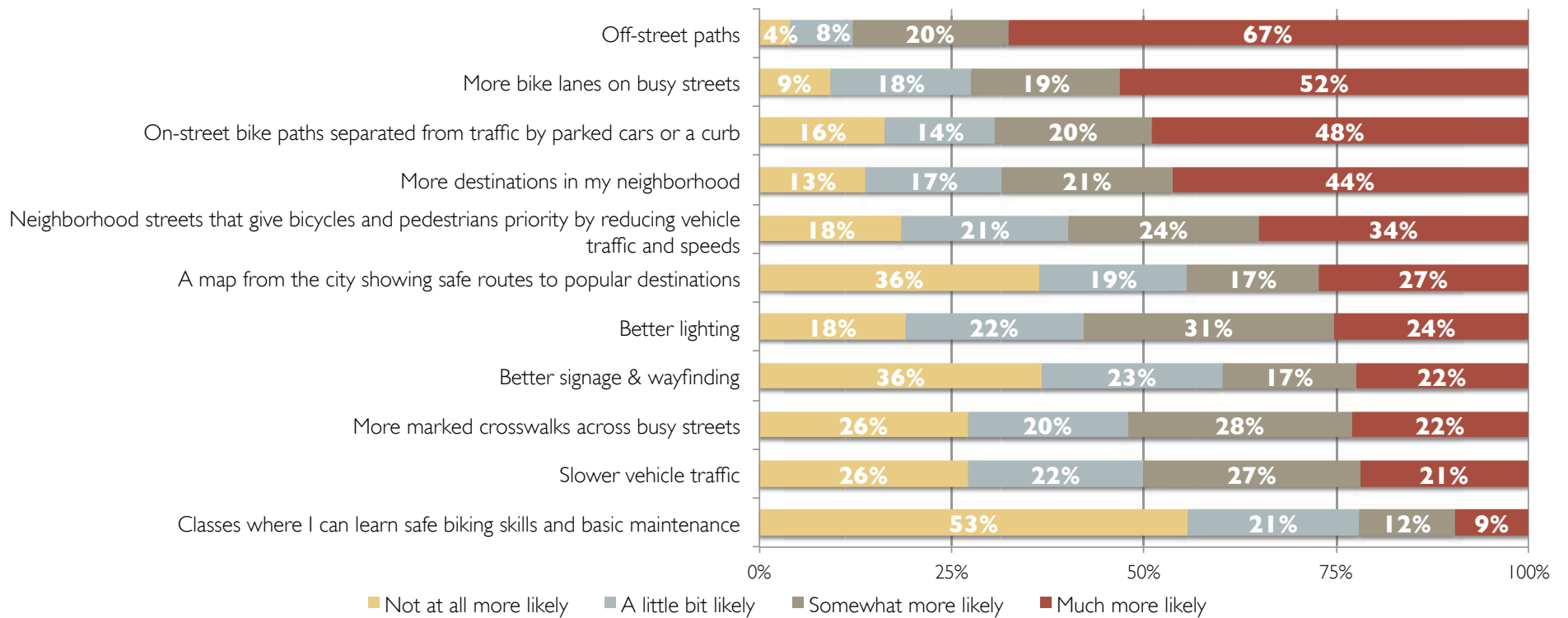
The development of off-street pathways would likely attract a high number of riders, greatly reducing conflicts between motorists and cyclists. Off-street pathways would also provide key recreational

and utilitarian connections for a wide variety of user groups.

In general, community members embrace bike lanes on busy streets and cite experience in other communities as more comfortable due to an existing bike culture, visibility of other riders, and wide variety of users. As Redmond cultivates its bike culture, bike lanes should become



Figure 8. To what extent would any of the following make it more likely that you would ride a bike to get around?



more appealing as more users use the facilities and rules of the road are upheld.

For pedestrians, the following actions would make it more likely that residents would walk to get around (as measured by survey totals - “somewhat more likely” and “much more likely”):

1. More destinations in my neighborhood (77%)
2. Better lighting (62%)
3. More marked crosswalks across busy streets (61%)
4. More sidewalks on busy streets (57%)
5. Continuous facilities that get you where you need to go (52%)

The perception of walking distance is impacted by the proximity of destinations, their visibility, and user ability to reach a variety of destinations (i.e. coffee

shop, bookstore, café, etc.). Developing small businesses opportunities along pedestrian-friendly corridors and at key intersections can be helpful to encourage more pedestrian activity.

Pedestrians also noted an interest in better lighting, indicating a desire for greater visibility as well as the need for increased nighttime safety. Key improvements along busy streets and key intersections, including lighting and marked crossings, will also aide in cultivating pedestrian-friendly streetscapes and remove barriers to users who may be willing to walk longer distances to destinations if safety is increased. Similarly, continuous facilities support access to destinations and separation from other road users, motorists and cyclists alike.

For a complete presentation of the survey and outreach results, see Appendix D: Survey & Findings on page 81.

The survey supports much of what b:spoke heard anecdotally throughout its outreach efforts: the community of Redmond would like to see an expanded network of off-street bicycle/pedestrian paths. This kind of infrastructure would motivate a variety of user groups to more frequently choose bicycles as a mode of transit and recreation.



Taproot Youth Outreach Drawings and Maps

The students of Elton Gregory and Obsidian Middle Schools provided our team with invaluable insights into their experiences of walking and cycling in Redmond. We asked them to envision the ideal streets and trails for bicycling, and produce drawings and street maps showing their designs.

As can be seen in Figure 9 to the right, many of these children produced remarkably innovative and sophisticated solutions to many of the challenges they encountered as pedestrians and cyclists. The top drawing depicts a pedestrian/ bike bridge over US 97, to make east-west crossings of the high-traffic highway safer. The middle design is a color-coded diagram of an improved intersection crossing, with painted bike lanes and

cyclist-triggered traffic signals. The bottom drawing shows a buffered bike lane, separated from vehicular traffic with bollards.

The resemblance between many of the children's designs and the ultimate strategies and recommendations made by b:spoke is uncanny, and shows how critical community outreach is to the development of effective plans customized specifically for their unique context.

Given the low response rate of youth (under 18) to the survey, the Taproot component of our outreach was essential to bridging that gap in user group representation.

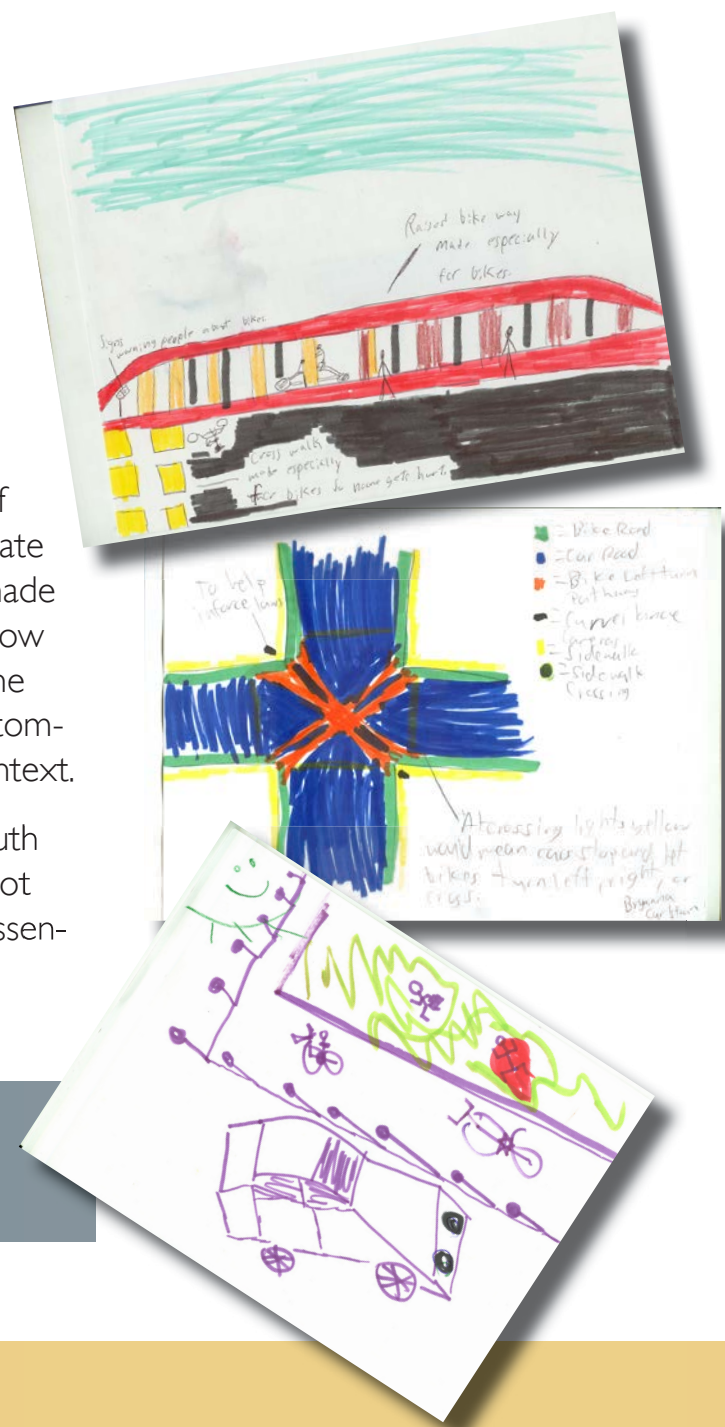


Figure 9. Student Illustrations of Desired Streetscape Solutions



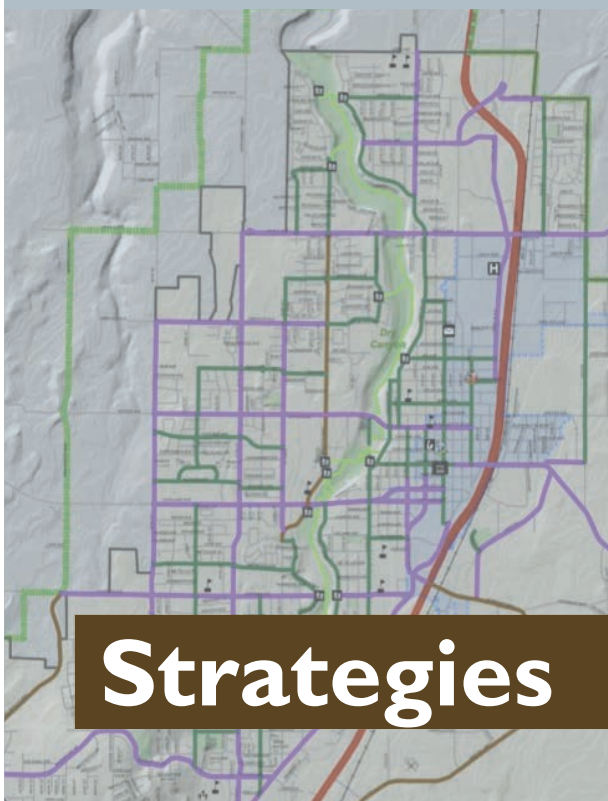


A Range of Options

A menu of strategies to increase bicycle ridership has been developed based on the results of best practices research, public participation and observations within the City of Redmond. These strategies aim to increase ridership from the addition of new riders to the system as well as to raise the number of bicycling trips by existing users.

We present in this chapter the range of strategies and the rationale for the appropriateness of the strategy in Redmond. The following chapter distills the full range of strategies into specific prioritized recommendations for action.

Building an active, cycling-friendly community is not a linear process, but rather an iterative process wherein needs, opportunities and constraints evolve as funding, transportation demands and behaviors change. Thus, proposed evaluation criteria including efficacy, cost, and maintenance are presented along with the strategies to help prioritize implementation.



Strategies



Opportunities & Constraints

The findings from assessments and community outreach are synthesized here into a summary of community opportunities and constraints for increasing bicycle ridership. In general, we find that Redmond is endowed with natural and built physical features that act as both assets and barriers to increased bicycle ridership.

In addition, the community has a strong contingent of dedicated bicycle enthusiasts who are motivated to be active advocates. Still they meet the challenges of unaware motorists, and a majority of citizens who fear riding on the road.

Natural and Built Environment

Table I shows a summary of opportunities and constraints in the natural and

Table I. Summary of Opportunities & Constraints: Natural and Built Environment

<i>Opportunities</i>	<i>Constraints</i>
Natural/Scenic/Recreational Amenities	East-West Connectivity Barriers
<ul style="list-style-type: none"> • Dry Canyon – “N-S bicycle highway” • Canals – opportunity to build trails along network of canals throughout city • Mountain and Butte Viewsheds • Extensive system of parks 	<ul style="list-style-type: none"> • Dry Canyon • US 97 Bypass • BNSF Railroad • Forked Horn Butte
Existing Bike Lanes & Trails	Roads & Trail Maintenance
<ul style="list-style-type: none"> • Dry Canyon Trail • Canal Trail • On-street bike lanes on major arteries • Sharrows on Black Butte & SW 5th Ave • Ample low-traffic streets for bike routes • Traffic-calming speed cushions already on some streets (SW Canyon Dr/15th Street) 	<ul style="list-style-type: none"> • Cinder surfacing on current canal trails limits user groups • Cinders for snow maintenance can be a hazard in bike lanes • Many existing lanes obstructed by grates, damaged pavement and gravel • Some existing off-street multi-use paths are unimproved. • Sidewalks are discontinuous throughout much of the city • Bike lanes are discontinuous throughout much of the city



**Table 2. Summary of Opportunities & Constraints:
Community**

Opportunities	Constraints
<ul style="list-style-type: none"> Existing bicycle enthusiasts and experienced riders eager to advocate and organize 	<ul style="list-style-type: none"> Majority of citizens feel unsafe riding bicycles in Redmond and few will ride on on-street bike lanes
<ul style="list-style-type: none"> Strong grass roots support for a local bicycle advocacy group 	<ul style="list-style-type: none"> Many drivers are unaware of bicycles on the road or in parking lots, leading to numerous near or actual accidents
<ul style="list-style-type: none"> Supportive City government interested in community involvement in planning processes 	<ul style="list-style-type: none"> Most cyclists in Redmond ride recreationally, not as a form of transportation.
<ul style="list-style-type: none"> City support for a Safe Routes to School program 	<ul style="list-style-type: none"> Some residents see cyclists as a nuisance
<ul style="list-style-type: none"> National Bicycle Races in Central Oregon 2011 & 2012 	
<ul style="list-style-type: none"> Downtown Urban Renewal Area improvements can be leveraged for bicycle projects 	

built environment. Prime among the many natural/scenic/recreational amenities in the City is the Dry Canyon Trail. The Dry Canyon itself, however, is also listed as a key constraint because it creates east-west connectivity problems

similar to those generated by the US 97 bypass and BNSF railroad. Another natural amenity, Forked Horn Butte, also creates a connectivity barrier to the new high school.

In the built environment, the city enjoys low traffic streets ideal for cycling and many existing on-street bike lanes on major arteries. However, these lanes lack continuity and are often obstructed by grates, poor surfacing, or lack of maintenance.

Community

As demonstrated by our numerous outreach events, Redmond has residents who are passionate about their community, and have a strong interest in improving the bicycle and pedestrian experience in the city. Interest among dedicated enthusiasts in creating a local advocacy group is visible. Similarly, the City government is supportive of a range of livability initiatives from implementing a Safe Routes to School program to improving infrastructure in the Downtown Urban Renewal Area.



The Strategies

The following represents a full menu of strategies designed to take advantage of Redmond's core strengths for increasing bicycle ridership.

Continue with Bicycle Master Plan

Redmond's current Bicycle Master Plan (part of the adopted Transportation System Plan) focuses on implementing bike lanes on major arterials & collectors as they are improved. According to the TSP, "bikeway improvements are aimed at closing the gaps in the bicycle network along arterial and collector roadways, in addition to providing multi-modal links to improve livability" (Redmond Transportation System Plan, 7-3). In addition, the current plan includes pursuit of all available bicycle and pedestrian grants and select bicycle and pedestrian projects

constructed through the City's capital improvement program.

This strategy is important both as a "baseline alternative" and for the value of increasing the connectivity of on-street bicycle lanes. Standard bicycle lane improvements are an important amenity to confident cyclists. These lanes provide necessary visibility to cyclists on roads with moderate traffic. However, standard bicycle lanes may not attract significant numbers of new users who are averse to riding in traffic.

Measure and Monitor Ridership

Conducting regular bicycle and pedestrian counts will help track progress of implementation activities and provide justification for future investments. Semi-annual automated counts (using pneumatic tube collectors) can help gauge

overall bicycle ridership. Annual human-conducted counts (utilizing volunteers) can help gather demographic information such as gender, age group and helmet usage of the riding population.

Key Actions:

- Establish baseline ridership levels and improvements target

Brand the System

Informational signage highlights to new users, existing users, and motorists that bicyclists are using the system. Official signage validates cycling as a transportation mode in Redmond. Wayfinding makes existing facilities and connections more visible and usable.

The Redmond TSP calls for "state of the art signage and striping on all bicycle lanes to educate both motor vehicle and



bicycle users about bicycle lane location, connection, and etiquette” (Redmond Transportation System Plan, 7-3).

Key Actions:

- Develop distinctive informational signage with destinations, mileage, and time
- Implement signs to highlight key access points and route changes
- Develop an information campaign (e.g. “Bike Redmond!”)
- Implement a bike network map, including a digital version optimized for mobile devices
- Make on- & off-street trail information available in formats for use in Google Maps
- Ensure that Redmond bike events and facilities are easily searchable and accessible in an online format

Events

Cycling can be a tool to promote community engagement. Cycling-specific events help create an advocacy network. Integrating cycling into broader community activities increases access and outreach for these events. Programming should include education about the system, bicycle safety, and access to supportive networks. These events are described in greater detail in Appendix E: Outreach Models on page 91.

Sample Broad Outreach Events:

- Park 2 Park: Similar to Portland’s Sunday Parkways series, this event should include open access of bicyclists and pedestrians to temporarily closed roads, and activities that support streets as places for community (e.g. bike fix-it stations, bike demonstrations)

- Nighttime riding event to promote nighttime safety
- Provide additional temporary bike parking at larger city events

Sample Business Events:

- Shop by Bike: Offer promotions or discounts to customers who arrive to downtown on bicycle (bring in your helmet to prove it!)
- Bike Scavenger Hunt: Incorporate bicycles into Downtown Redmond’s existing business outreach game
- Provide avenues for community to attract participants in near-term (Fall 2011 and 2012) events for Road Cycling and Mountain Bike National Championships being hosted in the region

Sample Youth Engagement Events:

- Bike rodeo



- Kidical Mass/Bike trains
- Safe Routes to School
- Promoting youth in schools

Implement Dry Canyon-based On-street Loop Routes

This strategy builds off the popularity of the Dry Canyon as a facility for recreational riders and “interested but concerned” riders who use the network for short trips. A series of routes that start in the Dry Canyon could increase recreational trips by providing better access to destinations in and along the canyon itself.

According to the Redmond 2020 Comprehensive Plan, “the City shall work to acquire and develop a trail system along the entire length of the Dry Canyon” (Redmond 2020 Comprehensive Plan 2008 Update, 37). In addition, the City of Redmond’s Trails Master Plan calls for

“development of collector and arterial surface bike paths to provide critical east-west connection to the identified trail components” (City of Redmond 2030 Parks Master Plan Update, 48).

Key Actions:

- Increase bicycle parking in parks along the Canyon trail
- Develop unique branding and signage of the system
- Implement signage at existing access points into the Canyon
- Improve the connection between the Canyon and the high schools (better surfacing)
- Prioritize new projects that feed off the Dry Canyon to build a route network. For example, prioritize loops to downtown, key parks away from the canyon, and schools

- Identification of a loop route in map form based on connecting major destination points
- Identify and implement additional access points to canyon with ramps or low-grade stairwells

Implement a “Bike Boulevard” System

Bicycle boulevards are low-traffic, shared-use roadways on which motorists are allowed, but are enhanced to provide priority to bicyclists and pedestrians.

Continuous bike boulevards help encourage “interested but concerned” cyclists on Redmond’s low traffic residential streets as both a recreational and transportation mode. These users generally fall within the basic cyclist category defined by the TSP, and are generally people who “prefer the most comfortable (although sometimes circuitous) access to destinations,



using low speed, low volume streets or separate, multiuse paths” (Redmond Transportation System Plan, 7-2).

These facilities can link neighborhoods, business districts and recreation opportunities. Bike boulevards can be implemented citywide. The planning process engages residents in making their own streets safer for vulnerable users and their streets centers of neighborhood activity.

For specific bicycle boulevard design details, see Appendix C: Best Practices on page 67.

Short-term Actions:

- Identify a low-traffic corridor for a demonstration project

Medium-term Actions:

- Implement the system with signage and sharrow markings
- Slow traffic along the boulevard with traffic calming devices like speed bumps and traffic circles
- Identify a public outreach strategy for introducing bike routes/boulevards to Redmond residents

Long-term Actions:

- Reduce traffic volumes with diverters

Focus on the Key Crossings

This strategy emphasizes improving the most difficult connections in the current set of facilities. The TSP already indicates a need to “provide arterial crossing enhancements” (Redmond Transportation System Plan, 7-3). Many key intersections

require vulnerable users to use very wide streets.

Enhancements should improve user visibility and increase the chances users can cross safely. Signalization enhancements could include increasing crossing time for pedestrian activated signals. Physical enhancements could include completing sidewalks and crosswalks, improving lighting, and exploring the use of painted bike boxes and bike lanes.

Top Priority Improvement Sites (in no particular order):

- Veterans Way & US 97
- Veterans Way & S Canal Blvd
- Highland & Rimrock/19th
- Add pedestrian signals at more access points on 5th & 6th



Implement Separated Bike Facilities

Many groups of users are highly averse to traffic. For example, persons with long commutes, young riders, elder riders, and recreational users are inhibited by high traffic speeds and traffic volumes. This strategy encourages the traffic-averse rider by focusing on expanding Redmond's separated transportation and recreational trail facilities.

Primarily, this strategy seeks to expand the trails network by focusing on implementing the Trails Master Plan to complete the Dry Canyon Trail, develop a neighborhood trail system on top of and along Central Oregon Irrigation District canals, and a trails system along BPA power line easements (City of Redmond 2030 Parks Master Plan Update, 48).

Near & Medium-term Implementation Actions:

- Implement asymmetrical off-street multi-use paths, similar to what is now implemented on Rimrock
- Add raised or buffered bike lanes to on-street facilities
- Pave existing cinder gravel off-street facilities

Long-term Implementation Actions:

- Explore separated crossings for US 97, for example, a bike/ped tunnel or bridge for US 97 just north or south of Veterans Way

Adopt a Complete Streets Policy

A Complete Streets policy would be a formal policy statement that encourages all agencies to consider all users in new

and retrofitted transportation projects. Implementation would include adopting a policy that establishes approved design guidelines, establishes performance criteria, and provides for clear exceptions where the policy is not applicable.

The 2020 Comprehensive Plan indicates that “all Master Plans shall observe and incorporate the Great Neighborhood Principles . . . Connect people and places through a complete street network and trail system that invites walking and bicycling” (Redmond 2020 Comprehensive Plan 2008 Update, 37).

Adopt a Pro-Bicycling Maintenance & Repair Policy

Although the TSP calls for “a maintenance program to clean bicycle lanes” (Redmond Transportation System Plan, 7-2), users of the current system cite that



obstructions (e.g. winter debris, flags) in the bicycle lanes inhibit safety. Including bicycle facilities in a maintenance & repair schedule helps get the most out of the existing network.

Key Actions:

- Keep bike lanes open during scheduled road repairs
- Survey for and remove obstructions from bike lanes
- Schedule seasonal street cleaning for bike lanes
- Establish an “Adopt a Bike Lane” program

Establish a Redmond Bicycle/Pedestrian Action Committee

A Bicycle/Pedestrian Action Committee can help advocate for all vulnerable transportation user groups. A Redmond BPAC should be established to ensure

review of transportation projects in the development phase from the viewpoint of bicycle and pedestrian users. Additionally, a BPAC can be empowered to spearhead encouragement and education activities.

Suggested Bicycle/Pedestrian Action Committee Support:

- Empower the group to coordinate events, branding and programming
- Provide staff support to get started
- Seek funding/budget for activities
- Establish a “community match” program that encourages community members to provide in-kind & volunteer matches to money spent by the BPAC on facility development and programming. This recognizes the community as a key actor in creating safe streets and expands

the budget by tapping into broader resources

- Develop a small grants program
- Can be used to initiate bike education, parking, or support tenets of the refinement plan
- Support youth in schools leading other youth
- Encourage new riders through peer and community relationships
- Seek youth involvement on the committee
- Youths do better in small groups, thus a small youth caucus is preferred over a single youth delegate
- Schedule meeting such that youths, and other user groups, may attend



Evaluation Criteria

While it is theoretically possible to implement all strategies as outlined, constraints on budget and human resources demand that the strategies be evaluated for feasibility and prioritization. Below is a discussion of criteria that are used to evaluate the different strategies developed for the Bicycle Refinement Plan. By design, all strategies are rated based relative to the current Bike Master Plan strategy; thus the Bike Master Plan strategy is neutral in each evaluation.

New Riders

Simply, this criterion asks if this strategy has the ability to attract new ridership. Given that most “interested but concerned” riders prefer low-traffic and separated facilities, those strategies get

the highest points for attracting new riders.

Similarly, encouragement activities are expected to do well for attracting a segment of the population who may be comfortable on the existing facilities. High points are awarded to strategies proven to attract new riders in other jurisdictions.

Raise Awareness

This criterion asks if this strategy can raise awareness about cycling in Redmond to new riders, existing riders, and motorists. Higher marks are awarded for strategies that increase visibility of both the system and users.

Build Support

This criterion evaluates whether there is opportunity for community members

to get involved and develop a sense of ownership in supporting a project in the strategy. High marks are awarded to strategies that include community building activities.

Cost

This criterion evaluates the relative cost of the strategy. Because no strategy is cost-free, no positive marks are given in this strategy.

Maintenance

This criterion asks if there is an additional maintenance burden for this strategy that perhaps is not accounted for in up-front costs? High marks are given to strategies that have low maintenance burdens.



Time

This criterion asks “What is the relative time-scale required to complete the strategy?” High marks are given to strategies that can be implemented quickly.

Strategy Evaluation

Table 3 on page 36 shows how the strategies presented in this section compare according to the criteria. The strategies with the highest scores tend to be the low-cost education and enforcement type alternatives that are available to implement in the near term. Those strategies with the lowest scores include higher-cost facility alternatives which require longer implementation timelines.

Equity and Evaluation for Preferred Strategies

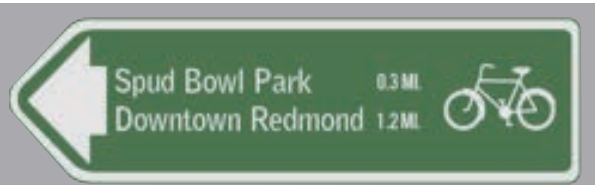
Evaluation of these strategies should continue after adopting a preferred set of strategies in a Redmond Bicycle Refinement plan. Evaluating equity for this plan can include measuring actions to ensure the broadest possible number of users have been reached or measuring whether actions reach targeted user groups, such as those at risk in the current transportation system because of age or ability. Additionally, geographic equity should be considered to ensure that all residents have equal access to the benefits of an improved active transportation system.



Table 3. Strategy Evaluation

Strategy	New Riders	Awareness	Builds Support	Cost	Maintenance	Timing	Total Score
Current Bike Master Plan	0	0	0	0	0	0	5
Measure & Monitor	0	0	+	+	0	+++	5
Brand the System	++	++	+	-	0	+	5
Events	++	++	++	--	0	+	5
Loop System	+	++	++	-	-	-	2
Bike Boulevards	++	++	++	-	-	--	2
Crossings	+	+	0	---	-	---	-4
Separated Facilities	+++	++	++	---	--	---	-1
Complete Streets	+	++	++	0	-	+	5
Pro-Bike Maintenance	+	0	0	-	-	+	0
Bike - Ped Advocacy	+	++	++	-	0	++	6





Final Recommendations

The final Refinement Plan recommendations are based on the cumulative efforts of the assessment process, community outreach, Stakeholder Advisory Group (SAG) feedback, and evaluation criteria of the proposed strategies. Final recommendations include actions for community involvement and events programming, as well as implementation of new physical bicycle/pedestrian infrastructure.

The strategies are further refined into a final set of immediate, near, and long-term recommendations. Table 4 on page 39 shows a list of the final recommendations.

Immediate Recommendations

The recommended immediate actions include those strategies that can be

implemented at low cost or without extensive preparations. The strategy “Establish a Redmond Bicycle/Pedestrian Action Committee” is further refined to the following recommended actions:

- Increase Redmond presence on Deschutes County Bicycle Pedestrian Action Committee (BPAC)
- Foster a local user network

Increasing involvement on the Deschutes County BPAC allows Redmond to build on the capacity and investment already existing in that organization. Establishing a local users’ network builds local capacity and supports local efforts.

Education and support initiatives in these recommendations are important for building an active cycling constituency. Figure 10 on page 40 shows an illustration of a “Bike Redmond” website

Recommendations



that could be used as a communication tool by a bicycle advocacy organization. Similarly, Figure 11 on page 41 shows illustrations of distinctive signage that helps brand the system to new and existing users.

Near-Term Recommendations

Near-term recommendations include those strategies requiring somewhat more financial or planning investment than the immediate strategies.

The proposed strategies to implement Dry Canyon-based loop routes and bike-boulevards are refined to one strategy of identifying low-traffic streets to create a continuous bike-route throughout Redmond. Prioritization of investments along this route would include:

- Signage for branding & wayfinding

- Enhanced crossings
- Bike corrals & parking

Implementation of a combination low-traffic bike route/boulevard and multi-use path is illustrated in Figure 12 on page 42. Similarly, Figure 13 on page 43 shows prioritization of cycling amenities along bicycle routes.

Long-Term Recommendations

Long-term recommendations include those where financial investment in physical infrastructure is the greatest. However, these strategies, which include improving difficult intersections and implementing separated facilities, may be the best investments for attracting new cyclists.

Improving crossing enhancements includes identifying funding, and scheduling bike/ped improvements to retrofit large

and busy intersections. Figure 15 on page 45 and Figure 16 on page 46 show illustrations of enhanced crossings through and over difficult barriers.

Implementing separated facilities would largely rely on creating rights-of-way agreements along canals and BPA power lines, as illustrated in Figure 14 on page 44. Connecting separated facilities may also require working with other types of rights of way, as illustrated in Figure 12 on page 42 and Figure 16 on page 46.

Illustrations

The following pages provide illustrations of some of the recommendations.



Table 4. Final Recommendations

Immediate Strategies	Continue with the current Bicycle Master Plan
	Increase Redmond’s presence on the Deschutes County Bicycle Pedestrian Action Committee
	Foster a local user network
	Implement a branding program identifying the system to users and non-users alike
	Develop community-supportive bicycling events
	Adopt policies that implement a Complete Streets policy (preferred) or a bike maintenance plan
Near-term Strategies	Adopt a pro-bike maintenance plan
	Identify a bike route system on low-traffic streets, prioritize investments along this route
Long-term Strategies	Establish baseline ridership counts and make improvement targets
	Improve key-crossings
	Implement separated facilities if demand for such facilities increases



A. Bike Redmond Website and Redmond Bicycle Map

Highlighted Recommendations:

- Brand the system
- Foster a local user network

Context:

Residents and visitors in Redmond often request a map of existing bicycle routes in Redmond. However, at this time, none exists. According to our Best Practices research, bicycle maps in other cities have been a key low-cost, high-return strategy to increasing bicycle ridership and confidence.

Description:

Figure 10 provides an illustration of “CHAIN” (Cultivating Healthy Active Individuals and Neighborhoods), an example of a city-hosted website that would provide a forum for experienced

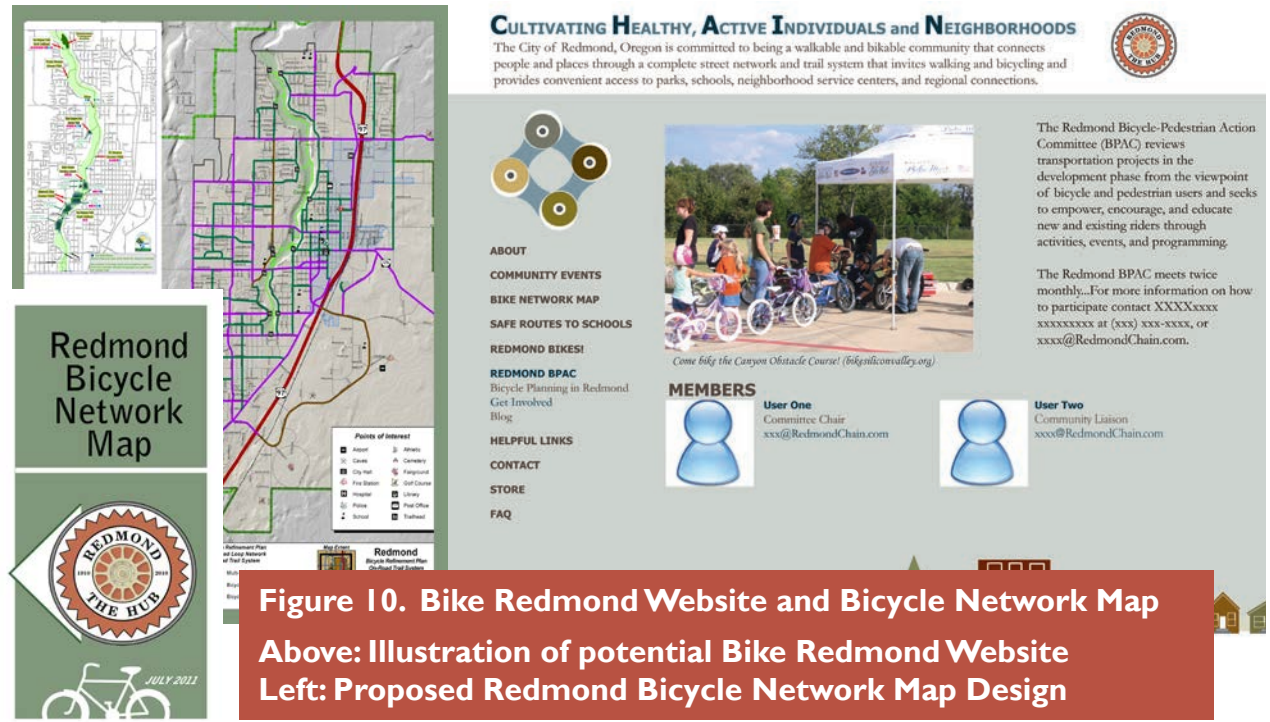


Figure 10. Bike Redmond Website and Bicycle Network Map
Above: Illustration of potential Bike Redmond Website
Left: Proposed Redmond Bicycle Network Map Design

and new cyclists in Redmond. This site would be a relatively low-cost way to provide information, education and materials to the general public.

This website could be monitored and updated by the new Redmond Bicycle Pedestrian Action Committee (BPAC), and host social networking among cyclists in the community. The website could host calendars of local and regional cycling

events, information for Safe Routes to Schools, helpful links to other cycling organizations, and the digital Redmond Bicycle Network Map.

In addition to being available digitally (and mobile optimized) on the website, the Redmond Bike Network Map should be available in print version at local businesses, the Chamber of Commerce, tourism offices, and other locations.



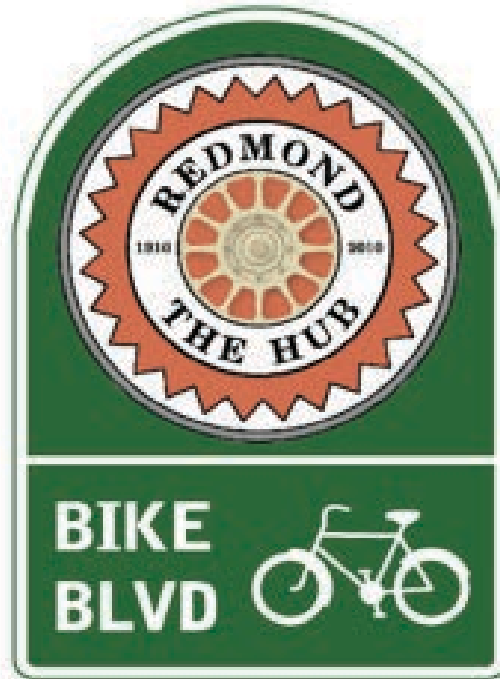


Figure 11. Redmond Cycling Signage

B. Distinctive Redmond Bicycle Signage and Wayfinding

Highlighted Recommendation:

- Brand the system

Context:

Redmond currently has no bicycle-specific wayfinding signage along its existing on-street bicycle lanes and separated multi-use paths. Aside from on-street

painted markings, inexperienced users and visitors have no way of navigating the extensive existing bicycle network in the city.

Rationale:

According to our Best Practices research, bicycle wayfinding signage has one of the best cost-to-benefit ratios of any strategy. With signage, users are able to

understand their proximity to key points of interest, such as parks, schools, urban districts, and other trails.

Points of interest should be marked with mileage and estimated time to location. Other signage options include bike boulevard/route markers and Dry Canyon Trail and Canal Trail markers.

Additionally, signage should reflect the strong “Hub” branding seen throughout Redmond and can also be included as part of Downtown Urban Renewal projects.



Figure 12. Enhanced Crossing & Multi-Use Path

Crossing of Spudbowl Park from SW Deschutes Avenue & SW Canyon Drive to SW Rimrock & SW Evergreen

C. Enhanced Crossing for Multi-Use Path and Bike Route

Highlighted Recommendations:

- Identify low-traffic bike routes
- Implement separated facilities

Context:

The City of Redmond's 2020 Comprehensive Plan has highlighted east-west connections as a key priority in improving the bicycle/pedestrian network in the city. One aspect of this is to provide access to already existing north-south trails like the Dry Canyon Trail.

Deschutes Avenue is already slated for upgrade as part of the Downtown URA Plan and it provides direct east side access to Spudbowl Park and the Dry Canyon Trail. Currently the access to the park is in the form of a sloped, unimproved dirt road. Further, SW Canyon Drive is a

wide, low-traffic north-south road with some speed cushions that could serve well as a low-traffic bike route

Description:

Figure 12 shows what the intersection of SW Deschutes and Canyon Drive would look like if Canyon Drive were a bike route and if the dirt road into Spudbowl Park was paved as a separated/multi-use trail (above). The bike route along SW Canyon Drive would be indicated by painted sharrows on the road and distinctive signage. The newly created paved trail would connect with the Dry Canyon Trail to the north with the Evergreen Trail (below) and SW Rimrock to the west and with the American Legion Park to the south.



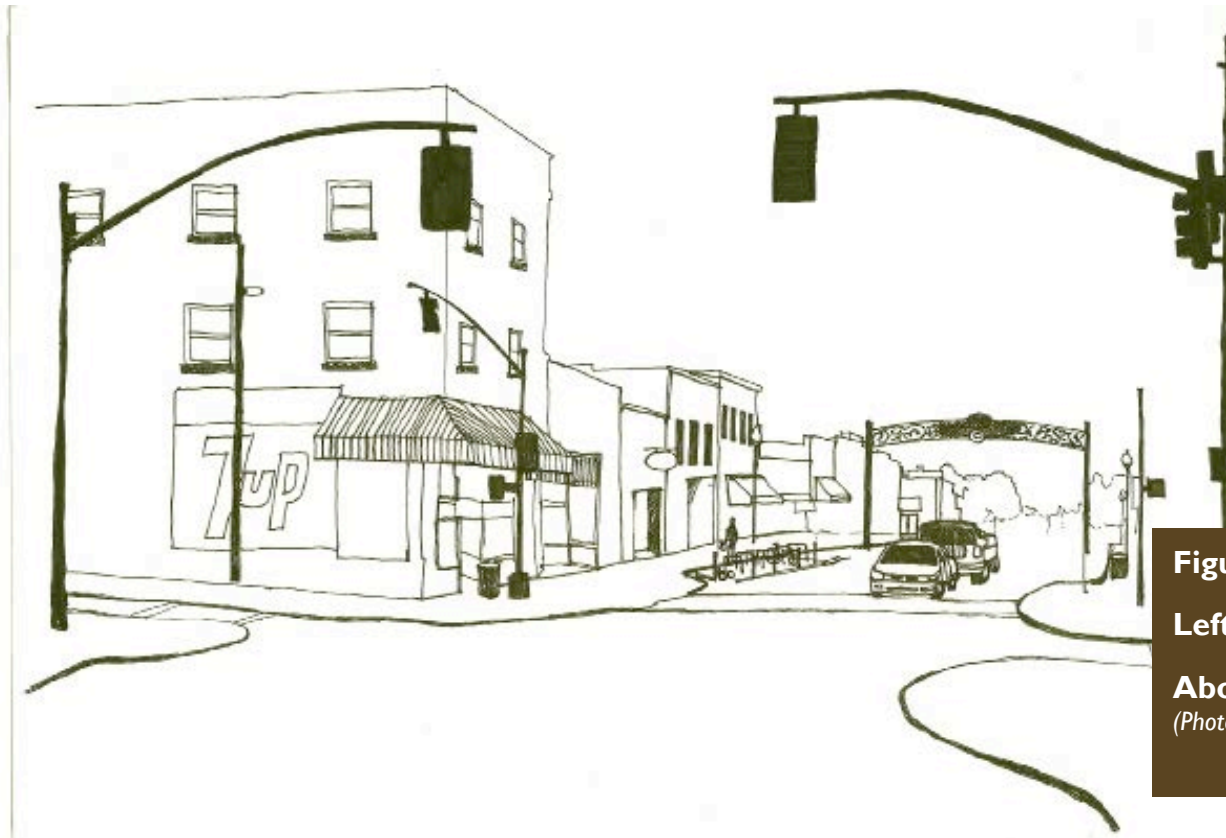


Figure 13. Downtown Bike Corral

Left: SW 6th Street at SW Evergreen

Above: Bike corral in downtown Portland

(Photo Source: City of Portland)

D. Bike Corral

Highlighted Recommendation:

- Prioritize improvements along existing bicycle routes, including parking

Context:

Bike parking corrals, a series of bicycle parking units replacing parallel parking spaces along main bike corridors, have

been implemented in various cities with great success. These facilities provide extra capacity for short cycling trips by replacing 1-2 parking spaces with capacity for 24-30 bicycles to park.

Description:

This rendering shows a bike corral, on SW 6th Street at SW Evergreen. Several

Redmond downtown businesses owners are regular bike commuters with many using cycles to run business operations and errands. Implementation of the bike corral provides tangible support to the cycling community.

Figure 14. Separated Facility

Lateral B Canal Route in extreme south-west Redmond, N/NW of new Redmond high school



ADA-compliant. Public access easements will be necessary to allow public use of the trails.

Description:

Figure 14 represents the kind of canal trail infrastructure that will allow for widespread use by a variety of user groups: pedestrians, cyclists, equestrians (where appropriate), children & adults, and experienced & inexperienced cyclists.

E. Separated Facility

Highlighted Recommendation:

- Implement separated bike facilities

Context:

The Parks Master Plan (2008) includes a Trails Master Plan that calls for new trails along the right-of-way of irrigation canals. Sections of these canal trails exist along the Pilot Butte Canal (owned by Central

Oregon Irrigation District) running north-south between SW Canal Boulevard and US 97. An additional trail exists west of 27th Avenue between Hemlock and Antler Avenues.

These trails as currently built are not suitable for cycling, as they have a cinder gravel surface. In addition, many residents report that these trails are poor for pedestrians and are not

Based on our community outreach, the residents of Redmond have a primary interest in seeing more separated/multi-use trails throughout the city, much like the popular Dry Canyon Trail. Since the City has agreements with the Irrigation District for right-of-way along the numerous canals, there is an opportunity for a widespread, comprehensive network of multi-use trails to energize the city.



F. Key Crossings

Highlighted Recommendation:

- Focus on the key crossings

Context:

Respondents indicated that the US 97 and SW Veterans Way intersection is difficult for cyclists.

Description:

Figure 15 shows what the intersection of US 97 and SW Veterans Way would look like if improvements were made to increase cyclist and pedestrian visibility.

Left-turn bicycle boxes demarcate a “safe haven” for bicyclists wishing to take a left turn from one street to the other without having to cross several lanes of traffic to make a “vehicular left”. Bicyclists wishing to turn left proceed straight through the intersection on a green light phase



Figure 15. Bicycle & Pedestrian Enhancement

US 97 & SW Veterans Way

and wait in the green painted bicycle box on the far side of the intersection until the cross street signal turns green. Bicyclists are most protected when vehicular right turns are prohibited.

Curb extensions and triangular “pork chop” curb extension islands bring the sidewalk further into the intersection, decreasing the crossing distance required for pedestrians. The curb extensions

should be mountable for tractor-trailers making right turns.

Green paint applications help denote potential “conflict zones” between automobiles and bicycles. These applications are suggested in places where automobiles are required to cross the bicycle lane (such as when turning right from SW Veterans Way eastbound to US 97 southbound).

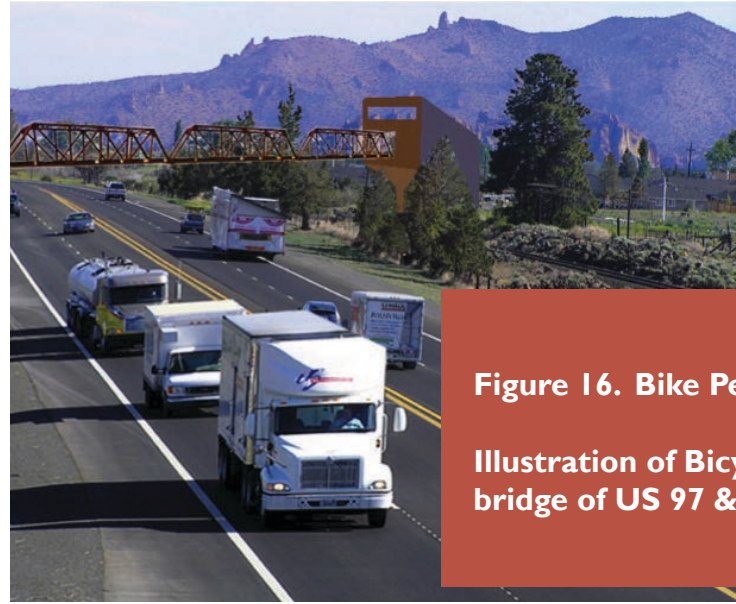


Figure 16. Bike Pedestrian Bridge

Illustration of Bicycle/Pedestrian bridge of US 97 & BNSF Railroad

G. Bicycle/Pedestrian Bridge

Highlighted Recommendations:

- Key Crossings
- Implement separated bicycle facilities

Context:

Mid-city crossings of US 97 and the BNSF Railroad are currently intimidating for cyclists and pedestrians alike. Many employees and students are discouraged from commuting by bike or foot to the employment areas and community college in southwest Redmond.

Description:

A bicycle-pedestrian bridge over US 97 and BNSF Railroad tracks would provide Redmond citizens with a safe, separated crossing over what has been identified as the most imposing barrier to increased bicycle ridership.

Through our survey, we have found that the bicycle facility type in most demand by the community is separated, multi-use paths. This bridge, located over the central portion of US 97 near Veterans

Way, would connect the residential areas to the west of the highway and railroad with the concentrated employment and industrial areas on the east side.

Further, the bridge would serve as an iconic gateway into the city and could be financed as project in the Downtown Urban Renewal Area.





Transportation and Land Use

The city of Redmond lies to the east of the Cascade Range in Central Oregon, with an estimated 2010 population of 25,945. The town encompasses 10.2 square miles in area, and was founded in 1910, and for many years was the economic engine of Deschutes County with a US Air Force Base (Roberts Field, later Redmond Airport) located within city limits. The following year marked the advent of electricity as well as the Oregon Trunk Line Railroad connecting Redmond with Bend and the Columbia River. While the city's postwar population remained steady for several decades, in the early 2000s the city, along with its neighbor Bend to the south, experienced a rapid growth period with the population almost doubling within a 10-year

period. The city's proximity to outdoor recreation attractions and resorts has contributed to its rise in popularity, making it an attractive market for second homes. The airport and neighboring industrial parks that include T-Mobile and PCC-Schlosser are the major employment centers within Redmond; the city as a whole contained 9,402 jobs in 2009.

In 2008, the City of Redmond adopted its Transportation System Plan (TSP) update that included an analysis of existing conditions for the roadway network as well as prioritization of future upgrades to the transportation infrastructure under the City's Master Plan and Action Plan. While both plans include projects that meet identified long-term transportation needs, projects listed only in the Master Plan do not have funds allocated

Appendix A: Transportation





Figure 17. US 97 Bypass seen from Maple Avenue Overpass

calls for completion of the Dry Canyon Trail, new trails along the right-of-way of irrigation canals, a trail along the Bonneville Power Administration power lines west of the city, and on-street bicycle lanes and sidewalks.

Roadways

The city is bisected east and west by US Route 97 and the railroad, which parallel each other throughout the city. US 97 connects Redmond north to Portland via US 26 and south to Bend, as well as regional destinations such as Madras and La Pine. The thoroughfare functions as the city's backbone; recent growth has largely spread north-south along the roadway. In addition, Oregon Route 126 is the primary facilitator for east-west travel to towns such as Sisters, Prineville and Eugene.

These major arterials intersect within Redmond's historic downtown. SW Glacier and SW Highland Avenues form a one-way east-west couplet as OR 126, while prior to 2008, US 97 was routed along NW/SW 5th and 6th Streets on a one-way north-south couplet.

US 97 Bypass & Major Roads

In an effort to relieve growing congestion as a result of the recent population boom, the first (north) phase of the Redmond Bypass, a four-lane divided highway, was constructed in 2008 allowing through traffic to bypass the city core. The project included construction of a grade-separated interchange north of downtown where former US 97, now US Business Route 97, meets the bypass, an overpass on Maple Street over the new highway, and two separate signalized



intersections at OR 126 (Evergreen and Glacier-Highland). Through traffic on OR 126 must turn left and travel for a short distance along US 97 before turning right at the next signal. South of downtown, the dominant building form is largely suburban where US 97 travels on a wide five-lane arterial flanked on both sides by strip commercial. There are several traffic lights located along this stretch, as well as a grade-separated interchange at SW Yew Avenue/SW Airport Way.

Other important north-south roadways include SW Canal Boulevard, which parallels US 97 to the west and was the original alignment for US 97 south of downtown, and Airport Way that circulates through the main employment areas. Additional connections are provided by SW 23rd Street-SW Rimrock Way-NW 19th Street, NW/SW 27th

Street, NW/SW 35th Street and NW/SW Helmholtz Way west of Dry Canyon; east of downtown, these include SW 15th Street-NW/SW Canyon Drive, NW/SW 9th Street, NE 5th Street, and NE 9th Street.

East-West Connectivity Issues

Due to the natural and man-made barriers such as Dry Canyon and the US 97 bypass/railroad, east-west mobility faces greater constraints than north-south travel. North of OR 126, NW/NE Maple Avenue features bridges over both the bypass/railroad and Dry Canyon, while W/E Antler Avenue runs within the canyon but does not allow through movement for vehicles across US 97. NW/SW Hemlock Avenue provides another east-west route, although it does not connect across Dry Canyon or the bypass/

railroad. South of OR 126 there are a greater number of options, including SW/SE Veterans Way, SW Obsidian Avenue, SW Quartz Avenue, SW Salmon Avenue, SW Reservoir Drive and SW Yew Ave. Of these routes, Veterans Way and Yew Avenue are most important within the city transportation network because they bridge the divide between both sides of US 97 and the railroad. Veterans Way, in particular, provides the most direct connection between the major employment centers located to the southeast.

Local Streets

The local street grid outside of downtown is largely intact especially west of Canal Boulevard, although there are several gaps and deviations where required by topography. Neighborhood streets that are parallel and continuous



with major arterials and collectors allow for diffusion of traffic instead of requiring all through movements to utilize the major roadways (except near the Dry Canyon area). East of the railroad however, the grid network is largely absent and destinations are accessed primarily through arterials.

Trails and Sidewalk/ Bicycle Facilities

Dry Canyon Trail

The Dry Canyon Trail is a 3.4 mile pedestrian/bicycle trail that runs north-south from Spruce to Quartz Avenues. The trail meanders within Dry Canyon and several linear parks to the south and allows for largely grade-separated connections between the north and south ends of the city, acting as sort of a “bicycle



Figure 18. Dry Canyon Trail bicycle infrastructure including wayfinding and ramps





Figure 19. Map of Dry Canyon Trail

(Source City of Redmond, GIS Department)

freeway". The trail is popular with locals and visitors alike, who enjoy its scenic beauty, numerous parks and trails, and

family-friendly bike path segregated from cars.

Steep walls on the sides of the canyon hamper neighborhood access as well as east-west regional connectivity. Connections across the canyon include Maple Avenue (where there is an overpass), Antler Avenue, Highland Avenue (where there is an underpass), and Quartz Avenue. The city has constructed several access stairs with channels to allow bicyclists and pedestrians to enter the canyon from surrounding neighborhoods (see Figure 18 on page 50). Several more are slated to be built at Maple Avenue and Pumice Avenue. The underpass beneath Highland Avenue allows for a safe connection between the north and south sides of the city.

While the Dry Canyon Trail has some wayfinding and interpretive signage at the north and south termini of the trail, someone unfamiliar with the area might have a difficult time finding the canyon or navigating the access trails. Accordingly, new wayfinding signage will greatly improve the pedestrian and bicycling experience in the Dry Canyon, and Redmond at large.

Collectors and arterials

In accordance with the statewide Transportation Planning Rule, cities are required to add sidewalks and bicycle facilities to existing collectors and arterials. In addition, any newly built collectors and arterials must be built with these facilities included. To that end, the TSP provides a list of projects that would retrofit existing roadways with sidewalks and bicycle

facilities (bike lanes in the majority of cases). There are currently intermittent bicycle lanes and shoulders along Airport Way and Veterans Way in SE Redmond, as well as several other east-west roadways elsewhere such as Highland Avenue, Maple Avenue, and Antler Avenue. There are also bicycle lanes present along US 97 throughout Redmond. Moreover, Rimrock Way-19th Street features a multi-use path for much of its length.

East-West Connections

The city has highlighted proposed east-west connections as especially important to providing access to major trails that primarily run north-south. Proposed on-street trails are envisioned for Maple, Hemlock, Antler, Highland, Obsidian, and Salmon Avenues west of Dry Canyon. Deschutes and Dogwood Avenues are

slated for upgrades within Redmond' downtown. Moreover, on-street trails are also planned on several north-south thoroughfares such as NW/SW 7th Street, NW/SW 27th Street and SW Canal Boulevard. As of 2008, the total length of the proposed on-street trail system was 18.2 miles.

Canal Right of Way

The city has intermittent trails along the right of way of previously used irrigation canals. A few sections exist along the Pilot Butte Canal which is owned by Central Oregon Irrigation District and runs between SW Canal Boulevard and US 97 throughout Redmond. An additional trail exists west of 27th Avenue between Hemlock and Antler Avenues. However, these trails are not suitable for

daily commuter use and are more appropriate for recreational cycling.

Public access easements will be necessary to allow public use of the canal trails. When completed, the continuous Powell Butte Canal trail would total 5.3 miles, with an additional 7-9 miles of trails along other canals. The city is also interested in completing a 4.5 mile trail to the west of the city along the BPA transmission lines. The BPA easement is between 125-200 feet in width; public access easements would be required to allow for development of this trail.

Regional Bikeway

The Three Sisters Regional Bikeway is a planned regional trail network that would connect Redmond with La Pine, Sunriver, Bend, Sisters, and Terrebonne. The



proposed Redmond section would travel north along SW Canal Boulevard from Redmond, then follow SW Helmholtz Way north before turning right on W Antler Avenue. At Dry Canyon, the trail would turn left and follow the existing Dry Canyon Trail to its northern terminus at the Water Pollution Control Facility. The trail would continue north along NW 19th Street before turning right on NW Pershall Way along the northern city and urban growth boundary. At NW 10th Avenue, the trail would turn right, heading south back into Redmond before turning left to go east on NW Quince Avenue. It would turn left to go north along US Business 97, and after crossing the interchange with current US 97, the trail would turn right on NW King Way and travel northeast out of Redmond

and towards Smith Rock State Park and Terrebonne.

Railroads

The Oregon Trunk Line Railroad was completed in Redmond in 1911. The railroad is now used exclusively for freight. It is owned by Burlington Northern and Santa Fe Rail Railway (BNSF) and operated jointly by BNSF and Union Pacific Railroad (UP).

At present time, 8-12 trains run daily through Redmond, with an expected annual increase of 8% over the long-term. There are numerous spur tracks off the BNSF line that are used for accessing various lineside industries in Redmond.

Before the opening of the US 97 bypass, the railroad formed the primary

east-west divide in Redmond. While the majority of residences are to the west of the rail line, new residential development has also been constructed along Maple Avenue to the east of the rail line.

There are six railroad crossings within Redmond. Maple Avenue features a grade-separated crossing, the rest are at-grade with gates and warning devices such as bells to signal an oncoming train. Maple Avenue, Veterans Way and Airport Way feature on-street trail connections across the railroad tracks.

Along with the US 97 bypass, the railroad provides a formidable barrier for those who live and work in Redmond and wish to commute from the west to employment centers in the east. BNSF







The City of Redmond adopted the 2020 Comprehensive Plan in 2001, which included land-use zoning designations throughout the city. This section reviews the zoning designations and real-world built form for commercial, residential, and industrial areas. Downtown is described in depth as an example of a commercial area. Residential areas are distinguished between those developed prior to 1990 and those developed after.

In addition to currently developed areas, Table 5 on page 66 shows that the majority of the city's urban growth boundary (UGB) is made up of Urban Holding land, the majority of which is located outside of city limits. This is land that is set aside for future residential development once demand warrants growth expansion. Land within this zone requires the city to

annex the parcels, as well as institute a zone change and/or comprehensive plan amendment before development can occur.

Downtown

Zoned Commercial

Commercial zones, including the central business district in downtown as well as auto-oriented strip commercial properties flanking US 97, US Business 97 and OR 126, account for 10.4% of total area. Saint Charles Medical Center is located within a commercial zone.

The Central Business District commercial zone (see Figure 21 on page 57) is defined as a mixed use downtown designation for primarily commercial uses.

Appendix B: Land Use and Built Form





Downtown Urban Renewal

Downtown Redmond has the most distinctive and consistent existing built environment identity of any Redmond built environment category, resulting from investments in new traffic, pedestrian, and recreational infrastructure in the Downtown Urban Renewal District. The iconic “Hub of Central Oregon” seal is featured prominently throughout downtown, on manhole covers, plaques, sun umbrellas, and Centennial Park banners and artwork.

According to the City of Redmond website, “In 1995, the City of Redmond originally adopted the Redmond Downtown



Figure 20. Design Elements Seen in Downtown Redmond

Urban Renewal Plan. This Plan initiated the successful US Highway 97 Reroute Project, the Sixth Street Reconstruction Project, the road system that supports the Fred Meyer complex, Centennial Park



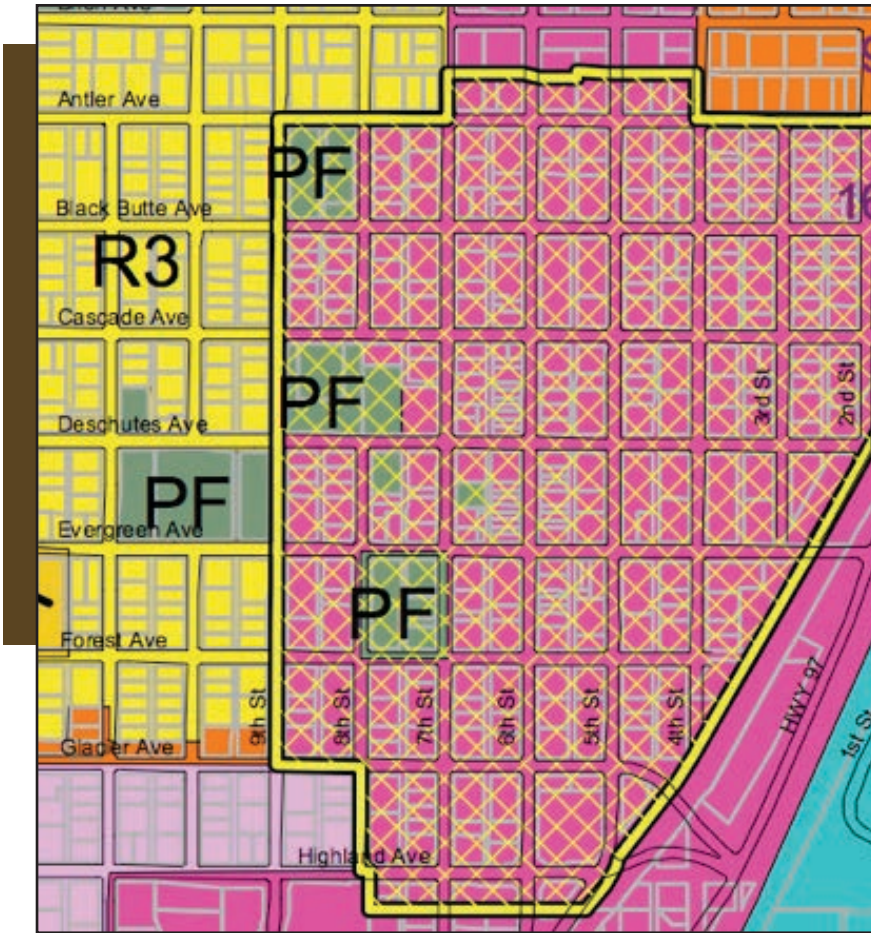


Figure 21. Zoning for Downtown Redmond

The bold yellow border and hashing indicates the area of the Downtown overlay district, Public facilities are identified with green areas and “(PF)” text. Central Business district commercial zone is identified with pink.
 (Detail of Map: 2020 Greater Redmond Area Comprehensive Plan and Zone Map)

and several other projects and programs meant to help revitalize the city center. The existing Plan authorized up to \$27 million in urban renewal project expenditures and is nearing its debt capacity limit” (City of Redmond). In January of

2011, the Downtown Urban Renewal Advisory Committee (DURAC) voted unanimously “to recommend amending the Plan to increase its maximum indebtedness and add 18 new projects. This recommendation reflected a conclusion

that blighted conditions remained and that targeted investments could both address the blighted conditions and contribute to the quality of life and economic health of the community” (City of Redmond).

The series of photographs in Figure 20 on page 56 illustrate the downtown Redmond built environment and “Hub of Central Oregon” branding. The latter is an integral part of the Redmond Downtown Urban Renewal plan, with a goal of building urban identity. The Downtown Urban Renewal plan has led to improvement projects along SW 6th Street, including curb corners, landscaping, brick sidewalk and ramp detail, recycling and trash bins, unique locally-crafted bicycle racks, public table and chair installations, and the iconic Redmond gate over 6th Street, among many other elements. The

urban renewal projects have led not only to a more pleasant downtown environment, but bicycle and pedestrian experience has been enhanced by road and sidewalk improvements, ADA-compliant sidewalk ramps, pedestrian crossings, and on-street bike sharrows.

Downtown identity is reinforced by consistent design of tree planter grates, “Hub of Central Oregon” manhole covers, plaques, & umbrellas, Redmond-branded benches, banners, and artwork, such as the stained glass clock tower in Centennial Park.

Downtown Architectural Design Standards

In the 2006 Downtown Architectural Design Standards for the City of Redmond, guidelines are set for pedestrian-oriented

downtown environment, liberated from the large volume of traffic on Highway 97 prior to the its rerouting. Consistent with the Redmond 2020 Comprehensive Plan mission statement, the ultimate goal is to “create a vibrant Redmond Downtown core where people shop, work, and play”. These standards are inspired by the design elements of Redmond’s historical commercial buildings, while implementing contemporary building methods. The Downtown Architectural Design Standards identify five goals: quality economic growth, vibrant downtown, improved downtown appearance, historic character, and pedestrian environment.

The goals of the design standards are targeted by distinct building elements that will produce an attractive, pedestrian-friendly environment. Specific standards are broken into eight categories:

1. cohesive architectural elements,
2. streetscape & pedestrian improvements
3. human scale,
4. weather protection,
5. pedestrian-oriented ground floor,
6. tri-partite facades,
7. materials, and
8. reinforcing the corner.

Of the streetscape and pedestrian improvements, the approach is to “reinforce the pedestrian realm and create spaces where people are encouraged to gather; implement one of the following four space-making treatments:” 1) small courtyards, 2) recessed entries, 3) chamfer entries (45-degree angle building corners), and 4) arcades.



Residential Zones

Within the city, high-density residential zones (R-4 and R-5) makes up 19.7% of Redmond's land area and is intended for a mix of single family residences, duplexes and multifamily residences on smaller lots. Limited commercial such as office are also permitted in these zones. These zones are concentrated in newer developments west of Dry Canyon, along SW Canal Boulevard and north of Maple Avenue to the east of the railroad.

Medium density residential (R-3) allows for some multifamily residential uses; this zone makes up 6% of Redmond's total acreage and is located in neighborhoods to the west of US Business 97 north of downtown and to the west of SW Canal Boulevard. Lower density residential (R-1 and R-2) zones are intended for large-lot



Figure 22. Sidewalks and Roadways in Pre-1990 Built Residential Areas

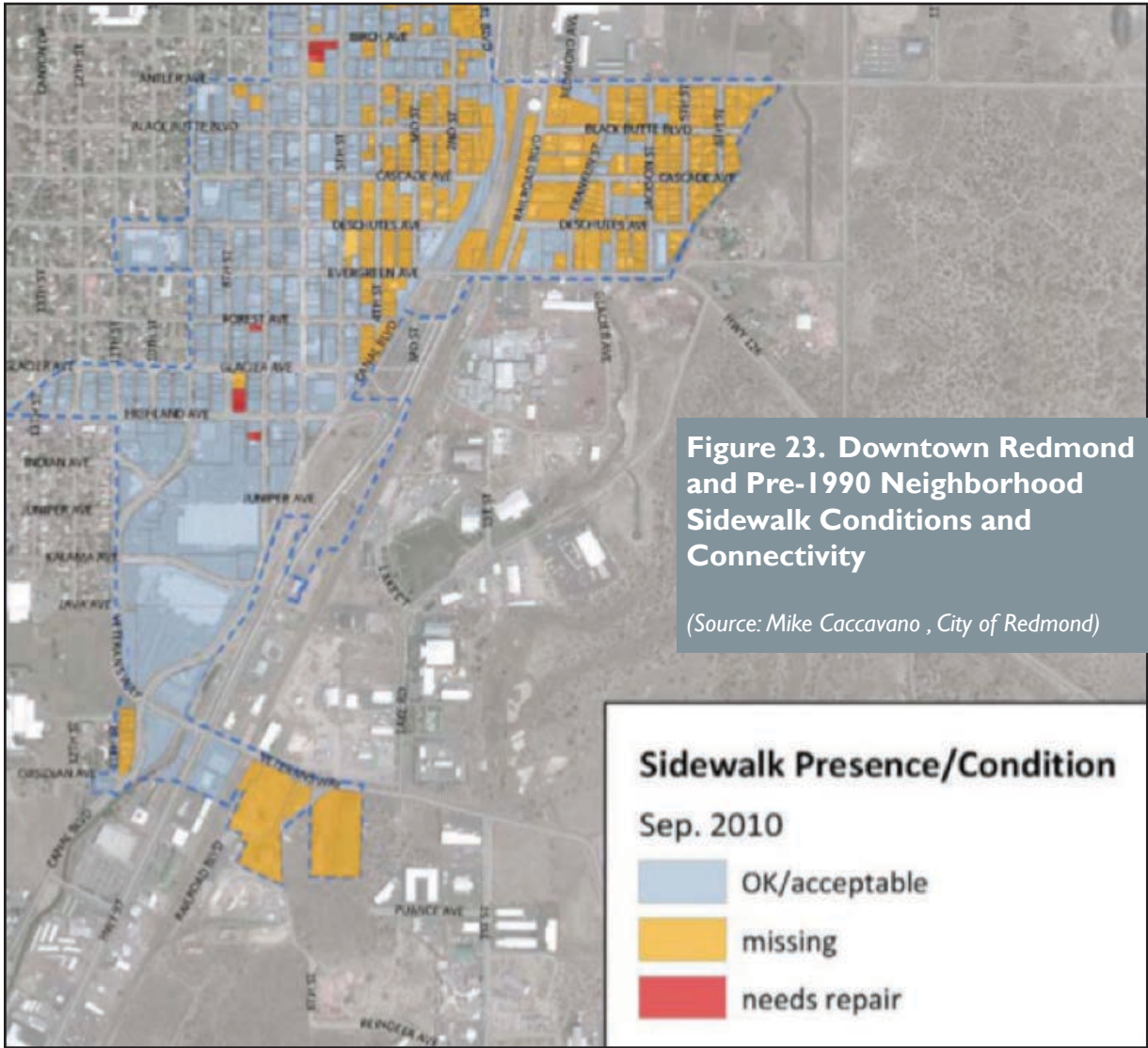


Figure 23. Downtown Redmond and Pre-1990 Neighborhood Sidewalk Conditions and Connectivity

(Source: Mike Caccavano , City of Redmond)

single family and duplex homes and account for 12.1% of total area. These zones are located in neighborhoods adjacent to Dry Canyon as well in the far southwest corner of the city.

Pre-1990 Residential Areas

Older and newer residential areas are designated as pre-1990 and post-1990, respectively, demarcated by the new style of residential development and rapid growth seen throughout Central Oregon since the mid-1990s. Most pre-1990 residential units are single family detached homes, ranging widely in style from early 1900s historical landmarks to 1970s single level ranch homes.

Older neighborhoods of all vintages predominantly have wide streets, many with discontinuous or absent sidewalks

Figure 24. Modern Residential Development at Forked Horn Butte

(see Figure 22). This lends itself to a challenging environment for pedestrians, due to incomplete and/or hazardous walking routes, and drivers intuitively driving faster on wider streets. Some of the older neighborhoods just north, west and south of downtown have gravel alleys behind homes (see Figure 22) that present opportunities for safe, low-traffic pedestrian and cycling routes and children's play areas.

Figure 23 shows the results of an evaluation by the City of Redmond of sidewalk connectivity and conditions in the downtown core of the city. Many of the older neighborhoods to the north, west and south of the downtown area have missing, damaged, or incomplete sidewalks. Some City staff have expressed an interest in prioritizing the improvement of sidewalk connections from these older



neighborhoods into the downtown core, as part of the downtown urban renewal effort.

Post-1990 Residential Areas

Redmond has experienced extensive new subdivision development since the 1990s. Figure 24 shows the Forked Horn Butte area on the southwest edge of the city, viewed from the new high school expected to open in Fall 2012. Most new residential development has been

on the outer perimeter of town in the form of cul-de-sac style single family detached housing subdivisions. Many young families have been attracted to Redmond for its relative affordability, high quality of life and outdoor recreation opportunities, and they tend to prefer this style of family-friendly development.

While these subdivisions take on various forms and styles, several developers have taken a unique approach that hybridizes

Figure 25. Sidewalks and Roadways in Post-1990 Built Residential Areas

the cul-de-sac street grid with the alleyways seen in the older neighborhoods close to downtown (see Figure 25 on page 62). Many of these homes also take a contemporary approach to the large front porch, and other more traditional design elements. The front door of these homes is on the main street, while the garage faces the alleyway - segregating different kinds of traffic and allowing for safer pedestrian, bicycle and child environments. Traffic is further mitigated and slowed by speed bumps. In addition, several of these subdivisions are clustered around children's playgrounds and/or parks that are connected to the neighborhood by a continuous network of sidewalks and in some cases, multi-use paths that run between homes. Most new developments were built to be compliant with ADA-style sidewalk





Figure 26. Sidewalks and Roadways in Industrial Areas

ramps, which supports the mobility of disabled and elderly populations.



Industrial Area

Industrial Zones

Redmond's primary concentration of employers is found in the industrial districts on the southeast corner of town, east of Highway 97/railroad corridor (see maps in Figure 27 on page 65). These include light manufacturing and research zones that have limited impact on surrounding development as well as heavy industry which can emit noise, smoke, emissions and other adverse effects. This area includes the most of the city's major employment centers; it does not include the airport, however, which has its own zone and makes up almost 14% of the Redmond's land area. The airport zone



was established to protect the airport from encroaching non-compatible uses that would threaten the necessary air-space required to operate aircraft safely.

Employers and Institutions

A major employer is the Redmond Municipal Airport (Roberts Field), which provides the only commercial flights in Central Oregon, and is also the location of a USDA Forest Service training facility and factories for aerospace manufacturing firms Butler Air and Lancair. West of the airport is a major T-Mobile call center that employs approximately 700 people. Several office parks are found in the same corridor as T-Mobile along Airport Way, many of them left vacant in recent years due to the recession.

Another noteworthy institution that draws people to the industrial area is the

Redmond Campus of Central Oregon Community College (COCC). The college offers a variety of courses, including some in the Manufacturing and Applied Technology Center (MATC), geared towards the career opportunities in the industrial district.

Walking and Biking

Although major roads in the area like Airport Way and Veterans Way have required on-road bicycle lanes, it remains a problematic bicycle and pedestrian environment. As can be seen in the photo collage in Figure 26, many of the bicycle lanes are interrupted by hazards such as drainage grates, gravel, and deteriorated asphalt. In addition, sidewalks come to abrupt ends that while marked for safety, make pedestrian mobility challenging and discouraging.

The biggest barrier to bicycle and pedestrian mobility is that essentially all of the industrial area lies on the east side of Highway 97 and the BNSF railroad tracks, on the opposite side of the majority of residents. These north-south routes act as a major barrier, making it difficult for people to commute to work or school. Consequently, while there were bike racks at some major employers like T-Mobile, there were no bicycles on the rack observed in the winter months of data collection.

Other Zones

Parks and Open Space

The Open Space Park Reserve zone accounts for 9.7% of total acreage and is meant to preserve open spaces and provide areas for recreational development



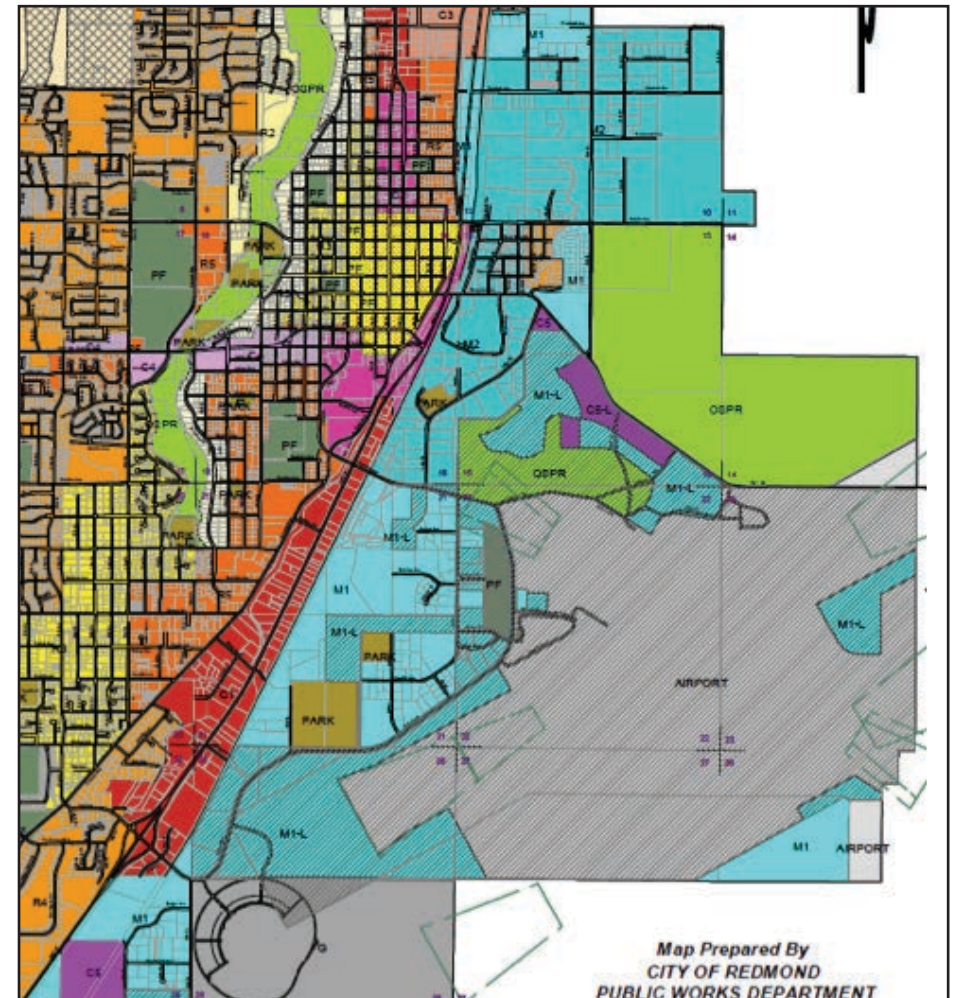
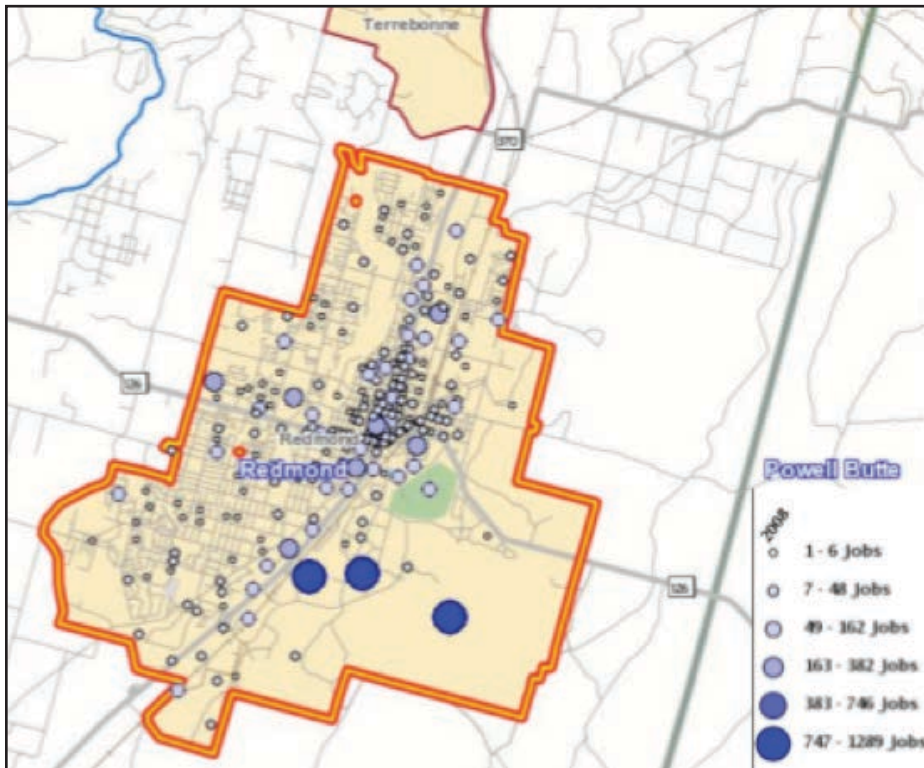


Figure 27. Redmond Industrial Area zoning (right) and employment distribution (above)

(Source: City of Redmond Public Works and Downtown Urban Renewal Plan Update)

Table 5. Redmond Zoning Designation and Acreage

Zoning Designation	Acres within City Limits	Acres within UGB	Percentage of Total City Area	Percentage of Total UGB Area
Airport	1,469	1,469	14%	12%
Commercial	1,094	1,094	10.4%	8.9%
Fairgrounds	321	321	3.1%	2.6%
Industrial	1,748	1,748	16.6%	14.2%
Open Space Park Reserve	1,015	1,015	9.7%	8.3%
Park	125	125	1.2%	1%
Public Facilities	322	322	3.1%	2.6%
Low Density Residential	1,277	1,277	12.2%	10.4%
Medium Density Residential	630	630	6%	5.1%
High Density Residential	2,066	2,066	19.7%	16.8%
Urban Holding	434	2,215	4.1%	18%
Total	10,501 acres	12,282 acres	100%	100%

and uses. This zone permits private development on a limited basis and allows transfer of development rights to areas that are suitable for development at higher densities. The Dry Canyon and Juniper Hills Golf Course are included in

this zone. Parkland in Redmond, which includes the Redmond Caves and several parks along the Dry Canyon Trail make up 1.2% of total land. The Redmond Fairgrounds are located in a separate zone and account for 3% of total land.

Public Facility Zones

Public facilities, including schools, government offices, police and fire stations, Redmond Cemetery and Central Oregon Community College, account for 3.1% of the city's total acreage.





Bicycling in North America

Davis, California, Portland, Oregon, and Minneapolis, Minnesota are cities routinely cited as having the highest level of bicycle usage in the United States. (Ridership is defined either as a share of commute trips or of all trips.) Planners in Davis and Minneapolis began modern bicycle infrastructure development in the 1970s (City of Minneapolis, 2010) (Buehler, 2007). Similarly, Copenhagen, Denmark began to target improvements for bicyclists in the 1970's and now enjoys a bicycle mode share of over 30%.

In contrast to the focus on utilitarian cycling by the City of Davis and Copenhagen, Minneapolis planners targeted recreational trails. Minneapolis and Portland both began to build bicycle facilities as part of the transportation network in

the 1990s. In the last decade, larger, more densely populated US cities like New York, Chicago, and San Francisco been aggressively seeking to increase cycling mode shares. Smaller towns, as well, have been looking to increase bicycling infrastructure as a quality of life amenity.

While most jurisdictions may not have the resources or density of New York, San Francisco, or Copenhagen, there are small and medium towns that are encouraging active transportation in their communities. This section presents the common practices of a sample of small and medium jurisdictions (see Table 6 on page 68) that have received certification as a "Bicycle Friendly Community" by the League of American Bicyclists. Additional examples of particularly innovative

Appendix C: Best Practices



practices are shown from cities and towns across North America.

Common bicycle jargon uses categories described as the “Four Es” to describe planning activities:

- Education
- Encouragement
- Engineering
- Enforcement

More recently, “Evaluation” has been added as a fifth category.

These categories are presented in this memo as follows:

Planning: How jurisdictions approach bicycle planning

Engineering: The types of physical infrastructure being planned and implemented.

Table 6. Bicycle Plans Reviewed			
Community	Population	Year of Bicycle Plan Reviewed	2010 Bicycle Friendly Community Award
Ada County, ID	395,974	2009	Bronze
Albuquerque, NM	448,607	2000	Bronze
Billings, MT	104,170	2011	Bronze
Brunswick, ME	21,820	2004	Bronze
Cedar Falls, IA	36,145	2009	Bronze
Salt Lake City, UT	186,440	2004	Silver

Education/Encouragement/

Enforcement: Programmatic activities that help grow a bicycling constituency.

Bicycle Planning Approaches

The towns sampled shared common visions for seeking to improve bicycling as an attractive transportation option,(Table 7 on page 70) particularly for short and medium length trips. A common



theme among jurisdictions with ambitious bicycling programs is an attention to bicyclists' needs at every level of transportation decision making from policy and planning to implementation.

Integrated Planning

Jurisdictions that focus on development of active transportation structurally incorporate bicycle / pedestrian issues into planning processes. All of the communities sampled have formed Bicycle Advisory Committees (BACs) to help guide planning, project implementation and outreach efforts. Examples of committee efforts include:

Planning: In Brunswick, ME, the advisory committee was formed to help plan and implement a 2.5-mile multi-use path. The committee has built on the success of that project and is responsible

for long-range bicycle planning in that community.

Outreach: The Mayor's Bicycle Advisory Committee in Salt Lake City helps organize that city's annual "Bike Week" event.

In addition to active BACs, larger jurisdictions have full-time bicycle and pedestrian coordinators. Mid-sized jurisdictions have recognized the value of part-time staff. For example, the contracted "Alternate Modes Coordinator" in Billings MT has helped the town receive over \$10 million in project grants.

Complete Streets Policies

Complete Streets policies are overarching directives adopted by states, counties, or local jurisdictions that establish that public rights-of-way should be designed to provide safe use and access for all

users. For example, a 2009 resolution adopted by Ada County ID states:

"Streets, bridges, and transit stops within Ada County should be designed, constructed, operated, and maintained so that pedestrians, bicyclists, transit riders, motorists, and people of all ages and abilities can travel safely and independently" (Federal Highway Administration, 2010).

Similarly, Cedar Falls Iowa recommends adoption of a complete streets policy in its 2009 Bicycle Plan to ensure that "bicyclists' needs (are) considered throughout the planning, design, construction and maintenance of all streets.



Table 7. Vision Statements from Reviewed Bicycle Plans

Community	Active Trans	Health	Improve Safety	Quality of Life	Congestion Mitigation	Other
Ada County, ID	×		×			Planning to help increase funding
Albuquerque, NM	×	×			×	Economic benefits through congestion mitigation
Billings, MT	×	×	×			
Brunswick, ME	×		×	×	×	To be able to have middle school aged children be able to walk / bike safely anywhere in town.
Cedar Falls, IA	×		×	×		Build on community Assets
Salt Lake City, UT	×	×				Recreation, Build Community

**Evaluation:
Metrics & Information Gathering**

Surveys and bicycle counts provide important tools to help assess current and near-term bicycling potential & needs. For example:

- Ada County, MT conducted survey counts at 33 locations over a 3-week period in preparation for its 2009 Roadways to Bikeways plan.
- The City of Portland uses volunteers to conduct annual bicycle and pedestrian counts over two days at key on-street and off-street locations, including bridges.
- Albuquerque bicycle counts used for its plan included observations such



Table 8. Systemic Planning Practices of Reviewed Plans

Community	Bike Coordinator	Bicycle Advisory Committee	Complete Streets Policy
Ada County, ID	Staff Transportation Planner w/ responsibility as dedicated bike/ pedestrian coordinator	Yes	Adopted May, 2009
Albuquerque, NM	Staff bicycle / Pedestrian planner	Yes	Proposed
Billings, MT	Part-time bicycle grants writer; proposed full-time staff.	Yes (includes city, county, and planning board representatives)	Now under review
Brunswick, ME	No	Bike-Ped	No
Cedar Falls, IA	Recommended in 2009 plan	Yes	Recommended in 2009 plan
Salt Lake City, UT	Dedicated Bike/Ped coordinator; also has dedicated trails coordinator.	Yes	Established by Mayoral Executive Order in 2006; included in city code in 2010

as helmet usage, sidewalk riding, and traffic violations.

Fragmented street networks were considered an existing constraint in many of the bicycle plans reviewed; establishing ridership counts were common practice

determining selection and prioritization of links for network completion.



Figure 28. Standard AASHTO Facility Examples

- a. Shared Roadway
- b. Signed Shared Roadway
- c. Bike Lane
- d. Multi-use path

Source: *Guide for the Development of Bicycle Facilities* (AASHTO, 1999)



Engineering & Design

Bicycle infrastructure development includes providing for a bikeway network, and establishing supporting amenities such as signage, signals, pavement markings, and bicycle parking. There are many academic studies showing a strong relationship between facility implementation and higher levels of ridership in a community (Dill & Carr, 2003; Dill, Pucher & Handy, 2010; Pucher, Thorwaldson, Buehler & Klein, 2010; Ewing, Handy & McCann, 2010).



Bikeways

Most jurisdictions cited in this memo call for on-street bicycle facilities that meet or exceed guidelines published in the *Guide for the Development of Bicycle Facilities* produced by the American Association

of State Highway and Transportation Officials (AASHTO, 1999). AASHTO categorizes 4 dominant facility types:

1. Shared roadways: These have no special identification for bicycling.



Includes low-volume streets and paved shoulders.

2. Signed shared roadways: These are similar to shared roadways, but are signed as being part of a bicycle route.
3. Bike lanes: These are standard, single-line striped bike lanes
4. Shared-use paths: These are off-street facilities, typically used by pedestrians and bicyclists for utilitarian and recreational use.

Each of these facilities is recognizable in Redmond. Examples from the Guide For the Development of Bicycle Facilities are shown in Figure 28 on page 72.

While the AASHTO guide is used a starting basis for facility engineering, the guide itself is clear that it is “not intended to set forth strict standards” (AASHTO, 1999, p. 2). Jurisdictions have provided

recommendations on how to implement the AASHTO guides with respect to overall street design. For example:

- Ada County Bikes to Boulevards plan calls for wider bicycle lanes when parking lanes are present. Additionally, this plan calls for wider parking lanes when auto-turnover is high.
- Billings and Cedar Falls both call for “road diets”, or removal of traffic and/or parking lanes to facilitate inclusion of bicycle lanes. Typically this involves converting 4-lane roads to 3-lane roads (two traffic lanes with a center turn lane).

Similarly, jurisdictions may use the AASHTO designs as a starting point to blend in a broader range innovative facility designs seen in North American and European cities with robust bicycling populations.

For example:

- Ada County, like Minneapolis, included its own detailed design guideline in its 2009 bicycle plan.
- Billings and Brunswick each illustrate specific facility recommendations, including bicycle boulevards, in their recent bicycle plans.

Academic studies have reported a range of responses to innovative facilities. It had been thought true that less confident cyclists prefer greater separation from vehicles, and more confident cyclists prefer on-street facilities. However, recent studies giving cyclists a greater range of options to choose from show that all types of riders prefer separated facilities (Winters & Teschke, 2010). The following are examples of some of the broader facility types recommended to improve greater separation of cyclists and traffic.



Figure 29. Examples of Cycle Track Implementation

Left: Bidirectional separated bikeway on Dunsmuir St, Vancouver BC.

(Doerksen, 2010)

Right: Grand Street cycle track in New York

(Source: Nicholas Klein in Pucher 2010)



Separated Cycle Tracks

On-street bicycle lanes may be separated from vehicular traffic either by auxiliary infrastructure (planters, bollards) or by a row of parked cars (Figure 29). Also called side-paths or “sandwich lanes”, these facilities are common in European cities and have been implemented in New York, Portland, Vancouver, and Montreal. These facilities provide greater separation between cyclists and automobiles and have been shown to attract greater numbers of cyclists, women cyclists in particular, than standard bike lanes (Dill, Pucher, & Handy, 2010;

Winters & Teschke, 2010; Pucher, Thorwaldson, Buehler, & Klein, 2010).

Cycle tracks work best on longer stretches of road with few driveways and intersections. The Ada County Roadways to Bikeways Plan (ACHD, 2009) proposes the use of cycle-tracks under specific conditions. Note, AASHTO guidelines warn against these types of facilities due to a variety of factors, most predominantly because cyclists are less visible to turning vehicles and could be at greater risk at for right hook collisions and other accidents at intersections. A recent study of emergency response

and police crash reports in Montreal, a city with a large network of cycle tracks, shows that the rate of injury to cyclists on these facilities is less than or equal to, but not greater, that of cyclists travelling on roads without cycle tracks (Lusk, Furth, Morency, Miranda-Moreno, Willett, & Denerlein, 2011).

Buffered Bicycle Lanes

Buffered bicycle lanes are more similar to standard bicycle lanes than a cycle track, but still allow a greater separation from traffic. The buffer in this context is a narrow painted separation between the





Figure 30. Before & After Buffered Bike Lane in Seattle

Source: Seattle Department of Transportation (SDOT, 2010)



Figure 31. Raised Bike Lane in Bend, OR

(Barnes, 2007)

traffic lane and the standard left-of-parking bicycle lane. The separation between the bike lane and the parking lane is also delineated.

None of the jurisdictions in the sample call for implementation of buffered lanes in their bicycle plans; however, these lanes have been implemented in Portland, Seattle, New York, and Philadelphia. In both Portland and Seattle, implementation of the buffered bike lane has included

removal of one thru lane of traffic. Figure 30 shows a before and after implementation in Seattle.

Raised Bike Lanes

Bike lanes elevated from the road way with a mountable curb (Figure 31) provide a deterrent to motorists from entering the bikeway, but do not present a physical barrier to cyclists when overtaking or turning. None of the jurisdictions

reviewed are planning these facilities, however they have been implemented in Bend and Eugene, Oregon and are being planned in Chicago, Vancouver B.C., Milwaukee, and Guelph ON (pop. 114,943). The Milwaukee bicycle plan recommends raised bike lanes for both streets with and without on-street parking; for streets with on-street auto parking, the parking lane is also raised.

Figure 32. Bicycle Boulevard as Illustrated in the Ada County Roadways to Bikeways plan

Bicycle Boulevards

Bicycle boulevards (similar to the European “Woonerf”) concept are low-traffic, shared-use roadways on which motorists are allowed, but which are enhanced to provide priority to bicyclists and pedestrians.

These traffic-calming enhancements include:

- speed bumps
- traffic circles
- choker entrance points limiting automobile flow
- lowered speed limits

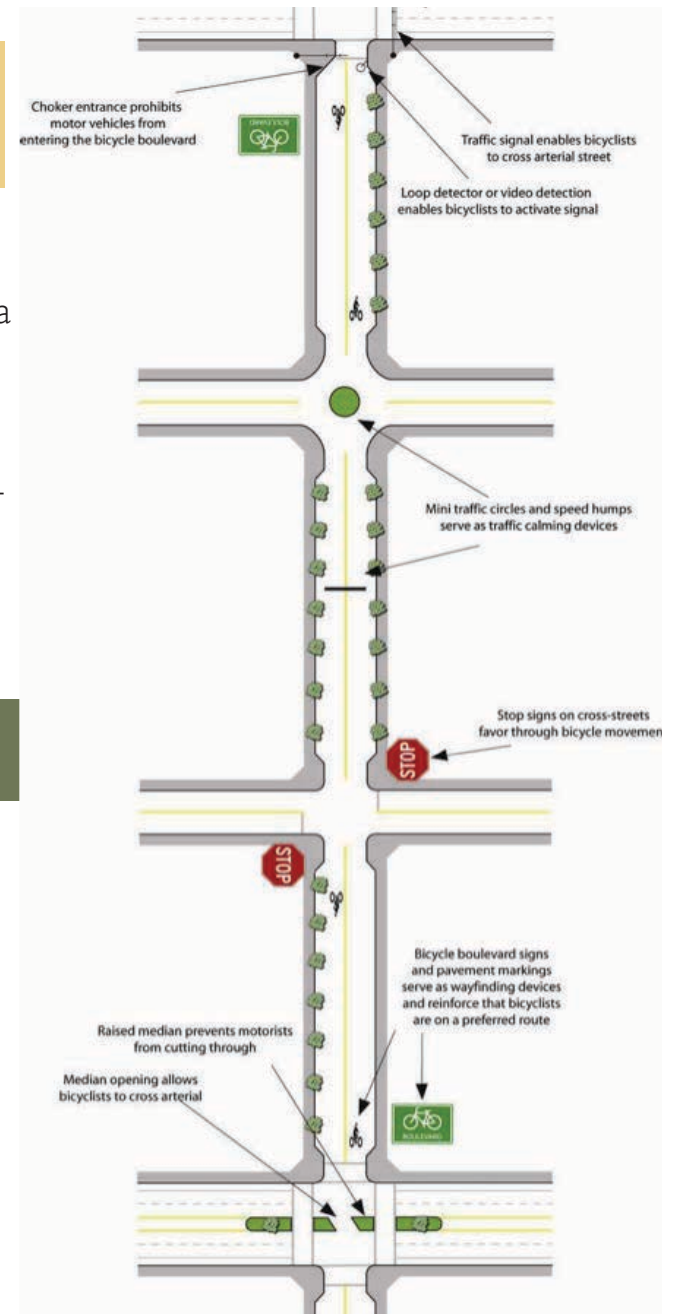
Stop signs are typically arranged along the boulevard to provide bicyclists with continuous right of way.

Both Billings and Portland currently have bicycle boulevards and have specific plans

for extending the existing networks. Ada County recommends bike boulevards as an approved facility type; similarly, Brunswick recommends implementation of traffic calming techniques and European-style “Woonerf” roads. Albuquerque is exploring the implementation of bicycle boulevards.

Other Supportive Bicycle Amenities

Infrastructure amenities aside from the bikeway network itself help ensure safe passage for bicyclists (especially through intersections), help provide cyclists with greater visibility, and help make cycle riding easier:



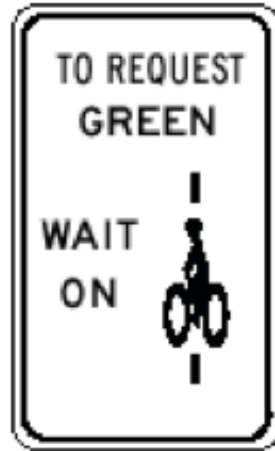


Figure 33. Signage and Pavement marking for bicycle loop detector use

Right: Billings Area Bikeway and Trail Master Plan (2011)
 Left: LADOTbikeblog.wordpress.com (2010)

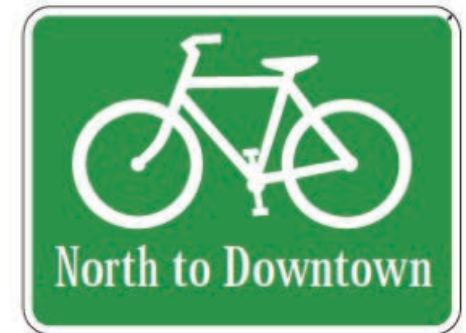
Signals

The Federal Highway Administration publishes standards for traffic control devices, including pedestrian and bicycle traffic in The Manual on Uniform Traffic Control Devices (MUTCD). The plans cited in this report give different levels of attention to signalization specifically aimed for bicyclists.

At the high end, the Billings bicycle plan calls for coordinating signal timing to allow for bicyclists traveling 10-15mph to travel through without stopping. Similarly, both the Cedar Falls and Billings plans call for tuning and signing demand-activated highlighting loop detectors for bicycle

Figure 34. Bicycle Wayfinding

Left: Ada County Bicycle Plan
 Right: Cedar Falls Bicycle Plan



use (Figure 33). In larger jurisdiction (e.g. Portland and New York), bicycle-specific traffic signals have been implemented for increased safety (Figure 29 on page 74, left).

Signage

Jurisdictions commonly call for increased signage to both advertise the system to users and to alert motorists to the presence of cyclists. The Cedar Falls bicycle plan calls for installing way-finding signage

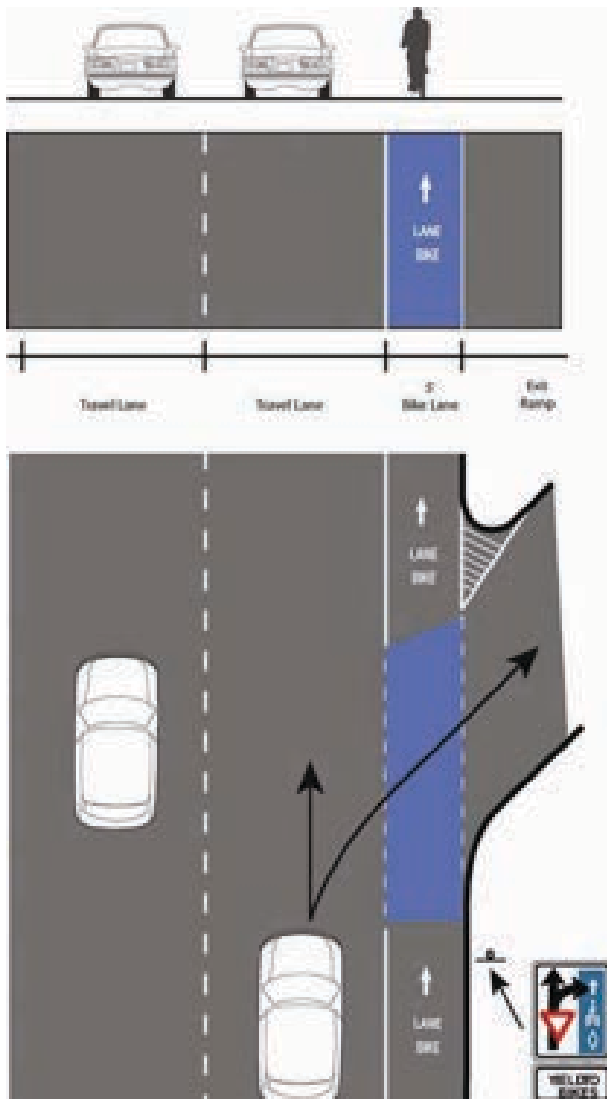


Figure 35. Intersection Markings

Source: (ACHD, 2009)

as a short-term (1-year) plan objective. Recommended signage often includes destinations of specific interest to bicyclists combined with information about the distance to that destination (Figure 34).

Intersection pavement markings

Painted markings at intersection stops and through lanes are recommended to increase the visibility of both the cycling facility and the cyclists using the facility.

The Ada County bicycle plan specifies colored lane treatments for intersections with high-volume turning movement (Figure 35). Similarly, “Bike boxes” allow bicyclists to wait in an area highly visible to motorists. Bike boxes have been implemented in New York City, San Francisco, Berkeley, Eugene, Madison, and Cambridge.

Parking

Most of the reviewed plans note that adequate bicycle parking is an important trip-end amenity for cyclists. These plans encourage ordinances mandating bicycle parking where they do not now exist. The bicycle plan for Billings provides a recommended number of bicycle parking spaces per land-use type as well as a comprehensive list of recommended parking facility types.

Education, Encouragement, and Enforcement

A 2009 study supported by the U.S. Department of Transportation found that the return on investment for facility implementation was highest in terms of ridership when supported through programmatic activities. (Crone, 2009) The following is a sample of some of the

education, encouragement, and enforcement activities recommended in the bicycle plans reviewed.

Publicize the System

The system in Salt Lake City is currently promoted in a map created by the transit agency; Cedar Falls proposed publishing a facility map as part of its recent plan. Billings proposed to publicize the bicycle network via a website devoted to cycling encouragement in the city.

Increase Visibility of Users

Billings also recommended an overarching “respect users” campaign targeted to all citizens as a reminder to expect users of other modes and share the roadway while traveling along city streets. Similarly, Billings recommended a “lights-on” campaign targeted to bicyclists and

pedestrians in an effort to make them more visible at night.

Encouragement of Children

Cedar Falls and Ada County both recommended creating or continuing with Safe Routes to Schools programs. Both Salt Lake City and Albuquerque have “bicycle rodeo” safety classes aimed at middle-school children with safety classes provided by local police departments.

Promote Utilitarian Usage

During the summertime, Cedar Falls has a “shop by bike” campaign with discounts provided by participating merchants to cycling customers. Similarly, Cedar Falls and Billings both recommend expansion of municipal bicycle fleets for use by city staff and law enforcement.

Promote Recreational Usage

Salt Lake City hosts an annual “Bike Week” every May. This well attended event includes bicycling races, bicycle art, and group rides.

Fair Enforcement of Rules of the Road

Billings, Cedar Falls, and Ada County all called for increased attention to cycling issues through enhancements to law enforcement training.



Further Information

Association of Pedestrian and Bicycle Professionals

<http://www.apbp.org/>

Bicycle Boulevard Planning & Design Guidebook (Alta Planning + Design)

<http://www.altaplanning.com/>

[bike+blvd+guidebook.aspx](http://www.altaplanning.com/bike+blvd+guidebook.aspx)

League of American Bicyclists

<http://www.bikeleague.org/>

National Complete Streets Coalition

www.completestreets.org

National Cooperative Highway Research Program "Liability Aspects of Bikeways" NCHRP Legal Research Digest Issue 53 Published by the Transportation Research Board Editor: James B McDaniel April, 2010

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_lrd_53.pdf



The Community Speaks

As part of the b:spoke community outreach process, our team distributed and collected online and print Redmond Reinvents the Wheel surveys from April 3 - April 25, 2011.

A total of 90 surveys were collected, with more than half of the respondents being male. Similarly, more than half of the respondents had children with about 1/3 of the respondents having at least one child in elementary school. Table 9 shows the demographic break down of respondents in detail.

The survey asked a variety of questions to determine respondents current levels of cycling and walking and attitudes towards safety, preferred destinations, and facility types.

Major findings include:

- A majority feel that Redmond is a good place to ride a bike
- Most respondents ride bicycles for recreational purposes
- Women reported feeling less safe riding bicycles on roads in Redmond than men
- An overwhelming majority of respondents indicated a strong desire for separated facilities and off road paths
- The majority of parents do not feel safe letting their children ride bicycles on streets

The following pages show the complete paper version of the Reinventing the Wheel survey. Comprehensive survey results are presented in Table 9 through Table 15.

Appendix D: Survey & Findings





Complete Paper Survey



Redmond Reinvents the Wheel!

Welcome and thank you for partaking in this survey. B:Spoke Planning and Design is interested in learning about your beliefs, attitudes and experiences with regards to walking and bicycling within Redmond. Please take a moment to answer the questions below to the best of your knowledge. This survey should take no longer than 10-15 minutes to complete.

Below are statements about Redmond with which you may or may not agree. Please check the answer that best reflects your agreement level.

	Strongly disagree	Somewhat disagree	Somewhat agree	Strongly agree	Not Applicable
There are many places to go within easy walking distance (10-15 minutes) of my home.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Redmond is a good place for walking.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Redmond is a good place for riding a bicycle.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
As a pedestrian, I feel safe from traffic while walking along streets in Redmond.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
As a pedestrian, I feel safe walking along streets at night.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
As a bicyclist, I feel safe riding a bike along streets in Redmond.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
As a bicyclist, I feel safe riding along streets at night.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
As a bicyclist, I feel that there is adequate parking at the destinations I visit most.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
As a motorist, I know how to operate my vehicle safely around pedestrians and bicyclists.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
As a motorist, I feel that the rules of the road are applied to everyone equally.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
As a motorist, I feel comfortable sharing the road with bicyclists and pedestrians.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
As a motorist, I feel that there is adequate parking at the destinations I visit most.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
As a parent, I feel my child(ren) is safe from traffic walking along streets in Redmond.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
As a parent, I feel my child(ren) is safe from traffic bicycling along streets in Redmond.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How often do you walk from your home to each of the following places?

	Never	Less than 1 time per month	1-3 times per month	1-3 times per week	4 or more times per week
Work or school	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A service provider (bank, post office, barber, dentist, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A restaurant, bar, or coffee shop	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A store	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The home of a friend or family member	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taking someone else to school or daycare	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recreation (parks/trails)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Not at all more likely A little bit more likely Somewhat more likely Much more likely

To what extent would any of the following make it more likely that you would choose to walk to get around in your neighborhood?

More sidewalks on busy streets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More sidewalks on neighborhood streets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Slower vehicle traffic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More destinations within walking distance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More marked crosswalks across busy streets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Better lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A map from the city showing safe routes for walking to popular destinations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More comfortable facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Continuous facilities that will get you where you need to go	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Better signage & wayfinding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

To what extent would any of the following make it more likely that you would choose to bike to get around in your neighborhood?

More bike lanes on busy streets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Neighborhood streets that give bicycles priority by reducing vehicle traffic and speeds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On street bike paths separated from car traffic by parked cars or a curb	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Off-street paths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Slower vehicle traffic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More destinations in my neighborhood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More marked crosswalks across busy streets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Better lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Classes where I can learn safe biking skills and basic maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A map from the city showing safe routes to popular destinations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Better signage & wayfinding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How often do you ride a bike from your home to each of the following places?

Work or school	Never	Less than 1 time per month	1-3 times per month	1-3 times per week	4 or more times per week
A service provider	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A restaurant, bar, or coffee shop	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A store	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The home of a friend or family member	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taking someone else to school or daycare	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recreation (parks/trails)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





Which of the following best describes how you feel about bicycling on streets in City of Redmond?

- I am not interested in any way and do not ride or have a bicycle.
 I am interested, but have concerns about riding my bicycle.
 I am enthusiastic and confident while I ride my bicycle.

To what extent would any of the following make it more likely that you would ride a bike to get around?

	Not at all likely	A little bit more likely	Somewhat more likely	Much more likely
More bike lanes on busy streets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Neighborhood streets that give bicycles and pedestrians priority by reducing vehicle traffic and speeds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On street bike paths separated from car traffic by parked cars or a curb	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Off-street paths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Slower vehicle traffic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More destinations in my neighborhood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More marked crosswalks across busy streets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Better lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Classes where I can learn safe biking skills and basic maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A map from the city showing safe routes to popular destinations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Better signage & wayfinding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

For the following factors, please indicate how they impact your decision for how you get to a destination.

	High impact	Moderate impact	Low impact
Weather	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Distance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Topography (slope)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Options available (car, bicycle, bus)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Convenience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Whether you are alone or in a group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cost	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



When cities and organizations provide targeted programming, they intend to increase the visibility and confidence of pedestrians and bicyclists. For the following examples of programming types, please indicate to what extent would each result in an increase in the amount you bike or walk.

	Not at All	Some Impact	Very Much So
Bicycle Repair and Maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Safe Routes to Schools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Festivals and Activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Neighborhood Rides	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recreation Events	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Share the Road safety classes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What intersection is most difficult for you to cross as a pedestrian or bicyclist? Why?
(i.e. X Street & Y Avenue)

As a share of the budget, please rate the level of spending on the following.

	Not enough	Enough	Too much
Facilities Development (sidewalks, bike lanes, off road trails, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Facilities Improvement & Maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Education	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Events	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Current employment (check all that apply)

- Employed full time
- Employed part-time
- Student
- Not currently employed outside the home
- Retired
- Other: _____

Please identify specific locations and/or problems that you think need to be improved to make walking and biking safer.

Circle your response to the following questions.



What is your gender?

Male Female

Do you have children under 18 in your household?

Yes No

Do you have any children that attend elementary school?

Yes No

Do you have access to a working bicycle?

Yes No

Table 9. Survey Respondents

What is your gender	#	%
Female	35	39 %
Male	54	61 %
Total	89	100 %

What is your current employment status?	#
Employed Full-time	61
Employed Part-time	11
Retired	8
Not currently employed	6
Student	5
Other	5
Total	89

What is your age?	#	%
Under 18	2	1 %
18-24	4	4 %
25-45	41	46 %
46-65	37	41 %
Over 65	6	7 %
No response	1	1 %
Total	89	100 %

Do you have children under 18 in your household?	#	%
Yes	46	51 %
No	44	49 %
Total	90	100 %

Do you have a child currently in elementary school?	#	%
Yes	29	63 %
No	17	37 %
Total	46	100 %



Table 10. Destinations for Cycling and Walking

How often do you ride a bike from your home to each of the following places?	Never	Less than once a month	1 to 3 times a month	1 to 3 times a week	4+ times a week
Recreation	11 %	20 %	30 %	19 %	17 %
Home of friend or relative	30 %	28 %	20 %	9 %	8 %
A store	38 %	27 %	18 %	6 %	8 %
A restaurant, bar, coffee shop	40 %	21 %	18 %	11 %	7 %
A service provider	47 %	16 %	20 %	14 %	11 %
Work or school	49 %	16 %	21 %	7 %	4 %
Taking someone to school	68 %	12 %	4 %	2 %	7 %

How often do you walk from home to each of the following places?	Never	Less than once a month	1 to 3 times a month	1 to 3 times a week	4+ times a week
Recreation	17 %	12 %	26 %	22 %	20 %
Home of friend or relative	29 %	21 %	26 %	8 %	11 %
A store	41 %	21 %	18 %	7 %	20 %
A restaurant, bar, coffee shop	43 %	20 %	17 %	9 %	7 %
A service provider	52 %	16 %	17 %	6 %	7 %
Work or school	61 %	13 %	6 %	6 %	11 %
Taking someone to school	70 %	8 %	7 %	6 %	10 %



Table 11. Attitudes Towards Cycling and Walking

Which of the following best describes how you feel bicycling on streets in the City of Redmond?	Male	Female	Total
I am not interested in any way and do not ride or have a bicycle	0	2	2
I am interested, but have concerns about riding my bicycle	28	23	51
I am enthusiastic and confident while I ride my bicycle	26	10	36

Table 12. Attitudes Towards Safety

Cycling Safety	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Agree
As a bicyclist, I feel safe riding a bike along streets in Redmond	15 %	38 %	37 %	10 %
Redmond is a good place for riding a bicycle	18 %	42 %	27 %	12 %
As a parent, I feel my child(ren) is safe bicycle on streets in Redmond	2 %	28 %	40 %	30 %

Walking Safety	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Agree
As a pedestrian, I feel safe from traffic while walking along streets in Redmond	25 %	45 %	17 %	13 %
Redmond is a good place for walking	27 %	40 %	22 %	8 %
As a parent, I feel my child(ren) is safe from traffic walking along streets in Redmond	13 %	46 %	25 %	16 %



Table 13. Preferences Towards Encouragement and Facilities

To what extent would any of the following make it more likely that you would choose to walk to get around in your neighborhood?	not at all more likely	a little more likely	somewhat more likely	much more likely
Slower vehicle traffic	31 %	21 %	27 %	17 %
More comfortable facilities	20 %	23 %	23 %	17 %
A cycling map from the city	38 %	18 %	16 %	23 %
Better signage and wayfinding	33 %	24 %	12 %	23 %
Continuous facilities	21%	21 %	23 %	29 %
More marked crosswalks	19%	14 %	29 %	32 %
Better lighting	21%	11 %	30 %	32 %
More sidewalks on local streets	21%	22 %	16 %	34 %
More sidewalks on busy streets	20%	18 %	14 %	43 %
More destinations within walking distance	9 %	8 %	19 %	58 %

To what extent would any of the following make it more likely that you would choose to bike to get around your neighborhood?	not at all more likely	a little more likely	somewhat more likely	much more likely
Classes where I can learn skills	53 %	21 %	12 %	9 %
Slower vehicle traffic	26 %	22 %	27 %	21 %
More crosswalks across busy streets	26 %	20 %	28 %	22 %
Better signage & wayfinding	36 %	23 %	17 %	22 %
Better lighting	18 %	22 %	31 %	24 %
A map from the city showing safe routes	36 %	19 %	17 %	27 %
Neighborhood bicycle routes	18 %	21 %	24 %	34 %
More destinations in my neighborhood	13 %	17 %	21 %	44 %
On-street separated bike paths	16 %	14 %	20 %	48 %
More bike lanes on busy streets	9 %	18 %	19 %	52 %
Off-street paths & trails	4 %	8 %	20 %	67 %

Table 14. Mode-choices Decision Factors

For the following factors, please indicate how they impact your decisions for how you get to a destination.

	High Impact	Moderate Impact	Low Impact
Topography (slope)	12 %	38 %	47 %
Cost	21 %	33 %	42 %
Options available (car, bicycle, bus)	24 %	44 %	28 %
Whether you are alone or in a group	30 %	24 %	42 %
Convenience	37 %	48 %	12 %
Distance	39 %	41 %	16 %
Weather	56 %	28 %	13 %

Table 15. Attitudes Towards Active Transportation Budget

As a share of the budget, please rate the level of spending on the following.

	Not Enough	Enough	Too Much
Events / Programming	37 %	51 %	6 %
Education	41 %	47 %	6 %
Facilities Improvement & Maintenance	42 %	49 %	2 %
Facilities Development (sidewalks, bike lanes, off-road trails)	69 %	24 %	0 %





Community Vision

The broader community needs a shared vision of the role of bicycling in Redmond. Create and support a community vision that puts safety and access first and accommodates the needs of all users.

- Adopt a complete streets policy to establish a framework incorporating a broad group of users into facilities improvements.
- Establish a baseline through a bicycle and pedestrian count to effectively measure growth. Set clear & measurable indicators with timelines.

The core of a community vision statement can be the basis for a branding campaign. For example, if the vision is about being a bike-friendly community and supporting ridership, a 'Bike

Redmond!' campaign may be best suited to generate momentum. On the other hand, it might be about the option to choose a transportation mode as other cities have done and expressed through a 'Go by Bike!' campaign. These ideas could be expanded through enhanced programming and empowerment opportunities.

Actively seek out partnerships with major employers, schools, Redmond Chamber of Commerce, etc. to encourage bicycling as a transportation mode, an asset to residents and the business community. By creating these partnerships early, potential conflicts (i.e. parking) can be resolved with mutual benefits. Bicycling infrastructure has been identified as a key economic development component and a community asset that can both serve

Appendix E: Outreach Models



existing residents and businesses while attracting new ones. Also seek out community health partners such as hospitals, Deschutes County programs and health initiatives that could target and value benefits from increased activity.

- Lead by example. Encourage city employees to walk or bike to work or for short trips out of the office.
- Explore purchasing a city bicycle fleet for use in public events and employee use.
- Compete in annual Bicycle Commute Challenge through Commute Options. Set new goals for office ridership and annual participation.
- Continue to seek out facility funding opportunities and grant opportunities consistent with the community vision, partnership programs and community initiatives.

- Explore community health grants and especially youth-specific program opportunities to help establish long-term programming and education support.

Programming & Empowerment Goals

- Support diverse event types (educational & activity based).
- A Redmond-specific BPAC could help to keep a pulse on changing community needs.
- Develop a nighttime riding & safety campaign.
- Seek out community health partners for partnering with events.
- Ensure that people feel safe walking and riding at night and are knowledgeable about rules of road, how to be visible, and the importance of obeying traffic signals.

- Ensure that vulnerable users have access to helmets, bike lights, and reflectors through grant funding.
- Attract users from the surrounding region to participate in Redmond cycling community events. Many regional cyclists participated and expressed interest in conversation at Earth Day and would like to see more events to draw people into town.

Redmond motorists expressed concern for bicyclists that wear dark clothing at night without proper reflectors or bright colors. Lack of visibility contributes to perception of danger by both motorists and cyclists.

Event Strategies

Encourage neighborhood rides and community events to engage a broad



spectrum of user groups. Closing off streets and highlighting existing facilities and demonstration projects can generate interest and awareness of current system and provide opportunity and encouragement to new riders. Portland's "Sunday Parkways" event series that celebrates the late spring and summertime riding season through neighborhood/geographic specific engagement.

Events typically include booths for city agencies, partners, and community vendors as well as music, youth-specific activities and food. Temporary parking facilities are brought in to accommodate larger bike crowds and a large team of volunteers helps to make these events a great success. Redmond could use this event model to kick off the spring/summer-riding season and distribute information about summer activities for

youth, encourage new riders and support the cultivation of a multifaceted bicycling community.

Many users ride for recreation. This type of riding is conducive to building a community through shared experience and multiple skill levels/ways to participate.

- Utilize the Dry Canyon for bike-themed events and to provide connections to the regional trail network.
- Support recreational riders with community events, group rides, and strengthen connections to surrounding communities and natural areas.

Increasing youth ridership encourages consistent riding habits and increases access to after school programming, recreation, and employment opportunities. Communities can encourage safe travel

options to school and other destinations by traveling in groups and forming strong youth-adult partnerships.

A number of communities across the country have implemented walking buses and bike trains to increase the perception of safety, increase convenience by removing individual parent participation, and build community through participation. A walking bus is a safe, fun and healthy way to walk to school. Each 'bus' has an adult 'driver' at the front and an adult 'conductor' bringing up the rear. The children walk to school in a group along a set route, picking up additional 'passengers' at specific 'bus-stops' along the way.



Proposed Outreach Events

Park to Park Pathways

Park to Park Pathways is designed to engage Redmond families in activities that illustrate different bicycle facilities and model bicycle safety in an educational AND fun environment. This event will utilize Redmond's existing assets – the Dry Canyon Trail, Rimrock Way multi-use path, parks, and schools – and show opportunities for future bicycle and pedestrian development. The best timing for this event is a weekend from 10am-3pm to support wide participation and minimize impact of proposed street closures.

A safe, fun, and informative loop should be identified and programmed to encourage and support new riders, strengthen community partnerships,

and provide a community gathering opportunity.

Throughout this loop route, supportive activities should be organized to showcase existing facilities, demonstrate proposals for new facilities to encourage valuable user feedback, and organize interested community members into actions that support bicycle development. For example, facilities can be modeled using street chalk, cones, and other movable items to mock up facilities. When modeling a new facility type is presented, a supporting informational booth should be provided to get feedback and provide information to the public

A proposed route is detailed in Figure 36. Park to Park Pathways: Event Route Proposal. This route takes advantage of existing off-street facilities and proposes

temporarily restricting on-street facilities to bicyclists and pedestrians.

- A. From Spudbowl Park at N end of Dry Canyon route
- B. To Redmond High School Parking Lot, along Evergreen Trail, across Rimrock Way crossing
- C. S on Dry Canyon Trail along American Legion Park, to Obsidian Avenue

On-street Loop out of Dry Canyon (streets to be closed):

- D. From Obsidian Ave E to 15th St.,
- E. Up 15th St. to Kalama Ave.
- F. West on Kalama Ave. to Canyon Dr.
- G. South on Canyon Dr. to Obsidian Ave.

The proposed loop highlights a variety of facility types including a street-adjacent multiuse path along Rimrock Way, low-stress bicycle boulevards along 15th












-  From Spudbowl Park at N end of Dry Canyon route
-  To Redmond High School Parking Lot, along Evergreen Trail, across Rimrock Way bike/ped crossing
-  S on Dry Canyon Trail along American Legion Park, to Obsidian Ave.
- On-street Loop out of Dry Canyon (streets to be closed):*
-  from Obsidian Ave E to 15th St.
-  N 15th St. to Kalama Ave.
-  W on Kalama Ave. to Canyon Dr.
-  S on Canyon Dr. to Obsidian Ave

Figure 36. Park to Park Pathways: Event Route Proposal

street and Canyon Drive, and trail facilities within Dry Canyon. Special attention should be given to signage along the route (highlighted by attaching brightly colored flags to each sign) to promote increased awareness of wayfinding and route information.

Activity setup areas should have hard surface available to support mock-up of facilities as well as be accessible to all user groups, including accommodations for wheelchair-bound users.

One activity area located at Spudbowl Park in Dry Canyon serves as the community activity hub for the event. Food vendors, community partners, and entertainment (i.e. music, raffles, children’s bounce house, etc.) should be concentrated here to take advantage of pavilion, bathroom facilities, and play opportunities.

Another activity area is located at Redmond High School serves as the community education hub for the event. Visitors will participate and find information about facility mock-ups, safety classes (proper hand signals, rules of the road for motorists and bicyclists, etc.), and bike tune-ups in partnership with local bicycle vendors and information on supporting safe routes to school (opportunities to volunteer, how to start a bike train or walking bus, how to get access to a bike).

The combination of vendors and events at the event should strengthen community Partnerships, integrate services and supportive programs, as well as provide information to bike community. Youth specific activities, teen parks programs, and community wide extra curricular activities (including club sports, employment opportunities, and volunteer

organizations) should be present to support youth travel by bicycle.

Other key organizational include: Commute Options, Deschutes County BPAC, Redmond BPAC, BTA, Central Oregon Trail Alliance (COTA), Central Oregon Council on Aging (COCOA), St. Charles Medical Center, Redmond Police Department, Redmond Chamber of Commerce, among others.

Mobilizing additional physical and staff resources are essential to creating an enjoyable event. Additional bicycle parking should be provided in anticipation of increase in parking need for event. One potential solution utilizes portions of fencing to establish a temporary parking area. Metal traffic barriers can be used to provide locations for event participants to park their bicycles and participate in

activities and parks. Additionally, a series of volunteers can manage and monitor bikes in these spaces to discourage theft. In addition to bike parking, additional restroom facilities should be secured due to increased demand and high concentration of children and families.

Advertising for these events should be coordinated through Redmond's bicycle website and take advantage of traditional outreach models including but not limited to Redmond's Utility Bill, newspapers, school newsletters (if during or close to the completion of the academic school year), and regional bicycle blogs and websites (including partner organizations).

Shop by Bike

A shop by bike campaign seeks to highlight bike-friendly destinations and



neighborhood commercial areas by encouraging community members to use a bike to get groceries, goods, and meet weekly needs. Bike-friendly shopping programs can highlight connections to key service areas like Downtown Redmond and clusters of commercial activity along major arterials and facilitate the development of additional end of trip facilities.

By supporting businesses to have adequate bicycle parking and pleasant pedestrian environments between destinations, this program can offer business owners an opportunity to gauge the number of bicycle customers. Business owners could capture changes in perceptions about bike facilities and how these facilities best support business through the use of a recurring survey. Key questions and concepts should include:

- What is the level of ridership among your customer base? How many customers visit your business by bicycle?
- Does your business have adequate bicycle parking?
- Has the number of participants in Shop by Bike increased over time?
- Have you made contact with any other businesses to organize events?
- How effective have these events been?
- How likely are you to participate in a similar event?

Collections of business owners can self organize, as well as seek support of the Redmond Chamber of Commerce, to tailor incentives, and build collaborative business relationships to promote events, increase foot traffic, and benefit the business community.







Based on our existing conditions assessment and recommendations, our team created numerous maps of Redmond. Following is a list of the maps found in the folder on the inside of the back cover:

Map 1 – Roadway Classifications

This map displays the functional classification of roads in Redmond based on the 2008 Transportation System Plan. The state of Oregon requires bicycle facilities along arterials and major collectors as part of its Transportation Planning Rule. Most of these roads feature bicycle lanes, although a handful (such as SW Rimrock Way) include an asymmetric multi-use path. A new path has been recently built along SW Elkhorn Road adjacent to the soon-to-be-completed Ridgeview High School. The US 97 bypass was completed in 2008 from the northern

city limit to OR 126 in order to remove through freight traffic from Downtown.

Map 2 - Trails Network

The 2008 Trails Master Plan identifies several irrigation canals as potential locations for future off-street paths in Redmond. Existing canal trails are primarily unpaved and therefore generally suited towards recreational riding. Most of the proposed trails run north-south which does not alleviate the constraints on east-west mobility that the city currently faces.

Map 3 – Zoning and Points of Interest

The land east of the BNSF railroad is primarily zoned for industrial except for pockets of residential development located largely to the north. Downtown features commercial zones while residential zoning dominates to the west and south of Dry Canyon. The

Appendix F: Maps



highest residential densities are on the west side of the US 97/BNSF railroad corridor.

Map 4 – 2009 Employment Density

Major employment centers, including Redmond Airport, are located to the east of US 97 and the Burlington Northern Santa Fe (BNSF) Railroad. There are only six access points across the railroad within the city limits, which underscores the concerns regarding access to the eastside since most of the population lives west of these corridors.

Map 5 – Population Density 2005-09

The highest population densities are featured in neighborhoods directly adjacent to Dry Canyon, especially to the south and west of Downtown.

Map 6 – School-Age Population Density

The spatial distribution of school-age population (children aged 0-17) generally mirrors the population density map.

Map 7 – Percentage of Households Below Poverty Line

The highest incidences of poverty are located directly adjacent to Dry Canyon, particularly to the south and west of Downtown.

Map 8 – Percentage of Households Without Auto Access

The highest incidences of households without automobile access are located directly adjacent to Dry Canyon, particularly just north of Downtown and to the southwest in the vicinity of Salmon Avenue and Canal Boulevard. Fortunately, these neighborhoods would perhaps benefit the highest from increased bicycle investment in Redmond

due to their proximity to amenities located in downtown.

Map 9 – Percentage of Commutes Between 0-9 Minutes

The highest incidences of commuters whose commute takes less than 10 minutes are located in close proximity to downtown and the eastside employment area, where the vast majority of the city's jobs are located.

Map 10 – Percentage of Commutes By Walk or Bike

The highest incidences of commuters who walk or bicycle as a primary means of transportation are located in close proximity to downtown and the eastside employment area, where the vast majority of the city's jobs are located.



Map 11 – Elementary School Network Analysis

Map 12 – Middle and High School Network Analysis

This map highlights the barriers created by Dry Canyon, which provides excellent north-south mobility for bicycles and pedestrians but few access points for those traveling east-west across the canyon. Schools located along the canyon feature much smaller 1-mile buffer distances along the street network compared to the Euclidean 1-mile distance. Areas within the network buffer distance should be prioritized for new bicycle-pedestrian infrastructure improvements for the benefit of children traveling to school (funding of which could be attained with assistance from Safe Routes to School). Areas where the network buffers of multiple schools overlap may be entitled to the highest priority

Map 13 – Community Outreach Map

Map 14 – Survey Responses Problem Corridors and Intersections

US 97/Veterans Way and OR 126/Rimrock Way received the highest number of complaints from bicyclists and pedestrians, with survey respondents citing the lack of safe connections as well as high traffic volumes and vehicle speeds as the primary causes for concern. Both US 97 and OR 126 form barriers of mobility in Redmond, and intersections along these corridors should receive special attention for new improvements.

Map 15 – On-Road Trail System Proposed Loop Network

The proposed loop network would feature 23.5 miles of bicycle boulevards, 31 miles of bicycle lanes, and 6 miles of street-adjacent off-street multi-use paths. This constitutes almost 1/3 of total street mileage in Redmond.

Map 16 – Future Multi-Use Off-Street Path Network Prioritization

Based on the Trails map, the portion of canal trails located closest to existing residential development (located south of downtown) would be prioritized for implementation in order to help residents of those areas make connections to destinations as part of a commute trip or for some other utilitarian purpose.

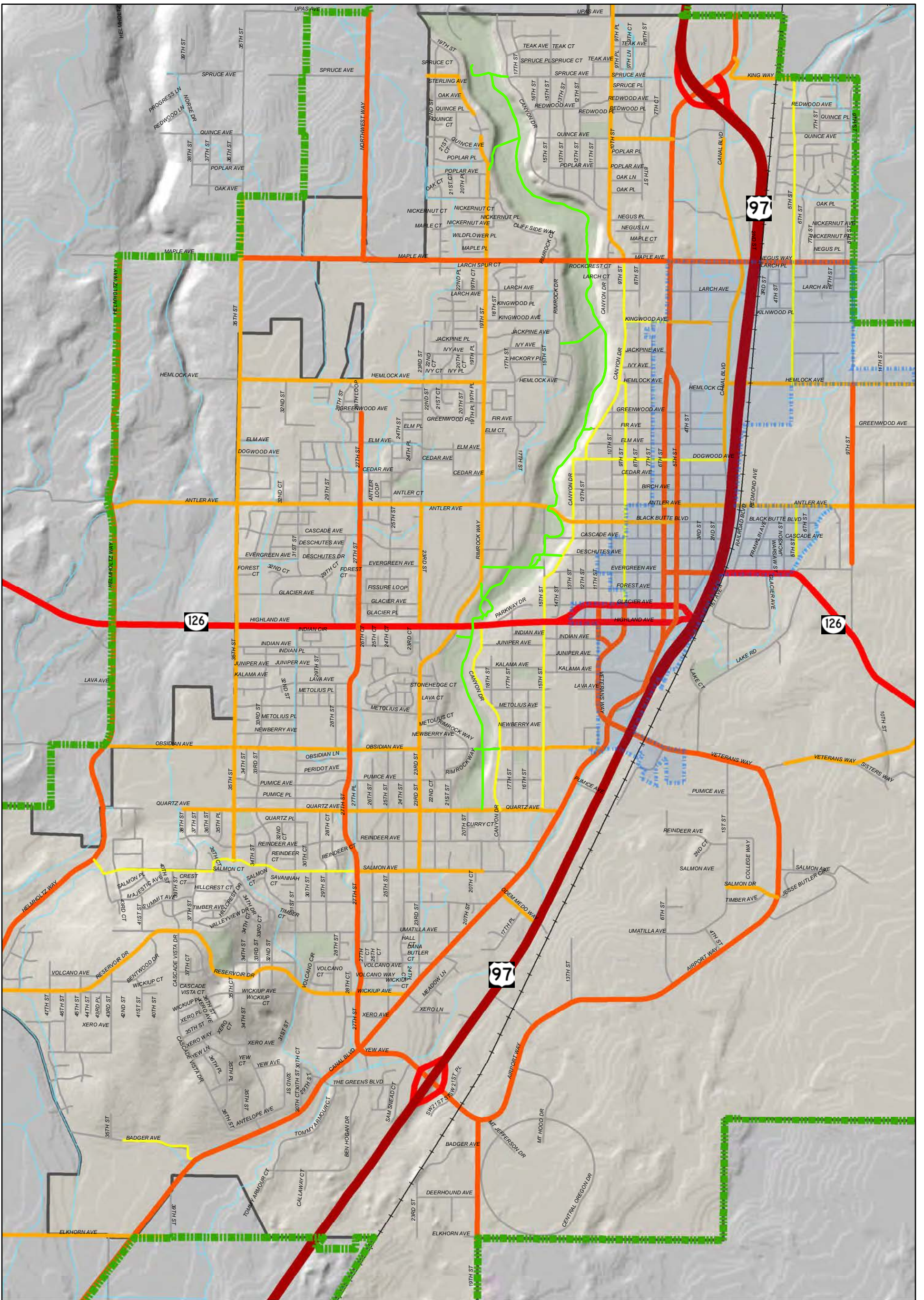
Map 17 – Proposed Network Connections and Intersection Improvements

Short-term improvements at crossings may include intersection improvements such as bicycle boxes, green paint to denote areas of conflict between bicyclists and motorists, increased signage denoting the presence of bicyclists and other low-to-moderate cost implementations. High-cost infrastructure investments include the provision of a new



grade-separated bicycle-pedestrian crossing over US 97 and the BNSF railroad at either Antler or Quartz Avenues to bridge the divide between the west side where a majority of Redmond residents live and the east side where a large number of jobs are located. Other connections are centered along Dry Canyon to provide greater access to adjacent neighborhoods.



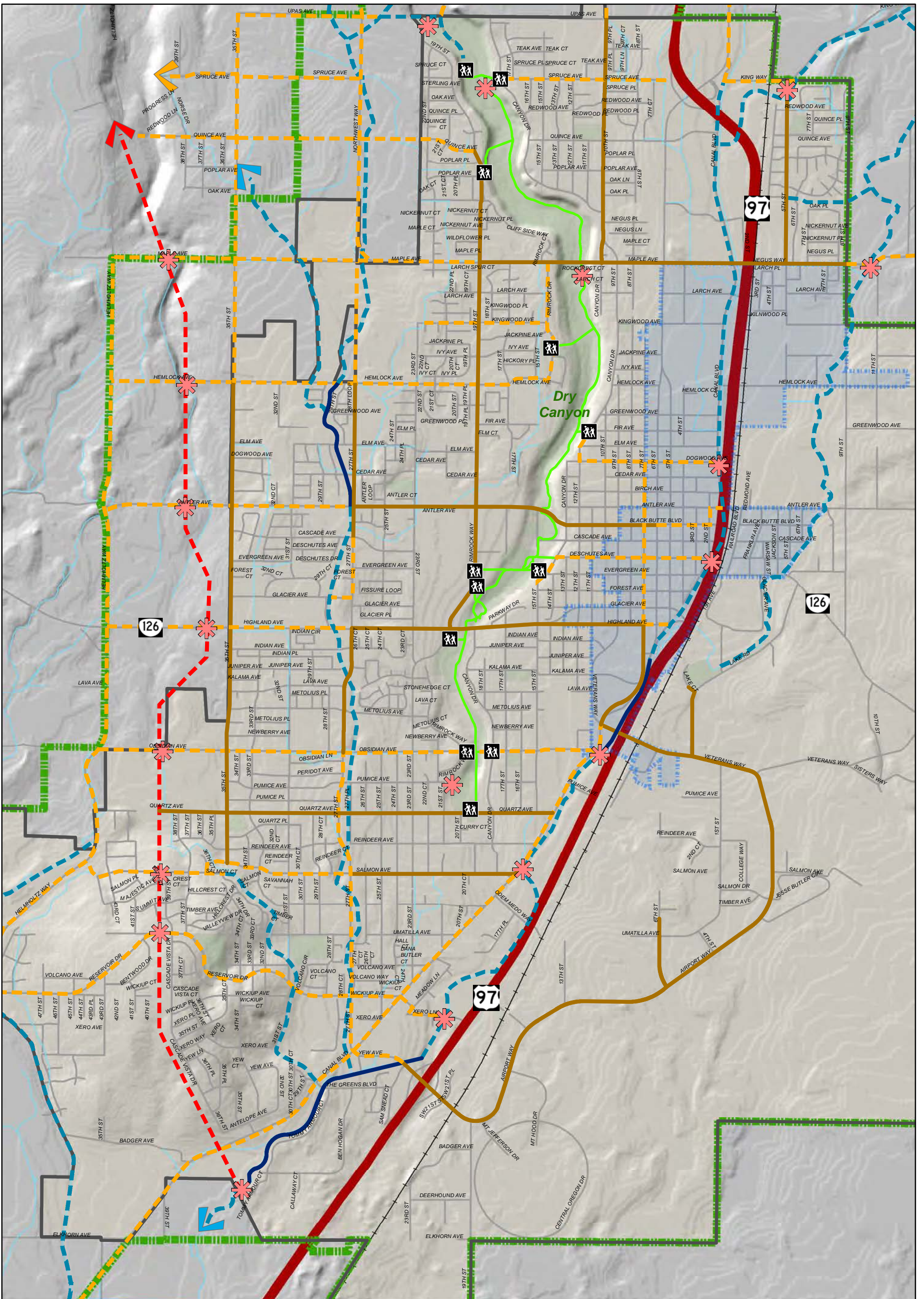


City Limits	2011 URA District	Roadway Classifications	
UGB	Parks	Major Arterial	Major Collector
Dry Canyon Trail	Railroad	Minor Arterial	Minor Collector
Canals		US Route 97	Other Streets

Map Extent

Redmond
Bicycle Refinement Plan
Map 1: Roadway Classifications

b:spoke
planning + design

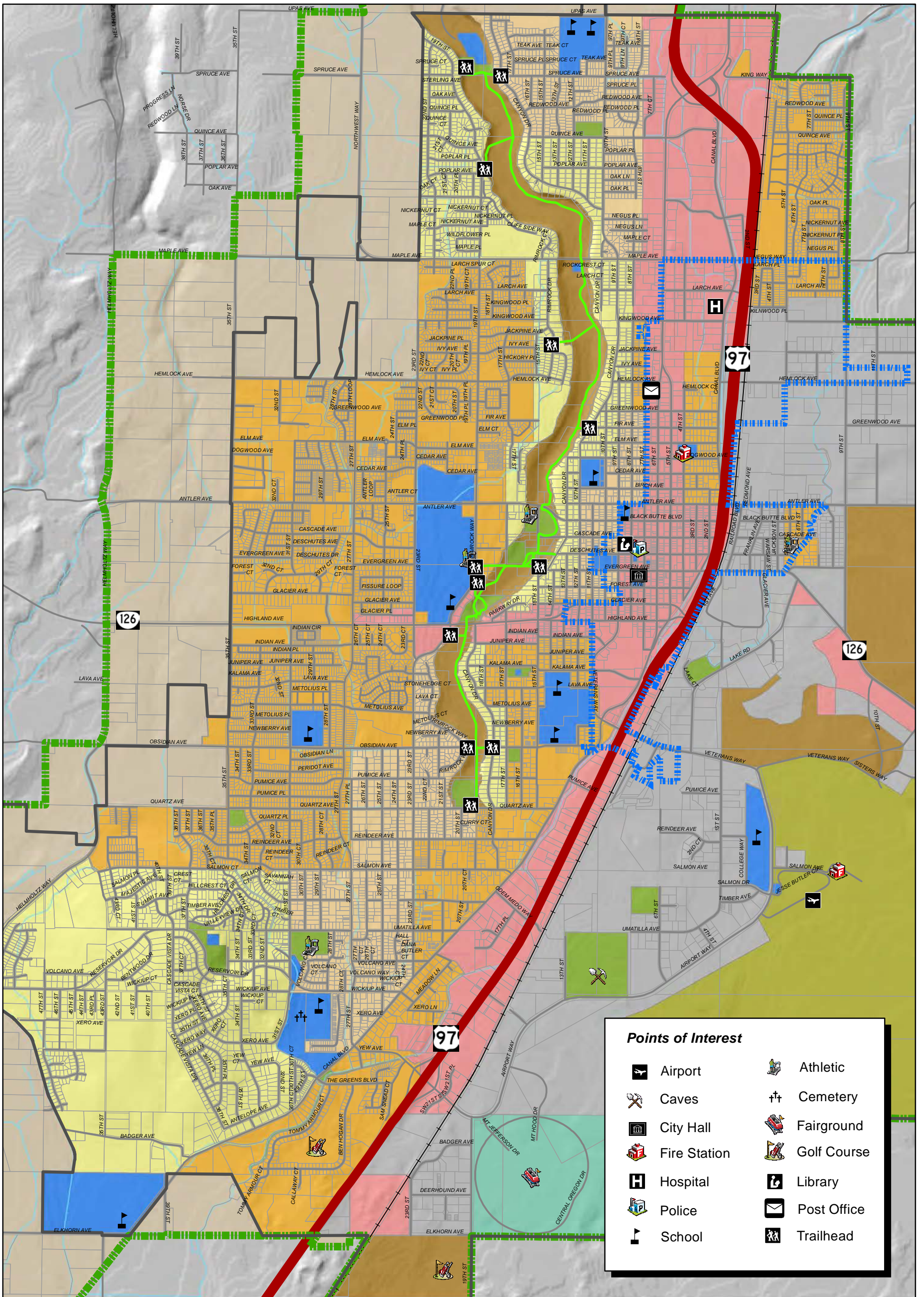


City Limits	2011 URA District	Existing Canal Trail
UGB	Parks	Proposed Canal Trail
Dry Canyon Trail	Railroad	Existing On-Road Trail
Canals	Existing Trailhead	Proposed On-Road Trail
		Proposed BPA Trail
		Proposed Trail Connection

Map Extent

Redmond
Bicycle Refinement Plan
Map 2: Trails Network

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Points of Interest

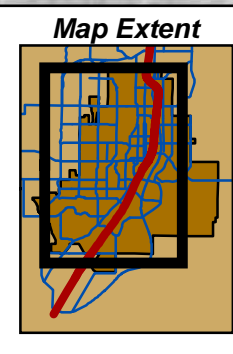
Airport	Athletic
Caves	Cemetery
City Hall	Fairground
Fire Station	Golf Course
Hospital	Library
Police	Post Office
School	Trailhead

Adopted Zoning Designations

City Limits	2011 URA District
UGB	Railroad
Dry Canyon Trail	Canals

Adopted Zoning Designations

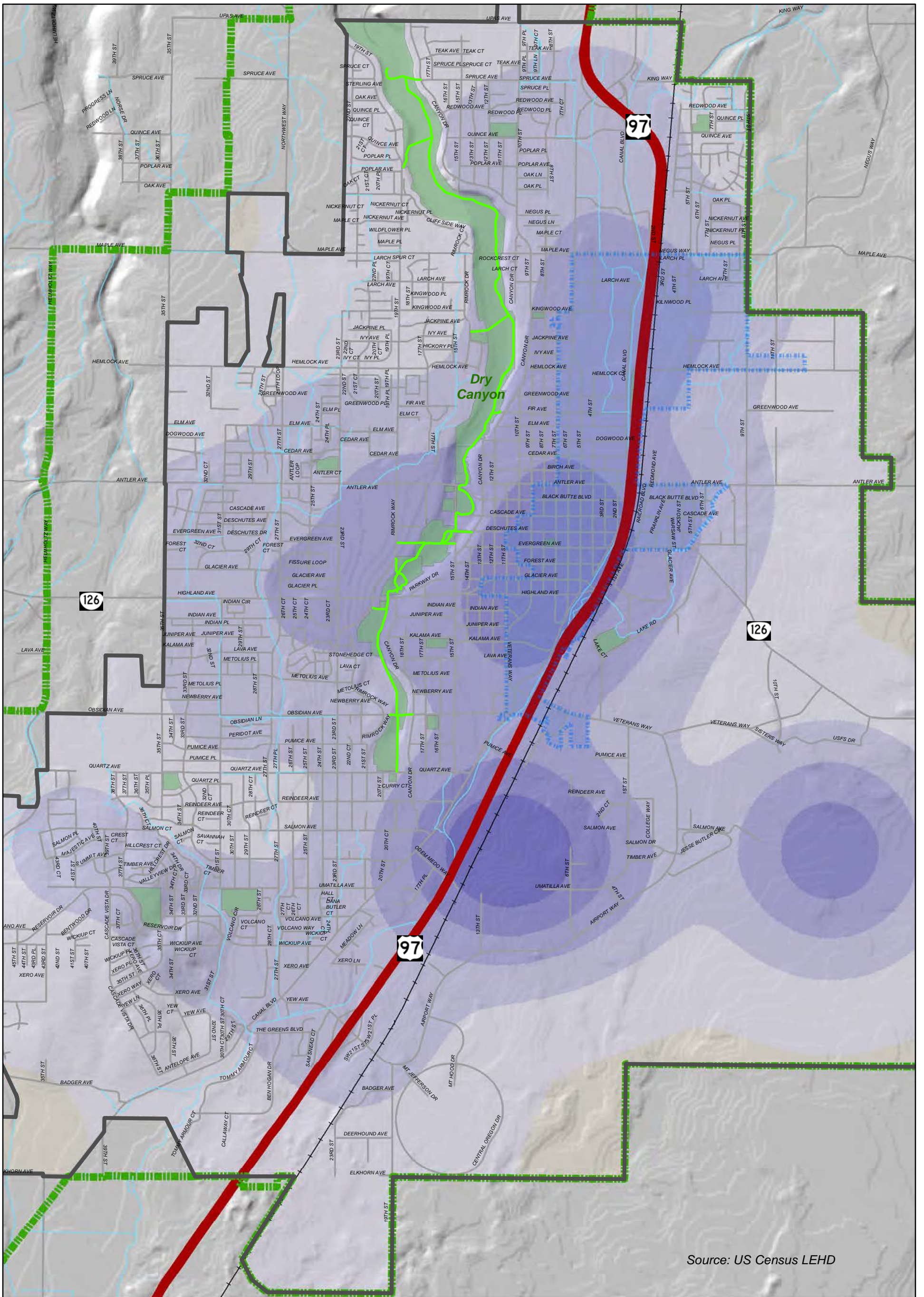
Airport	Public Facilities
Commercial	Low Density Residential
Fairgrounds	Medium Density Residential
Industrial	High Density Residential
Open Space Park Reserve	Urban Holding
Park	



Redmond Bicycle Refinement Plan
Map 3: Zoning and Points of Interest

0 0.3 0.6 Miles

planning + design



Source: US Census LEHD

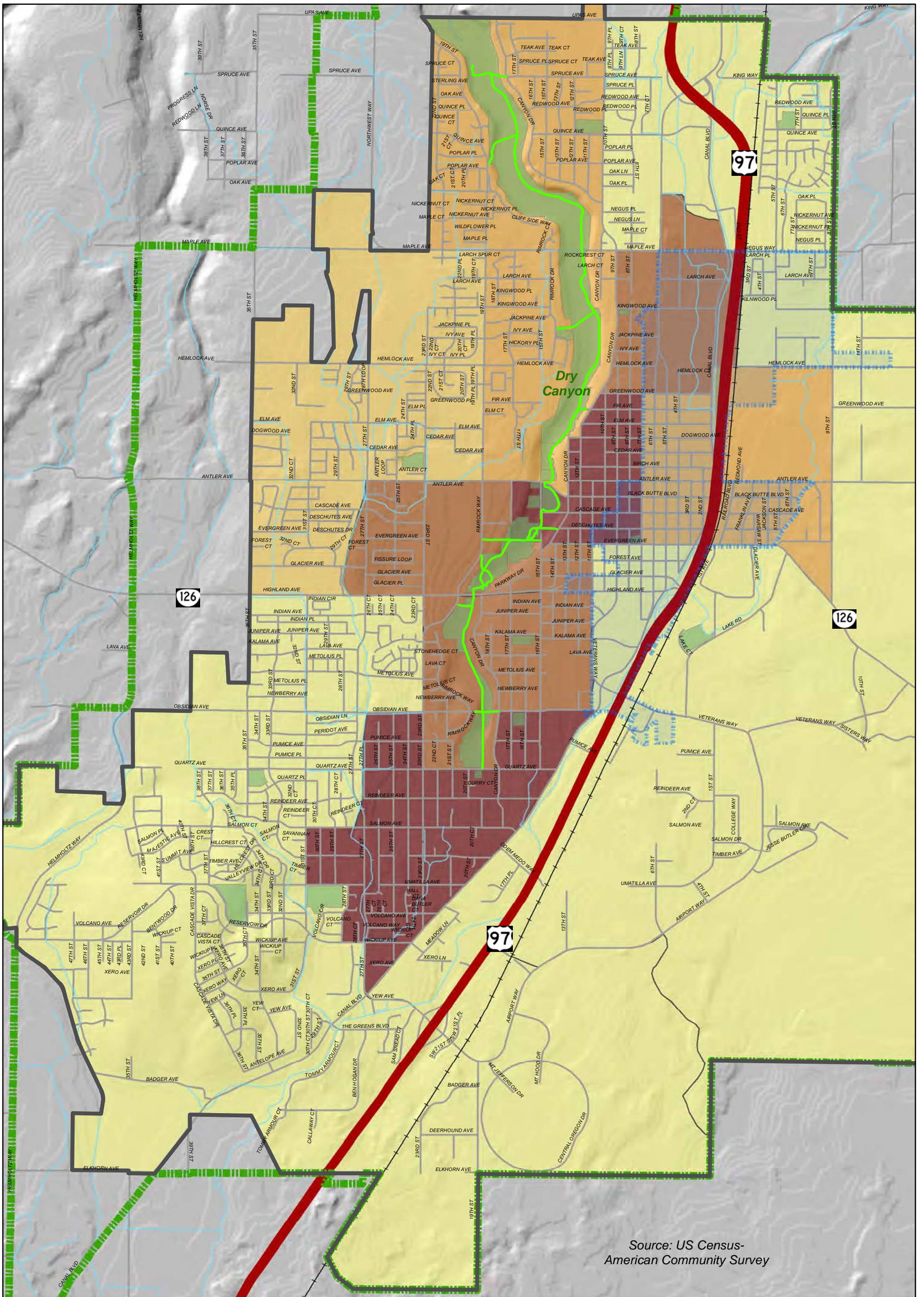
	City Limits		2011 URA District
	UGB		Parks
	Dry Canyon Trail		Railroad
	Canals		US Route 97

Jobs Per Square Mile		5-218
		219-859
		860-1,926
		1,927-3,421
		3,422-5,342









	Map Extent
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Redmond
 Bicycle Refinement Plan
 Map 4:
 2009 Employment Density

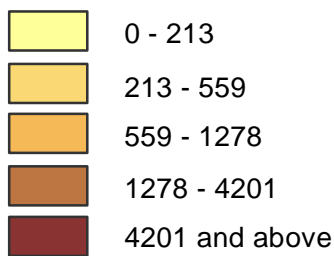
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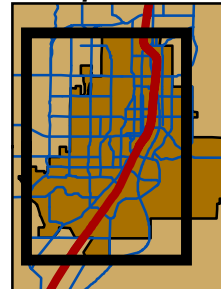
Source: US Census-
American Community Survey

-  City Limits
-  UGB
-  Dry Canyon Trail
-  Canals
-  2011 URA District
-  Parks
-  Railroad
-  US Route 97

**Population Density by Block Group:
Persons Per Square Mile**



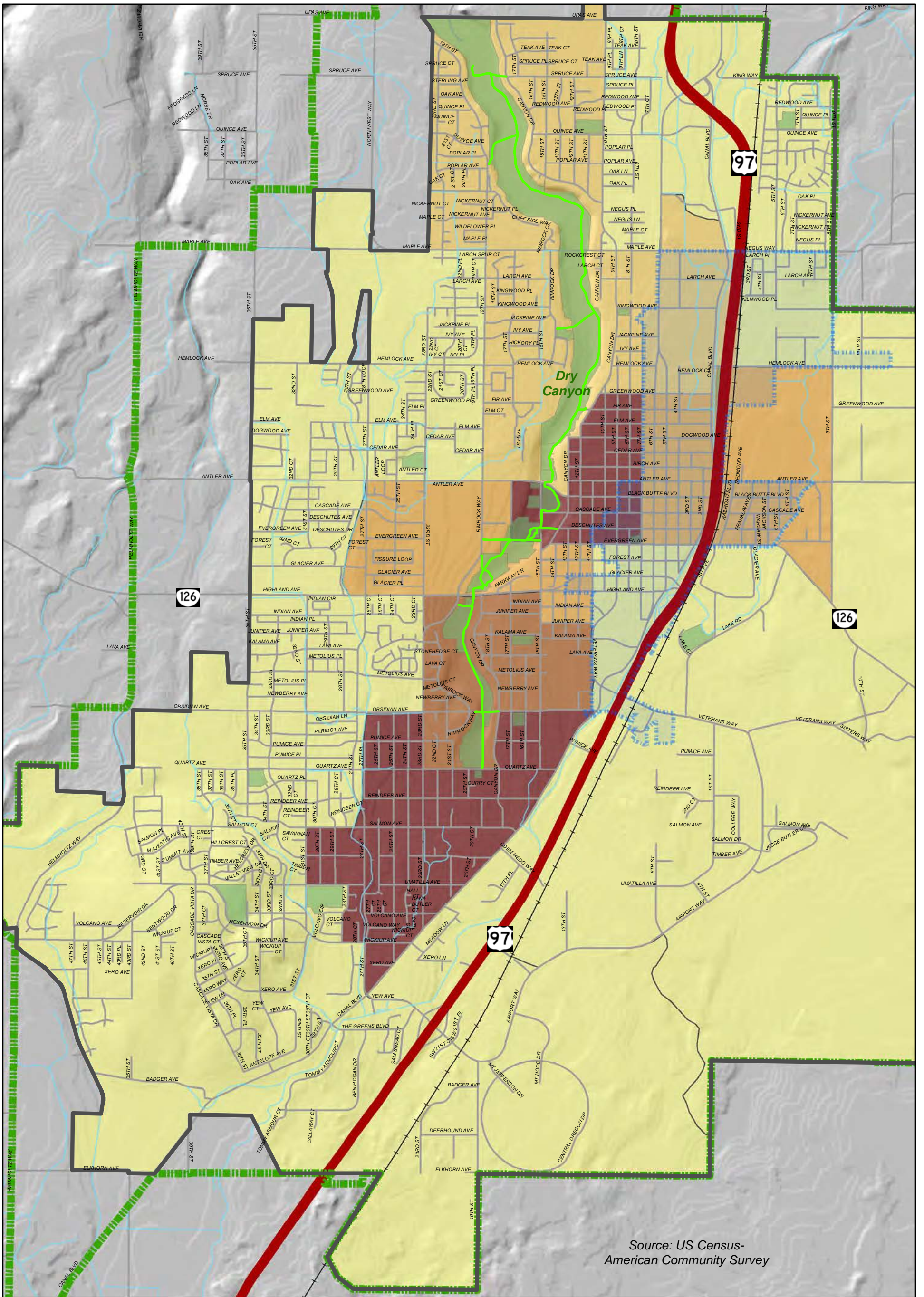
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

**Redmond
Bicycle Refinement Plan
Map 5:
Population Density 2005-09**








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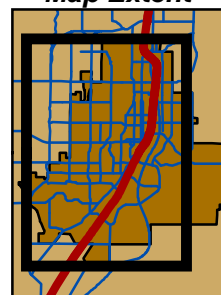
Source: US Census-
American Community Survey

-  City Limits
-  UGB
-  Dry Canyon Trail
-  Canals
-  2011 URA District
-  Parks
-  Railroad
-  US Route 97

**Population Density by Block Group:
Persons Age 0-17 Per Square Mile**

-  0 - 146
-  146 - 364
-  364 - 643
-  643 - 1081
-  1081 and above

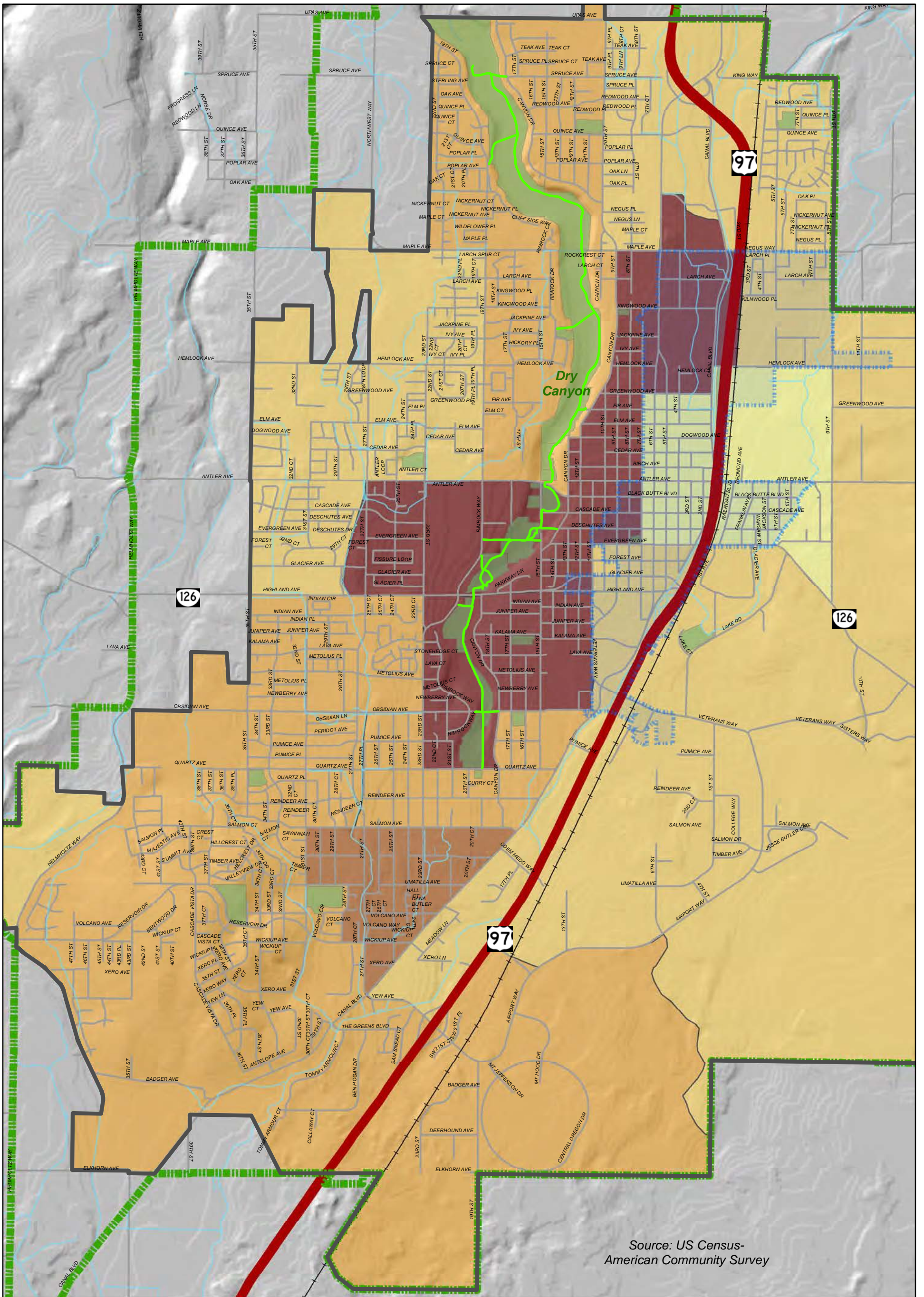
Map Extent











**Redmond
Bicycle Refinement Plan
Map 6:
School-Age Population Density**

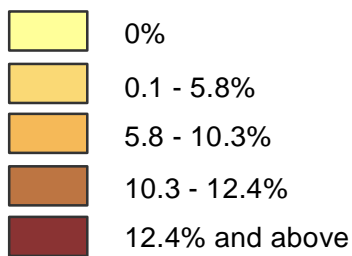
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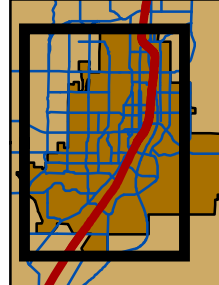
Source: US Census-
American Community Survey

-  City Limits
-  UGB
-  Dry Canyon Trail
-  Canals
-  2011 URA District
-  Parks
-  Railroad
-  US Route 97

**Percentage of Households by Block Group:
Below Poverty Line**



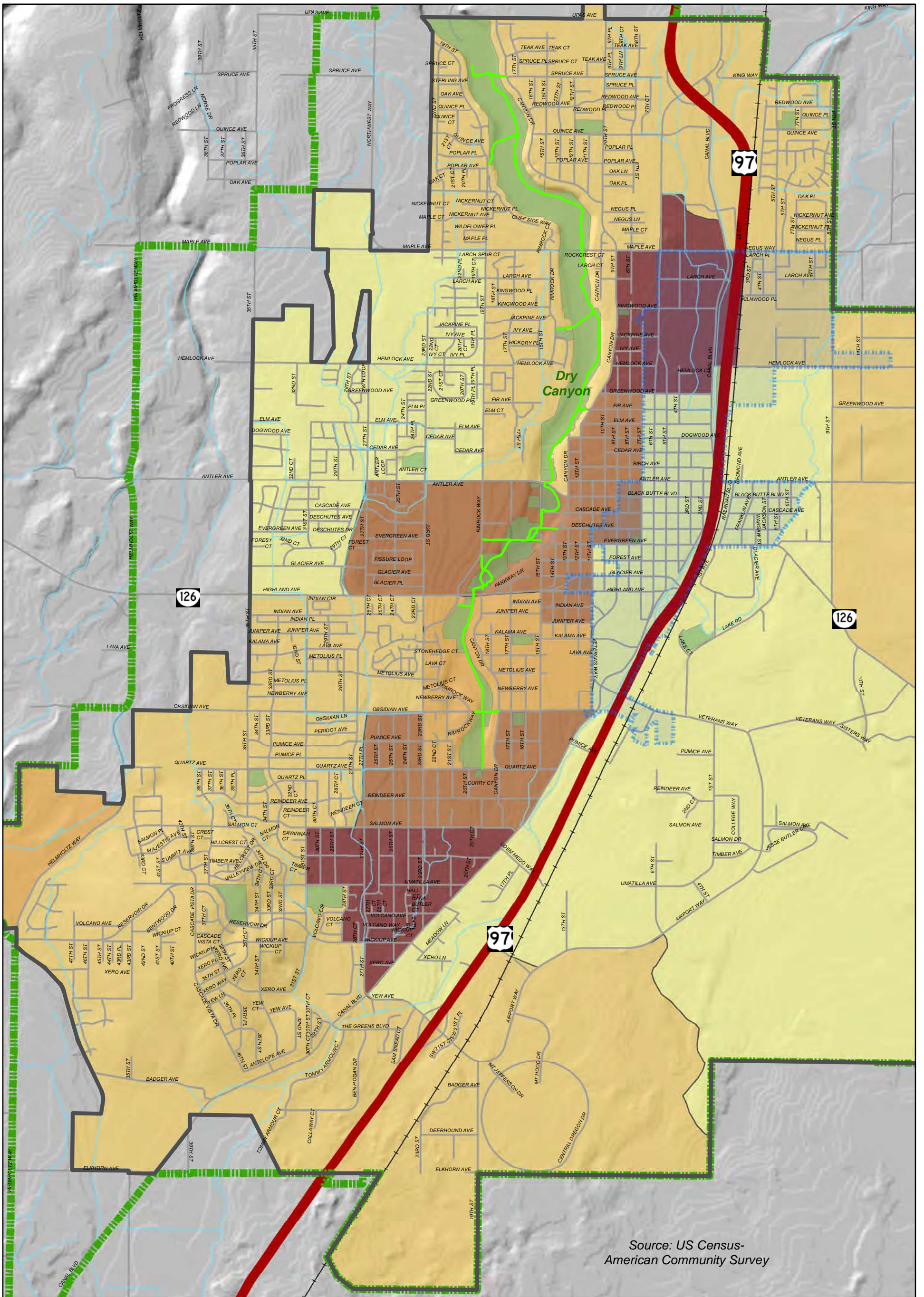
Map Extent











**Redmond
Bicycle Refinement Plan
Map 7: Percentage of
Households Below Poverty Line**








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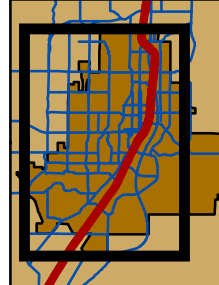
Source: US Census-American Community Survey

-  City Limits
-  UGB
-  Dry Canyon Trail
-  Canals
-  2011 URA District
-  Parks
-  Railroad
-  US Route 97

**Percentage of Households by Block Group:
With 0 Vehicles Available**

-  0%
-  0.1 - 2.6%
-  2.6 - 4%
-  4 - 6.4%
-  6.4% and above

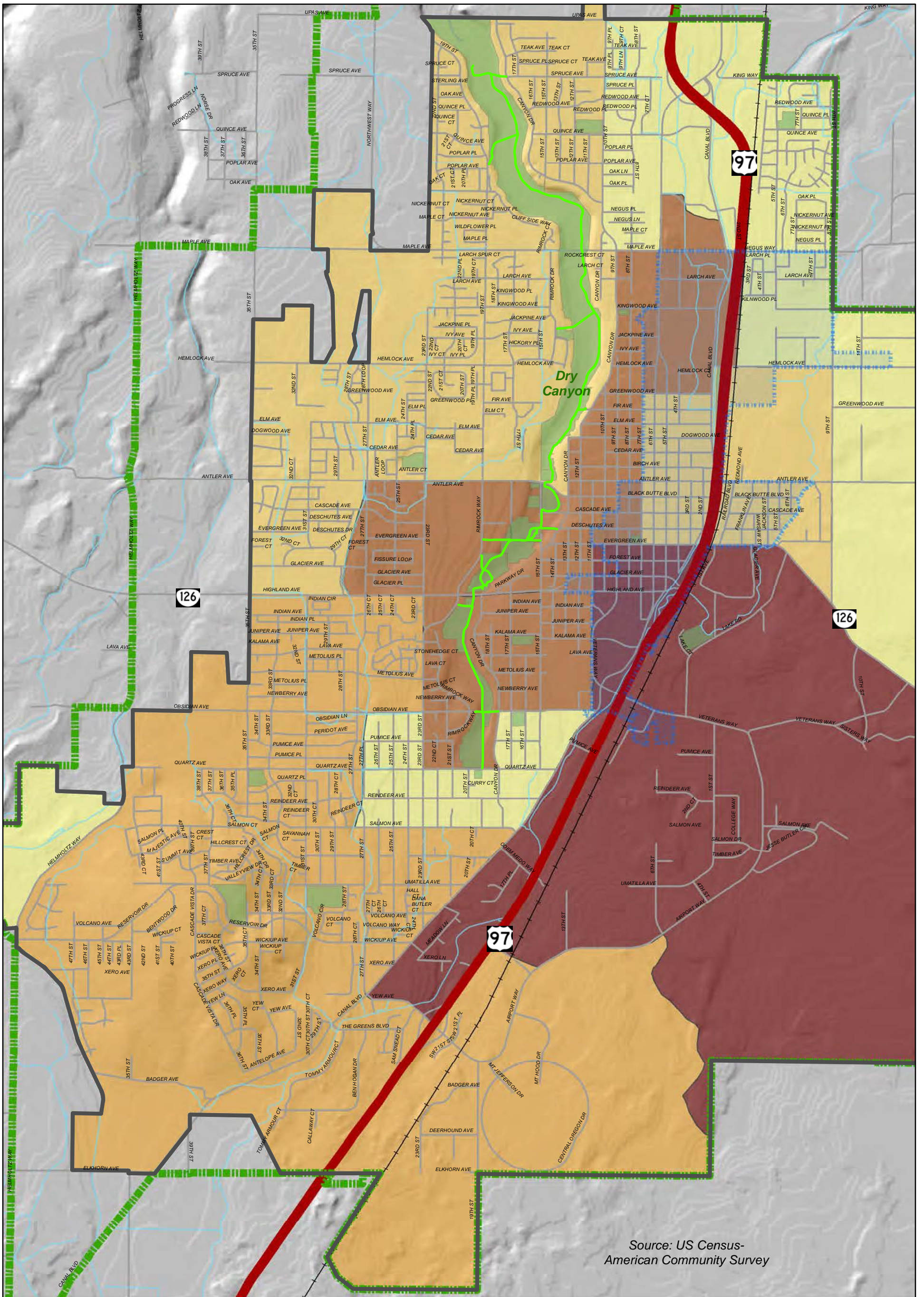
Map Extent



**Redmond
Bicycle Refinement Plan
Map 8: Percentage of
Households Without Auto Access**

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planning + design



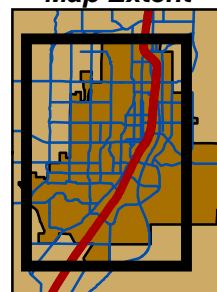
Source: US Census-
American Community Survey

- City Limits
- UGB
- Dry Canyon Trail
- Canals
- 2011 URA District
- Parks
- Railroad
- US Route 97

**Percentage of Workers by Block Group:
Commute Times Between 0 and 9 Minutes**

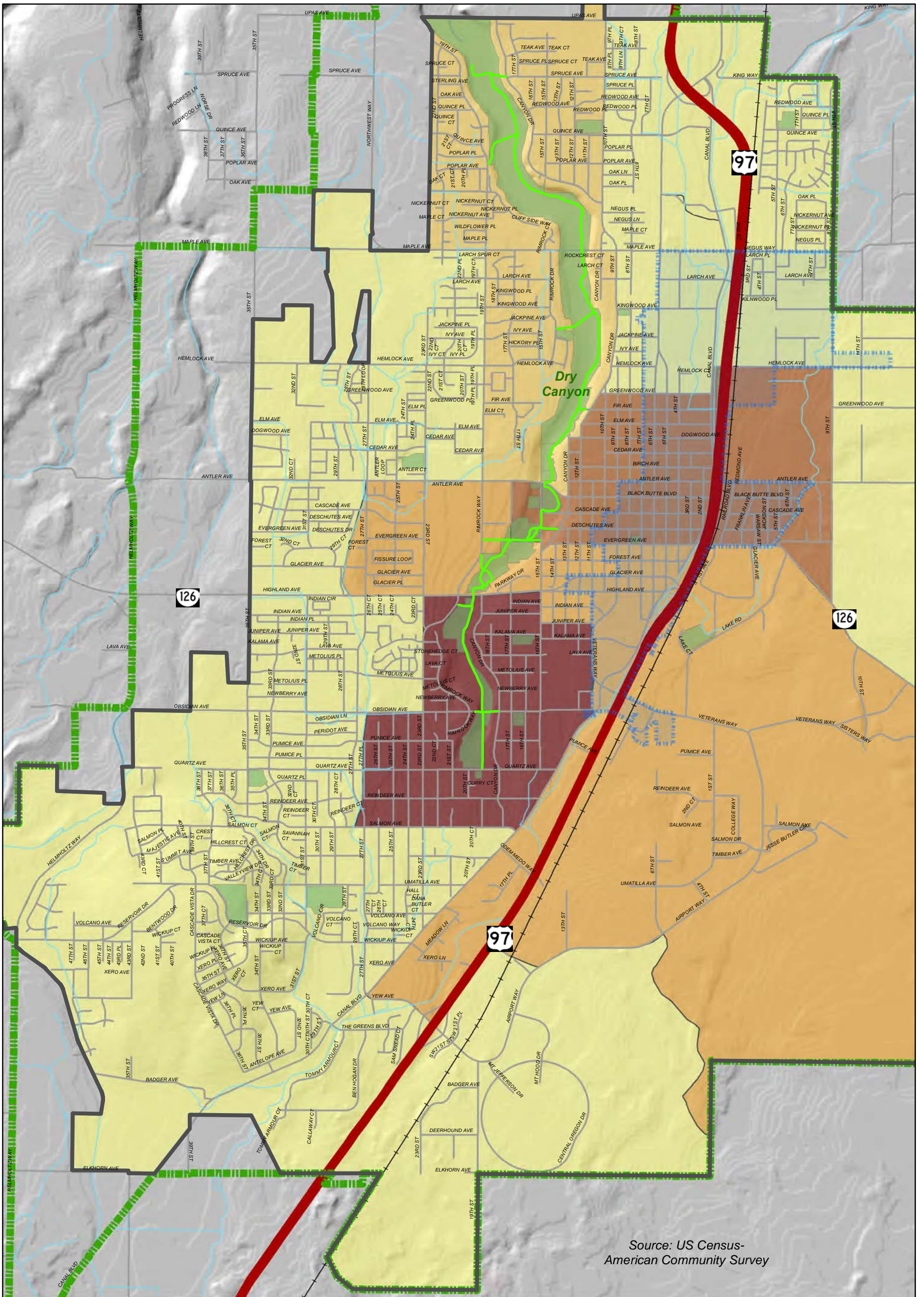
- 0 - 11%
- 11 - 18%
- 18 - 21%
- 21 - 36%
- 36% and above

Map Extent

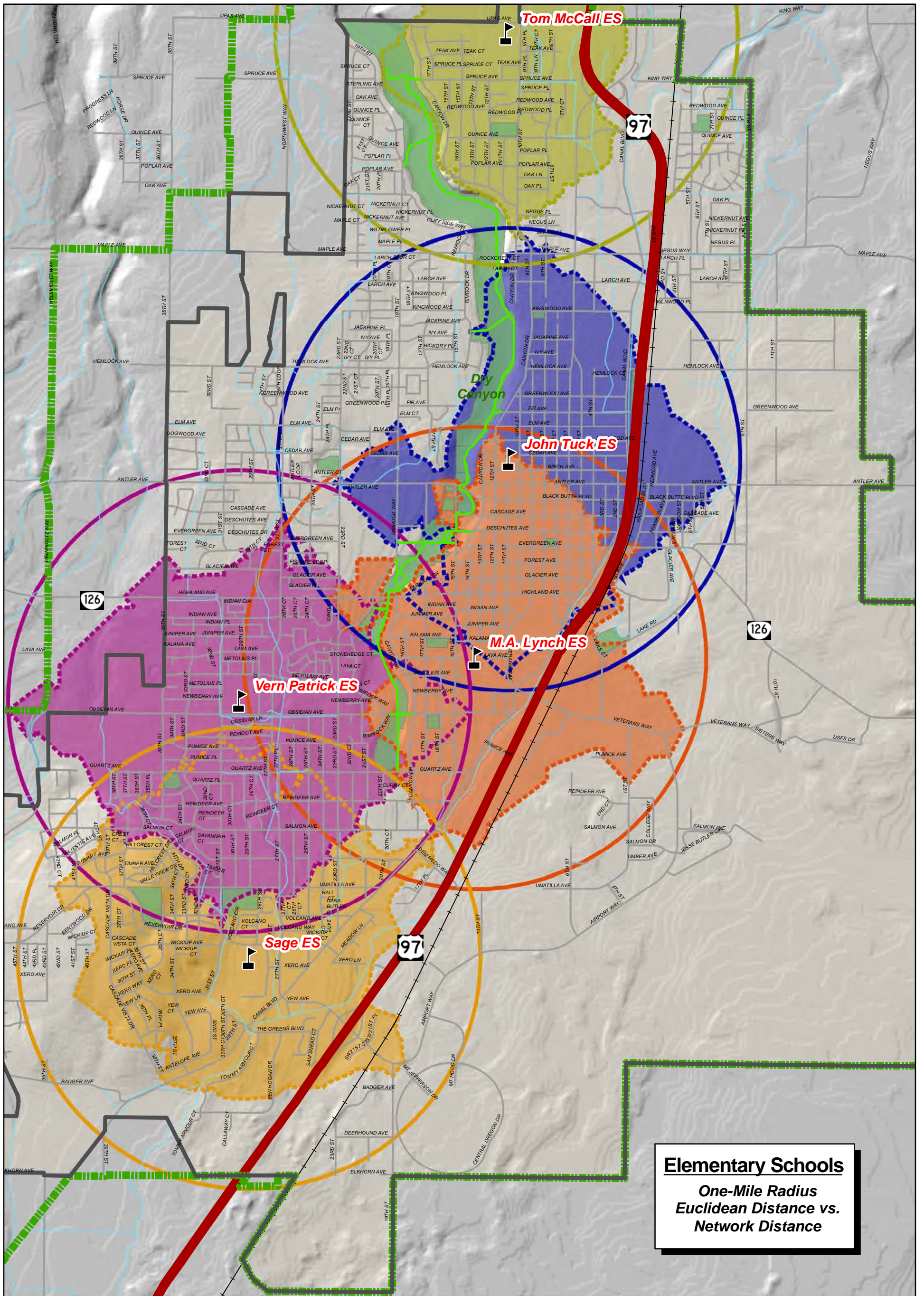


Redmond
Bicycle Refinement Plan
Map 9: Percentage of
Commutes Between 0-9 Min

b.spoke
planning + design



City Limits	2011 URA District	Percentage of Workers by Block Group: Means of Transportation - Walk or Bike <ul style="list-style-type: none"> 0 - 1.2% 1.2 - 3.7% 3.7 - 4.5% 4.5 - 5.4% 5.4% and above 	Map Extent 	<h2 style="text-align: center;">Redmond</h2> <h3 style="text-align: center;">Bicycle Refinement Plan</h3> <h4 style="text-align: center;">Map 10: Percentage of Commutes by Walk or Bike</h4> <div style="text-align: right;"> b.spoke <small>planning + design</small> </div>
UGB	Parks			
Dry Canyon Trail	Railroad			
Canals	US Route 97			



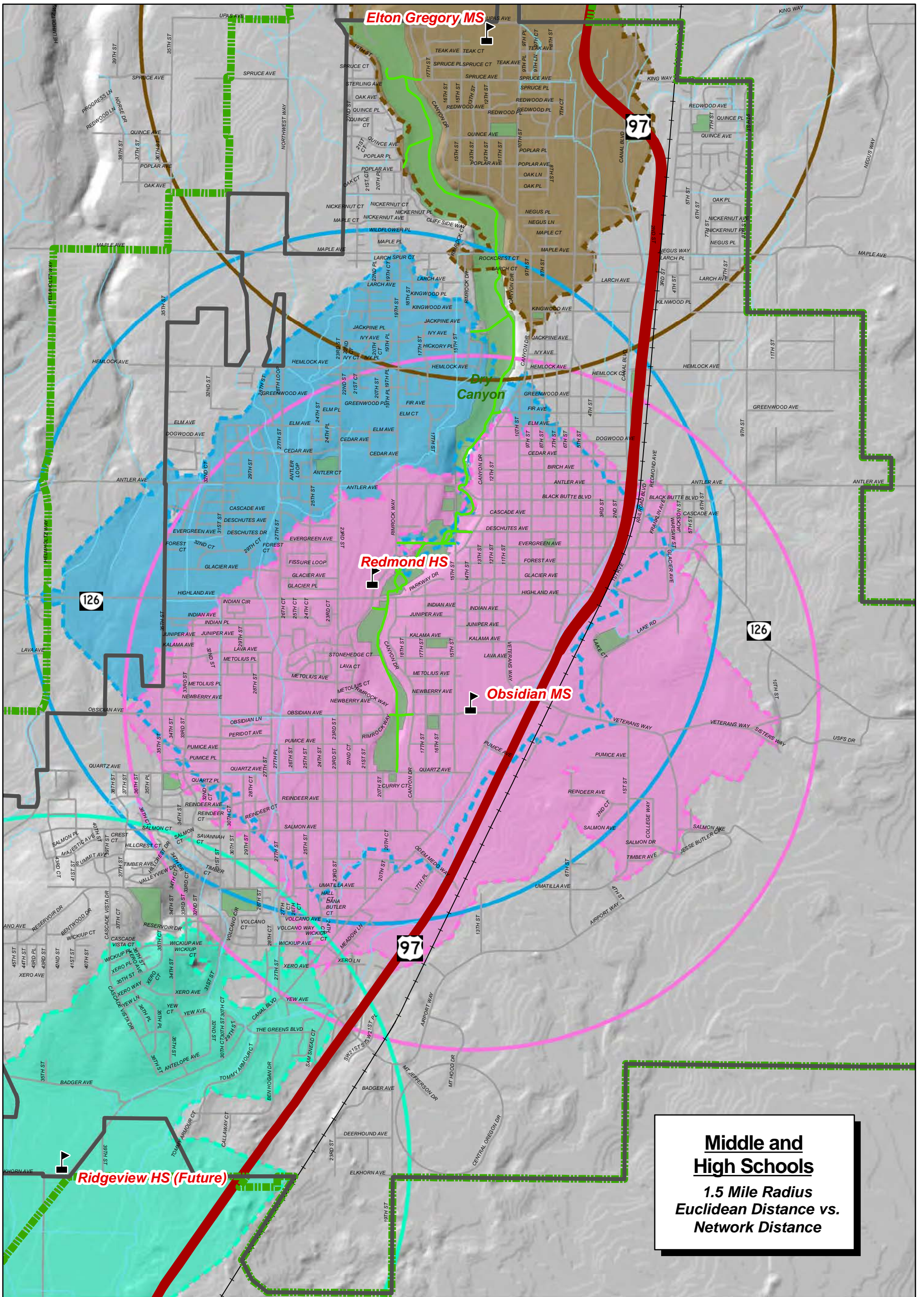
Elementary Schools
 One-Mile Radius
 Euclidean Distance vs.
 Network Distance

	City Limits		Parks		John Tuck
	UGB		Railroad		M.A. Lynch
	Dry Canyon Trail		US Route 97		Sage
	Canals		School		Tom McCall
					Vern Patrick

Map Extent

Redmond
 Bicycle Refinement Plan
 Map 11: Elementary School
 Network Analysis

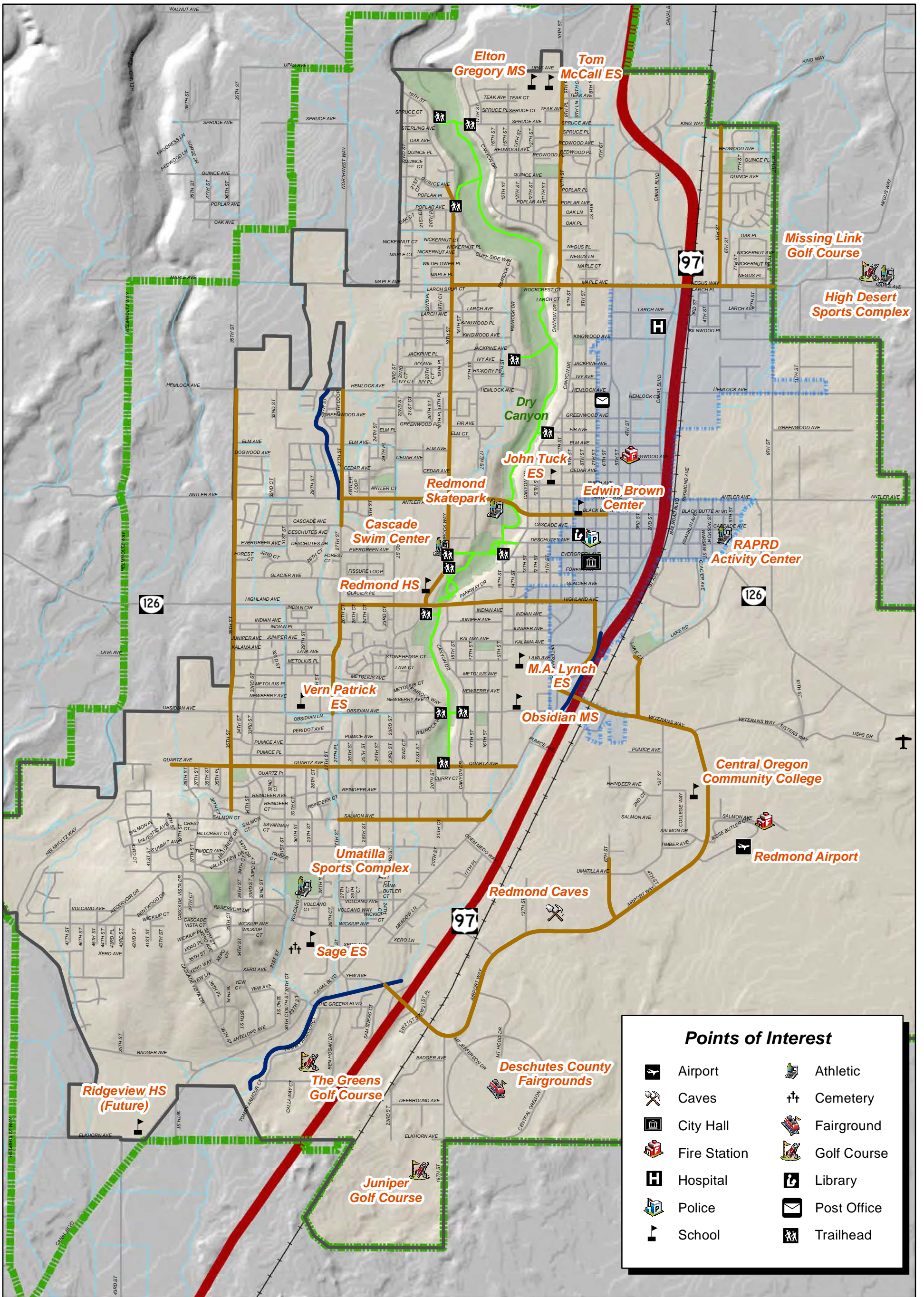
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City Limits	Parks	Middle and High Schools
UGB	Railroad	Elton Gregory MS
Dry Canyon Trail	US Route 97	Obsidian MS
Canals	School	Redmond HS
		Ridgeview HS

Map Extent

Redmond
Bicycle Refinement Plan
Map 12: Middle and High School Network Analysis

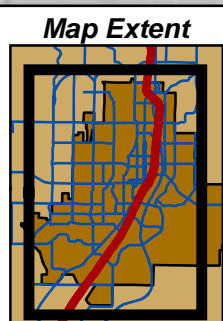


Points of Interest

	Airport		Athletic
	Caves		Cemetery
	City Hall		Fairground
	Fire Station		Golf Course
	Hospital		Library
	Police		Post Office
	School		Trailhead

- City Limits
- UGB
- Dry Canyon Trail
- Canals
- 2011 URA District
- Parks
- Railroad
- US Route 97

- ### Additional Trail Facilities From Trails Master Plan
- Existing Canal Trail
 - Existing On-Road Trail

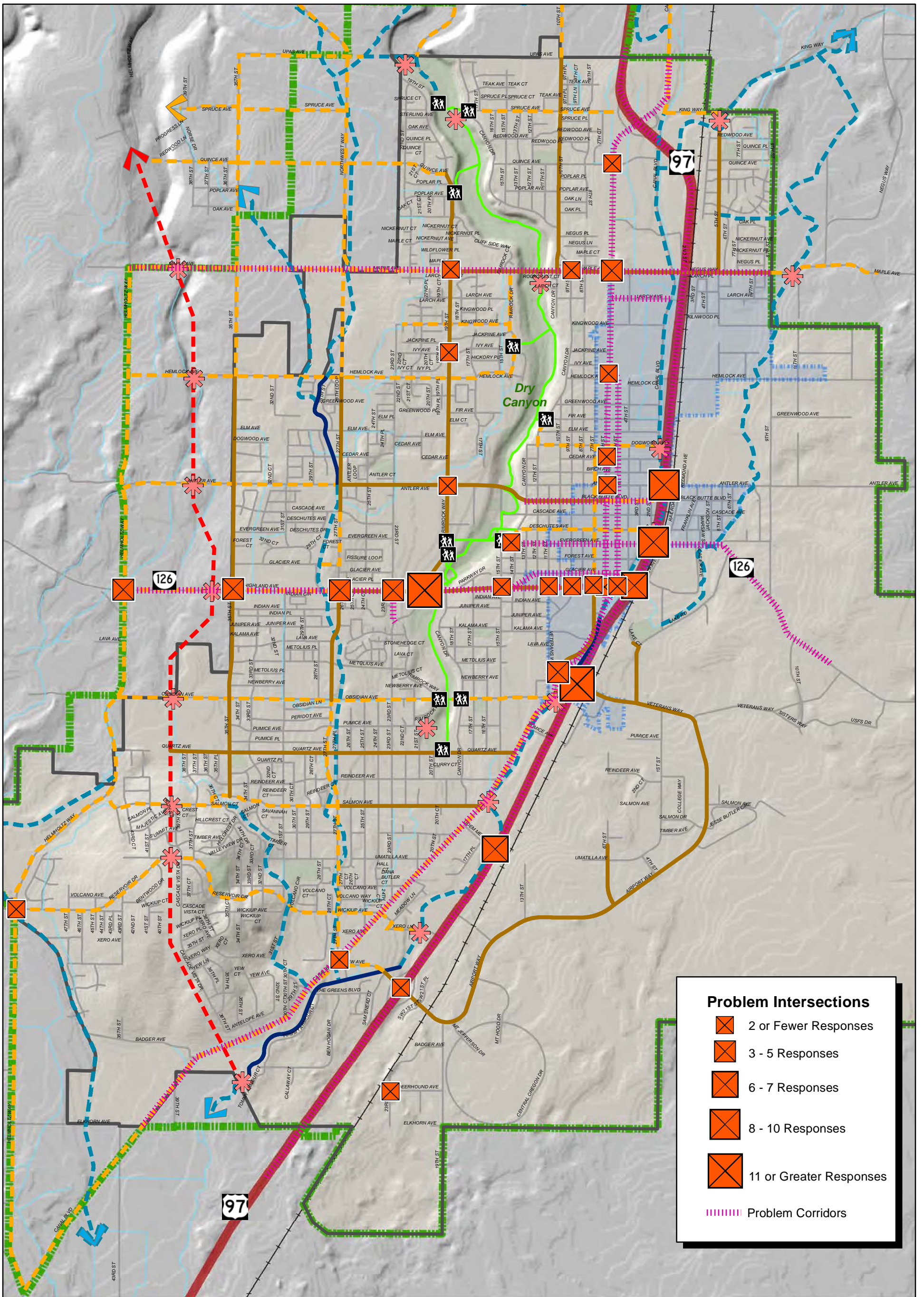


Redmond






Bicycle Refinement Plan


Map 13: Community Outreach Map









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Problem Intersections

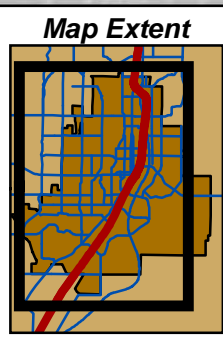
-  2 or Fewer Responses
-  3 - 5 Responses
-  6 - 7 Responses
-  8 - 10 Responses
-  11 or Greater Responses

 Problem Corridors


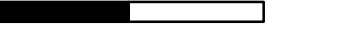
-  City Limits
-  UGB
-  Dry Canyon Trail
-  Canals
-  2011 URA District
-  Parks
-  Railroad
-  Existing Trailhead

Additional Trail Facilities From Trails Master Plan

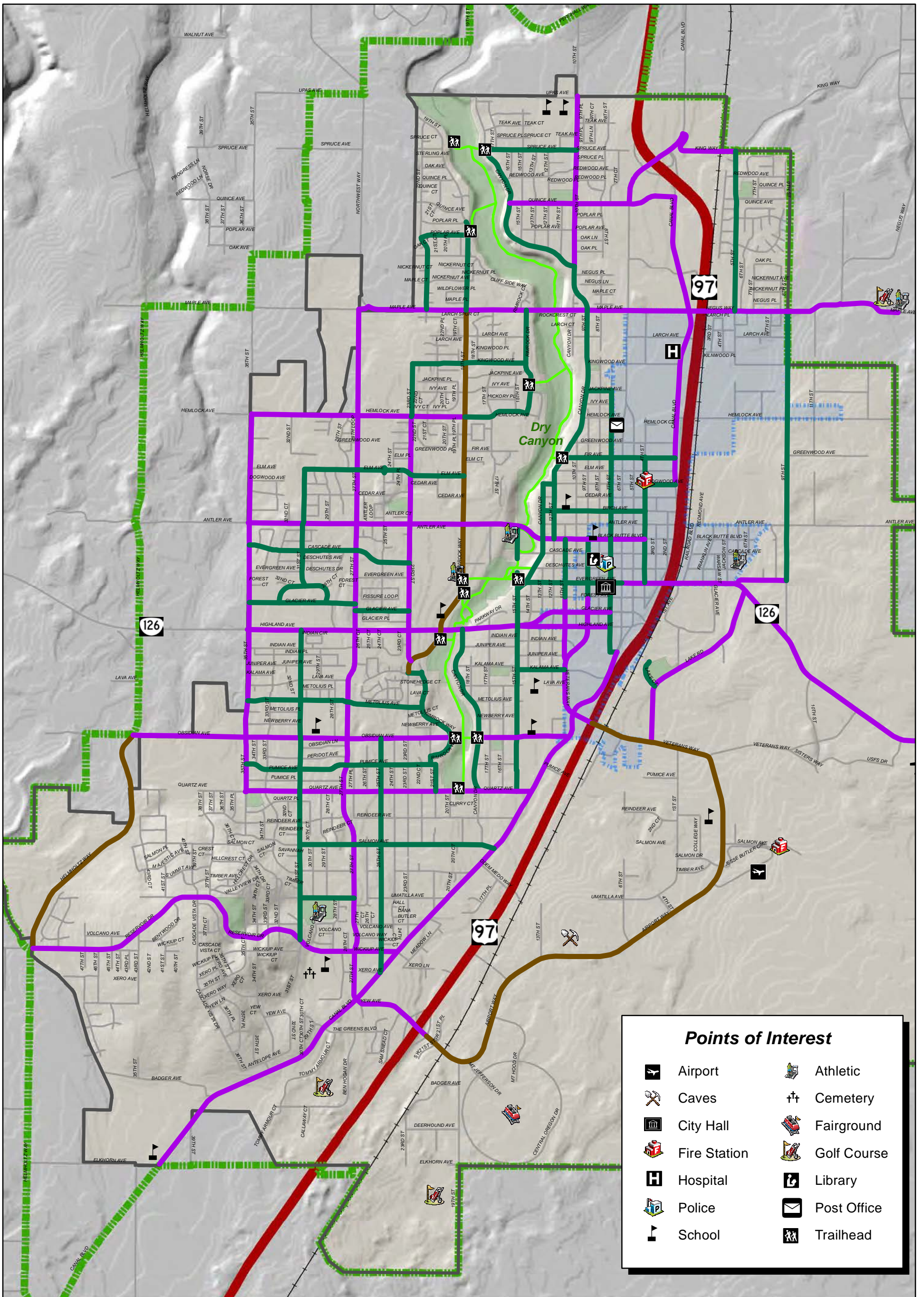
-  Existing Canal Trail
-  Proposed Canal Trail
-  Existing On-Road Trail
-  Proposed On-Road Trail
-  Proposed BPA Trail
-  Proposed Trail Connection



Redmond Bicycle Refinement Plan
Map 14: Survey Responses Problem Corridors and Intersections

b:spoke
 planning + design



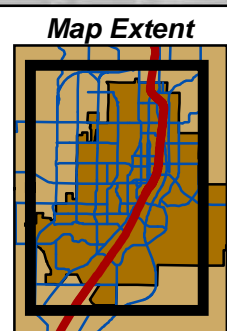
Points of Interest

Airport	Athletic
Caves	Cemetery
City Hall	Fairground
Fire Station	Golf Course
Hospital	Library
Police	Post Office
School	Trailhead

City Limits	2011 URA District
UGB	Parks
Dry Canyon Trail	Railroad
Canals	US Route 97

Bicycle Refinement Plan Proposed Loop Network On-Road Trail System

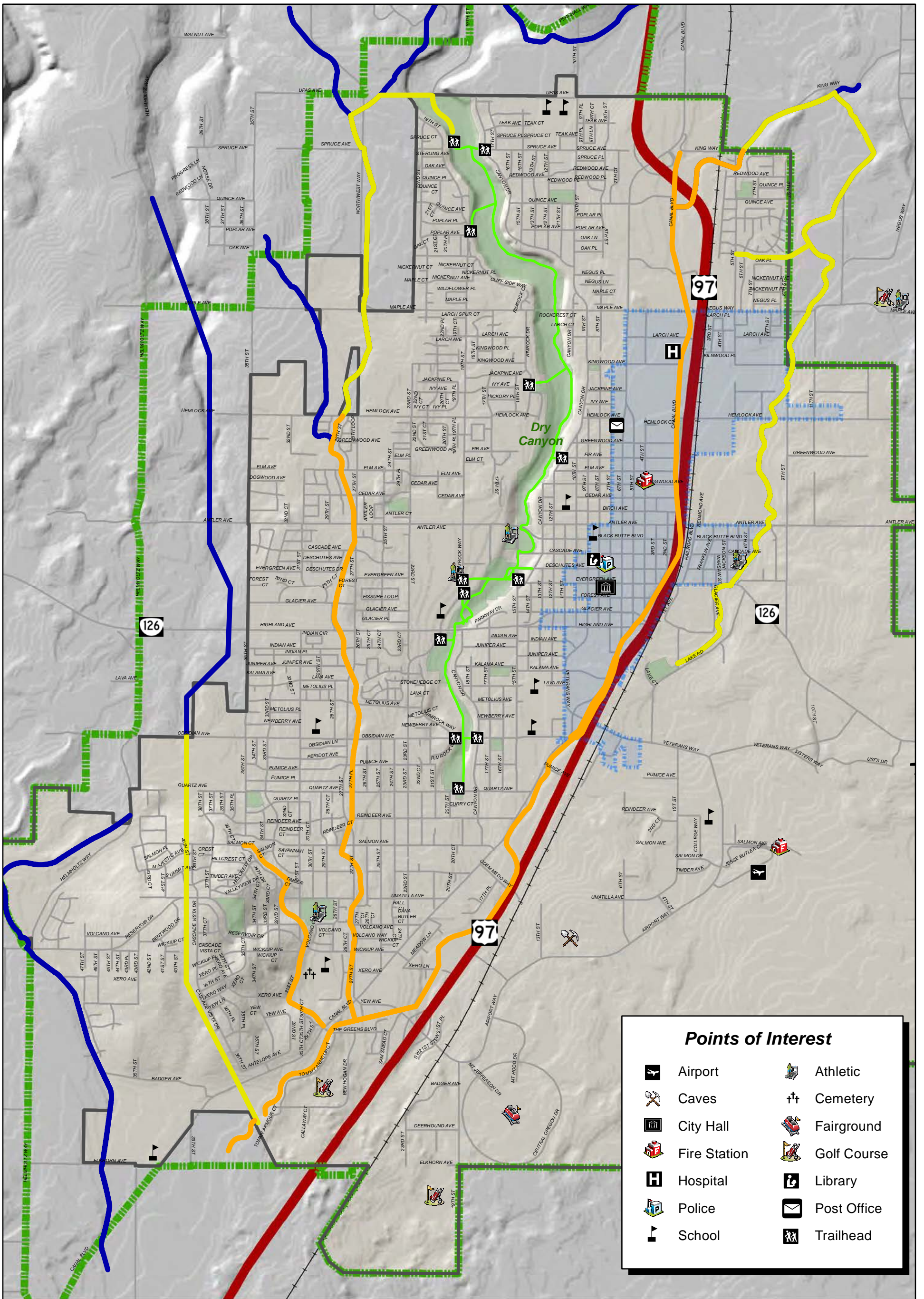
Multi-Use Path	Bicycle Boulevard
Bicycle Lane	



Redmond

Bicycle Refinement Plan Map 15: On-Road Trail System Proposed Loop Network

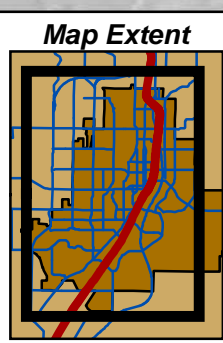
b:spoke
planning • design



- City Limits
- UGB
- Dry Canyon Trail
- Canals
- 2011 URA District
- Parks
- Railroad
- US Route 97

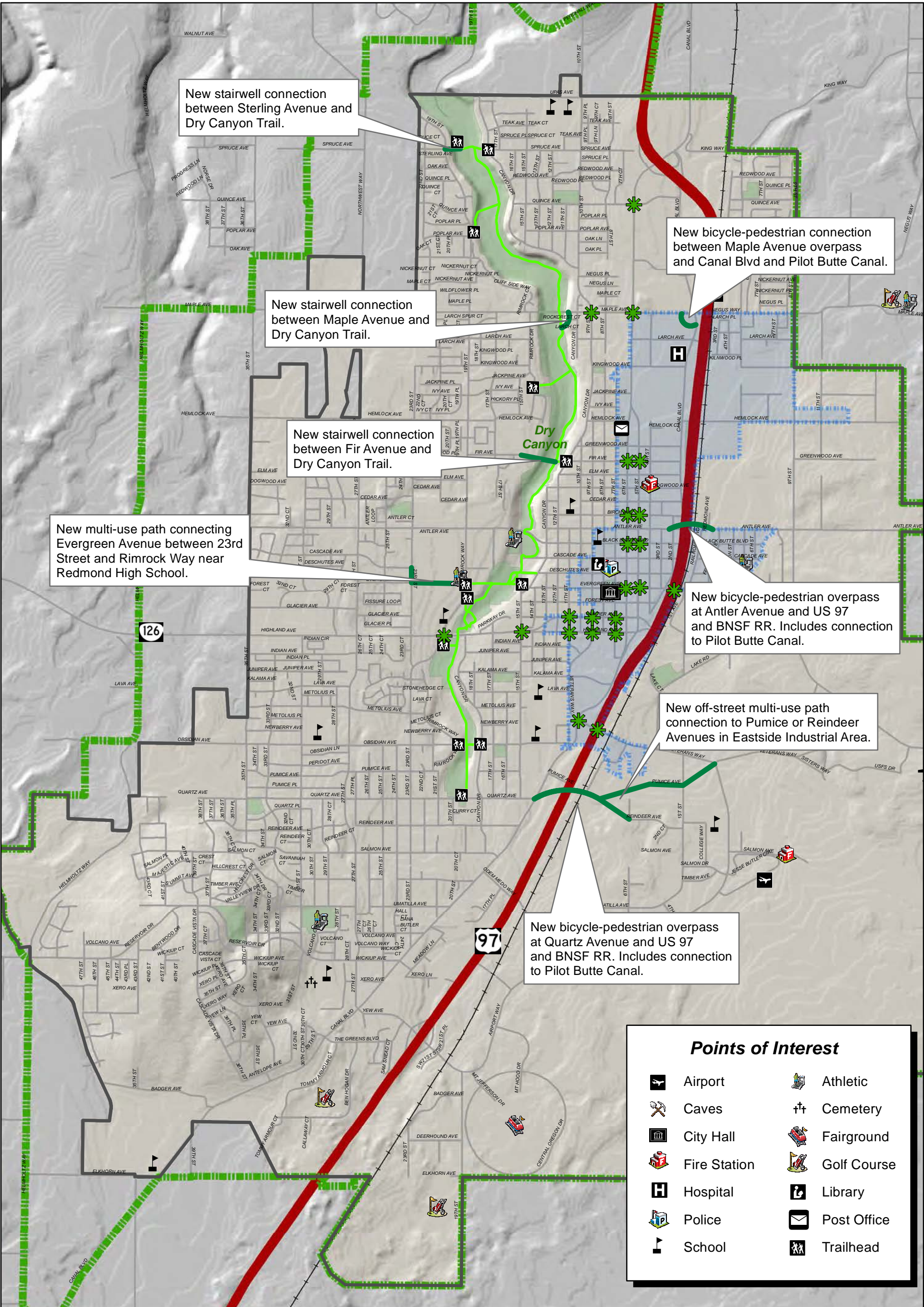
- Multi-Use Off-Street Paths From Trails Master Plan**
- 1st Phase (High Priority)
 - 2nd Phase (Medium Priority)
 - 3rd Phase (Low Priority)

- Points of Interest**
- | | |
|--------------|-------------|
| Airport | Athletic |
| Caves | Cemetery |
| City Hall | Fairground |
| Fire Station | Golf Course |
| Hospital | Library |
| Police | Post Office |
| School | Trailhead |



Redmond Bicycle Refinement Plan
Map 16: Future Multi-Use Off-Street Path Network Prioritization

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New stairwell connection between Sterling Avenue and Dry Canyon Trail.

New stairwell connection between Maple Avenue and Dry Canyon Trail.

New stairwell connection between Fir Avenue and Dry Canyon Trail.

New multi-use path connecting Evergreen Avenue between 23rd Street and Rimrock Way near Redmond High School.

New bicycle-pedestrian connection between Maple Avenue overpass and Canal Blvd and Pilot Butte Canal.

New bicycle-pedestrian overpass at Antler Avenue and US 97 and BNSF RR. Includes connection to Pilot Butte Canal.

New off-street multi-use path connection to Pumice or Reindeer Avenues in Eastside Industrial Area.

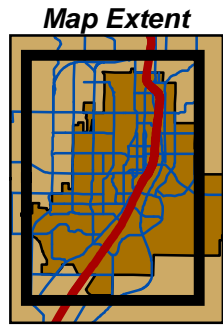
New bicycle-pedestrian overpass at Quartz Avenue and US 97 and BNSF RR. Includes connection to Pilot Butte Canal.

Points of Interest

Airport	Athletic
Caves	Cemetery
City Hall	Fairground
Fire Station	Golf Course
Hospital	Library
Police	Post Office
School	Trailhead

- City Limits
- UGB
- Dry Canyon Trail
- Canals
- 2011 URA District
- Parks
- Railroad
- US Route 97

- Proposed Areas of Investment**
- Intersection Improvements (Short-Term)
 - New Bike-Ped Connections (Long-Term)



Redmond
Bicycle Refinement Plan
 Map 17:
Proposed Network Connections and Intersection Improvements

0 0.3 0.6 Miles

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Photo & Image Sources

All photos were taken by b:spoke photographers Amy Hesse or Reza Farhoodi, unless otherwise noted below.

All digital simulations are designed by Spencer Williams.

All maps are created by Reza Farhoodi, unless otherwise noted.

Figure 14 (page 44):

Digital Simulations by Spencer Williams

Top: Photo of Cyclist Mother and Children - Retrieved on May 22, 2011 from Velo-city: <http://velo-city.org/trailer-bikes/Follow-Me-trailer-bike.web.jpg>

Bottom: Photo of Cyclists in a Row - Retrieved on June 1, 2011 from MLive.com: http://blog.mlive.com/kzgazette/2008/07/bicyclists_motorists_in_southw.html

Photo of Joggers - Retrieved on June 1, 2011 from A Trail Runner's Blog: <http://runtrails.blogspot.com/2007/06/fighting-my-demons-at-mt-diablo-50k.html>



Figure 13 (page 43):

Left: Drawing by Spencer Williams

Right: City of Portland, *Bike Corrals in High Demand*. from PortlandOnline: <http://www.portlandonline.com/shared/cfm/image.cfm?id=277354>

Figure 14 (page 44):

Digital Simulation by Spencer Williams

Photo of Equestrian - Retrieved on May 22, 2011 from America's Horse: <http://www.pricecanyon.com/pdfs/America%27s%20Horse%20Article%20with%20Photos.pdf>

Photo of Woman Jogging with Stroller - Retrieved on May 22, 2011 from Stroll-Smart(tm): <http://www.stroll-smart.com/contactus.html>

Photo of Children Biking in Line - Retrieved on May 22, 2011 from Get

Fit Festus: <http://www.getfitfestus.com/p/bike-to-school-program.html>

Figure 15 (page 45):

Map Diagram by Reza Farhoodi
Aerial Image: GoogleEarth

Figure 16 (page 46):

Left: Craigieburn Pass, Australia. Retrieved May 31, 2011 from Architecture-Page. http://www.architecture-page.com/go/projects/craigieburn-bypass__2

Right: Digital Simulation by Spencer Williams

Figure 19 (page 51):

City of Remond, GIS Department

Figure 21 (page 57):

Detail of 2020 Greater Redmond Area Comprehensive Plan and Zone Map. Retrieved February 2011 from

City of Redmond Zone Map Link, http://doc.ci.redmond.or.us/Community_Development/Zone_Map.pdf

Figure 23 (page 60):

Mike Caccavano, City of Redmond

Figure 27 (page 65):

Left: City of Redmond Public Works

Right: City of Redmond Downtown Urban Renewal Plan

Figure 28 (page 72):

All: AASHTO, 1999

Figure 29 (page 74):

Left: Doerksen, 2010

Right: Nicholas Klein in Pucher, 2010

Figure 30 (page 75):

All: SDOT, 2010. *What's a Buffered Bike Lane?* Retrieved March 2011, from The SDOT Blog: <http://sdotblog.seattle>.



gov/2010/06/21/what%E2%80%99s-a-buffered-bike-lane

Figure 31 (page 75):

Barnes, P. (2007). Trip to Bend.
Retrieved March 2011, from Picasa:
http://picasaweb.google.com/lh/photo/raBzyFkgoVX4Eo_-yCmKCg

Figure 32 (page 76):

ACHD, 2009

Figure 33 (page 77):

Left: LADOTbikeblog.wordpress.com
Right: Billings Area Bikeway and
Trail Master Plan (2011)

Figure 34 (page 77):

Left: ACHD, 2009
Right: *Cedar Falls Bicycle Plan, 2011*

Figure 35 (page 78):

ACHD, 2009