OREM BICYCLE AND PEDESTRIAN PLAN

2010

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Acknowledgements

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1 Vision, Goals, and Objectives

1.1 Introduction

The Vision, Goals, and Objectives of the Orem Bicycle and Pedestrian Plan are principles that guide the development and implementation of the Plan for years to come. Goals and objectives direct the way the public improvements are made, where resources are allocated, how programs are operated, and how City priorities are determined. This Plan will lay out a framework of how to create and expand programs and improvements to increase bicycling and walking in Orem.

This chapter identifies goals for discussion and review by the City and its advisors. These goals should support the City's vision and describe the most important aspects of the City's programs, priorities and attitudes. A 'best practices' review of goals formulated by other cities was undertaken to assist the City in creating a Bicycle and Pedestrian Plan and facilitate initial discussions. This material is available in **'Appendix A – National Best Practices.'**

1.2 Vision, Goals, and Objectives

The following vision, goals, objectives and policies have been based on national best practices and from discussions with the Project Steering Committee, City of Orem staff, and the Mountainland Association of Governments.

A vision statement outlines what the city wants to be. It concentrates on the future and is a source of inspiration. Goals help guide the city towards fulfilling that vision. Goals will relate to both existing and newly launched efforts by the City of Orem. Objectives are more specific statements under each goal that define how each goal will be achieved. Objectives are measurable and allow tracking and benchmarking systems to demonstrate the extent of the City's progress toward the goals and overall vision. Each objective has a number of implementation measures that can help target efforts toward the achievement of the objective and the related goal.

1.3 Project Vision

"Orem will be the most bicycle and pedestrian friendly city in the State of Utah, and will be rated a 'Platinum' Bicycle Friendly Community by the League of American Bicyclists."

1.4 Goals & Objectives

The Bicycle and Pedestrian Plan will be implemented through a comprehensive program of activities based on the following goals:

1. Complete Streets
2. Implementation
3. Evaluation
4. Environmental Sustainability
5. Transit Integration
6. Maintenance
7. Education & Encouragement
8. Enforcement
9. Health & Safety

1. Complete Streets

Goal: Implement a Complete Streets Policy

Objectives:

1A: Require all Capital Improvement Projects to conform to the Orem Bicycle and Pedestrian Plan.

1B: Implement a continuous network of bike lanes, signed shared bikeways, and bike boulevards that serve all bicycle user groups, including both recreational and utilitarian riders.

1C: Implement an accessible network of pedestrian supportive infrastructure, including sidewalks, curb ramps, and trails in high-priority pedestrian areas.

1D: Provide a bicycle and pedestrian network that is safe and attractive to women, children and the elderly.

1E: Evaluate streets for bike facilities based on the recommended projects in this Plan when performing street resurfacing or restriping projects.

1F: Eliminate gaps in the bicycle network to improve connectivity between destinations and with adjacent cities (Provo, Lindon, Vineyard).

1G: Require private development projects to finance and install bicycle facilities, sidewalks, and multi-use trails as appropriate and where recommended in the Orem Bicycle and Pedestrian Plan, as part of on-site improvements and off-site mitigation measures as appropriate.

1H: Adopt and adhere to existing and future standards established by the AASHTO Guide for the Development of Bicycle Facilities, and the Manual of Uniform Traffic Control Devices (MUTCD).

1I: Consider use of additional Design Guidelines presented as a part of this Plan where appropriate and feasible.

2. Implementation

Goal: Complete a non-motorized transportation system network

Objectives:

- 2A: Adopt the Orem Bicycle and Pedestrian Plan by the Orem City Council
- 2B: Create a sustainable, dedicated source of bikeway funding within the annual city budget.
- 2C: Encourage multi-jurisdictional funding applications with the Mountainland Association of Governments and the neighboring cities of Provo, Lindon, and Vineyard.
- 2D: Update the Orem Bicycle and Pedestrian Plan as appropriate to reflect new policies and/or requirements for bicycle funding.
- 2E: Secure on-going funding to support regional bicycle outreach programs such as "May is Bike Month"
- 2F: Achieve "Bicycle Friendly Community" Silver status by 2015
- 2G: Achieve "Bicycle Friendly Community" Gold status by 2020
- 2H: Achieve "Bicycle Friendly Community" Platinum Status by 2025

3. Evaluation

Goal: Monitor the implementation of the Orem Bicycle and Pedestrian Plan.

Objectives:

- 3A: Track the success of the Orem Bicycle and Pedestrian Plan as a percent completed of the total recommended bikeway system.
- 3B: Track citywide trends in bicycle usage through the use of Census data, and annual bicycle counts.
- 3C: Monitor bicycle and pedestrian collision data to seek continuous reduction in bicycle and pedestrian collision rates.

4. Environmental Sustainability

Goal: Reduce the vehicle miles traveled by single occupancy vehicles in the City of Orem.

Objectives:

- 4A: Increase the mode split to 5% for non-motorized transportation by 2015.
- 4B: Reduce greenhouse gases from transportation sources by 50% by 2050.

5. Transit Integration

Goal: integrate bicycling and walking into the transit system.

Objectives:

- 5A: Increase the number of multi-modal trips that include bicycling and walking for at least one trip segment by improving and simplifying connections and transfers.
- 5B: Consider incorporating bikeways in transit projects that include an exclusive right-of-way.
- 5C: Provide access and bicycle support facilities to transit through the development of bikeways that serve transit stations and transit hubs.
- 5D: Provide safe and accessible routes to transit for pedestrians
- 5E: Accommodate bicycles on all transit vehicles.
- 5F: Provide safe end-of-trip facilities (bike parking, etc) at all transit facilities served by three or more routes
- 5G: Provide projects that improve multi-modal connections and enhance bicycle-transit trip linking. This includes future BRT and regional commuter rail projects within Orem city limits.

6. Maintenance

Goal: Ensure citywide bicycle and pedestrian facilities are clean, safe, accessible.

Objectives:

- 6A: Maintain existing and future bicycle and pedestrian facilities to a high standard in accordance with guidelines established in this plan
- 6B: Incorporate bicycle network repair and maintenance needs into the regular roadway maintenance regime as appropriate, paying particular attention to sweeping and pothole repair on priority bicycle facilities.
- 6C: Establish weed management program to target spread of 'Puncture Vine' to reduce incidents of bicycle flat tires.
- 6D: Address pedestrian and bicyclist safety during construction and maintenance activities
- 6E: Identify safe, convenient and accessible routes for bicyclists and pedestrians through construction zones
- 6F: Establish routine maintenance program that encourages citizens to report maintenance issues that impact bicyclist and pedestrian safety.
- 6G: Develop an on-going maintenance city-wide maintenance strategy for non-motorized transportation facilities

7. Education & Encouragement

Goal: Implement comprehensive education and encouragement programs targeted at all populations in the city.

Objectives:

- 7A: Educate the general public on bicycle and walking safety issues and encourage non-motorized transportation with programs that target pedestrians, bicyclists and motorists.
- 7B: Install signage along all local and regional bikeways to assist with way-finding and to increase awareness of bicyclists.
- 7C: Support Safe Routes to School and other efforts, including educational and incentive programs to encourage more students to bicycle or walk to school, through a partnership with the school districts and other interested parties.
- 7D: Encourage employers to provide incentives and support facilities for employees that commute by bicycle.
- 7E: Promote bicycling and walking through City-sponsored events.
- 7F: Educate professional drivers (transit drivers, delivery drivers, etc) on bicyclist rights and safe motoring behavior around bicyclists.
- 7G: Encourage large employers, colleges and universities, activity centers and major transit stops to provide secure bicycle storage facilities and racks and promote their efforts.
- 7H: Encourage bicycle parking and showers, changing facilities and lockers for employee use at public buildings.

8. Enforcement

Goal: Increase enforcement on City streets and bikeways

Objectives:

- 8A: Increase attention by law enforcement officers to bicycle-related violations by both motorists and bicyclists, and emphasize positive enforcement for safe bicycling behavior by children.
- 8B: Increase enforcement efforts to prevent the obstruction of dedicated bikeways and walkways.
- 8C: Reduce aggressive and/or negligent behavior among drivers, bicyclists and pedestrians.
- 8D: Ensure that all bicycle or pedestrian collisions are accurately recorded into an collision database for future analysis and monitoring.

9. Health & Safety

Goal: provide safe and accessible routes for bicyclists and pedestrians of all ages and abilities.

Objectives:

- 9A: Reduce crashes involving bicyclists, pedestrians and motor vehicles by at least 10%.
- 9B: Reduce the number of bicycle injuries by 50 percent from current levels
- 9C: Strive to increase the proportion of cyclists who feel safe cycling in town to 75%

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2 Relevant Document Summary

2.1 City of Orem General Plan, January 2008

This plan set forth the City's long term goals and policies with regards to growth and development. As part of the plan update process a city-wide survey was conducted to help city officials establish the goals of the plan. Five goals were formulated, with three goals directly impacting the Bicycle and Pedestrian Plan.

1. The preservation of open space and the provision of parks and recreation facilities.
2. Less emphasis on economic development, more emphasis on residential quality of life
3. Streetscape improvements on State Street and making streets more walkable.

The plan motto is "Family City USA", and the plan mission states:

"The mission of the City of Orem is to partner with citizens and businesses to help create and preserve a community where people want to live, work, and play."

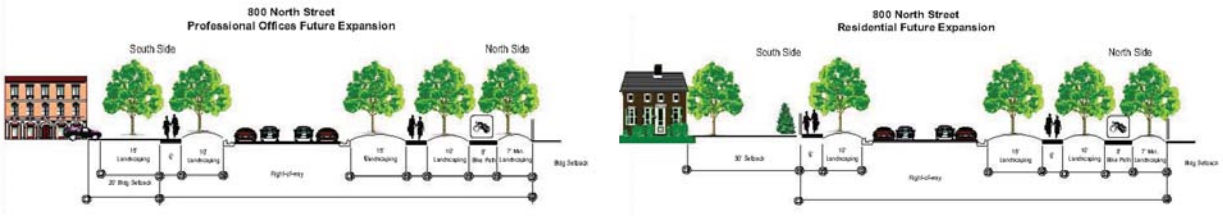
Demographic information from the plan shows that the population is:

- 10.6% under the age of 5 years
- 18.5% between the ages of 5 and 14 years
- 10.9% between the ages of 15 and 19 years
- 27.6 % between the ages of 20 and 34 years
- 20.2% between the ages of 35 and 54 years
- 12.2% 55 years and above

Gender is fairly evenly split between male and female residents, with 90.8% of the population race classification as white.

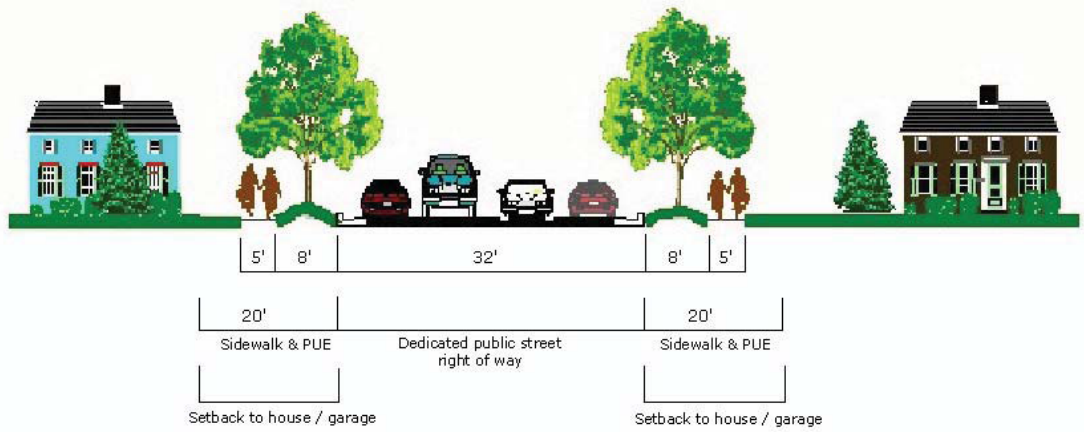
2.1.1 Urban Design

To support the City's "Family City USA" motto, family-friendly streets are encouraged. In the Urban Design chapter of the plan, overall streetscape improvements are recommended to enhance the pedestrian environment. Those improvements are: streetscape design, signs, street lighting, historic preservation and public art. Specific streets are listed noting existing conditions, previous improvement projects and the identification of specific areas for future improvements. Streetscape priorities map (see **Figure 2.1**) exhibit the streets prioritized for improvements. Street cross sections have been developed for 800 North Street, sub-local streets, and for buffered sidewalks.



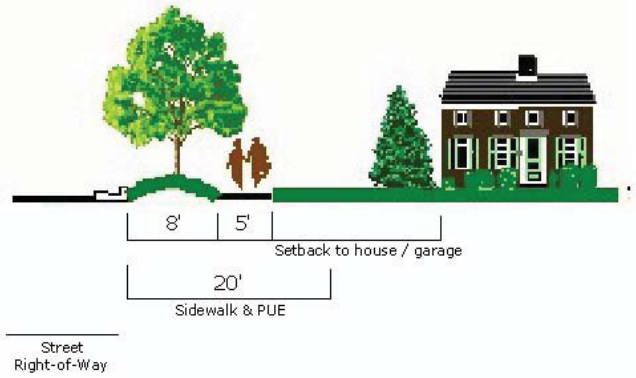
Cross sections for 800 North Street

Cross Section of Sub-Local Street



Setback requirements by zone:

Cross Section of Buffered Sidewalk



2.1.2 Transportation

The transportation chapter of the general plan includes guidelines for bicycle and pedestrian paths. A passage from this chapter reads:

"Utah has the lowest bicycle transportation rates and one of the highest drive alone rates out of [the] six western region states. Utah's bicycle fatality rate, at 4.5 fatalities per million is 36% higher than the national average. Many local trips that Orem resident make in their cars might be made on foot or by bicycle if such methods weren't considered unsafe and unappealing."

The goals for the bicycle and pedestrian path are that they are separated from vehicular traffic where possible and provide a connection between parks and open spaces. It should be noted that separating bicycle lanes from pedestrian walkways is desired.

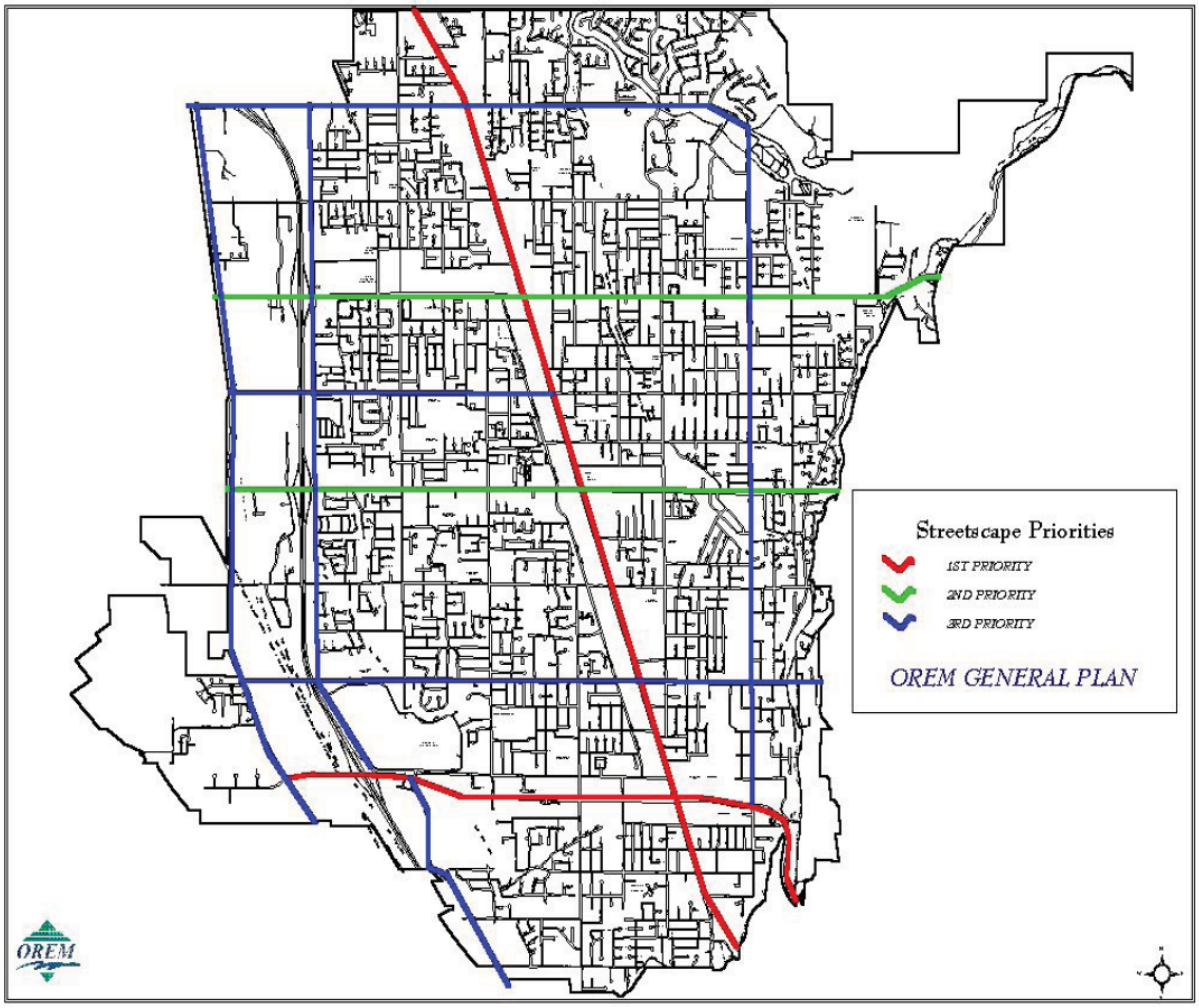


Figure 2.1 –Streetscape Priorities (City of Orem)

This element of the plan outlines the need for a Bicycle and Pedestrian Master Plan to be developed and appended to the general plan. An Ad Hoc Committee and public involvement are stated as key components to the development of the Bicycle and Pedestrian Master Plan, and the support and use of bicycle projects. Transportation goals that are related to the City of Orem's Bicycle and Pedestrian Plan are:

- Within two years
  - Adopt and implement a bicycle and pedestrian path master plan
  - Complete the College Interconnect Trail from UVSC to BYU
- Within ten years
  - Plan and construct trails along the Murdock Canal, the Bonneville Shoreline and Utah Lake shore

The Street Master Plan map is shown in **Figure 2.2** and the most current existing bicycle and trails map in **Figure 2.3**.

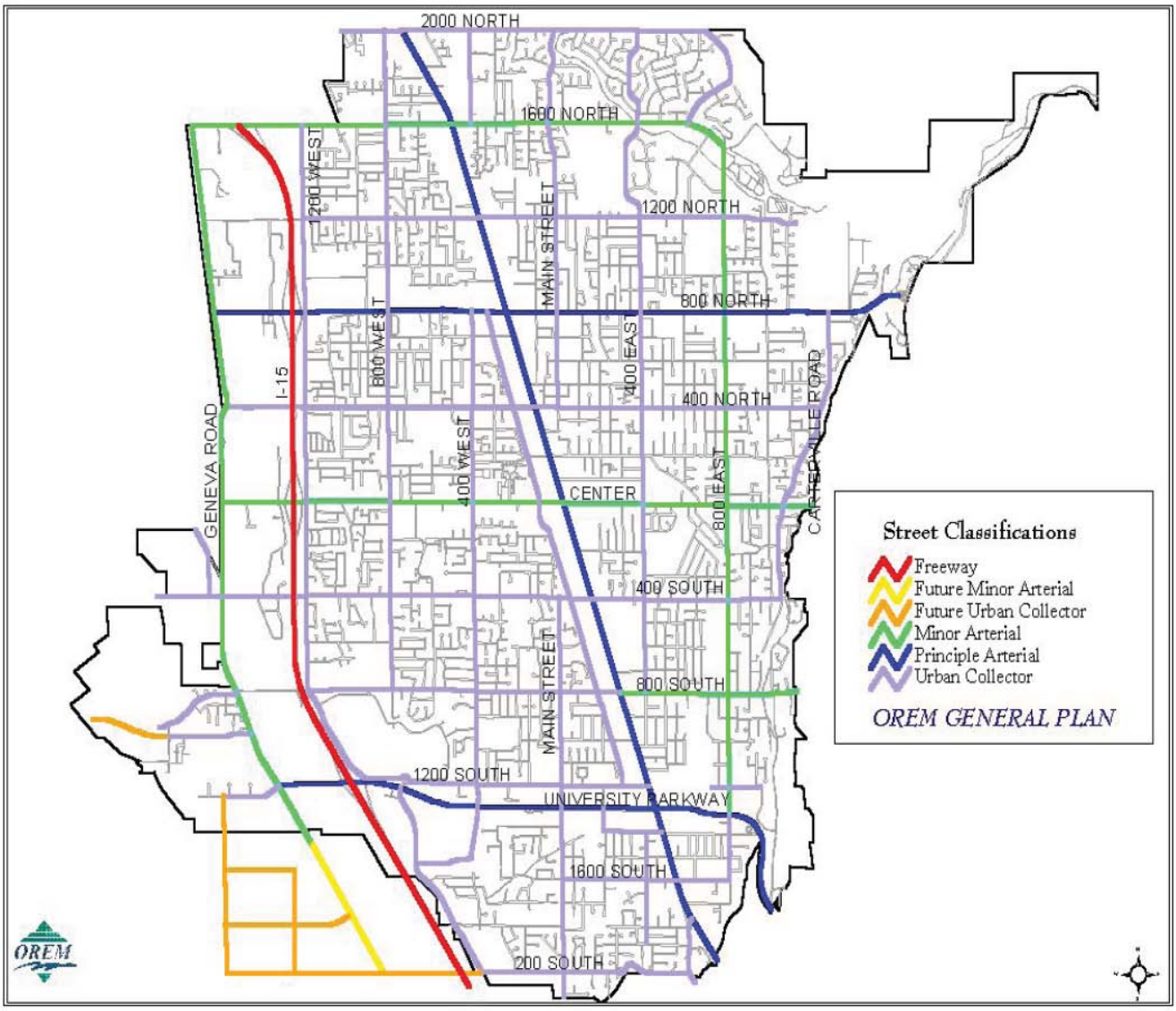


Figure 2.2 – Street Master Plan Map (City of Orem)

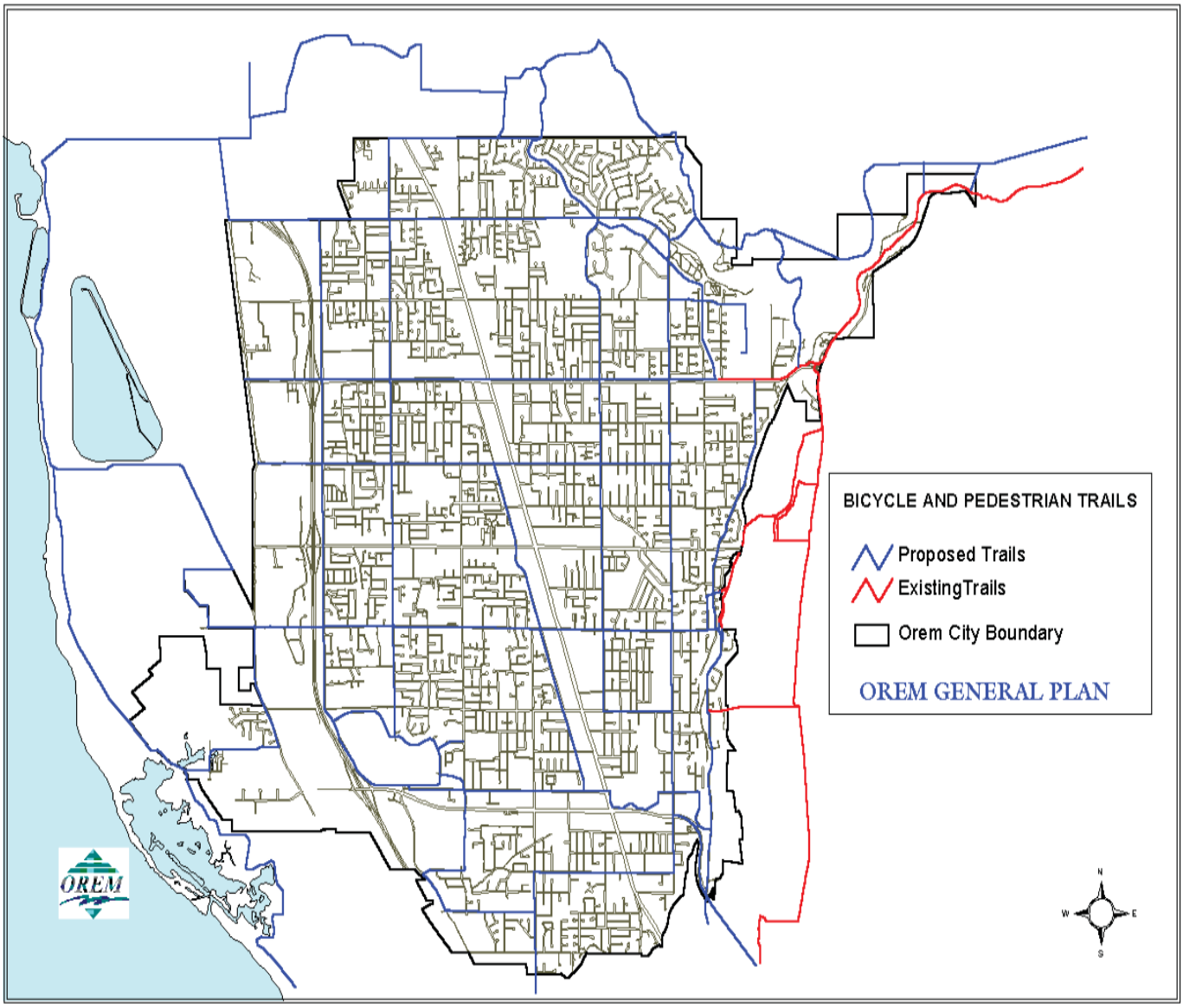


Figure 2.3 – Existing and Proposed Bicycle and Pedestrian Trails (City of Orem)

2.1.3 Housing

The Housing chapter centers on opportunities to diversify housing types. The student housing element indirectly addresses the need for bicycle and pedestrian facilities by calling to reduce car trips made by students attending Utah Valley State College. Locating student housing in areas near the college will assist in making student life more affordable and could reduce car dependence.

2.1.4 Parks and Recreation

A map documenting park facilities throughout the city is shown in Figure 2.4

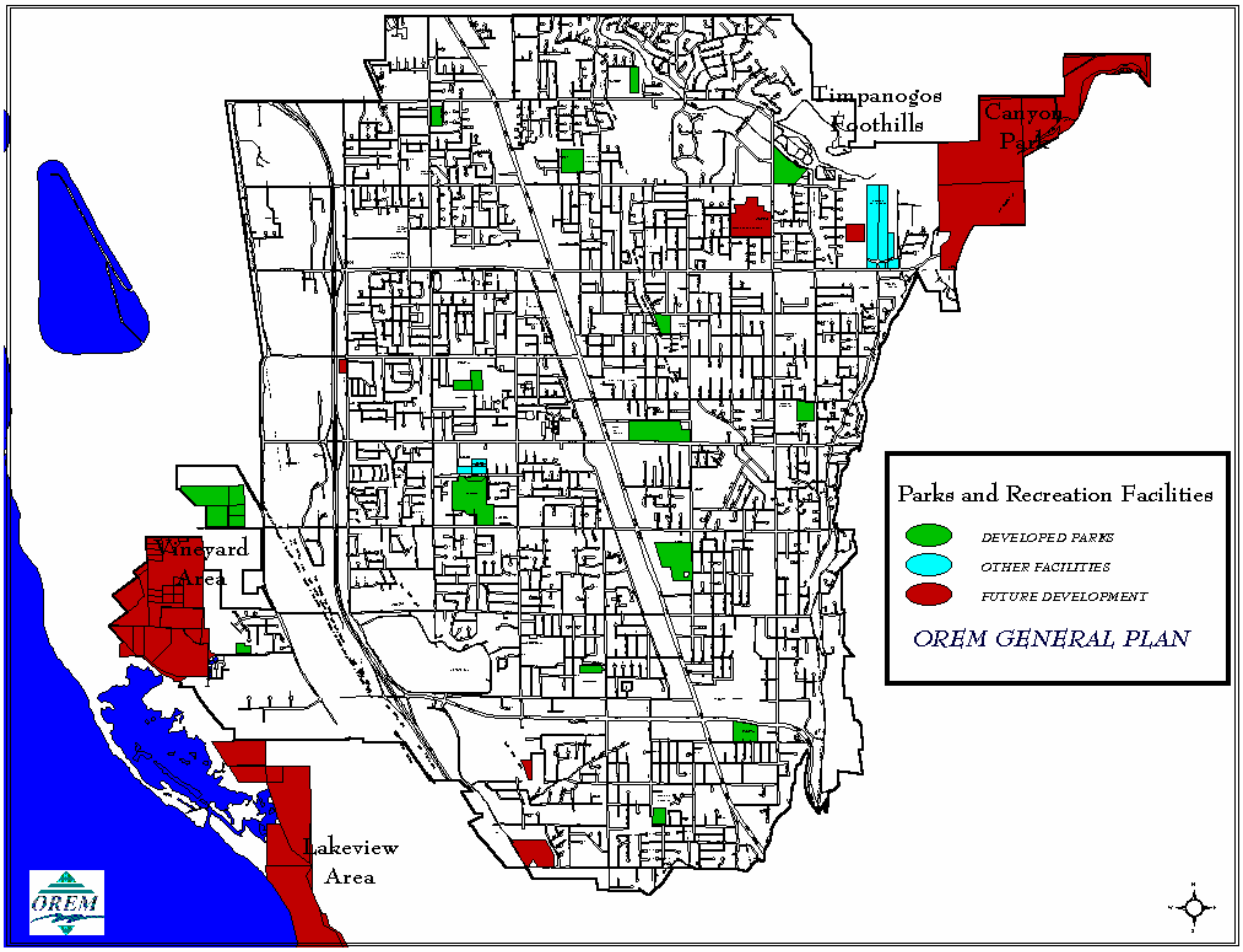


Figure 2.4 – Parks & Recreation Facilities (City of Orem)

2.2 City of Orem Municipal Code, Chapter 22 - Zoning, subsection 15.6 and 15.7 – March 2009

Pedestrian Access in non-residential areas is addressed in *subsection 15.6*. All commercial zones with more than 600 feet of street frontage or are located adjacent to a mass transit stop are required to provide a pedestrian pathway between the public right-of-way, across the landscaping, to the parking lot or sidewalk.

Sub-section 15.7 covers bicycle parking and facilities. On-site bicycle parking spaces must equal 10% of the required automobile spaces, with a minimum of three spaces provided. A maximum of thirty bicycle parking spaces per building are allowed. The Director of Development Services can waive the bicycle parking requirement if the development is not likely to attract bicycle traffic. Car washes and personal storage units are listed as developments that are not likely to generate bicycle traffic.

Bicycle parking facilities (lockers or racks) are to be provided where bicycle parking is required. Bicycle parking facility requirements are:

1. Provide for storage and locking of bicycles, either in lockers, medium-security racks or equivalent facilities in which the user may lock both the bicycle frame and the wheels.
2. Be located on a raised island no less than six inches in height, or within an area sufficiently projected from vehicular traffic.
3. Be designed so as not to cause damage to the bicycle.
4. Facilitate easy locking without interference from or to adjacent bicycles.
5. Consist of racks or lockers anchored so that they cannot be easily removed and of solid construction, resistant to rust, corrosion, hammers and saws.
6. Be consistent with their environment in color and design and be incorporated whenever possible into building or street furniture design.
7. Be located inconvenient, highly visible, active, well-lighted areas but not interfere with pedestrian movements.

2.3 Mountainland Association of Governments (MAG) 2007 Regional Transportation Plan

2.3.1 University Parkway/SR-265

This major east / west arterial road between Provo and Orem connects both cities to the I-15 freeway. It is a major commercial corridor with limited access to adjacent businesses. Major intersections are highly congested. The parkway has a six lane configuration in Orem and four in Provo. The College Connector trail, which runs parallel to the parkway, was recently completed thereby adding a bike and pedestrian option for travel and recreation along segments of this corridor.

Planned improvements for University Parkway include widening the Provo section of the corridor to University Ave to six lanes, improving trail access, and adding a Bus Rapid Transit (BRT) facility. As with

other major corridors ITS, congestion management, and improved transit will be used to further mitigate congestion.

2.3.2 Bicycle, Pedestrian and Other Non-Motorized Modes

The Regional Transportation Plan states "Walking and biking can and must be made comfortable, safe, and desirable; otherwise people will for the most part choose other modes. Incorporating well designed and constructed trails, bike lanes, sidewalks, street furniture, traffic calming, and other appropriate elements into the built environment invites people to walk and bike. Doing so is critical to the goal of reducing dependence on the automobile for transportation."

Bike and Pedestrian facilities are categorized in the following groups:

- Shared Use Paths – paths that should offer opportunities not provided by the road system.
- Crushed Gravel Trail – generally appropriate for mountain bikes, pedestrians and equestrians, with a 10' minimum encouraged.
- Bike Lane or Bicycle Lane – striped pavement markings and signing on roadways to create a "bicycle friendly environment" through increased visibility of cyclists.
- Shared Roadways– roadways should have a sufficient paved width to accommodate bicyclists and motor vehicles. Bicycle-safe drainage grates and bridge expansion joints, improved railroad crossings, smooth pavements, adequate sight distances, and bicycle signal timing and detector systems are recommended design practices.
    - Signed Shared Roadways are designated by bike route signs. These routes provide continuity to other bicycle facilities and designate preferred routes through high-demand corridors. Signed routes reflect that the responsible agencies assure these routes are suitable and will be maintained with bicyclist's needs in mind. Signing also alerts motorists that bicycles are present.
    - Shared Roadways (no bikeway designation) accommodate most bicycle travel. Not designating a route as a bikeway can:
        - Act as a deterrent on routes unsuitable for bicycle travel
        - Be inappropriate for some roadways such as minor residential streets

The design of pedestrian oriented landscapes is addressed within the plan. Design considerations cover connectivity, safe roadway crossings, traffic calming techniques and street furniture and other pedestrian-scaled amenities. Mountainland staff utilized the Bicycle Compatibility Index (BCI) model to analyze all roadway projects within the Long Range Plan. The output of the model indicates a Level-Of-Service (LOS) ranging from "A" to "F". A LOS of "C" indicates that a roadway is comfortable for the average adult bicyclist. Based on a LOS of "C", MAG has identified bike lanes or wide shoulders be included in planned projects (see **Figure 2.5** for the project list) unless law or engineering judgment precludes such inclusion.

2.3.3 Mountainland Association of Governments (MAG) 2030 Regional Transportation Plan – Bicycle and Pedestrian Projects Map, July 2007

This map (Figure 2.5) is particularly useful in understanding Orem's role within the regional trail system. The map identifies existing and planned routes, along with gaps in Orem's network. MAG's map used in conjunction with the City of Orem's current bicycle route map, will serve as the base working map for City of Orem's Bike and Pedestrian Plan.

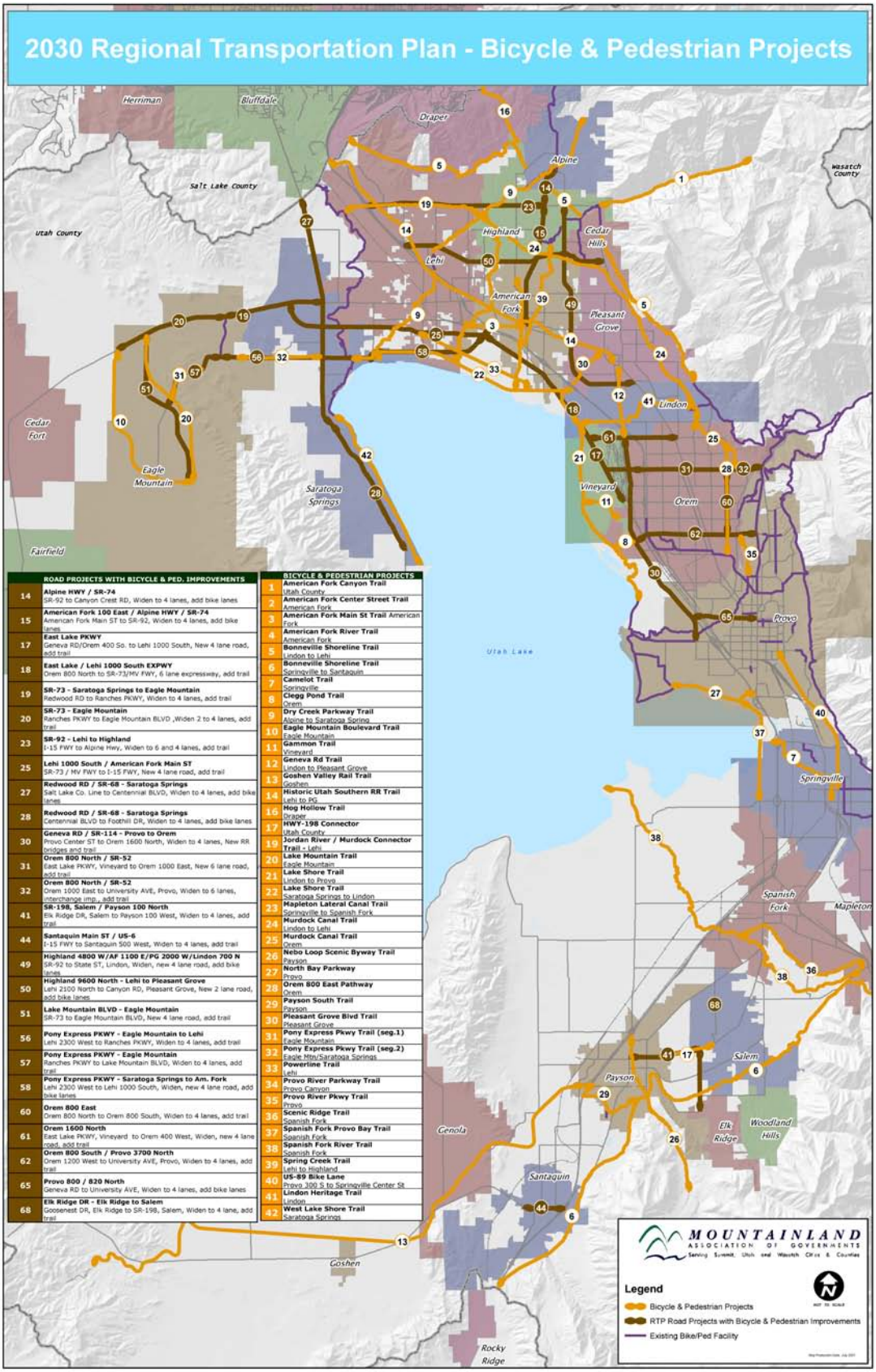


Figure 2.5 – 2030 Regional Transportation Plan – Bicycle & Pedestrian Projects (MAG)

2.4 Mountainland Association of Governments Non-Motorized Trail Standards

This article establishes the minimum requirements for the design of Multi-Use Paths within the City of Orem. In this document the standards presented are based on recommendations of the American Association of State Highway and Transportation Officials (AASHTO), as set forth in the AASHTO Guide for the Development of Bicycle Facilities, 1999; and the Manual on Uniform Traffic Control Devices, 2003 Edition (MUTCD 2003), and other sources.

Section B sets definitions of various facility types. Most notably, it discusses the nature of shared use paths indicating:

Proper design will accommodate two-way use, with infrequent interruptions by driveways or roadway crossings. ***Long sections of trail without road crossings or driveways are most desirable.*** *At a bare minimum, 1320 feet (1/4 mile) between such interruptions should be planned and maintained throughout.*

Trails should not be located along roadsides where sidewalks are normally provided. Typically, sidewalks are not good candidates for use as trails, since they tend to be too narrow to accommodate multiple uses and are too frequently interrupted. Where good trail design is not possible due to frequent interruptions or lack of suitable separation from roadways, a combination of bicycle lanes and sidewalks may be more appropriate.

Section C governs design and construction standards and provides standards beyond what is available in the AASHTO Guide for the Development of Bicycle Facilities. Shared-Use paths should be 10 feet wide (8 feet minimum) and conform to recommended surface thicknesses and subgrade requirements. Recommendations are also made for bridge structures, signage, grades, and corner radii. Finally, the standards require all new construction and alterations to comply with the Americans with Disabilities Act (ADA) of 1990.

2.5 Utah Department of Transportation Pedestrian & Bicycle Guide, May 2008

The Pedestrian and Bicycle Guide was created to provide UDOT staff and interested citizen's on how to improve walking and bicycling conditions in Utah. The guide addresses design and maintenance, funding, education and the UDOT project development process of bicycle and pedestrian facilities. The guide is a valuable resource and reference for any Utah city or county planning bicycle and/or pedestrian facilities.

2.6 Utah Department of Transportation's Bicycle Corridor Priority Routes Project, February 2009

2.6.1 Public Involvement Element

In response to increased bicycle facilities demand statewide, the Utah Department of Transportation (UDOT) formed a planning team to prepare a statewide Bicycle Corridor Priority Routes analysis. The public involvement portion of this analysis began in September 2008 through thirteen Open Houses held throughout the state. The Open Houses offered general information about the project, including sketches on how bikes could be accommodated on state roads, a map showing existing conditions and the selection criteria UDOT would use to prioritize bicycle routes. Public comments could be received in a number of ways including filling out comment sheets, writing on maps, and submitting comments electronically.

Fifty nine people attended the Open House in Orem on September 18, 2008. According to UDOT's geographic tracking of comments, attendees at Orem's Open House represented the several communities in the Utah Valley.

2.6.2 Priority Routes

In Orem, State Route 114 (Geneva Road) between West 400 North and West 400 South has been identified as a Level 1 priority. Priority Level 1 are deemed more important that Priority Level 2. UDOT makes mention that funding has not been secured for any of the identified priority improvements and encourage those entities involved to make the improvements as opportunities arise to create a more bicycle-friendly transportation system.

2.7 Utah Department of Transportation's Guidelines for Bicycle and Pedestrian Accommodations

UDOT has outlined bicycle and pedestrian accommodation guidelines to ensure safety and mobility of bicyclists and pedestrians in all roadway projects. The guidelines are as follows:

2.7.1 Urban and rural freeways and limited access highways:

Bicycles and pedestrians are not allowed on urban area freeways where alternate routes are available and accommodations are not required. Where they are permitted on rural freeways, special attention should be given to rumble strip application and shoulders. For a listing of bicycle and pedestrian restricted locations on state routes, see the Restrictions map on the UDOT web site at www.udot.utah.gov/walkingandbiking then select Online Maps.

2.7.2 Urban and rural arterials:

Pedestrian use of highway right-of-way is common within cities and towns; and Utah Code defines bicycles as vehicles. Every effort should be made to include bicycle and pedestrian accommodations in all new construction and reconstruction projects on the state system. The specific level of accommodation will vary by project and should be determined by the Project Team, including the UDOT Bicycle and Pedestrian Coordinator.
The guidelines were created in response to UDOT Policy 07-117: Routine Accommodations for Bicyclist and Pedestrians, adopted May 2006

An accommodation is defined as any facility, design feature, operational change, or maintenance activity that improves the environment in which bicyclists and pedestrians travel. Examples of such accommodations include the provision of bike lanes, sidewalks, signs, and the addition of paved shoulders. Bicycling and walking are successfully accommodated when travel by these modes is efficient and safe for the public. The level of accommodation should be considered on a project-by-project basis.

A checklist is included as part of the guideline document to facilitate a discussion between the project team members and to determine the level of accommodation for bicyclists and pedestrians in a roadway project.

2.8 Utah Department of Transportation's Roadway Design Manual of Instruction Section 9 – Bicycle and Pedestrian Facilities

UDOT encourages multi-modal transportation options on roadway facilities. Bicycle and pedestrian planning and design guidelines outlined in Section 9 are based on AASHTO standards. Checklists are provided for bicycle and pedestrian facilities in general, as well as for the Concept/Environment Phase and the Scoping Phase of a project.

2.8.1 Bicycle Facilities

UDOT encourages the use of the Bicycle Compatibility Index (BCI) to evaluate roadways for bicycle compatibility. UDOT specifies that state highways in urban area should have an 8' side minimum shoulder.

2.8.2 Pedestrian Facilities

Local transportation plans, in addition to site conditions, are used as the basis to determine the types of pedestrian facilities installed. At-grade crossings are permitted anywhere along a roadway unless specifically prohibited by posted signs. Marked crosswalks are only required when the intended pedestrian route is different than the typical crosswalk area. Examples of atypical crossings are at roundabouts and intersections with triangular refuge islands or offset legs.

2.9 Utah Department of Transportation Bicycle Suitability and Restrictions Maps

UDOT has identified the shoulder width along state roadways to help agencies determine if bicycle facilities would be suitable (**Figure 2.6**). Additionally, UDOT has created a map (**Figure 2.7**) showing state roadways that restrict bicycle facilities.

2.10 Utah Department of Transportation Utah Traffic Controls for School Zones, 2005 edition, revised December 2008

UDOT provides the above manual to ensure consistency and set specific standards for all Utah school crossing zones. All jurisdictions in Utah are required by code to use the manual

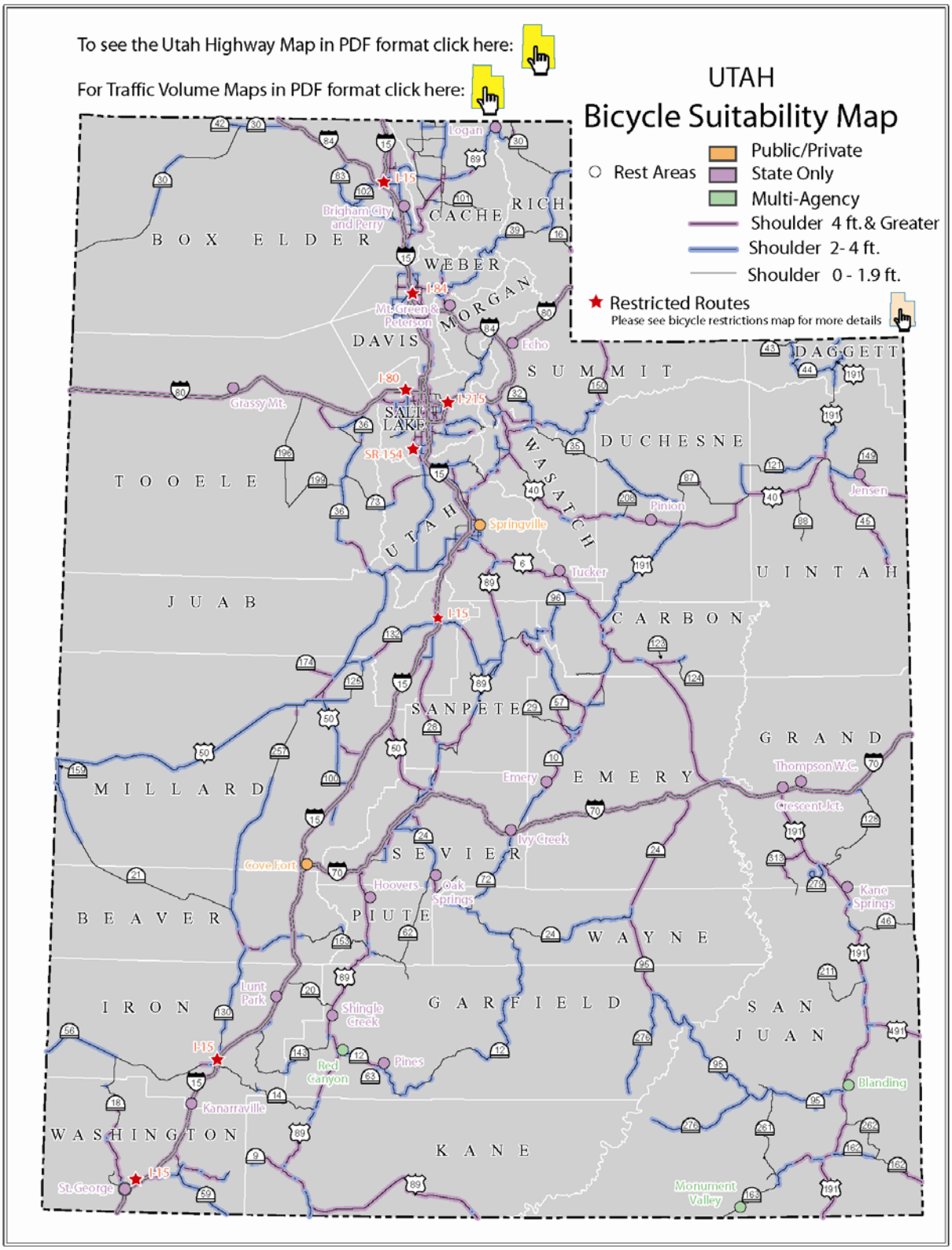


Figure 2.6 – Utah Bicycle Suitability Map (UDOT)

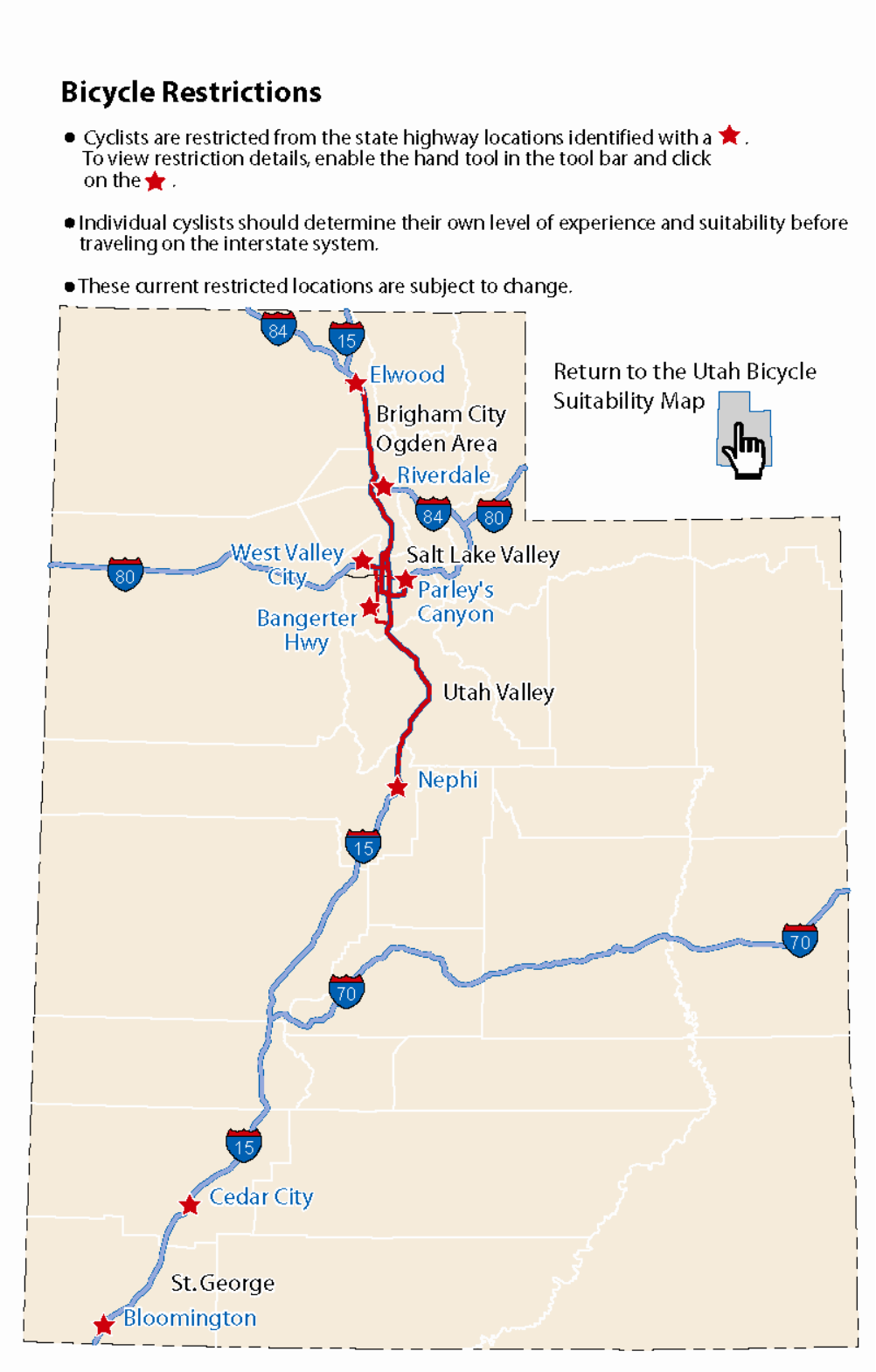


Figure 2.7 – Utah Bicycle Restrictions (UDOT)

3 Existing Bicycle & Pedestrian Facilities

3.1 Existing Conditions

The City of Orem has increased its investment of bicycle and pedestrian infrastructure in recent years. New bicycle lanes have been installed in conjunction with some road surfacing projects. Pedestrian sidewalks are typically continuous in neighborhoods and along most of the roadways. Traffic lights are generally equipped with pedestrian ramps and pedestrian signal heads, many of which also are pedestrian countdown signals.

This chapter summarizes current bicycle and pedestrian infrastructure in the City of Orem and is divided into the following sections:

Setting – Describes Orem's location, climate, and land uses.

Existing Bicycle Facilities – Lists Orem's existing on- and off-street bicycle facilities, describes major off-street paths, and provides a map of these facilities. This section also describes support facilities, such as bicycle parking.

Existing Pedestrian Facilities – Provides a description of the existing pedestrian facilities within Orem. This section identifies locations with high pedestrian use and describes existing sidewalks.

Transit Connections – Describes how bicyclists and pedestrians are supported on UTA transit services.

3.2 Setting

The city of Orem lies between Utah Lake and the Wasatch Mountains in Utah County south of Salt Lake City, Utah. Orem is bordered by the Town of Vineyard to the west, The City of Provo to the east and south and the City of Lindon to the north. The City of Orem comprises approximately 18.2 square miles in area. Topography is generally flat with an average of 300 feet of elevation gain between western and eastern extents of the city.

The population of Orem was approximately 84,000 people according to the 2000 Census. Recent estimates have revised the population to approximately 93,000 people in July of 2008, nearly a 10% increase. Over the past few decades, Orem has transitioned from a primarily agricultural area to one that is nearly built out to its city limits. Rapid development in the 1980s and 1990s added an average of 38 new subdivisions a year according to the Orem General Plan. It is clear that most of the future growth and development within the Orem city limits will be within the existing built areas necessitating improvements to the transportation network.

Orem contains a variety of land uses with several main corridors within the city comprising the majority of commercial and industrial related uses. State Street runs generally north-south through Orem and is lined almost exclusively with Community Commercial. Other corridors such as 800 North, University Parkway, and to a lesser extent 400N travel east-west and have a mix of Regional and Community Commercial and Residential zoning. TheI-15 corridor serves as a strong delineation on the western edge of Orem. There are some medium density residential and regional commercial uses on the eastern side of the freeway, while the western side is mixed with Industrial, Light Industrial and Residential uses. Utah Valley University borders the I-15 corridor near University Parkway and there are some newer housing developments beginning to come online to the far western edge of the city limits adjoining similar development in Vineyard. Much of Orem is

dominated by Low Density Residential development with medium and high density development being found closer to the main corridors described above.

The existing topography and built environment in Orem are generally supportive to walking and bicycling with generally flat routes and wide streets laid out on a grid system. These existing conditions provide a solid foundation from which to improve the bicycle and pedestrian networks.

Orem's existing bikeway network includes (as of Fall 2010) approximately 10.5 miles of off-street bicycle paths, 9.2 miles of on-street bike lanes, and 0.6 miles of signed bicycle routes. **Figure 3.1** below summarizes the three most common bikeway types, all of which can currently be found in Orem. **Figure 3.2 – Existing and Approved Bikeways in Orem** on the following page provides a map of this network.

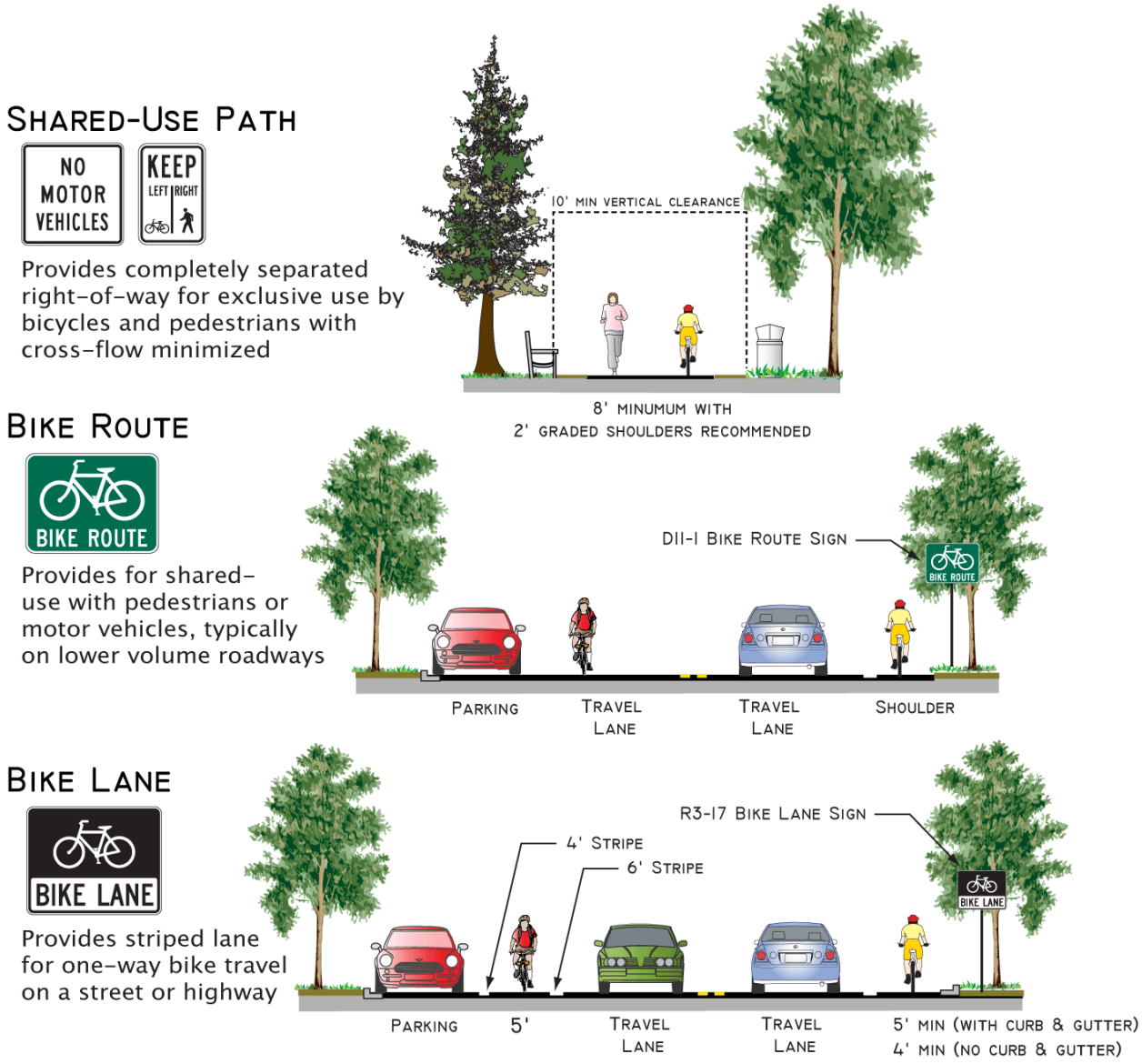


Figure 3.1 – Bikeway Types in Orem

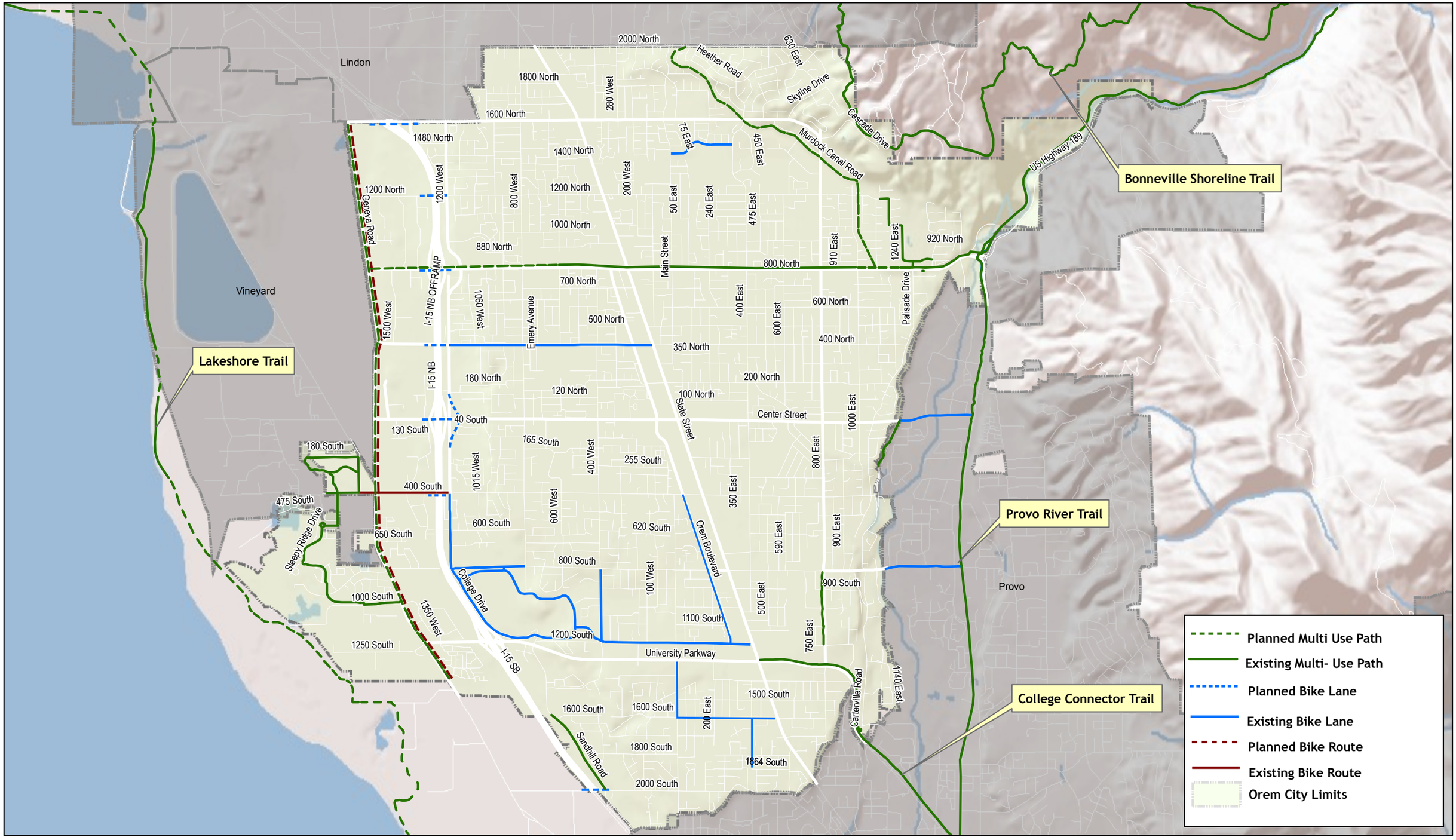


Figure 3.2 - **Existing and Approved** Bicycle Facilities

Orem, UT
Orem Bike and Pedestrian Plan
Source: Mountainland Metropolitan Council of Governments, City of Orem
Author:
Date: October 2010

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3.2.1 Bike Lanes

Bike Lanes are a marked space along the length of a roadway for exclusive use of cyclists. Bike lanes create a visual separation between bicycle and automobile facilities, thereby increasing bicyclist's comfort and confidence. Bike lanes are typically used on major through streets with average daily traffic (ADT) counts of 3,000 or higher and should be one-way facilities that carry bicycle traffic in the same direction as motor vehicle traffic.

Bike lane on 1200 South near South 200 East

As noted in Figure 3.1 – Bikeway Types in Orem, the City of Orem has several marked bike lanes. Generally, these bike lanes are 4 feet wide and are adjacent to on-street parking. AASHTO recommends a bike lane width of 5 feet where on-street parking is permitted. Where the on-street parking turn-over rate is high an additional 1 to 2 feet of width is desirable. Given that large numbers of the city's streets are more than wide enough to accommodate motor vehicular, bicycle and pedestrian facilities, bicycle facilities should be installed and retrofitted according to AASHTO guidelines.

Bike route sign on the Provo River Parkway Trail

3.2.2 Bike Routes

A bike route is a signed route on a road, street or path and does not require that the road include any special bicycle facilities. According to AASHTO, bike routes suggest to bicyclists that a particular route has advantages over other alternate routes. Further, AASHTO indicates that bike routes serve one of two purposes: To provide continuity to other bicycle facilities (usually bike lanes) or to designate preferred routes through high demand corridors.

Bike routes are typically found on lower volume streets and can provide directional wayfinding signage to assist the bicyclist in navigating. The City of Orem currently has one bike route on 400 South. This bike route connects the bike lane on 1200 West to Lake Shore Park. A bike route is planned on the portion of Geneva Road within the city boundaries.

3.2.3 Off-Street Shared-Use Paths

This section details off-street, shared use paths in and adjacent, to Orem. As **Figure 3.2** shows, several of the main pathways near Orem are not completely within the city limits, but they do influence bicycle circulation as these pathways serve as destinations. Off-road, shared use paths include: the Lakeshore Trail, the Provo River Parkway Trail, the College Connector Trail, the 800 North Trail, and the Bonneville Shoreline Trail.

Provo River Parkway Trail near 800 North in Orem

3.2.4 Shared-Use Paths

Usually, shared use paths are used in corridors not served by streets and highways, or where wide utility or railroad right-of-way exists. Shared use paths offer non-motorized transportation opportunities not provided by the road system. Common applications of shared use paths are along rivers, canals, railroad right-of-way, on college campuses, in parks, and in master-planned communities. AASHTO guidelines note that providing a sidewalk as a shared use path is unsatisfactory, as sidewalks are designed with pedestrians in mind. Pedestrians travel at slow speeds and can change speed and direction quickly. Bicyclists travel at higher speeds and can have insufficient time to avoid conflicts with pedestrians.

3.2.5 Lakeshore Trail

The Lakeshore trail will eventually join the Jordan River Parkway trail at Inlet Park in Saratoga Springs to the North Bay Parkway trail in Provo. This trail parallels the shores of Utah Lake and offers users a scenic views of the lake and surrounding mountains. The built sections of the trail are paved and have shaded rest areas. The topography is generally flat.

Lakeshore Trail in the City of Vineyardl

3.2.6 Provo River Parkway Trail

The Provo River Parkway Trail is a 15-mile paved, multi-use trail between Vivian Park in Provo Canyon and Utah Lake. The trail varies in width from 8 to 16 feet wide. The trail follows the Provo River, and is relatively flat, with only a couple of short, steep climbs. This topography makes the trail popular with families, as small children can navigate the trail. In Orem, the Provo Canyon Trailhead is located on 800 North where the Provo river crosses under the road.

Provo River Parkway Trail at Stone Gate Lane

3.2.7 College Connector Trail

The College Connector Trail was developed to link the Brigham Young University in Provo to the Utah Valley University in Orem. This trail also connects Provo's Rock Canyon to Orem's Lake Park. The College Connector Trail is a paved multi-use trail along University Parkway.

3.2.8 800 North Trail

The 800 North Trail consists of a 10 foot concrete sidewalk/path on the north side of the street, with landscaped buffer separating the trail from the road. The trail is complete from about 600 West to 1000 East.

800 North Trail

3.2.9 Bonneville Shoreline Trail

The Bonneville Shoreline Trail is a state-wide trail system and is anticipated to be a 250 mile route at build out. The trail will stretch from the Idaho border to Nephi, Utah. The Bonneville Shoreline Trail follows the eastern shoreline of ancient Lake Bonneville and the Wasatch fault for much of the route. The trail is a natural surface trail.

Two trailheads for the Bonneville Shoreline Trail are located in Orem. The Orem Trailhead is east of Cascade Dr. near the water tanks. The Provo Canyon Trailhead is a shared trailhead that serves both the Provo Canyon Trail and the Bonneville Shoreline Trail.

3.3 Existing Pedestrian Facilities

3.3.1 Sidewalk Design

Generally, sidewalks line the major roadways in the City of Orem and range in width from 3 feet to 10 feet. Most sidewalks are adjacent to roadways, although some sidewalks, such as the College Connector Trail on University Parkway and the 800 North Trail, are buffered from vehicle traffic by a planter strip. Most of Orem's residential sidewalks are 4 feet in width and generally offer insufficient space for two pedestrians to share. Many residents were observed walking in the street adjacent to a companion on the narrow sidewalk.

Grass strip between road and sidewalk along 800 N.

3.3.2 Sidewalk Connectivity

A sidewalk inventory was conducted on all arterial and collector roadways to determine the locations of missing sidewalk segments within the city (see **Figure 3.3 – Arterial and Collector Sidewalk Gaps**). The sidewalk inventory shows that the overall the sidewalk connectivity within Orem is very good. Most of the existing sidewalk gaps occur to the west of State Street along commercial or industrial corridors, with the majority of these residing to the west of I-15. Through the sidewalk inventory accounting for total missing sidewalk frontage (both sides of the street are counted) it is evident that approximately 39.6 miles of arterial roadway frontages lack sidewalks and 73.6 miles of collector roadway frontages lack sidewalks.

No sidewalk along the commercial corridor on the north side of University Parkway between State Street and the entrance to Best Buy

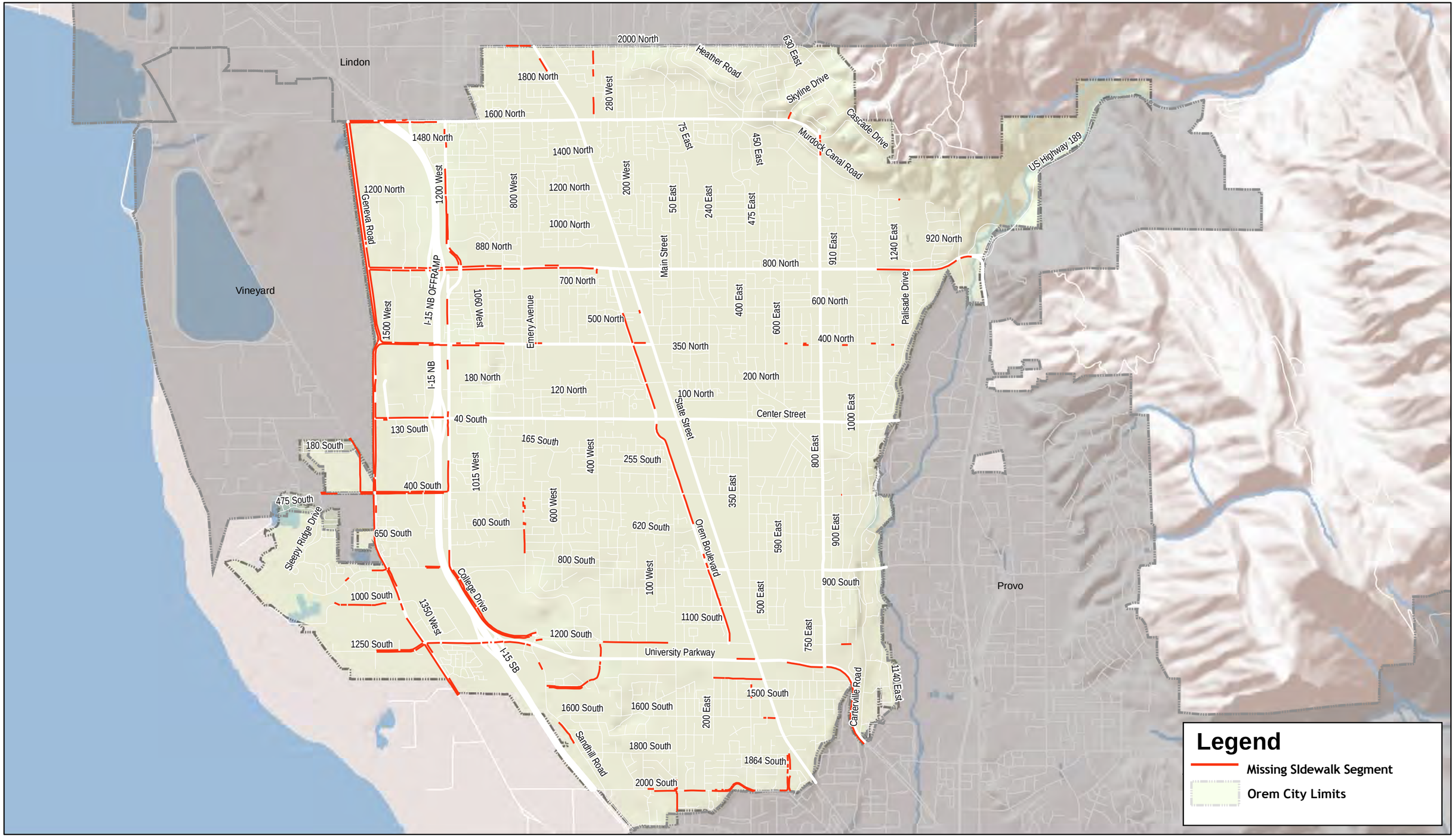

Figure 3.3 - Arterial and Collector Sidewalk Gaps

Orem, UT
Orem Bike and Pedestrian Plan
Source: Mountainland Metropolitan Council of Governments, City of Orem
Author:
Date: October 2009

0 0.25 0.5 Miles

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3.3.3 Crosswalks and Intersections

Crosswalk markings provide guidance for pedestrians who are crossing roadways by defining and delineating paths across intersections or other crossing points. The Safe Routes to School Guide states that:

"However, marked pedestrian crosswalks, in and of themselves, do not slow traffic or reduce pedestrian crashes. There are several reasons to install marked crosswalks, a few being:

- To indicate a preferred pedestrian crossing location
- To alert drivers to an often-used pedestrian crossing
- To indicate school walking routes

A FHWA study "Safety Effects of Marked versus Unmarked Crosswalks at Uncontrolled Location: Final Report and Recommended Guidelines" noted that in some locations, crosswalks should be installed with other pedestrian facility enhancements to decrease possible pedestrian crash risks.

In the City of Orem, many major intersections are striped with standard "transverse" crosswalks (two parallel lines).

Intersection crosswalk striping in school zones varying and include "transverse" striping, typical piano key striping and piano key striping in alternating white and yellow stripes. Signalized intersections have pedestrian push buttons that pedestrians must use in order to activate walk signals. Many intersections in Orem use pedestrian countdown timers that provide pedestrians with the number of seconds remaining in the crossing phase before the signal changes. Such devices have been shown to increase safety by reducing the likelihood that pedestrians become stranded in the middle of the crossing when the signal changes.

Transverse crosswalk markings at 2000 North at State Street

'Transverse' and 'piano key' crosswalk striping near North Ridge Elementary School at 1600 North and Main Street

Alternating crosswalk striping colors designate a school zone crossing at Sharon Elementary School on N. 400 East and E. 570 North

3.3.4 Transit Connections

Significant mass transit infrastructure will be added to Orem over the next several years. A center lane running Bus Rapid Transit (BRT) is planned along University Parkway, through the UVU campus, to a new intermodal station on 800 South, west of the railroad alignment. In addition to the BRT, the FrontRunner commuter rail is planned in the railroad corridor that parallels Geneva Road. The new BRT and FrontRunner facilities will prompt several changes in the city's transit infrastructure. New facilities include:

Transit station at the University Mall

- A intermodal transit station on Geneva Road between 800 and 1200 South
- Several BRT transit stops along University Parkway and the UVU campus
- A new crossing of I-15 on 800 South to increase access options to the new transit station

As these facilities come online, several bus route changes in Orem network will occur to maximize the mass transportation network.

Currently, a transit station is located on 800 East at the University Mall parking lot. This transit station is scheduled to be removed once the BRT is in full operation, as BRT stations will be located in the center of University Parkway.

The Orem East/West (#862) route is heavily used by Utah Valley University (UVU) students to navigate around the campus. The express routes connecting to Provo and the communities north of Orem are also popular routes for UVU students.

3.4 Opportunities and Constraints

This section outlines some of the opportunities and constraints in the City of Orem's bicycling and pedestrian networks. **Figure 3.4 – Opportunities and Constraints** was constructed to visually demonstrate some of the opportunities and constraints that would influence a city-wide bicycle system.

3.4.1 Opportunities

Generally, the relatively flat topography, combined with the grid layout of Orem's streets, support year-round walking and bicycling activities.

Roads

Many of Orem's roadways appear to have more vehicle capacity than is currently needed, for example many residential and collector streets have curb-to-curb widths of 50 feet much greater than needed to support on-street parking and one travel lane in each direction. These wide roadways present an opportunity to enhance multi-modal transportation options. Bicycle facilities on these streets could be developed through relatively simple and inexpensive treatments, such as roadway re-striping.

On-Street Parking

Most of the roadways allow on-street parking. For pedestrians, on-street parking is beneficial in creating a more comfortable walking experience by providing a physical barrier separating traffic from the pedestrians. On-street parking can be more of a challenge for bicyclists as it can allow car doors to open unexpectedly in the path of a bicyclist. Generally this is more of a problem in commercial areas where parking turn-over is higher than in residential areas. Bicycle lanes should be five feet in width or greater to allow for safer travel of bicyclists adjacent to on-street parking.

Wide roadway on E. 1600 North near N. 500 East

On-street parking on N. 1000 East near E. 600 North

Wide roadway with no supplemental striping on E 400 North

Expansion of Shared-Use Path Network

Orem's existing network of shared-use paths provide a backbone of a potential network of pathways, both within the city limits, to regional trail systems, and in connecting to neighboring communities of Lindon, Provo, and Vineyard. The expansion and interconnecting of Orem's shared-use path system is a significant opportunity to improve pedestrian and bicycle connectivity.

Canal Corridors

The linear nature of canal corridors provide direct travel away from the roadway network and make them good trail candidates. As shown on in **Figure 3.4 - Opportunities and Constraints** map most of the current bicycle and pedestrian facilities cross the city from east to west. The canals in Orem offer north/south connection opportunities, which could provide valuable additions to the city's off-street trail network.

Union Canal at 2000 North

Transit

The addition of three BRT transit stops on University Parkway presents an opportunity to extend the multi-use path on 800 East across University Parkway and add pedestrian and bicycle facilities to the south side of University Parkway.

To access the planned multi-modal transit station on Geneva Road, a crossing of I-15 is planned. This is a significant opportunity to plan and design a crossing with safe and convenient bicycle and pedestrian facilities. This connection will increase overall east/west connectivity in Orem.

Development

As new development and redevelopment occurs, the city has an opportunity to ensure bicycle and pedestrian facilities are included in the design of and in the construction phases through the plan review process.

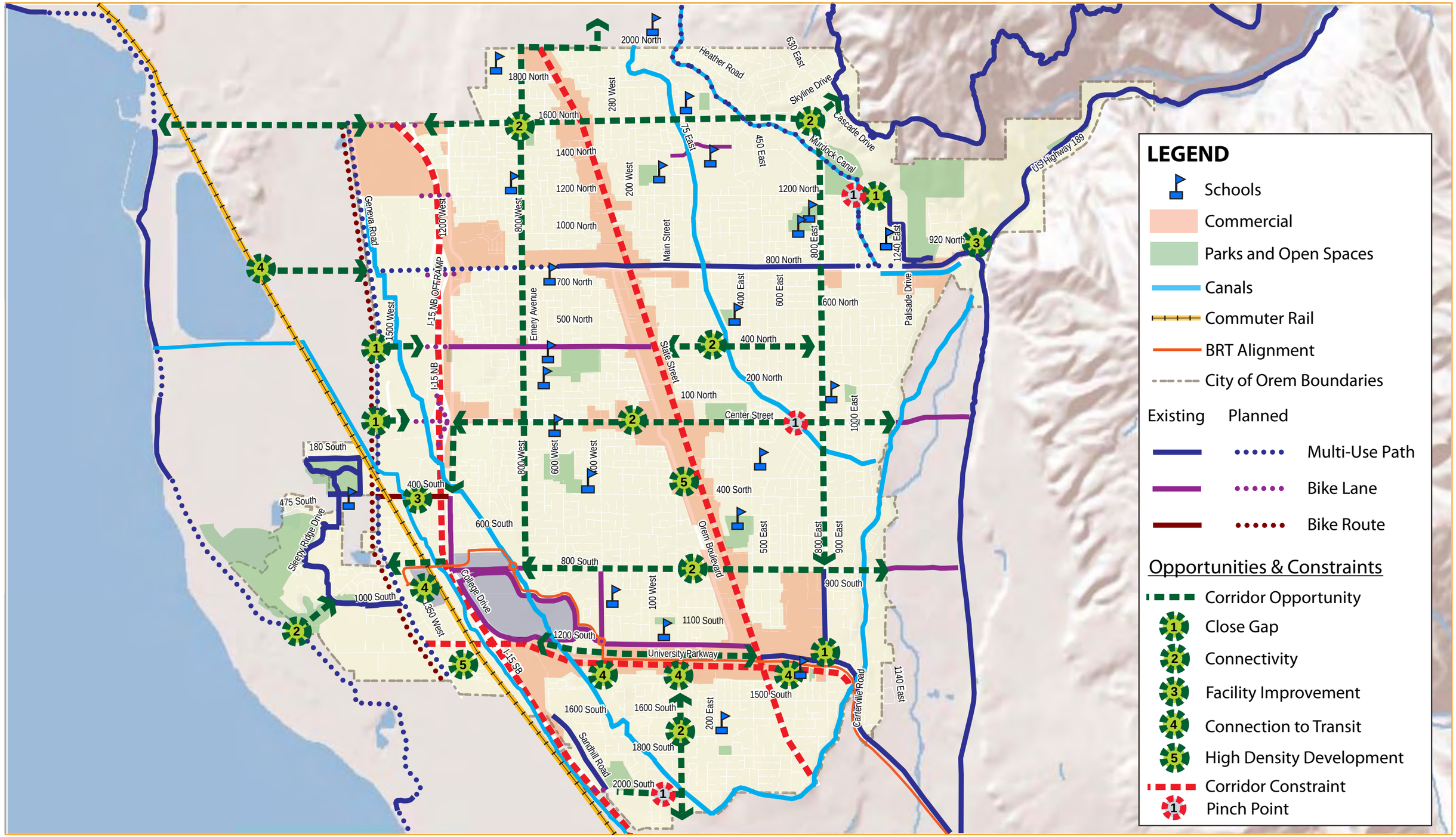

Figure 3.4 - Opportunities and Constraints

Orem, UT

Orem Bike and Pedestrian Plan

Source: Mountainland Metropolitan Council of Governments, City of Orem

Author:

Date: October 2009

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3.5 Constraints

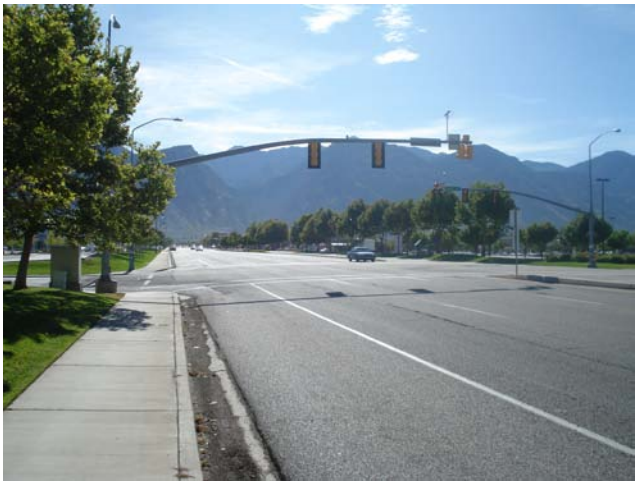
3.5.1 Barriers

Several roadways in Orem can serve as barriers to bicycle and pedestrian travel. These barriers can generally be categorized into three types:

Physical barriers: This barrier describes a physical impediment to travel where crossings can only occur at freeway interchanges. Interstate 15 is the only facility in Orem that comprises this type of barrier.

Facility barriers: This type of barrier occurs where no bicycle or pedestrian facilities may exist. Roadways with these characteristics include Geneva Road. Certain industrial roadways to the west of I-15 also can be categorized as facility barriers.

Situational barriers: This type of roadway occurs where roadway widths, travel speeds, or other roadway characteristics make bicycle or pedestrian travel difficult, uncomfortable, or unsafe regardless of the provision of sidewalks or shoulders. State Street and University Parkway are situational barriers in Orem.



The wide roadway and high traffic volume make University Parkway a situational barrier

A facility barrier is** exemplified **by lack of pedestrian sidewalks on 400 South (west of I-15).

Facility Gaps

Gaps in continuous bicycle or pedestrian facilities exist as significant constraints in Orem, while simultaneously presenting opportunities.

Property Rights

Some residential lots in the Orem city limits remain undeveloped since the area was subdivided. These lots typically exist as gaps in pedestrian facilities and can even impact the continuity of the roadway. Some of these lots may have existed in this state for 40 years or more.

Insufficient Rights-Of-Way

Along some roadways in Orem the existing public right-of-way may not be sufficient to provide accommodation for pedestrian or bicycle facilities. This occurs in two distinct scenarios, the first is where the existing right-of-way is narrow such as 2000 South and 100 West. The second situation occurs where the built roadway takes up nearly all of the right-of-way such as on University Parkway between State Street and the entrance to Best Buy. In both cases property acquisition either through sale or easement dedication may be needed to provide the necessary width for pedestrian and bicycle facilities.

Snow Removal Practices

With each passing year winter brings variable weather conditions including colder temperatures and snow/ice accumulation on Orem's roads and sidewalks. Both of these factors can affect the decision to walk or bicycle for transportation or recreation in the winter and was cited by Orem residents in the user survey repeatedly as a reason for not walking or bicycling more. While snow/ice accumulation will always remain a barrier to walking and bicycling improved maintenance and enforcement practices can minimize the impact to those wishing to walk and bicycle year-round in Orem.

4 Needs & Attitudes Assessment

4.1 Introduction

This chapter examines the needs of bicyclists and pedestrians, both generally, and specific to Orem residents using the output of a very successful first phase of the public involvement program. Please see **Table 4.1** below for a summary of public involvement effort to date. In addition, a non-motorized 'Demand & Benefits' analysis was conducted to develop a snapshot of current levels of bicycling and walking in Orem and a projection to the year 2030 with full implementation of this plan. Within the 'Demand & Benefits' analysis is also a number of economic and other indicators that will be influenced through increased use of bicycling and walking by Orem residents. The public outreach plan can be found in **'Appendix B – Public Outreach Plan.'**

Table 4.1 – Public Involvement Summary

Event/Tool	Date(s)	Involvement Summary
MAG Open House	Oct 21, 2009	Booth provided at MAG open house where approximately **30 members of the public** provided feedback and contact information to the project team.
Orem Bicycle and Pedestrian Plan Charette	Jan 19, 2010	It is estimated that slightly approximately **110 members of the public** attended the first public workshop where they participated in the Orem walking and biking survey, a visual preference survey of bicycle and pedestrian facilities, and a mapping exercise.
Orem Walking and Biking Survey	Oct 09' – Jan 10'	In total, **768 members of the public** provided feedback via the Orem Walking and Biking Survey. The survey was administered both electronically and in paper format.
www.bikely.com	Oct 09' – Jan 10'	www.bikely.com provides a forum where users may enter a specific bicycle or pedestrian route into a Google Maps interface. This service required a new account to be created by the user which may have affected involvement. In total, **34 individual route** files were downloaded and analyzed. It is possible more routes may have been created by users, but may have been marked or tagged incorrectly.
www.walkbikeorem.com	Oct 09' – Oct 10'	To date, there have been **21 project contact form submissions and 14 individual emails** collected by the project team with information pertaining to conditions for walking and bicycling in Orem. The website hosted the draft facility recommendations as downloadable maps and interactive Google maps. **Approximately 120 residents** submitted feedback on the recommended facilities and a the recommended Complete Streets Policy found in Chapter 9.
Orem Bicycle and Pedestrian Plan Open House	Sept 29, 2010	It is estimated that **approximately 20 members** of the public attended the final project Open House to review the recommendations contained within Chapters 5 through 9.

This chapter is organized into the following sections:

- Needs and Types of Bicyclists
- Needs of Pedestrians
- Orem Walking and Biking Survey Results
- Orem Bicycle and Pedestrian Study Charette Summary
- Online Bicycle Route Submissions (bikely.com)
- Demand & Benefits Analysis.

4.2 Needs and Types of Bicyclists

Similar to motor vehicles, bicyclists and their bicycles come in a variety of sizes and configurations. This variation ranges from the types of vehicle a bicyclists chooses to ride (i.e. a conventional bicycle, a recumbent bicycle, or a tricycle) to the behavioral characteristics and comfort level of the bicyclist. Bicyclists, by nature, are much more sensitive to poor facility design, construction and maintenance than motor vehicle drivers. Bicyclists are physically exposed to the elements due to the lack of protection provided by the bicycles structure and lack of other safety features that are present in an automobile.

The skill level of the bicyclist also provides a dramatic variance on expected speeds and expected behavior. There are several systems of classification currently in use within the bicycle planning and engineering professions. These classifications can be helpful in understanding the characteristics and infrastructure preferences of different bicyclists. However, it should be noted that these classifications may change in type or proportion over time as infrastructure and culture evolve. Often times an instructional course can instantly change a less confident bicyclist to one that can comfortably and safely share the roadway with vehicular traffic. Bicycle infrastructure should be planned and designed to accommodate as many user types as possible with separate or parallel facilities considered to provide a comfortable experience for the greatest number of bicyclists.

The 1999 AASHTO Guide for the Development of Bicycle Facilities identifies bicyclists as being 'Advanced or Experienced', 'Basic or Less Confident' or 'Children'. The AASHTO classifications above have been the standard for at least 15 years and have been found to be helpful when assessing existing bicyclists. However, these classifications have been found to not accurately describe all existing types of bicyclists, nor account for the population as a whole, including potential bicyclists who are interested in riding but may not feel existing facilities are safe enough. Beginning in the Pacific Northwest in 2004, and then supported by data collected nationally after 2006, alternative categories have been developed to address the 'attitudes' of Americans towards bicycling. See **Figure 4.1- Bicyclist Types by Overall Population** for categories.

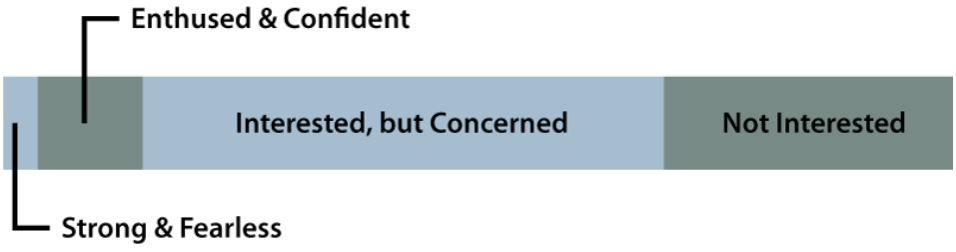


Figure 4.1 – Bicyclist Types by Overall Population

Less than two percent of Americans comprise a group of bicyclists who are **'Strong & Fearless'**. These bicyclists typically ride anywhere on any roadway regardless of roadway conditions or weather. These

bicyclists can ride faster than other user types, prefer direct routes and will typically choose roadway connections – even if shared with vehicles – over separate bicycle facilities such as bicycle paths.

'Enthused & Confident' bicyclists encompass ten to thirteen percent of those who are mostly comfortable riding on all types of bicycle facilities. These bicyclists will usually prefer low traffic streets or shared-use pathways when available. These bicyclists may also deviate from a more direct route in favor of a preferred facility type. This group includes all kinds of bicyclists including commuters, recreationalists, racers, and utilitarian bicyclists.

The third group can be categorized as **'Interested, but Concerned'** and do not ride a bicycle regularly. Fifty to sixty percent of the population are **'Interested, but Concerned'** and represent bicyclists who typically only ride a bicycle on low traffic streets or bicycle paths under favorable conditions and weather. These potential bicyclists perceive traffic and safety as significant barriers that prevent them from bicycling more often. These bicyclists may become more regular riders with encouragement, education and experience.

The remainder of the American population, twenty to thirty percent, are not bicyclists, and perceive severe safety issues with riding in traffic. This group is classified as 'Not Interested'. Some people in this group may eventually give bicycling a second look and may progress to the user types above. Although, a significant portion of these people will never ride a bicycle under any circumstances.

4.3 Trip Type

For the purpose of this plan, bicycle trips are separated into two trip types: recreational and utilitarian. Recreational trips can range from a long group rides to a family outing, and all levels in between. Utilitarian trips include commuter bicyclists, which are a primary focus of state and federal bicycle funding, as well as bicyclists going to school, shopping or running other errands.

Table 4.2 – Characteristics of Recreational and Utilitarian Trips

Recreational Trips	Utilitarian Trips
Directness of route not as important as visual interest, shade, protection from wind	Directness of route and connected, continuous facilities more important than visual interest, etc.
Loop trips may be preferred to backtracking	Trips generally travel from residential to shopping or work areas and back
Trips may range from under a mile to over 50 miles	Trips generally are 1-5 miles in length
Short-term bicycle parking should be provided at recreational sites, parks, trailheads and other recreational activity centers	Short-term and long-term bicycle parking should be provided at stores, transit stations, schools, workplaces
Varied topography may be desired, depending on the skill level of the cyclist	Flat topography is desired
May be riding in a group	Often ride alone
May drive with their bicycles to the starting point of a ride	Use bicycle as primary transportation mode for the trip; may transfer to public transportation; may or may not have access to a car for the trip
Trips typically occur on the weekend or on weekdays before morning commute hours or after evening commute hours	Trips typically occur during morning and evening commute hours (commute to school and work). Shopping trips also occur on weekends.
Type of facility varies, depending on the skill level of cyclist	Generally use on-street facilities, may use pathways if they provide easier access to destinations than on-street facilities

4.4 Needs of Pedestrians

People walk for various reasons. They may commute to work, school, transit or other multi-modal facilities. They may run personal errands, go shopping, make social visits or attend social events. People also walk for as a means of recreation and entertainment or to improve their health and fitness. As a result, pedestrian needs vary for different trip types. A commuter may desire a well-connected direct route with efficient signal timing, while a recreational pedestrian may be more concerned about the aesthetics of the surroundings. Regardless, all pedestrians share some common needs, such as safety, connectivity, and accessibility. Pedestrian mobility networks should also consider persons with disabilities. The Americans with Disabilities Act (ADA) mandates that reasonable accommodation for access should be provided for those who may need such assistance. A list of the most critical needs of pedestrians follows.

- **Crossing visibility**. Crossing facilities, including crosswalks and signage, should alert both motorists and pedestrians to the presence of the facility. Crosswalk design can aid in increasing visibility through the use of specific striping patterns and lights.
- **Continuous facilities**. Sidewalk gaps, missing sidewalks and worn crosswalks are all barriers to safe pedestrian travel. Continuous facilities allow pedestrians to choose the safest and most efficient path to and from their destination, encouraging them to choose walking as their mode of transportation.
- **Common design guidelines**. Narrow sidewalks, sidewalks that are directly adjacent to heavy-volume roadways without vegetation or a parking buffer, and sidewalks with utility boxes or lighting poles in the walkway detract from the walking environment and can make it difficult or impossible for the mobility impaired to use the sidewalk.
- **Slow traffic speeds**. The larger the roadway or turning radii at intersections, the faster vehicles will proceed through the area. Where appropriate, constraining roadway width with bulb-outs and tightening right turns at intersections can slow vehicles as they approach areas with high pedestrian volumes.
- **Mixed land uses**. Segregated land uses generally increase the distance between different destinations, and make it difficult for residents to walk to employment, shopping, schools and recreational facilities from their homes. Mixed land uses make it easier to build housing, employment, shopping, schools, and recreational amenities within walking distance of each other.
- **Direct connections**. Pedestrians must sometimes walk long distances to access adjacent destinations when the street network is developed in a non-grid street pattern with cul-de-sacs and limited collector streets that connect to the arterial network. Pedestrian cut-throughs between cul-de-sacs and unpaved path networks that create direct connections reduce walking distances.

4.5 Orem Walking and Biking Survey Results

This section illustrates the needs and attitudes of Orem area residents regarding walking and bicycling in their community. What follows is a summary analysis of the key results of a publicly administered online (and paper) survey of local residents. The survey gathered information on preferred facility types, current transportation behavior, and reasons why residents do or do not choose to walk and bike. Orem residents that were surveyed, displayed a strong desire for a dedicated network of off-street trails for recreation. Responses also indicated that improved connectivity through on-street dedicated facilities (i.e. bike lanes and sidewalks) may increase walking and biking as a transportation option in Orem.

Over 750 individual responses were collected between mid-October 2009 and early February 2010, including 430 men and 334 women. This high response rate demonstrates that there is a significant level of interest in local bicycle and pedestrian issues, as well as a large community of existing bicyclists. Almost one-third of all respondents are frequent riders (ride almost daily), while another one-third are regular riders logging one to three weekly bike trips. A complete summary of the results of the Orem Walking and Biking Survey can be found in **'Appendix C - Orem Walking and Biking Survey Results.'**

4.6 Walking Results

In the survey, respondents were asked to share how often they walk. Approximately 66 percent of those surveyed specified that they walk either daily or one to three times per week (See **Fig. 4.2**). A follow-up to this question asked respondents to clarify their walking habits (See **Table 4.3**). The most popular reason for walking was exercise and fitness (34 percent). The comparatively lower proportion of people choosing other reasons to walk, such as commuting (8 percent) and walking for errands or other transportation (13 percent) may be attributed to lower land use densities and insufficient pedestrian facilities which make walking difficult, unsafe, or even impossible. In a later question this issue was explored in greater detail by asking respondents to select the reasons they choose not to walk at all or walk more frequently.

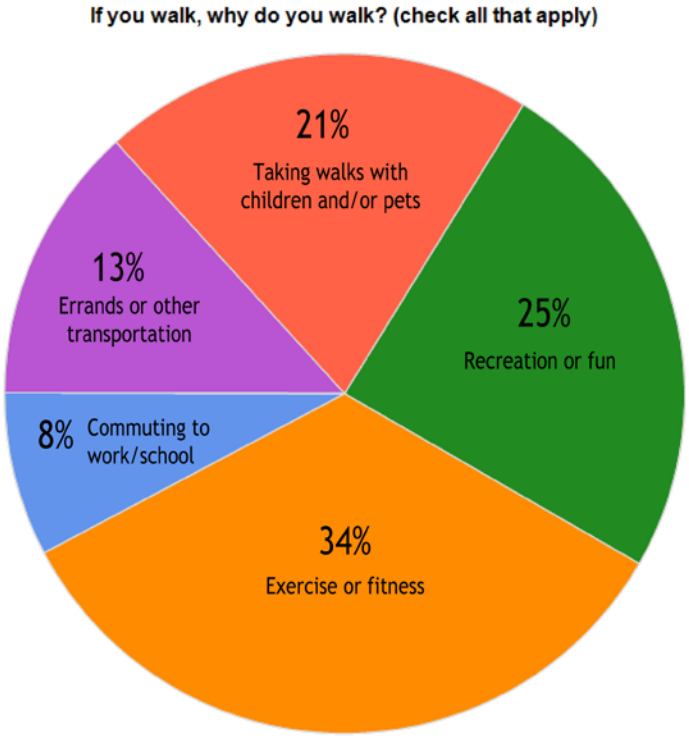


Figure 4.2 – Why do you walk?

Table 4.3 – Reasons People Walk

Answer Options	Response Percent	Response Count
Exercise/fitness	34%	495
Commuting to work/school	8%	114
Errands or other transportation	13%	193
Taking walks with children and/or pets	21%	300
Recreation or fun	25%	358
total responses		**1460**

The most common response for reasons not to walk or walk more frequently were that destinations are too far away (18 percent)—resulting from long distances between the commercial areas where people shop and the residential areas where they live (See **Table 4.4**). Also important to note is that a lack of sidewalks or paths (11 percent) deterred walking trips. It may be inferred from these results that an increase in infrastructure supporting walking (i.e. enhanced crosswalks, upgraded sidewalks, and additional walking paths) could encourage Orem residents to take more walking trips.

Table 4.4 – Reasons People Don't Walk or Walk More Frequently

Answer Options	Response Percent	Response Count
Too many cars/motorists drive too fast	10%	179
I have to carry things	9%	159
Lack of sidewalks or paths	11%	186
Existing sidewalks or paths are in poor condition	6%	110
Destinations are too far away	18%	310
Not enough lighting	4%	77
I travel with small children	4%	79
I am not physically able to walk	1%	13
I don't have enough time	16%	283
I don't feel safe walking (crime/personal safety)	4%	69
Weather concerns	13%	222
Other	5%	80
Total responses		**1767**

4.7 Biking Results

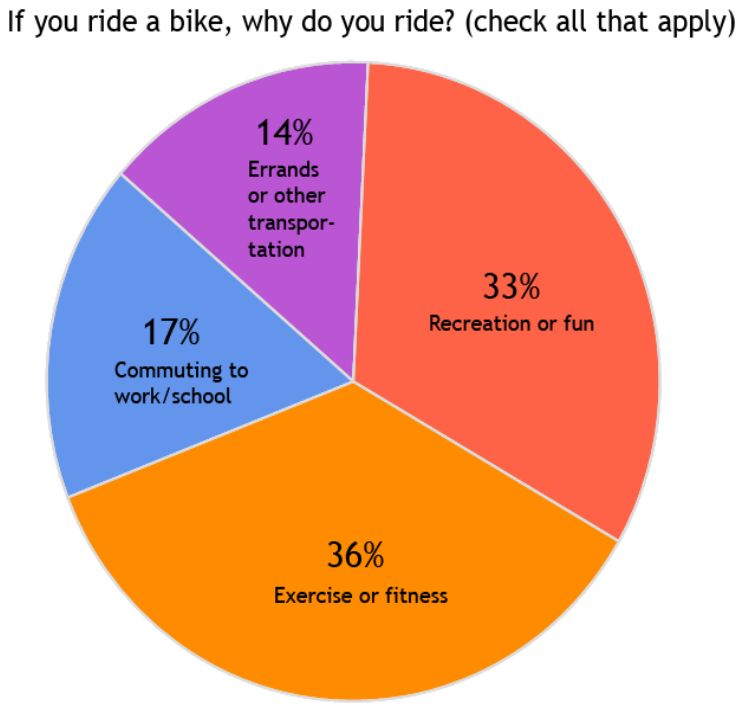


Figure 4.3 – Why do you ride?

A separate set of questions in the online survey targeted respondent's attitudes toward bicycling in the City of Orem. Highlights from this section show that bicycling is common in the area—more than one-fourth of respondents ride nearly daily while another one-fourth ride one to three times per week. Generally, the distances people ride are indicative of the types of trips they are taking. The results of this survey showed that, on average, over half of riders bicycle under five miles one-way (55 percent). This figure suggests that there is potential for increasing bicycle commuting in Orem, since commute trips are typically in the range of one to three miles.

A comparison between the type of riding Orem residents engage in (**Fig. 4.3**) and the reasons why they do not ride more frequently (**Table 4.5**), offers further detail into the types of measures that could be implemented to bolster mode share for bike trips.

Table 4.5 – Reasons People Do Not Ride a Bike or Ride More Frequently

Answer Options	Response Percent	Response Count
Too many cars/motorists drive too fast	13%	276
I have to carry things	6%	129
Lack of bike lanes or paths	17%	352
Existing bike lanes or paths are in poor condition	6%	135
Destinations are too far away	7%	148
Not enough lighting	2%	47
I don't feel safe biking (crime/personal safety)	3%	55
I am not physically able to bike	1%	13
I don't have enough time	7%	152
I travel with small children	3%	61
I do not own a bicycle	2%	50
Weather concerns	13%	270
Unsafe/unlawful motorist behavior	11%	241
Insufficient bike parking	7%	144
Other (please specify)	2%	51
total responses		2124

The table above demonstrates the direct correlation between lack of bike lanes and paths (17 percent) and an individual's decision to ride less frequently. The Respondents concern with safety is directly related to concerns over the lack of bicycle infrastructure. Two categories in this question: 'too many cars/motorists drive too fast' (13 percent) and 'unsafe/unlawful motorist behavior' (11 percent) show how current and potential riders are concerned with safety on the roadway. Combined, these three categories make up over 40 percent of the reasons why Orem residents are bicycling less frequently. Investment in quality bicycle facilities will address the safety concerns of residents and encourage more cycling trips. Improved facilities increase the perceived level of safety for cyclists by clearly delineating space for them on the roadway. Another positive impact of developing bike lanes, bicycle boulevards, and other facilities is the clear message it sends to motorists alerting them to bicyclist's right to the roadway.

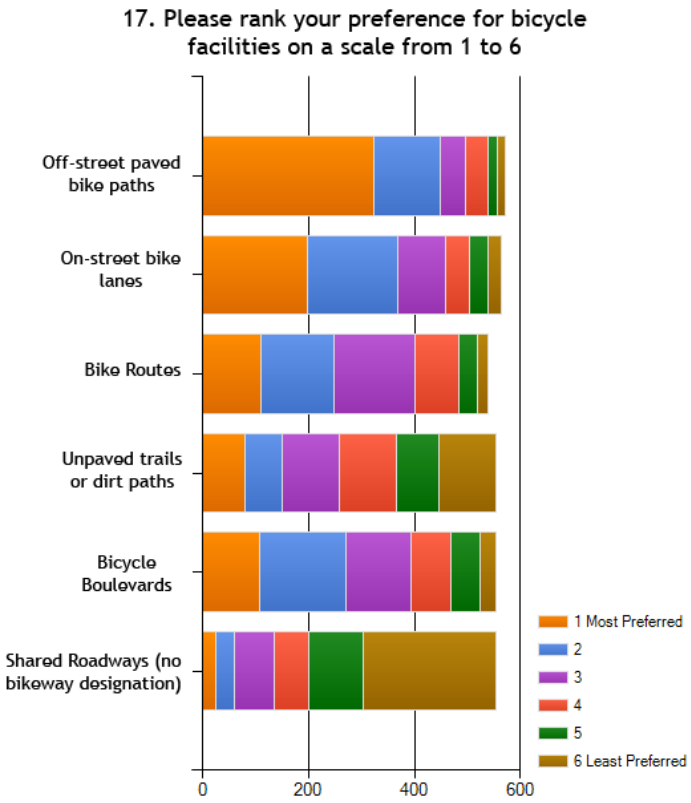


Figure 4.4 – Preference Survey

According to this survey, investment in a bicycle network would alleviate nearly 40% of the reasons the residents of Orem choose not to ride at all or ride more frequently. Only approximately 20 percent of responses (destinations being too far away and weather concerns) lie outside of the control of either the City or its citizens to change.

Respondents for the survey were also asked to rank their preference for bicycle facilities. This question indicates that Orem residents, by order of popularity, are most interested in the development of off-street paved paths, a network of on-street bicycle lanes, and creating new bike routes and bike boulevards. Respondents' least preferred option was maintaining the status quo—shared roadways with no specific bikeways designation (See **Fig. 4.4**). These results indicate that respondents would most like:

- Safer streets for bicycling
- New bike paths, bike lanes, and other bike facilities
- To be able to ride more frequently

4.7.1 Female Bicyclists

A female rider's needs, as observed in this online survey, did not differ substantially from those of their male counterparts. Both men and women are interested in improving the safety of their bicycling experience and the frequency of bike trips in the City of Orem. Where differences do exist, they occur at a more granular level—the degree that women would cite exercise and fitness as a reason they bike (82 percent) as compared with men (87 percent). Improving bicycling conditions in ways that will encourage more women to bike is not significantly different from planning a bicycle network for all potential users. Below are some of the key differences between men and women that surfaced in this survey.

- Women show a greater interest in the Safe Routes to School programs
- Bicycle access to shopping centers and neighborhood stores holds greater importance for women
- Women show a slightly higher concern about crime/personal safety (six percent for males versus fifteen percent for females)
- The average length of a one-way bike ride taken by women is likely to be less than two miles
- Twelve percent of women bike daily, or near daily, as compared to 38 percent of men

Preferences concerning the types of bicycle facilities that would be most appreciated in the community held constant for both sexes. No group was significantly more or less interested in one facility type than another.

4.8 Conclusion

This survey provided a comprehensive snapshot of the needs and attitudes of Orem residents toward walking and biking in their community. Used as a barometer for the larger community, the survey indicates that there is great support for upgrades and improvements to the local bicycling and pedestrian networks. These results are indicative of a clear desire for improved facilities that are capable of improving safety and providing greater accessibility to the goods and services necessary for daily life.

4.8.1 Orem Bicycle and Pedestrian Plan Charette Summary

The first public charette was held on January 19th, 2009 at the Orem Senior Center. It is estimated that 110 members of the public were in attendance. There were 99 unique respondents using the interactive survey equipment with several more participants coming and going throughout the evening. Ninety members of the public signed in, yielding 68 email addresses that can be used to keep attendees up to date with the planning process and notified of future workshop events.

Over 100 Orem Residents Attended the Charette

The charette was divided into two distinct activities. The first was comprised of a PowerPoint presentation that educated the attendees in bicycle facility types and included the same survey questions as the online survey. This approach helped the project staff to gage the demographics of the charette attendees, and to record their preferences of proposed facility types and accommodation strategies. The second part of the charette involved a mapping exercise whereby participants were broken up into 12 groups and given a map of Orem's existing bicycle facilities a second map of missing arterial and collector sidewalks within the city limits. Participants were asked to mark up the maps both with comments, and with markers and dots to indicate if they felt roads/intersections were generally good, in need of improvement, or difficult.

4.8.2 Survey/Visual Preference Analysis

Attendance increased during the administration of the clicker survey. Initially, there were 89 participants with a roughly even split of 53 percent males and 47 percent females. Not all questions yielded a full complement of responses, and some participants arrived late and did not participate in some of the earlier questions. Full results of the Charette Survey/Visual Preference Analysis can be found in '**Appendix D - Charette Survey/Visual Preference Analysis**.'

Initially, Participants were shown Figure 4.1 – Bicyclist Types by Overall Population and asked to rank themselves within that categorization. The responses from the attendees show a higher degree of representation of confident cyclists than the population as a whole. A full 94 percent of attendees either currently ride a bike regularly, or are interested in doing it more often. 'Strong and Fearless' cyclists typically make up 1 to2 percent of the population. At the charette, they comprised nearly 20 percent of attendees.

Fifty-five percent of participants rode their bicycles several times a week, with another 15 percent riding their bicycles several times a month. The distances ridden varied considerably, with 37 percent typically riding under 2 miles, with similar amounts riding progressively larger distances. Nearly half of attendees listed 'exercise/fitness' as the primary reason for riding a bicycle. The secondary reason respondents ride bicycles resulted in a fairly even tally across all categories.

To gage the effect Orem's climate had on rates of bicycling, participants were asked in which seasons do they ride. Predictably, winter affected responses, as nearly 80 percent of attendees do not ride bicycles in the winter. Over half of participants do ride in the spring, summer and fall seasons. This indicates a strong potential for bicycle use in Orem, with lower potential during periods of cold temperatures and the presence of snow/ice. Over 20 percent of attendees did ride year round. Winter related issues, such as snow, ice, temperature and weather, accounted for over 83 percent of the reasons given for not riding year round. These factors are not something that the City of Orem has control over and may indicate that encouraging residents to ride during the winter riding will be challenging. Surprisingly, only 5 percent listed road maintenance (year round) as a reason not to ride.

Questions about walking generally yielded similar results as the online version of the survey. Rates of walking were high among participants with exercise trips listed as the number one reason to walk, followed closely by commuting and transportation. The reasons for not walking more, included distance, followed by time and traffic. Only 12 attendees listed lack of sidewalks or paths as a reason and 11 listed the condition of pedestrian facilities as a reason.

4.8.3 Facility Preference Survey

In a lecture-style educational session, the attendees were presented with photos , statistics and descriptions of bicycle facility types of The intent here was to gage public opinion regarding the level of support and preference levels for each type of bikeway facility.

On-Street Bike Lanes

A full 87 percent of attendees either strongly supported or supported the development of more on-street bike lanes in Orem. Because of the high-level of support for on-street bicycle lanes, different strategies to retrofit them into Orem's existing roadway network were demonstrated. The following results were observed:

Lane narrowing was presented as the first strategy. Lane narrowing was strongly supported or supported by 82 percent of attendees. In this scenario, no real sacrifices are required of the roadway, just travel lane or parking lane width. The strong level of support reflects the overall level of support for bike lanes as a whole.

The parking removal option was presented next and support for this strategy dwindled slightly with 12 percent not supporting the idea, and nearly 17 percent having reservations. Nearly 72 percent of attendees still strongly supported or supported the idea.

Finally, **lane removal** was presented, with emphasis on removing the center turn lanes from many of Orem's streets. When presented with this option, support shrank slightly to 64 percent, with a larger number of attendees opposing it (nearly 23 percent), and 14 percent of participants having reservations about this strategy.

Shared Roadways

The next facility type to be examined was the shared roadway concept. This concept was presented in its most basic form with nothing more than bike route signage and possibly wayfinding signage to mark the bike

facility. Support was slightly less for shared roadways than for bike lanes, potentially indicating a greater preference for bike lanes.

The shared roadway concept was expanded and an introduction to bicycle boulevards was given. Bicycle boulevards prioritize for bicycle travel over motor vehicle travel through traffic calming and other facility treatments. . Support dropped from nearly 79 percent, for the basic shared-roadway scenario, to 60 percent expressing strong support or support for the idea. This is likely due to some respondents having reservations regarding the use of traffic calming near their residence.

Shared-Use Pathways

The final facility type to be presented was the separated 'multi-use' or 'shared-use' pathway. This facility type is ideally located in an independent right-of-way, as in a park or in a separate right- of-way from a roadway. Support for this facility type was predictably very high, with only 11 percent having reservations or opposing the idea. A full 90 percent of attendees strongly supported or supported the concept.

Next, the concept of 'sidepaths' was introduced. A sidepath is a shared-use pathway is provided adjacent to a roadway. The benefits, safety issues and challenges, along with concerns surrounding the safe crossing of driveways and cross-streets of shared-use pathways was presented. Support for this facility type dropped considerably from about 90 percent to 55 percent. The responses to this question indicate that there is more support for new shared-use pathways with greater separation from roadways than sidepaths in Orem.

Following the sidepath question, the discussion returned to the concept of a shared-use pathways being provided in the canal right-of-way. Orem has several canal corridors that one day might be modified to include provision for a shared-use pathway. Potential benefits and challenges were presented to the development of such corridors. Support was very high with nearly 64 percent of respondents strongly supporting the idea, another 18 percent supporting it, with12 percent having reservations, and 6 percent not supporting the idea.

Finally, a rail-with-trail scenario was presented. This pathway would be constructed adjacent to an active rail line. Support was still very high for a rail-with-trail scenario with those who strongly supported the concept dropping slightly; however, when compared to the canal scenario, opposition to the concept fell to 10 percent and those with reservations falling also to 10 percent.

4.9 Mapping Exercise Summary

Upon completion of the interactive survey portion of the charette, participants were told to flip over the two large maps on each table and begin the mapping exercise. Each table had a pedestrian map and a bicycle map. Both maps showed common facilities within Orem, such as commercial areas, parks, and schools. The pedestrian map noted the locations were sidewalks were missing. The bicycle maps noted the existing shared-use paths and bike lanes= Participants were given colored markers and dots along with sticky pads to write any additional comments or recommendations. The colors used for the markers and dots were red, yellow and green. Red signified a corridor or location that was considered 'difficult' or 'problematic', yellow signified that the corridor or location 'needs improvement' but was functional, and green signified corridors or locations that gave a 'great experience.'

Thirteen Groups Provided Detailed Feedback on Provided Maps

4.9.1 Results

In total, 21 maps were marked up by charette participants and collected. A high volume of information collected on each map. A full summary of the mapping exercise comments can be found in '**Appendix E – Charette Mapping Exercise Feedback Summary**.' The following is a condensed summary of the findings.

Canals (15 group comments)

There was strong support for trails along canal routes. It was indicated that canal routes were good north/south corridors in the city. Several groups wanted to connect the canal routes with on-street paths to make "beltways" around Orem. Only one comment mentioned concern about the privacy of homeowners and wanted a portion of the approved Murdock Canal trail alignment moved "on-street" between 800 North and 1200 North

Schools

Many comments touched on access to schools by bicycling and walking. Comments ranged from the general, to requests for extending school zone speed limits

Maintenance

Numerous times, participants made notation to keep bikeways and sidewalks clear of snow, and to enforce snow clearance on sidewalks by the City.

Education

Many comments referenced increasing educational efforts, including making drivers more aware of pedestrians and bicyclists, school education for children about how to walk and bicycle safely, and safety education for adult bicyclists, such as how to cross a roadway properly.

Bicycle and Pedestrian Corridors

Cumulatively, it seemed that no roadway in Orem escaped the scrutiny of charette participants. In total, 30 separate corridors were highlighted and feedback was provided. Comments and recommendations typically touched on providing sidewalks and bike lanes, but some expanded to include maintenance issues, specific perceived hazards, and the user's feeling of safety there. Certain corridors were highlighted with green as an example of good facilities that participants wanted to see more of. This included Palisades Drive, 700 South, and 800 South.

Intersections

In all, 22 intersections were marked by charette participants. Many comments were simply that the intersection was difficult, but some comments went into more detail such as signal timing, and geometric hazards.

4.10 Online Bicycle Route Submissions (bikely.com)

The website, www.bikely.com, provides a forum where users may enter a specific bicycle or pedestrian route into a Google Maps interface. This service required a new account to be created by the user which may have affected involvement. In total, 34 individual route files were downloaded and analyzed. It is possible more routes may have been created by users, but may have been marked or tagged incorrectly. **Figure 4.5 – Existing and Approved Bikeways and Reported Bikeway Travel Routes** on the following page shows the routes that were provided electronically. Corridors with the most responses were 800 East, 800 South, 400 South, Orem Boulevard, and 800 West. The Provo River Parkway and College Connector Trail were both heavily cited by participants as both transportation and recreational corridors.

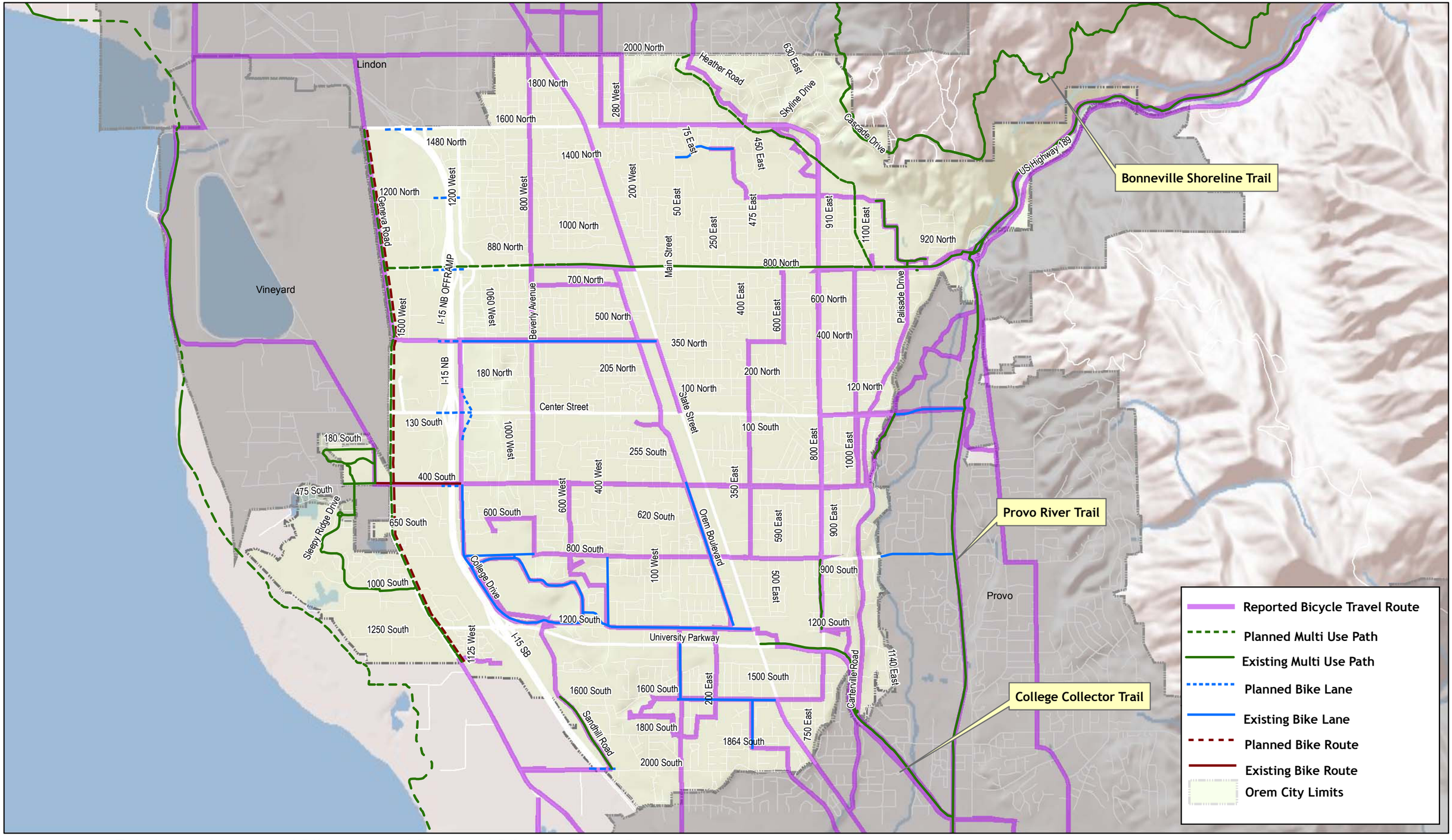


Figure 4. 5 - **Existing and Approved Bikeways and Reported Bikeway Travel Routes** (www.bikely.com)

Orem, UT
Orem Bike and Pedestrian Plan
Source: Mountainland Metropolitan Council of Governments, City of Orem
Author:
Date: February 2010

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4.11 Demand & Benefits Analysis

After the implementation of recommendations made by the Orem Bicycle and Pedestrian Plan, new biking and walking facilities and programs will increase the number of Orem residents using active transportation to travel to work, school, and run errands. Increased rates of walking and bicycling have numerous community benefits, including improved air quality, better community health resulting from exercise, and reduced fuel and road maintenance costs. The current level of walking and bicycling in Orem already yields some amount of these benefits. It is often helpful to monetize these benefits to demonstrate the cost efficiency of investing in bicycling and walking transportation. The model developed for Orem provides a before and after snapshot of the benefits provided by the current level of walking and bicycling, and what benefits could be enjoyed in the future after the results of the Bicycle and Pedestrian Plan are implemented.

As with any modeling projection, the accuracy of the result is dependent on the accuracy of the input data and other assumptions. Effort was made to collect the best data possible for input to the model; when data points where not available, contextual information was collected in order to make an educated assumption. A full list of the local and national sources used in the data for this model is available in '**Appendix F – Orem Bicycling and Walking Benefits Model Data Sources.**'

4.11.1 Bicycle and Pedestrian User Groups and Projections

The base input for estimating the benefits of walking and bicycling is the rate at which people choose to walk and bike for transportation, and how far they typically travel when making a trip. The Orem benefits model identified three primary groups making regular walking and bicycling trips: commuters, Utah Valley University students, and school children. According to the U.S. Census American Communities Survey, about 1percent of the employed population of Orem travels to work by bicycle, and approximately 1.75 percent walk. Another 2.4 percent of Orem residents use public transit to travel to work, most of which access transit by foot, although some access via bicycle. Detailed data does not exist on how UVU students travel to class, but the number of car parking spaces and transit passes sold by university departments were used to create an informed estimate. Recent data from the National Center for Safe Routes to Schools shows approximately two percent of school children bike to school and 13 percent walk. Finally, estimates were developed to represent the probable rate of walking and biking by these different groups in 2030, after many bicycle and pedestrian improvements are implemented in Orem.

National publications and peer-reviewed studies were used to inform the average distance traveled by each of these types of walking and bicycling trips. Additionally, a factor was applied to estimate the number of utilitarian (non-recreational, non-commute) trips made by bicycle in Orem. Using this process, the following estimate was generated for current bicycle and pedestrian activity:

Table 4.6 - Vehicle Trips and Miles Reduction

Vehicle Trips and Miles Reduction		
Year	2010	2030
Bicycle commuters (including children)	1,659	9,528
Walking commuters (including children)	7,371	18,803
Weekly bicycle trips	25,077	140,308
Weekly walking trips	73,705	188,034
Weekly vehicle trips reduced	48,748	178,164
Weekly VMT reduced	83,735	368,701
Yearly bicycle trips	1,308,544	7,321,519
Yearly walking trips	3,847,427	9,815,360
Yearly vehicle trips reduced	2,544,277	9,298,108
Yearly VMT reduced	**4,370,062**	**19,241,288**

4.11.2 Benefits Captured

Using the total number of miles traveled in trips made by these active modes of transportation, air quality benefits can then be calculated by comparing the amount of pollutants and greenhouse gases that would be emitted if people instead chose to travel in a car for that same distance. Most other benefits are also calculated on a per-mile basis, such as traffic congestion costs. By applying conversion factors from academic studies and federal reports, the economic benefits of the current level of walking and bicycling in Orem were quantified. The benefits of non-commute, non-school walking trips were not captured in this model due to the lack of a reliable conversion factor to estimate trips from the available commute trip data. Although they provide livability and health benefits, recreational and exercise trips are not counted in this model, because they are less likely to replace vehicle trips.

Table 4.7 – Air Quality Benefits

Air Quality Benefits		
Year	2010	2030
Reduced Hydrocarbons (pounds/year)	13,103	57,691
Reduced Particulate Matter (pounds/year)	97	428
Reduced Nitrous Oxides (pounds/year)	9,153	40,299
Reduced Carbon Monoxide (pounds/year)	119,466	526,005
Reduced Carbon Dioxide (pounds/year)	3,555,071	15,652,899

Table 4.8 - Annual Economic Benefits of Increased Bicycling

Annual Economic Benefits		
Year	2010	2030
Reduced Carbon Dioxide Costs		
Carbon Dioxide	$57,138	$404,272
Subtotal	$57,138	$404,272
Other Reduced Emissions Costs		
Hydrocarbons	$11,137	$49,037
PM	$8,174	$35,989
NOX	$18,305	$80,598
Subtotal	$37,616	$165,624
Reduced Economic Costs of Oil Imports		
"Monopsony" Component	$56,651	$192,781
Price Shock Component	$24,705	$84,070
Subtotal	$81,356	$276,851
Reduced External Costs of Vehicle Travel		
Traffic Congestion	$285,204	$970,543
Vehicle Crashes	$1,354,719	$4,610,080
Roadway Maintenance Costs	$611,809	$2,081,972
Subtotal	$2,251,732	$7,662,595
Reduced Healthcare Costs		
Healthcare savings of newly active people	$972,137	$4,610,881
Subtotal	$972,137	$4,610,881
Household Transportation Savings		
Reduction in HH transportation spending	$2,185,031	$14,635,928
Subtotal	**$2,185,031**	**$14,635,928**
Total	**$5,585,010**	**$27,756,151**

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5 Recommended Bicycle Facilities

This chapter describes the proposed system of bikeways and pedestrian facilities for the City of Orem. The proposed system was developed based on the public outreach efforts described in Chapter 4 Needs & Attitudes Assessment, the results of the Alta StreetPlan model, and field observation. The following criteria and design parameters were used in developing the proposed system of bikeways and the priority list of bikeway projects.

5.1 Bikeway Selection Criteria

The development of the proposed system of bicycle routes took into account the broader goals of **Chapter 1: Project Vision, Goals & Objectives**. In particular, the recommendations emphasize a safe, comfortable, convenient and highly-connected bikeway system that meets the transportation and recreation needs of the broad range of bike riders, while balancing the needs of other transportation types including automobiles, train, transit and pedestrians. In particular, factors considered during development of the proposed system map include:

Needs assessment – A thorough review of existing plans and studies was conducted to determine what exists today. In addition, the location and attractiveness of existing bicycle routes and bicycle travel within Orem was reviewed. Specific parameters included access to parks, public facilities, schools, employment centers, residential and non-residential land use; population and employment densities, and roadway conditions including number of lanes, capacity and speed.

System Coverage – The proposed system considers balanced access from the City's population centers for both commuting and recreation purposes. In general, Orem has a fairly uniform built environment and street configuration, the recommended bikeway network maximizes potential within the existing grid system.

Safety – The proposed system provides the highest level of safety possible taking into account bicycle travel and bicycle crossings of major roadways.

Connectivity – The proposed system provides connections between residential areas, schools, parks, public transit stops, shopping centers, employment centers, with an emphasis on connections to major activity centers and multimodal transfer locations.

Connections to Adjacent Jurisdictions – The proposed system connects the City of Orem to surrounding communities such as Provo, Vineyard and Lindon.

Projects of Regional Significance – Projects that cross jurisdictional boundaries and have the potential to create regionally significant bike facilities. This is important because a recurring theme throughout the planning process was a desire by bicyclists to be able to connect Orem seamlessly with surrounding jurisdictions.

5.1.1 Proposed Bikeway Network Development

Planning for the future growth of the bicycle system was prioritized into two methodologies. The first sought to create a system of improvements that could be reasonably expected to be completed in a short time period estimated at five years. These improvements have will make up the first phase of growth in the bicycle system and are referred to as Phase 1 improvements. In addition the future buildout of the Orem bicycle system was considered. These improvements represent the 'Vision' of what Orem could be and will take a greater amount of time to fully realize. The proposed 'Phase 1' bikeway system is shown in **Figure 5.2 – Bicycle Facility Recommendations** Phase 1 and includes approximately 23 miles of new bikeway facilities. **Figure 5.3 – Bicycle Facility Vision** Plan includes approximately 96 miles of new bikeway facilities. **Table 5.1** below shows the number proposed miles for each bicycle facility type in the vision plan.

Table 5.1 – Proposed Miles of Bicycle Facilities by Type

Facility Type	Number of Segments	Miles
On-Street Bicycle Lanes	28	56.46
Bicycle Routes	28	22.29
Bicycle Boulevards	2	1.3
Shared Use Paths	12	16.62
Totals:	70	96.7

Following the release of the draft Phase 1 network for review in June of 2010, Orem residents were given the opportunity to provide feedback by rating the Phase 1 projects on a scale of 1 (least important) to 6 (most important). **Figure 5.1 – Public Responses Ranking Phase 1 Projects** summarizes the results with an average ranking (out of 6) and indicates that completing the 800 North Trail and the Murdock Canal Trail are high priorities for the public. With regard to on-street bike lanes, Orem Boulevard, 800 South and400 East ranked highest.

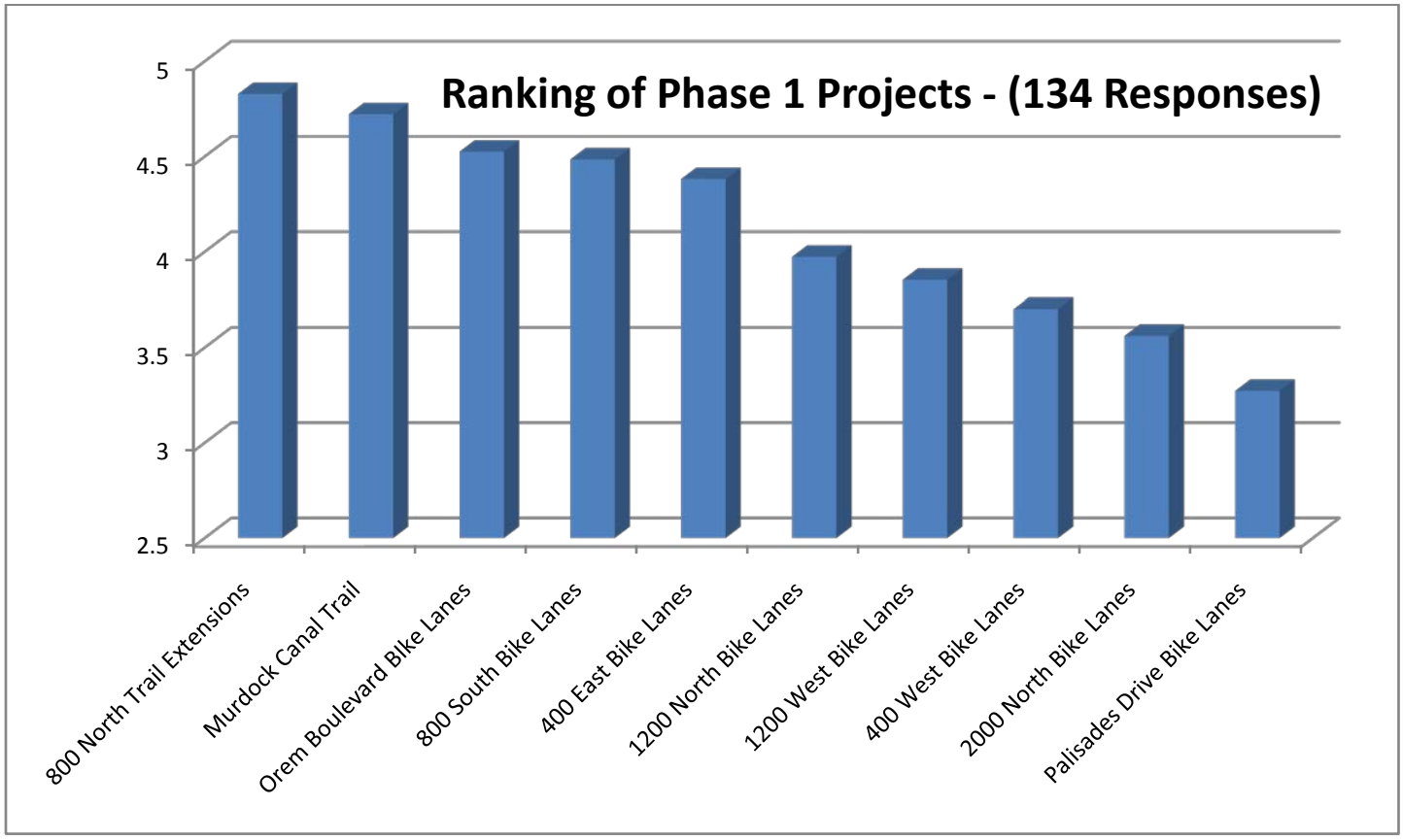

Figure 5.1 – Public Responses Ranking Phase 1 Projects

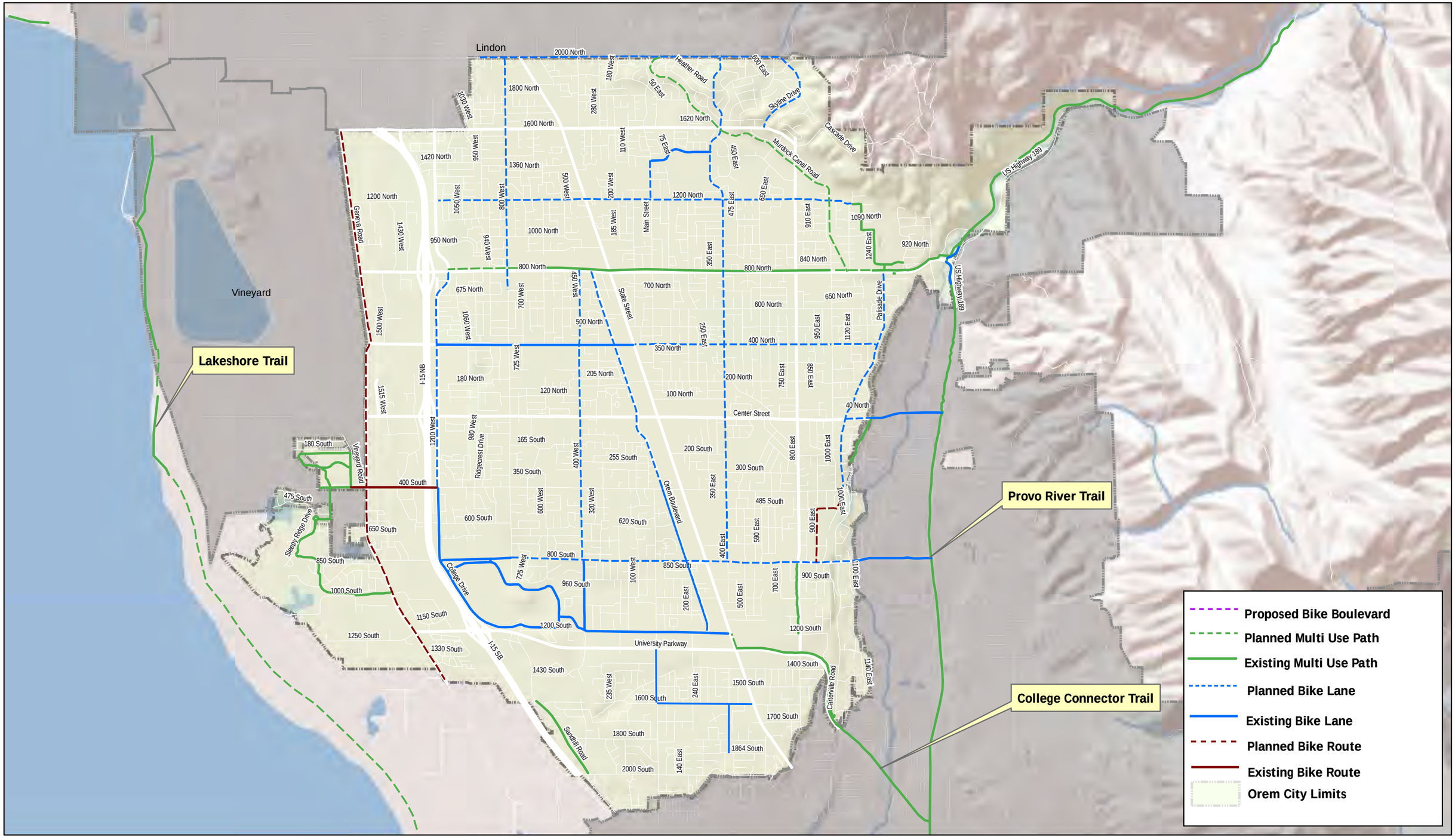

Figure 5.2 - Bicycle Facility Recommendations Phase I

Orem, UT
Orem Bike and Pedestrian Plan
Source: Mountainland Metropolitan Council of Governments, City of Orem
Author:
Date: October 2010

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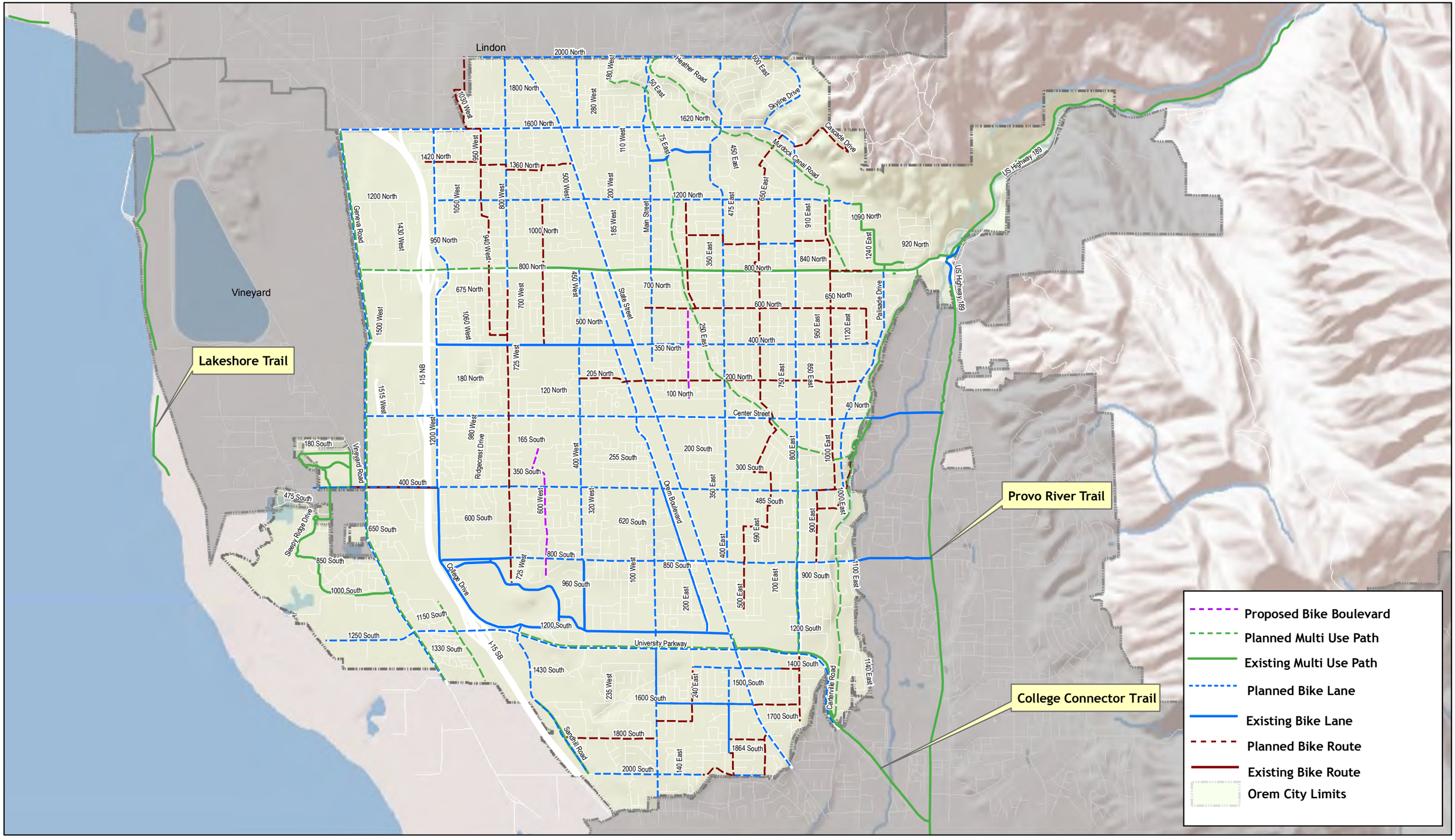

Figure 5.3 - Bicycle Facility Vision Map

Orem, UT
Orem Bike and Pedestrian Plan
Source: Mountainland Metropolitan Council of Governments, City of Orem
Author:
Date: October 2010

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5.1.2 Recommended Bicycle Lanes

The recommended network of bicycle lanes forms the core of the overall network. Bike lanes defined as a portion of the roadway that has been designated by striping, signage, and pavement markings for the preferential or exclusive use of bicyclists. Bike lanes in other jurisdictions are generally found on major arterial and collector roadways and are four to seven feet wide. Bike lanes can be found in a large variety of configurations, and can even incorporate special characteristics including coloring and placement if beneficial. The 2009 update to the Manual of Uniform Traffic Control Devices no longer requires the use of the R3-17 'Bike Lane' sign.

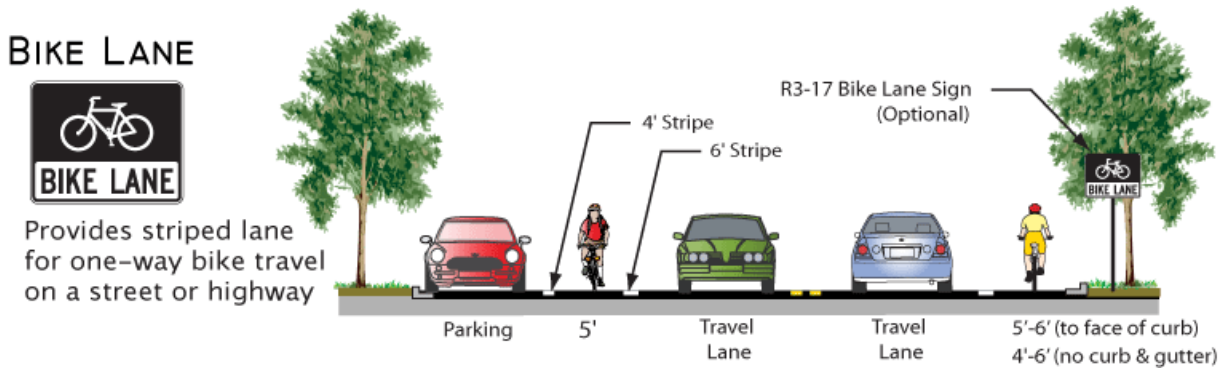

Figure 5.4 – Typical Bicycle Lane Configurations

Bike lanes enable bicyclists to ride at their preferred speed without interference from prevailing traffic conditions and facilitate predictable behavior and movements between bicyclists and motorists. Bicyclists may leave the bike lane to pass other bicyclists, make left turns, avoid obstacles or debris, and to avoid other conflicts with other roadway users. In Orem, bike lanes represent the greatest opportunity for continuous dedicated bicycle facilities due to the city being nearly built out.

5.1.3 StreetPlan Analysis

A critical component of the bike lane analysis was the use of Alta Planning + Design's 'StreetPlan' model. The StreetPlan model is a method to determine how an existing roadway cross section can be modified to include bike lanes. Assuming acceptable minimum widths for each roadway element, the model analyzes a number of factors including strategies to retrofit bike lanes on each surveyed roadway segment. Factors used in this analysis include:

- Current roadway width
- Raised or painted median
- Number and width of travel lanes
- Presence and number of turn lanes and medians
- Location and utilization of on-street parking

In some cases, the retrofit is simple and only requires the addition of a bike lane in readily available roadway space. In other circumstances a retrofit may be more challenging and require the narrowing of a travel lane, the removal of on-street parking or a more detailed engineering study. This model is useful as it clearly illustrates locations where projects can be completed easily and locations where adding bike lanes may be challenging. Retaining a uniform roadway configuration throughout a corridor can simplify travel for motorists and cyclists alike creating a safer and more comfortable experience for all users.

It is recognized that acceptable lane widths vary by functional classification, for example 10 foot travel lanes may be acceptable for a local street, but higher speed arterials may require 11 feet as the minimum lane width. For the purposes of the model, acceptable minimum roadway dimensions were set at the following:

- Travel lane width: 11 feet
- Right turn lane width: 10 feet
- Left or Center Turn Lane width: 10 feet
- Parking lane width: 7.5 feet

Where existing roadway dimensions were extremely close to allowing bike lanes the above standards were examined through supplemental field work. In some cases an adjustment was made to the aerial photo measurements to more accurately reflect actual conditions. In some cases, the City of Orem may be willing to further reduce the lane widths indicated above.

StreetPlan Outcomes

Many segments of Orem's roadway network resulted in multiple potential strategies for accommodating bike lanes. To aid the analysis and help set priorities for consideration Orem residents were polled during the first public workshop. At the workshop, approximately 100 members of the public were given the below strategies for retrofitting bike lanes within existing Orem collectors and arterials. The participants were asked to rate each strategy according to their level of support. The following section lists the options for retrofitting bike lanes given the physical curb-to-curb roadway constraints found in Orem. These options were analyzed in the order determined from the public workshop feedback and from project steering committee feedback. Based on this order, the StreetPlan model uses the first strategy (below) for a given segment of roadway and is given priority over succeeding strategies. Not all of the below options were possible strategies for all segments, but on many segments multiple strategies could be used to implement bike lanes.

Bike Lanes Fit With Existing Roadway Configuration – In this option, enough surplus road space exists to simply add the bike lane stripes and stencils without impacting the number of lanes or configuration of the roadway. This is by far the most desirable and easily implemented option available.

Narrow Travel Lanes and/or Parking Lanes – In this option, bike lanes can be added by simply adjusting wide travel lanes or parking lanes within the established minimums presented above. No reduction to the number of travel lanes is needed.

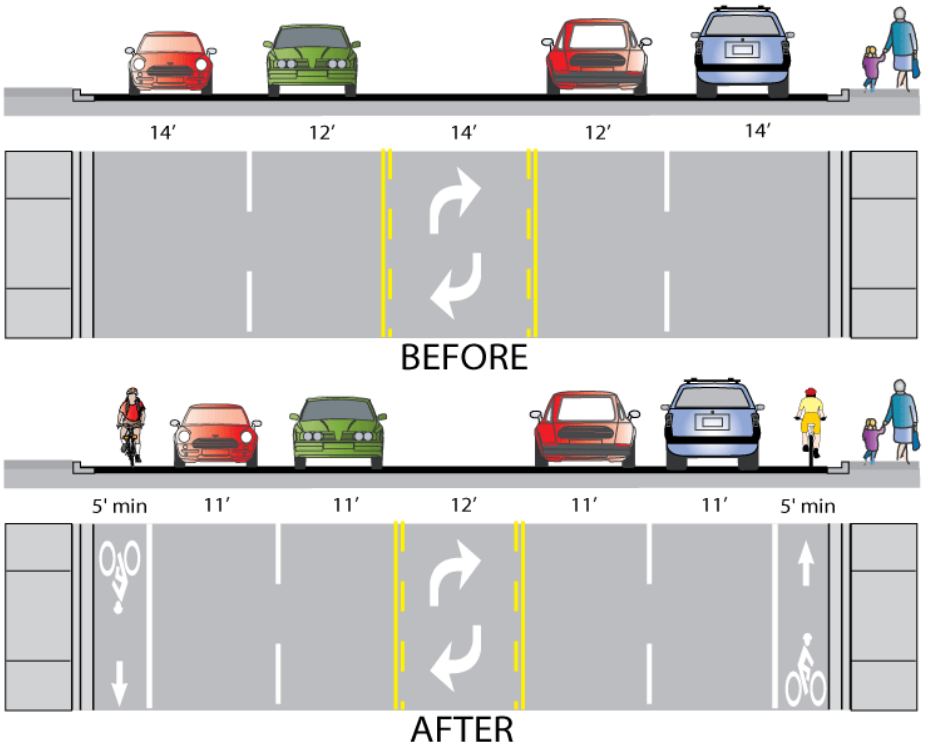

Figure 5.5 – Bicycle Lanes Added Through Lane Narrowing

Remove Redundant or Unneeded On-Street Parking – In this option, unnecessary on-street parking on one side of the street is removed to create space for bike lanes. Acceptable situations for this scenario include collector or arterial roadways that pass by back fences of homes rather than the front sides, or areas that have large surface parking lots adjacent to existing on-street parking.

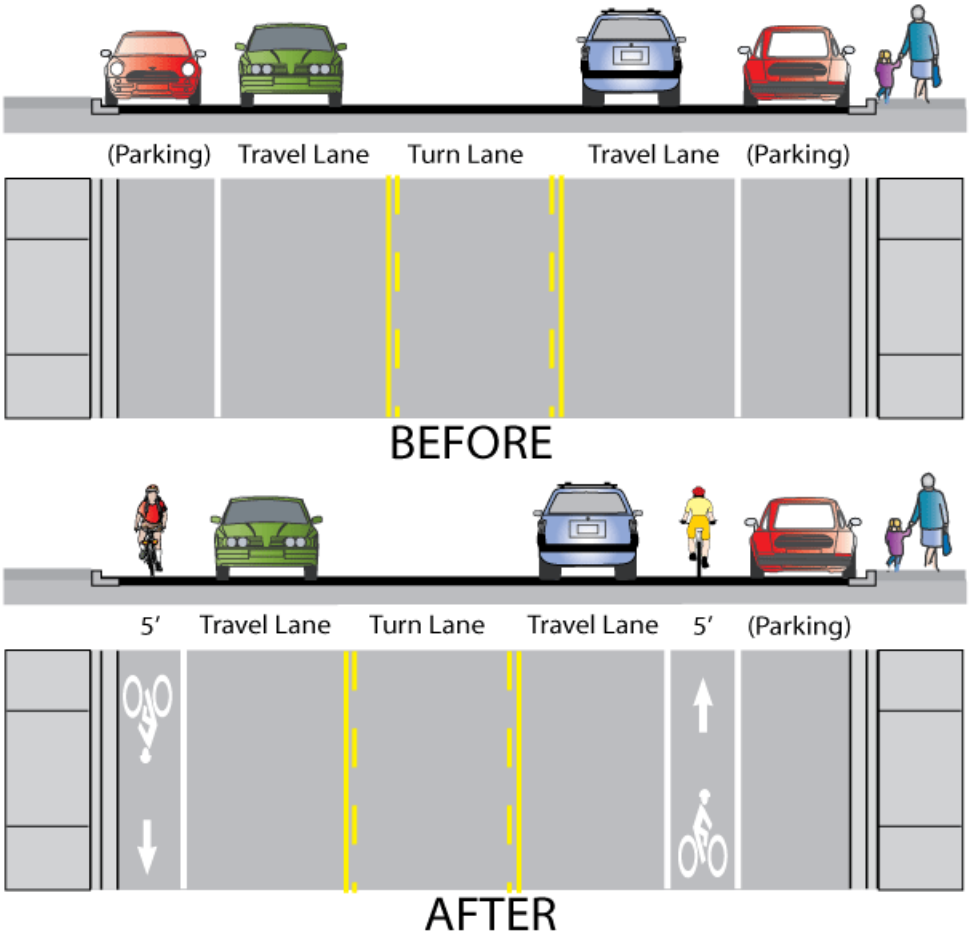

Figure 5.6 – Bicycle Lanes Added Through Parking Removal

Remove Center Turn Lane – In this option, the center turn lane is removed to provide road space for the addition of bicycle lanes. This strategy preserves all on-street parking. The turn lane can be restored at intersections if needed where parking is typically prohibited. This option will have some impact to turning vehicles mid-block. There is no definitive cutoff point at which a volume of ADT should prevent bike lanes being added through center turn lane removal. A suggested rule of thumb would permit the removal of center turn lanes on roadways with vehicle volumes below 10,000 vehicles per day for stretches of roadway with good access control (fewer driveway entrances) and/or low percentages of turning vehicles. Similarly, this treatment may not be advisable on roadways with ADT greater than 5,000 with large numbers of driveways or higher percentages of turning vehicles. The resulting cross-section, Figure 5-5, is common throughout the country and currently exists on 1200 South in Orem with an ADT ranging from 6,000-9,000 vehicles per day depending on location.

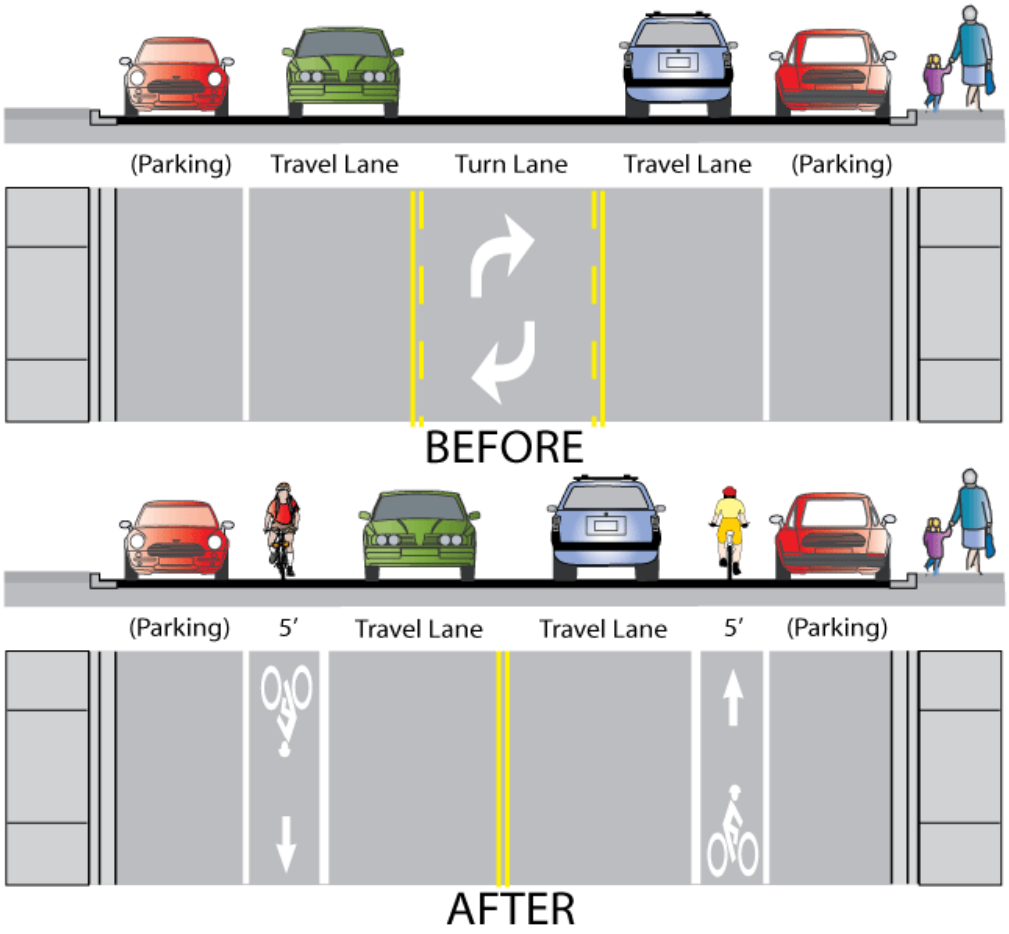

Figure 5.7 – Bicycle Lanes Added Through Center Turn Lane Removal

Remove On-Street Parking – In this option, on-street parking may be removed on one side of the road. However this on-street parking configuration may currently be utilized in residential or commercial areas. This option is seen as a less desirable option and may only be considered as a last resort in short sections to maintain bike lane continuity. A full parking study should be conducted to determine if excess parking capacity exists before making changes to the roadway configuration.

Bike Lanes Will Not Fit – In this last case, the existing roadway geometry will not allow for the addition of bike lanes. Either a bike route or major reconstruction of the roadway may be necessary for bikeway continuity.

Figure 5.8 – StreetPlan Outcomes displays the results of the above analysis on all collectors and arterials in Orem. This analysis represents only what is physically possible within the existing roadway dimensions and does not reflect the final recommendations provided in **Figure 5.3 – Bicycle Facility Vision Plan. Table 5.2 – Proposed Bicycle Lanes within Orem City** Limits below lists the proposed bicycle lanes within Orem City Limits.

Table 5.2 – Proposed Bicycle Lanes within Orem City Limits

Street	From	To	Length (Miles)
Geneva Road	1600 N	Southern City Limit	4.12
1200 W	1600 N	400 S	2.58
800 W	2000 N	700 N	1.63
400 W	2000 N	1600 N	0.5
400 W	800 N	800 S	2.03
Orem Boulevard	800 N	400 S	1.64
N Main Street	2000 N	300 N	2.17
S Main Street	400 S	1200 S	1.0
S Main Street	1600 S	Southern City Limit	0.7
400 E	2000 N	800 S	3.64
400 E	1400 S	1600 S	0.25
800 E	Cascade Dr	University Parkway	3.55
2000 N & Skyline Drive	920 W	1600 N	2.79
1600 N	Geneva Road	Cascade Drive	3.24
1200 N	Geneva Road	1110 E	3.53
800 N	Geneva Road	N Canyon Road	4.15
400 N	Geneva Road	1200 W (existing BL)	0.5
400 N	State Street	Palisades Drive	1.71
Center Street	Geneva Road	Eastern City Limit	3.54
400 S	Western City Limit	Palisades Drive	3.54
800 S	800 W	Eastern City Limit	2.44
Provo Slough Access Road	1890 W	I-15 SPUI (Center)	1.0
University Parkway	I-15 SPUI (Center)	S Carterville Road	2.9
1400 S	200 E	East side of Hillcrest School	0.6
2000 S	Sandhill Road	250 E	0.8
2000 S	424 E	S Columbia Lane	0.22
1300 (N Palisades Drive)	800 N	400 S	1.6
400 E	1400 S	1600 S	0.25
		Total:	**56.72 miles**

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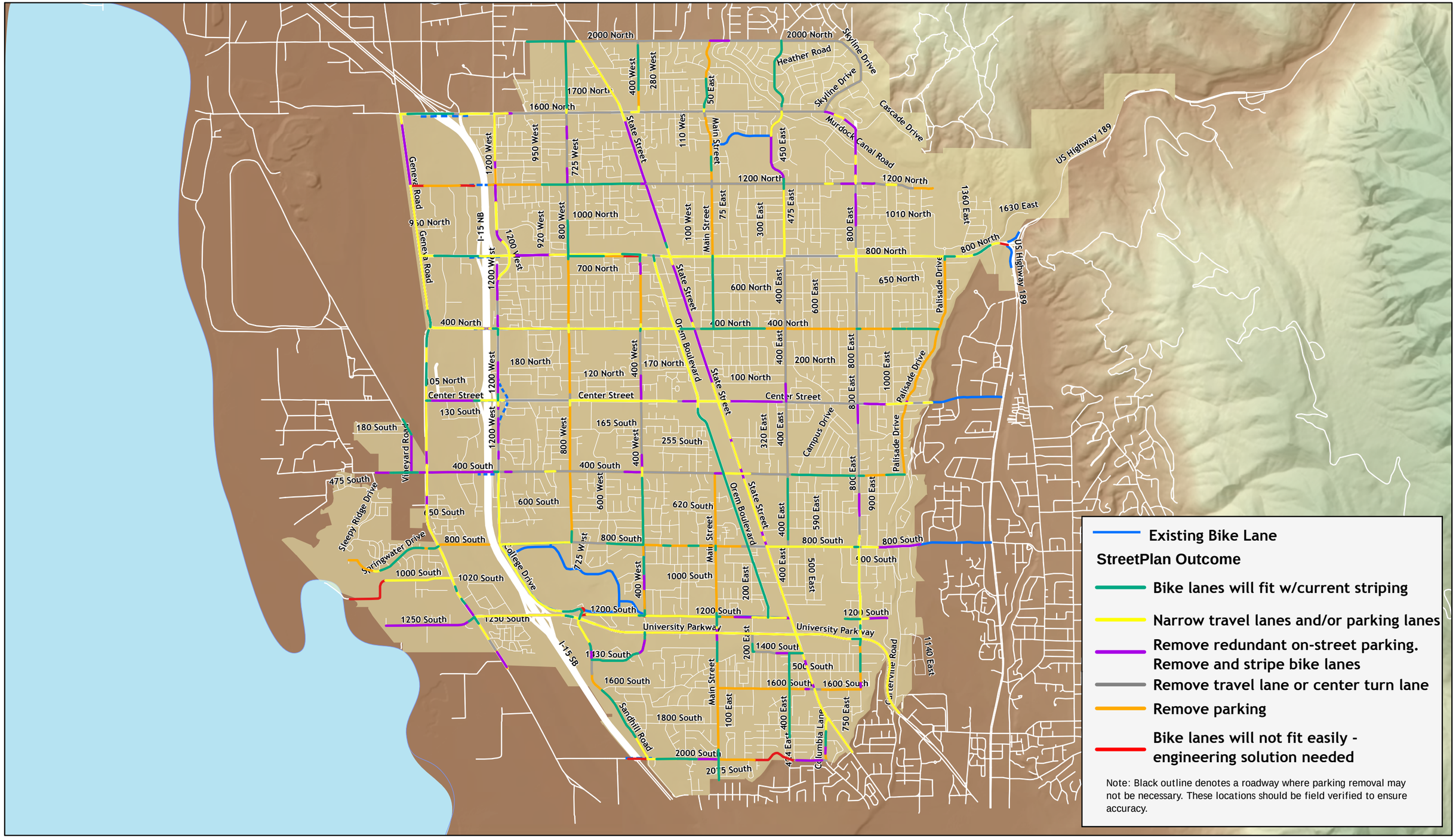

Figure 5.8 - Street Plan Outcomes

Orem, UT

Orem Bike and Pedestrian Study

Source: Mountainland Metropolitan Council of Governments, City of Orem

Author:

Date: March 2010

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5.1.4 Bicycle Routes & Bicycle Boulevards

The recommended network of bicycle routes forms a secondary network to the primary bike lane network. Bike routes provide a less congested experience that many less experienced bicyclists prefer over on-street bike lanes. Bike Routes are defined as facilities shared with motor vehicles. They are typically used on roads with low speeds and traffic volumes (typically 3,000 ADT or less), although they can be used on higher volume roads with wide outside lanes or wide shoulders. Bike routes can be established along "through" routes not served by shared-use paths or bike lanes, or to connect discontinuous segments of bikeway (normally bike lanes). A motor vehicle driver will usually have to cross over into the adjacent travel lane to pass a bicyclist, unless a wide outside lane or shoulder is provided.

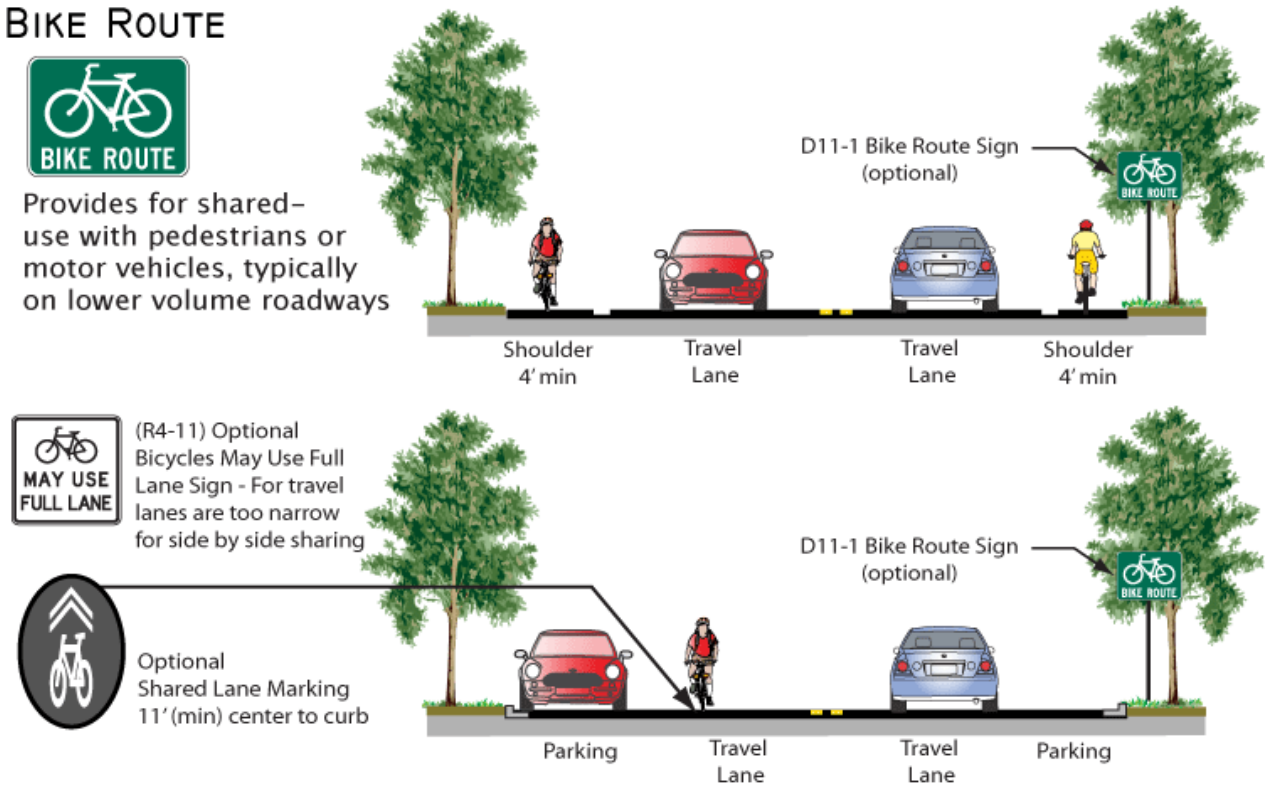

Figure 5.9 – Typical Bicycle Route Configurations

Bicycle routes can employ a large variety of treatments from simple signage to complex treatments including directional signage, various types of traffic calming applications and/or pavement stenciling. The level of treatment to be provided for a specific location or corridor depends on several factors. Unique Bicycle Route Signage that can incorporate wayfinding provides a sense of place is recommended in lieu of the D11-1 Bike Route Sign to create added emphasis and a sense of place. With more intensive treatments bike routes can become known as 'Bicycle Boulevards'.

Table 5.3 – Proposed Bicycle Routes within Orem City Limits

Street	From	To	Length (Miles)
900 / 950 W	2000 S	800 W	2.2
800 W	700 N	1000 S	2.0
600 W	1200 N	400 N	1.0
200 E	1200 N	600 N	0.78
190 E	600 N	100 N	0.63
424 E	1864 S	2000 S	0.15
600 E Route	1600 N	1070 S	3.92
1000 E	1200 N	400 S	2.0
1200 E	600 N	400 N	0.25
500 N	Palisades Drive	900 E	0.14
1400 N Route	1250 W	State Street	1.11
Cascade Drive	1600 N (800 E)	Bonneville Shore Line Trailhead	0.5
1000 N	200 E	400 E	0.25
950 N	400 E	600 E	0.25
970 N	800 E	1000 E	0.23
600 N	50 W	1200 E	1.57
400 N	1000 E	N Palisades Dr	0.3
200 N (& 205 N)	400 W	N Palisades Dr	2.0
400 S	900 E	N Palisades Dr	0.2
500 S	900 E	N Palisades Dr	0.13
1400 S	680 E	800 E	0.14
900 E	400 S	800 S	0.5
1700 S	S Main Street	200 E	0.38
1700 S	State Street	800 E	0.26
1800 S	Sandhill Road	S Main Street	0.65
1800 S	400 E	S Columbia Lane	0.25
2000 S	250 E	424 E	0.25
S Columbia Lane	1800 S	2000 S	0.25
		Total:	**22.29 miles**

Bicycle boulevards take the shared roadway bike facility to a higher level, creating an attractive, convenient, and comfortable cycling environment that is welcoming to cyclists of all ages and skill levels (**Figure 5.10 – Example Elements of a Bicycle** Boulevard). In essence, bicycle boulevards are low-volume and low-speed streets that have been optimized for bicycle travel through treatments such as traffic calming and traffic reduction, signage and pavement markings, and intersection crossing treatments. These treatments allow through movements for cyclists while discouraging similar through trips by non-local motorized traffic. Motor vehicle access to properties along the route is maintained. **Table 5.4 – Proposed Bicycle Boulevards within** Orem City Limits identifies street segments appropriate for bicycle boulevards.

Table 5.4 – Proposed Bicycle Boulevards within Orem City Limits

Street	From	To	Length (Miles)
200 E	1400 S	1700 S	0.38
600 W	165 S	925 S	0.95
		Total:	**1.33 miles**

As the popularity and usage of bicycling in Orem grows, the City may find it necessary to add additional treatments to the network of bike routes upgrading them to bicycle boulevards. Additional design guidelines for bicycle boulevards can be found in **'Appendix G: Bicycle & Pedestrian System Typologies and Designs'**.

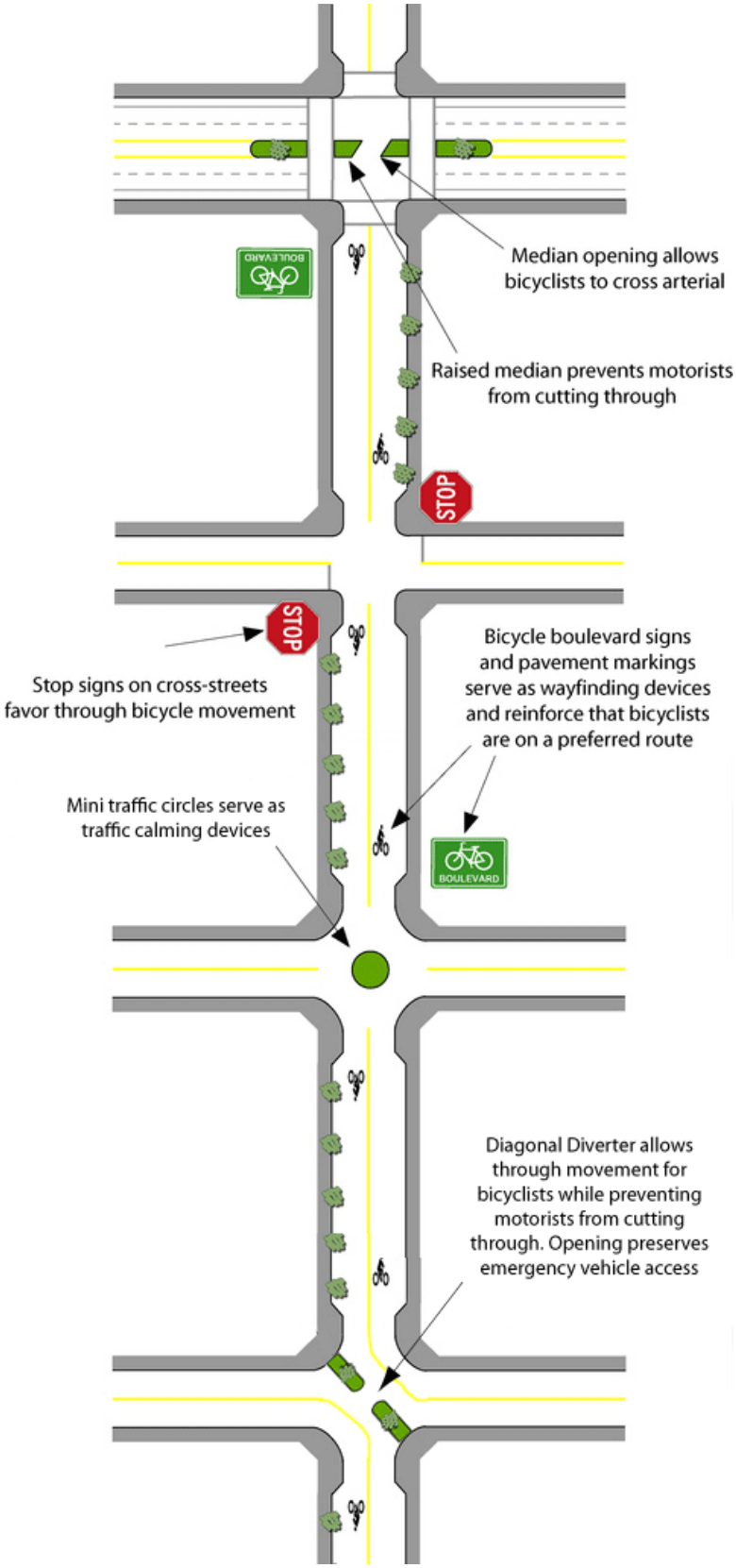

Figure 5.10 – Example Elements of a Bicycle Boulevard

5.1.5 Shared Use Pathways

A bicycle path (or shared use path) allows for two-way, off-street bicycle use and also may be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users. These facilities are frequently found in parks, along rivers, beaches, and in greenbelts or utility corridors where there are few conflicts with motorized vehicles. Shared-use path facilities can also include amenities such as lighting, signage, and fencing (where appropriate). The recommended network of shared use paths complements the on-street network of bikeways and is suitable for all users and ability levels.

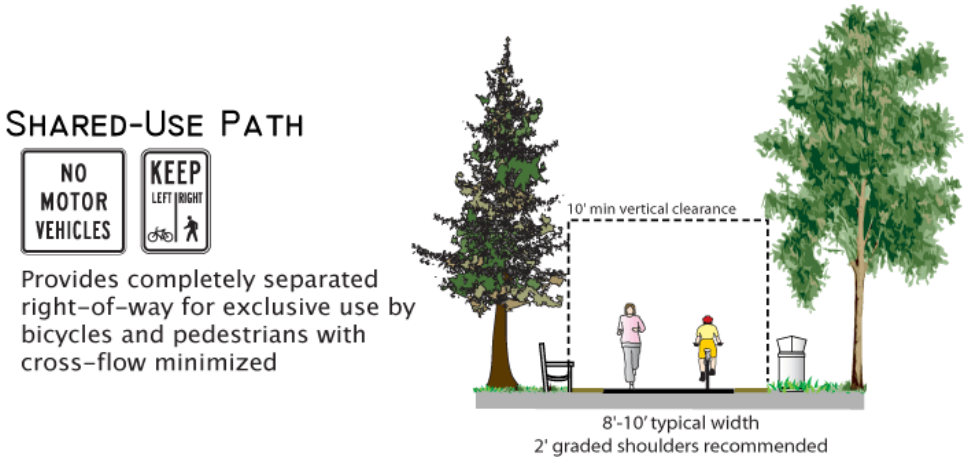

Figure 5.11 – Typical Shared-use Path

Shared use paths have been constructed along roadways such as the 800 North Trail. Also known as "sidepaths", these facilities have unique operational challenges due to their geometric configuration at intersections. This geometry creates a situation where a portion of the bicycle traffic rides against the normal flow of motor vehicle traffic and can result in wrong-way riding when either entering or exiting the path. This can also result in an unsafe situation where motorists entering or crossing the roadway at intersections and driveways do not notice bicyclists coming from their right, as they are not expecting traffic coming from that direction. Stopped cross-street motor vehicle traffic or vehicles exiting side streets or driveways may frequently block path crossings. Even bicyclists coming from the left may also go unnoticed, especially when sight distances are poor.

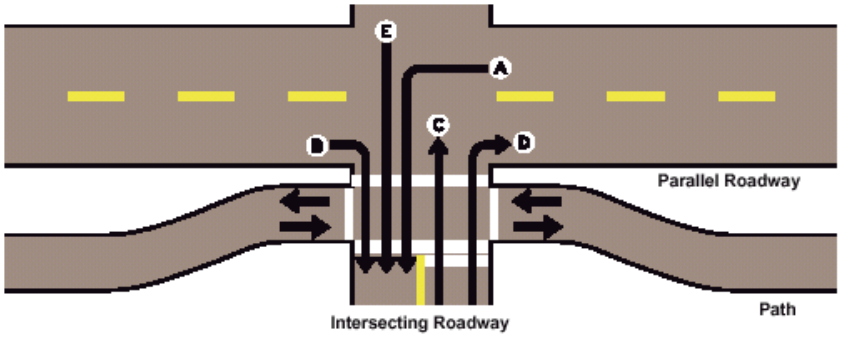

Figure 5.12 – Potential conflict points along a Sidepath

During the first public workshop, attendees were provided with information about the differences between shared use paths and sidepaths and were asked to provide their preference for both facility types. Seventy one percent of workshop participants strongly supported fully separated shared use paths, like the Provo River Parkway. For a sidepaths, this support dropped to 25 percent. For this reason, no new sidepaths have been proposed beyond the full completion of the 800 North Trail, 800 East, Carterville Road, and the College Connector Trail along University Parkway. **Table 5.5 – Recommended Shared Use Paths within Orem City Limits**, provides the recommended shared use paths within the Orem City Limits.

Table 5.5 – Recommended Shared Use Paths within Orem City Limits

Street	From	To	Length (Miles)
Shared-Use Paths – Separate From Roadways			
Railroad Trail	Future Intermodal Station (approx 1000 S)	Multi Family Housing South of University Parkway	0.6
Murdock Canal Trail	2000 N	800 N	2.33
Union Canal Trail	2000 N	Palisades Drive (City Limits)	3.32
Shared-Use Paths - Sidepaths			
State Street Connector	Termination of existing path on University Parkway	1200 S Street Bike Lanes	0.1
College Connector Trail Extension (University Parkway)	State Street	Sandhill Road	1.5
800 N Trail	Geneva Road	600 W	1.29
800 N Trail	1000 E	1240 E	0.31
Geneva Road Trail	1600 N	Southern City Limits	3.91
Sandhill Road	University Parkway	Existing Path	0.50
800 East Path Segment 1	Murdock Canal trail	Existing Path	0.82
800 East Path Segment 2	Existing Path	University Parkway	0.12
Carterville Road Path	Existing Path	College Connector Trail	1.82
		Total:	**16.62 miles**

6 Recommended Pedestrian Facilities

6.1 Pedestrian Facility Selection Criteria

The development of the proposed system of pedestrian improvements also took into account the broader goals of **Chapter 1: Project Vision, Goals & Objectives**. The City of Orem has recently invested in new sidewalk construction near many of the city's schools. Orem's collector and arterial sidewalk network was inventoried in **Chapter 3: Existing Bicycle & Pedestrian Facilities**. This network was analyzed for pedestrian need and access. Not all missing sidewalks inventoried were given recommendations for construction. A map of recommended sidewalk facilities can be found in **Figure 6.1 – Pedestrian Facility Recommendations.**

Although the map does not depict sidewalks on every street, it is the City's policy to require or provide sidewalks on both sides of all streets (where possible). Other pedestrian system recommendations include shared-use paths and intersection improvements to accommodate safe and convenient pedestrian crossings.

6.2 Sidewalks

To complete the sidewalk network along existing streets, special emphasis was given to completing sidewalk gaps and providing sidewalks on routes serving major pedestrian destinations (e.g., schools, commercial areas including State Street, University Parkway, parks, etc.). **Table 6.1 – Recommended Sidewalks within Orem City** Limits, shows the recommended sidewalk projects by length. A total of over 83,000 feet of new sidewalks or more than 15 miles is recommended for Orem.

Table 6.1 – Recommended Sidewalks within Orem City Limits

Street	From	To	Miles	Feet
N State Street	Existing sidewalk	1870 N	0.10	540
N State Street	Columbia Paints	570 N	0.02	80
Geneva Road	Northern City Limit	Southern City Limit	3.79	20000
1200 W	Existing sidewalk	1520 N	0.03	180
1200 W	1480 N	Existing Sidewalk	0.04	190
1200 W	1340 N	950 N	0.51	2680
1200 W	920 N	800 N	0.26	1350
1200 W	640 N	500 N	0.16	850
1200 W	Robin Hood Ln.	Existing Sidewalk	0.05	250
1200 W	Existing sidewalk	Center St	0.04	200
1200 W	Center St	Existing Sidewalk	0.10	540
1200 W	250 N	400 S	0.19	1000
800 W	450 S	480 S	0.02	125
800 W	420 S	420 S	0.02	80
800 W	570 s	580 S	0.04	200
800 W	600 S	700 S	0.11	600
800 W	Existing sidewalk	500 S	0.03	140
Sandhill Road	1292 Sandhill Road	1424 Sandhill Road	0.16	850
Sandhill Road	1642 Sandhill Road	1766 Sandhill Road	0.16	850
400 W	1728 400 W	1692 400 W	0.04	220
400 W	1668 400 W	1626 400 W	0.04	220
400 W	1870 400 W	1830 400 W	0.05	280
400 W	1982 400 W	1890 N	0.09	480
400 W	754 N 400 W	Existing Sidewalk	0.02	80
Orem Blvd	570 N	Near Center St	0.68	3600
Orem Blvd	Near Center St	620 S	0.68	3600
Orem Blvd	720 S	Existing Sidewalk	0.03	160
Orem Blvd	Existing sidewalk	800 S	0.02	120
Orem Blvd	800 S	1200 S	0.47	2500
S Columbia Ln	1800 S	2000 S	0.18	950
1600 N	Geneva Rd	Existing Sidewalk	0.42	2200
1600 N	1316 1600 N	1238 1600 N	0.09	460
800 N	Geneva Rd	900 W	1.63	8600
800 N	Existing sidewalk	600 W	0.09	490
800 N Service Road	Existing sidewalk	Near 400 W	0.03	170

Street	From	To	Miles	Feet
400 N	Geneva Rd	I-15	0.34	1800
400 N	I-15	1200 W	0.04	230
400 N	1200 W	1030 W	0.18	940
400 N	Existing sidewalk	1080 W	0.03	140
400 N	1060 W	400 North Frontage Rd	0.20	1050
400 N	786 400 N	714 400 N	0.09	480
400 N	Orem Blvd	State Street	0.08	400
400 N	600 E	Existing Sidewalk	0.02	100
400 N	700 E	Existing Sidewalk	0.06	320
400 N	Existing sidewalk	950 E	0.03	180
400 N	Existing sidewalk	1100 E	0.03	180
400 N	Existing sidewalk	1200 E	0.02	110
Center Street	Geneva Rd	1200 W	0.42	2200
400 S	S Vineyard Rd	1200 W	0.55	2900
400 S	Geneva Rd	I-15	0.42	2200
800 S	Existing sidewalk	Geneva Rd	0.10	540
1250 S (University Pkwy)	1890 W	Geneva Rd	1.14	6000
1250 S (University Pkwy)	Geneva Rd	Sandhill Rd	0.63	3300
University Pkwy	Existing sidewalk	800 E	0.24	1280
1430 S / 400 W	Sandhill Rd	University Pkwy	0.40	2100
1430 S / 400 W	650 W	Existing Sidewalk	0.22	1160
1600 S	Existing sidewalk	State Street	0.06	330
2000 S	Existing sidewalk	150 W	0.04	225
2000 S	78 2000 S	34 2000 S	0.06	300
2000 S	18 2000 S	S Main St	0.02	80
2000 S	Existing sidewalk	220 E	0.02	80
2000 S	Existing sidewalk	250 E	0.02	80
2000 S	Existing sidewalk	Columbia Ln	0.05	270
		Total:	**15.87 mi**	**83810 ft**

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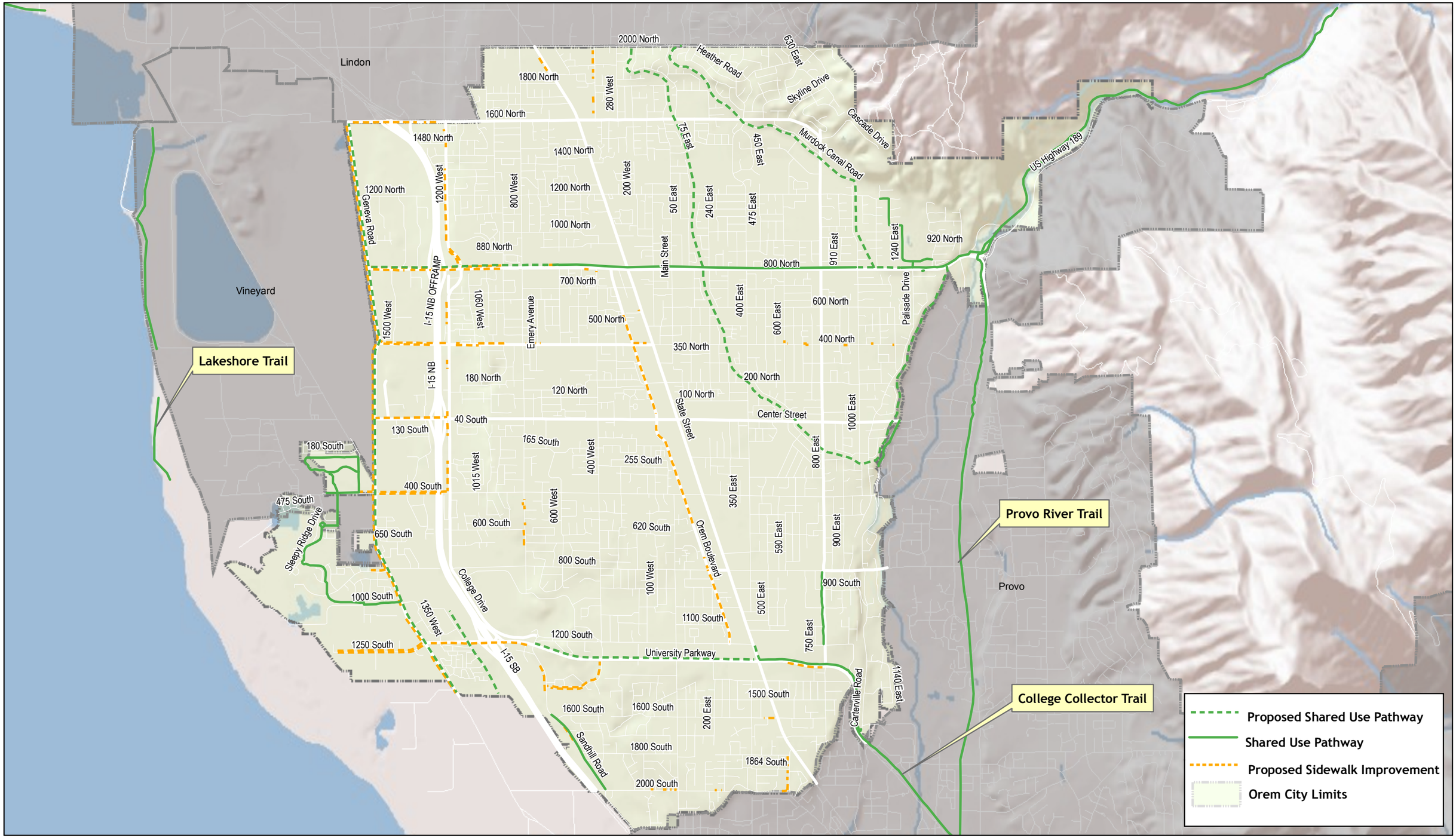

Figure 6.1 - Pedestrian Facility Recommendations

Orem, UT
Orem Bike and Pedestrian Plan
Source: Mountainland Metropolitan Council of Governments, City of Orem
Author:
Date: April 2010

MOUNTAINLAND Association of Governments
OREM
0 0.25 0.5 Miles
alta PLANNING + DESIGN

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7 Intersection Improvements

7.1 Intersection Selection Criteria

Intersections represent a major challenge in Orem's existing walking and bicycling environment. This Plan contains an overall strategy to improve intersections and other pedestrian crossings citywide through a variety of treatments (outlined in **Appendix F: Bicycle & Pedestrian System Typologies and Designs**). As the City or UDOT performs signal or pavement maintenance several strategies can improve walking and bicycling safety and usability. The following is recommended for consideration during any pavement or signal maintenance work.

Signals: Install pedestrian countdown signals with new signal projects (as required by 2009 MUTCD for most crossings). The City of Orem already has many examples of pedestrian countdown signals around the city.

Replace existing pedestrian signals with countdown signals at intersections with long crossing distances (over 50 feet)

Crosswalks: Refresh crosswalk markings on an annual basis, or as needed to keep the crossing visible to approaching motorists. Consider installing higher visibility crosswalk markings at crossings and intersections, near schools, near commercial centers, or at any location with higher levels of pedestrian activity.

Ramps: If sidewalk/curb work is necessary add ADA compliant pedestrian ramps.

Approaches: Install bike lane pockets where possible on all approaches to an intersection where a bike lane is present.

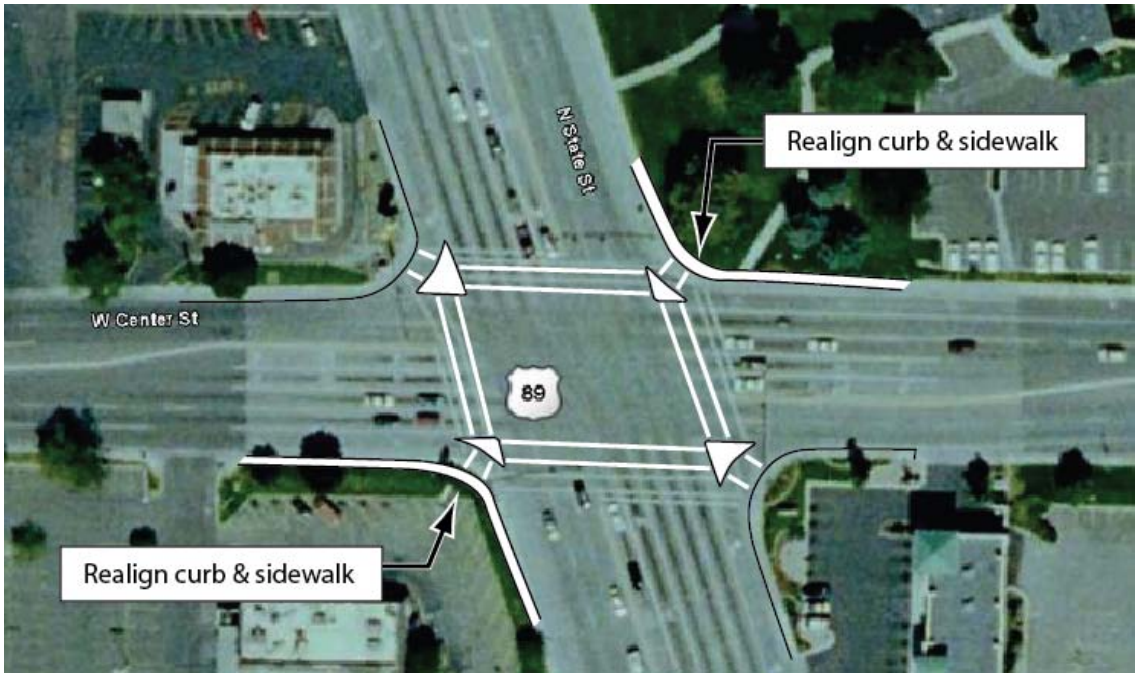
Refuges: If medians are present or to be added through reconstruction, consider integrating a pedestrian refuge island into the design to provide protection to stranded pedestrians.

In conjunction with the above recommendations for improving signalized intersections, there are locations within Orem that should be considered for improvements prior to scheduled maintenance or future work. In addition, there are some new signals that could be added in conjunction with bikeway projects that would have added safety benefits. Some of the below recommendations respond to public feedback including information collected in the first workshop and online via the user survey. **Table 7.1 – Recommended Intersection Improvements within Orem City Limits**, details these locations.

Table 7.1 – Recommended Intersection Improvements within Orem City Limits

Intersection	Problem	Recommendation
800 North & Palisades Drive	Popular intersection for accessing 800 N trail and subsequently the Provo River Greenway. Many complaints about this intersection during public involvement.	Add Piano key/ladder crosswalk markings to eastern leg of crossing. Add bike lane pockets to the approaches along Palisades Drive when bike lane is added. Upgrade pedestrian signals with countdown signals along 800 North. Verify pedestrian crossing times over 800 North are appropriate for 3.5 feet per second.
800 North & 1000 East	No signal currently present. Pedestrians have no crossing for nearly 1,300 feet to the west and nearly 2,000 feet to the east. Future bike route corridor	Add either full signal or Pedestrian Hybrid Beacon (HAWK style) should be installed (if full signal warrants are not met) with the development of the orchard property to the southwest or developed with the addition of the 1000 East Bike Route.

800 South & 800 East	Shared-use path improvements planned for western leg of intersection.	Add piano key style crosswalk markings to the west leg of the intersections when path is developed. Change out pedestrian signalheads for countdown timers.
1600 North & 1200 West	Southeast corner is confusing for pedestrians, cyclists and vehicles.	Provide pedestrian walkway connection from crosswalk to adjacent sidewalk heading east. Remove/restripe white shoulder line on southwest corner to keep right turning vehicles out of conflict with bicyclists.
1600 North & 400 West	Median in intersection provides pinch point for cyclists	Install R4-11 'Bikes May Use Full Lane' sign eastbound in advance of intersection.
University Pkwy & 800 East	Numerous Orem residents have expressed concern about this intersection in particular with some comments directed at right turning vehicles passing through the crosswalk turning from westbound University Parkway onto northbound 800 East.	**Short Term:** Install W11-15 warning sign on the westbound approach to the intersection along University Parkway. Consider Use of Leading Pedestrian Interval (LPI) to give pedestrians a walk signal prior to a vehicle green light. Replace pedestrian signal heads with countdown timers. **Long Term:** Consider installing 'Pork Chop' pedestrian refuge islands on the northern side of the intersection on each side. May require realignment of curb lines and slight relocation of College Connector Trail. This improvement will shorten pedestrian crossing distance and isolate the right turn movement from the overall crossing in both cases.
Center Street & State Street	Numerous Orem residents have expressed concern about this intersection. Long crossings with lots of vehicle conflicts.	**Short Term:** Consider Use of Leading Pedestrian Interval (LPI) to give pedestrians a walk signal prior to a vehicle green light. Replace pedestrian signal heads with countdown timers. **Long Term:** Install 'Pork Chop' pedestrian islands on all four corners, will require relocation of sidewalk and curb line on northeast and southwest corners.
University Parkway & State Street	Numerous Orem residents have expressed concern about this intersection. Long crossings with lots of vehicle conflicts.	Consider Use of Leading Pedestrian Interval (LPI) to give pedestrians a walk signal prior to a vehicle green light. Replace pedestrian signal heads with countdown timers.
800 North & State Street	Numerous Orem residents have expressed concern about this intersection. Long crossings with lots of vehicle conflicts.	**Short Term:** Consider Use of Leading Pedestrian Interval (LPI) to give pedestrians a walk signal prior to a vehicle green light. Replace pedestrian signal heads with countdown timers. **Long Term:** Install 'Pork Chop' pedestrian islands on all four corners, will require relocation of sidewalk and curb line on northeast and southwest corners.
800 North & 600 West	Future Bike Route, potential new crossing at northeast corner of Orem Junior High	Add either full signal or Pedestrian Hybrid Beacon (HAWK style) should be installed (if full signal warrants are not met).
Center Street & 600 East	This point is a crossing for the future Union Canal trail and also the 600 East Bike Route	A bicycle/pedestrian signal is recommended at the canal crossing. Could be regular half signal or Pedestrian Hybrid Beacon (HAWK style).
Center Street & Palisades Drive	This point is a crossing for a bike lane on Palisades Drive	A full signal is recommended at this location if traffic volumes support it when the bike lane is developed.



Concept for long term improvement to the State Street / Center Street Intersection

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8 Orem Complete Streets Policy

8.1 Introduction

A complete street is one that is designed and operated to safely accommodate all users, including: motorists, pedestrians, bicyclists, transit, and people of all ages and abilities. A complete street policy causes transportation agencies to design and operate the entire right of way to encompass users of all types and to promote safe access and travel for the users. A complete street policy is put in place to ensure that the streets are safe for bicyclists, children, persons with disabilities, motorists, movers of commercial goods, pedestrians, users of public transportation, and seniors.

Complete Streets are designed for all users (image: Complete Streets Coalition – www.completesteets.org)

A complete street is comprised of many different elements; these elements may include, but are not limited to: sidewalks, bike lanes, crosswalks, wide shoulders, medians, bus pullouts, special bus lanes, raised crosswalks, audible pedestrian signals, sidewalk bulb-outs, and more. The elements that are used can vary from project to project, but the end result is still to achieve a connected network that is safe and effective for all modes of travel.

1600 South and 400 South are Complete Streets

8.2 Elements of a Complete Streets Policy

All existing complete streets policies contain standard elements that together, create an effective and adoptable policy that benefits all roadway users. A complete street policy is put in place to create a standard for complete street implementation. Complete streets are designed and operated to create safe access and travel for 'all users', including pedestrians, bicyclists, transit vehicles and users, and motorists, of all ages and abilities. A complete street policy seeks to create a comprehensive, integrated, and connected network and promotes transportation agencies to use complete street designs in all appropriate road projects. A complete streets policy recognizes the need for flexibility: that all streets are different and user needs should be balanced. Any exceptions to complete street implementation must be clearly and specifically stated within the policy and require high-level approvals so that there is no confusion what type of design needs to be used is required. Standard design places the emphasis on level of service and traffic. A complete street policy should balance the needs of all the users within the design. The design must fit in with the context of the community while using the latest and best standards.

Standards within the policy must be put in place to ensure that an effective policy is created. The policy must create a network that is complete and connected while still allowing for flexibility within the design. All streets are unique and require different levels of attention, so the policy must be flexible enough to accommodate all types of roads and be adoptable by every agency. The policy must apply to both new and reconstruction projects at all levels including planning, design, maintenance, and operations.

Major street improvements are not a requirement through maintenance activities and should not be expected. Maintenance activities do present some opportunities that can improve the environment for other roadway users. While the construction of a sidewalk is not appropriate as part of maintenance activities, facilities such as improved crosswalks, or bike lanes, or a shoulder stripe may be included in a routine re-stripe of a roadway if adequate space exists and the facility is designated to have such facilities in Orem Bicycle and Pedestrian Plan.

Orem residents were given background on Complete Streets and asked if they thought the City Council should adopt a Complete Streets Policy. Figure 8.1 shows that there was a strong positive reaction to Complete Streets.

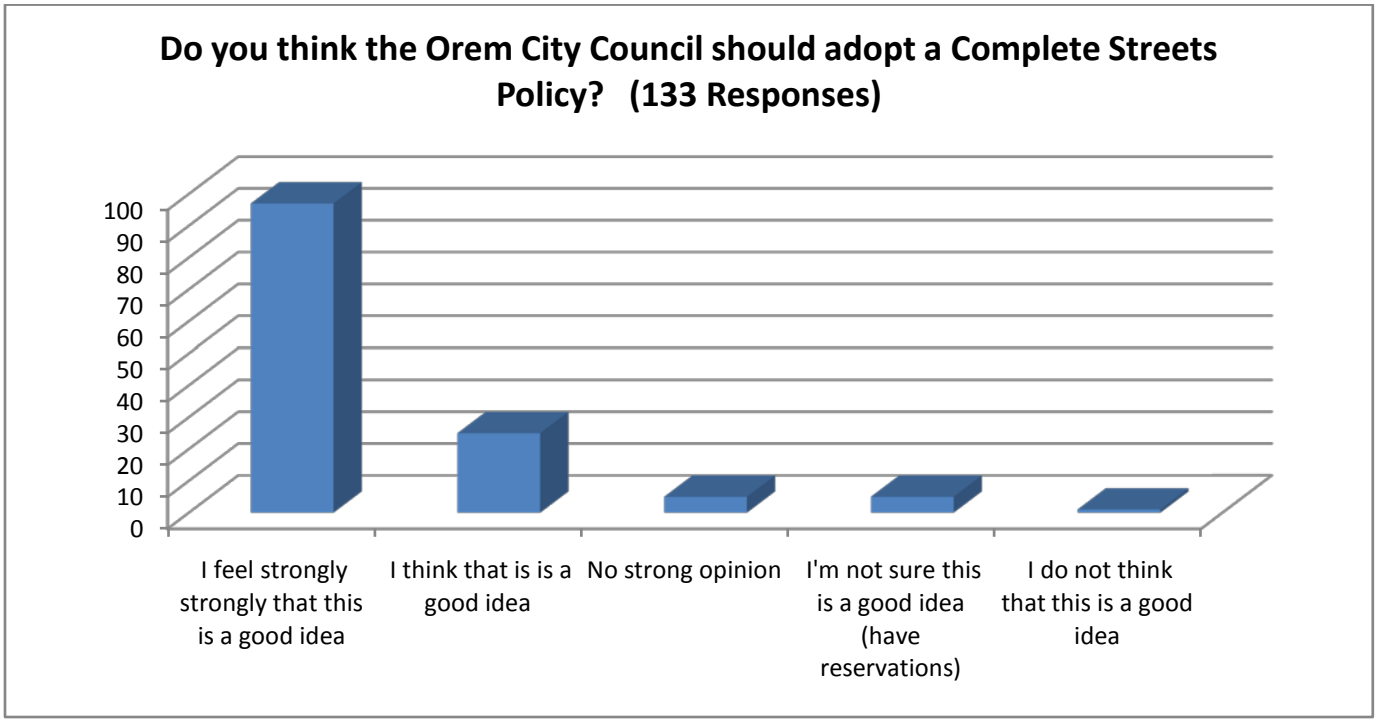

Figure 8.1 – Results of Online and in-Person Poll at the Final Open House

8.3 A Policy for Orem

As part of the Orem Bicycle and Pedestrian Plan, the Orem City Council has adopted the following Complete Streets policy:

The City of Orem will plan for, design and construct appropriate accommodation for bicyclists, children, persons with disabilities, motorists, movers of commercial goods, pedestrians, users of public transportation, and seniors in all new construction, maintenance activities, and retrofit or relocation projects subject to the exceptions contained herein.

The City of Orem will incorporate Complete Streets principles into: the City of Orem General Plan, City of Orem Municipal Code and other plans manuals, rules, regulations and programs as appropriate.

Complete Streets may be achieved through single projects, privately funded development, or incrementally through a series of smaller improvements or maintenance activities over time. All sources of transportation funding should be drawn upon to implement Complete Streets within the City Limits. The City of Orem believes that maximum financial flexibility is important to implement Complete Streets principles.

Complete Streets principals will be applied in street construction, reconstruction and maintenance projects except in unusual or extraordinary circumstances contained herein:

1. Bicyclists and pedestrians are prohibited by law from using the facility. In this case, alternative facilities and accommodations shall be provided within the same transportation corridor as determined by the City Engineer.
2. The cost of establishing bikeways or walkways or other accommodations would be disproportionate to the need. Costs shall be considered disproportionate if the cost of including bicycle or pedestrian facilities exceeds twenty percent of the cost of the entire project.
3. Where absence of need exists, including absence of future need.
4. Where the City Engineer issues a documented exception concluding that the application of Complete Streets principles is unnecessary or inappropriate because it would be contrary to public safety.
5. Where the existing right of way does not allow for the accommodation of all users. In this case alternatives shall be explored such as the use of revised travel lane configurations, paved shoulders, signage, traffic calming, education or enforcement to accommodate pedestrians, cyclists, transit, and persons with disabilities.

Any project that does not include Complete Streets principles shall have said determination confirmed and filed with supporting documentation with the City Council for review.

8.4 Implementation

Effective implementation requires additional steps to ensure success. The City of Orem will need to review their procedures and, if necessary, restructure them, to accommodate all users on every project. In addition, applicable changes to design manuals or public works standards will need to be made to fully encompass the safety and needs of all users by employing the latest in design standards and innovation. Periodic education and training of planners and engineers is also recommended to ensure the latest techniques in balancing the needs of roadway users are being applied. Finally, existing data sources and projects can be tapped to track how well the streets are serving all users.

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9 Education Outreach Strategy

9.1 Introduction

Bicycle and pedestrian programs enhance the biking and walking experience and can be a cost-effective complement to infrastructure investments. Support programs include educational programs, the provision of bicycle parking, and various city programs and policies. This chapter recommends bicycle and pedestrian programs to be implemented in Orem. The goal of these programs is to:

- Support and enhance the infrastructure recommendations in this Plan;
- Increase the number of people walking and riding bicycles in Orem; and
- Create a safer and more comfortable environment for walking and bicycling.

Recommended programs are organized into the following categories:

- Education
- Outreach
- Enforcement
- Evaluation and Policy
- Safe Routes to School
- Bicycle Parking
- Bicycle /Pedestrian Access to Transit

Recommended programs have been classified by priority to guide the City of Orem with implementation by the following categories:

1. Short term is defined by action or implementation in the years 2011-2013
2. Medium term is defined by action or implementation in the years 2013-2016
3. Long term is defined by action or implementation after the year 2016. Long term programs are intended to be complimentary to other programs to be implemented in the short and medium term.

9.2 Education

9.2.1 Safety Campaign

Purpose:	Raise the visibility of pedestrians and cyclists and encourage motorists to drive safely around them
Target Audience:	Motorists
Primary Agency:	City of Orem Public Works
Partners:	Mountainland Association of Governments, Utah Bicycle Coalition, Pedestrian and Bicycle Advisory Committee (if one is formed)
Priority:	Short to medium term
Sample Programs:	http://www.BikeSafeSonoma.com/

Motorists often do not know how to drive around pedestrians and cyclists. Some motorists may even feel hostile towards non-motorized road users. A safety campaign aims to raise the visibility of Orem residents who walk and bicycle. Three main messages are recommended:

- Pass with Care – Promote statewide 3-foot passing law and promote careful passing at all times
- Every Corner is a Crosswalk – Remind motorists to yield to pedestrians at all marked and unmarked crosswalks
- You've Got a Friend Who Bikes – Encourage empathy from motorists towards bicyclists by reminding them that each cyclist could be their neighbor, friend, colleague, or relative

The Utah Bicycle Coalition has previously been able to secure donated ad space for cycling-related public service announcements, and they may be able to partner on this campaign to broker a similar donation.

Regulation sign on a Utah road

9.2.2 Drivers Education Course

Purpose:	Educate young drivers about safe driving around cyclists
Target Audience:	Drivers' Education students
Primary Agency:	City of Orem Department of Public Safety
Partners:	Mountainland Association of Government, Orem Bicycle Retailers, Pedestrian and Bicycle Advisory Committee (if one is formed)
Priority:	Short to medium term

Ensuring that beginning drivers know their rights and responsibilities related to cycling is an important and effective way to increase road safety for cyclists. There is currently a degree of outreach where an Orem resident regularly visits drivers' education classes to discuss rules of the road related to bicycling and his experience as an everyday cyclist, and to show a bicycle/vehicle safety video created by the Utah Department of Health, Transportation, and Safety. We recommend that this outreach continue as a high priority. In order to reach more students, it is suggested that additional volunteers be trained to make these presentations.

9.2.3 Youth Bicycle Safety Education

Purpose:	Educate school-aged children on safe bicycling skills and rules of the road; encourage bicycling among children
Target Audience:	Youth
Primary Agency:	City of Orem Parks and Recreation, School District
Partners:	City of Orem Public Works, Orem Bicycle Retailers, Health Department
Priority:	Short to medium term
Sample Programs:	League of American Bicyclists: http://www.bikeleague.org/programs/education/courses.php#kids1 Bicycle Transportation Alliance – Portland, OR: http://www.bta4bikes.org/resources/educational.php

Most children learn to ride a bicycle, but few are taught the bicycle handling skills and rules of the road needed to bicycle regularly for practical purposes. A comprehensive school-based bicycle education program is recommended to educate students about the rules of the road, proper use of bicycle equipment, biking skills, street crossing skills, and the benefits of biking. Education programs can be part of a Safe Routes to School program. These types of education programs are usually sponsored by a joint City/school district committee that includes appointed parents, teachers, student representatives, administrators, police, active bicyclists and public works department staff. Any program should have a significant on-bike component.

9.2.4 Adult Bicycling Skills Courses

Purpose:	Educate older children and adults on safe bicycling skills; encourage bicycling
Target Audience:	General public
Primary Agency:	City of Orem Parks & Recreation
Partners:	Orem Bicycle Retailers, League of American Bicyclists Certified Instructor
Priority:	Short term
Sample Programs:	http://bikeleague.org/programs/education/courses.php

Most cyclists do not receive any training on safe cycling practices, the rules of the road and bicycle handling skills. Cycling skills courses can address this education gap. The most common program is the League of American Bicyclists courses (including Road I, Road II, and Commuting), taught by League Certified Instructors. At the time of writing, there is one League-Certified Instructor in Orem, and city residents will benefit from his expertise in this area. Courses cover bicycle safety checks, fixing a flat, on-bike skills, crash avoidance techniques, and traffic negotiation. In the past, the commuter challenge (hosted by the Utah Transit Authority) has included the opportunity to earn points by taking a LAB-certified course. Though this is not happening this year, it is recommended that it resume in the future. It is also recommended that the City take the lead in expanding LCI course offerings, perhaps through Parks and Recreation courses or through adult continuing education courses.

9.2.5 Diversion Course

Purpose:	Educate motorists, bicyclists, and pedestrians on roadway safety and traffic laws
Target Audience:	General public, usually first-time offenders of particular traffic violations
Primary Agency:	City of Orem Department of Public Safety
Partners:	City of Orem Public Works, Mountainland Association of Governments, community advocates, Pedestrian and Bicycle Advisory Committee (if one is formed)
Priority:	Medium term
Sample Programs:	Portland, OR: http://www.legacyhealth.org/body.cfm?id=1928 Marin County, CA: http://www.marinbike.org/Campaigns/ShareTheRoad/Index.shtml#StreetSkills

A diversion class is offered to first-time offenders of traffic offences that endanger bicyclists and pedestrians, and/or violations perpetrated by bicyclists and pedestrians (such as speeding, or running a stoplight on a bike). It can be aimed just at motorists or at bicyclists, motorists and pedestrians. In lieu of a citation and/or fine, individuals can take a one-time, free or inexpensive class instead. In Marin County, interested citizens can take the class even if they did not receive a ticket. This program is a good way to educate road users about bicycle rights and responsibilities, and can

also increase public acceptance of enforcement actions against bicyclists. It is recommended that the class be developed and taught by a coalition of law enforcement, City/Mountainland Association of Governments staff, and community advocates.

9.3 Outreach

9.3.1 Bicycling/Walking Website

Purpose:	Make it easier for residents to find information about walking and bicycling
Target Audience:	General public
Primary Agency:	Mountainland Association of Governments
Partners:	City of Orem Public Works, Pedestrian and Bicycle Advisory Committee (if one is formed)
Priority:	Short term
Sample Programs:	http://www.velo.qc.ca/english/index.php

Residents and visitors will benefit from a "one-stop-shopping" location for walking, bicycling, and trail information. The website should be hosted on the Mountainland Association of Governments page and include:

- A list of all local bicycling and walking groups and resources
- Information about current projects and how to get involved (e.g. public meetings, comment periods)
- Maps and brochures (links to online maps and brochures, where to find in person, and how to request mailed materials)
- Links to laws and statutes relating to bicycling
- Information about cycling events (rides, classes, volunteer opportunities)
- A list of local bike shops, including phone number and address

9.3.2 User Map

Purpose:	Encourage walking and biking by providing route and facility information and highlighting walking and bicycling destinations
Target Audience:	General public
Primary Agency:	Mountainland Association of Governments
Partners:	City of Orem Public Works, Pedestrian and Bicycle Advisory Committee (if one is formed)
Priority:	Short term (MAG) medium to long term (Orem)
Sample Programs:	NYC online map: http://www.nycbikemaps.com/maps/manhattan-bike-map/ City of Portland maps: http://www.portlandonline.com/transportation/index.cfm?a=haccb&c=deiaj

One of the most effective ways of encouraging people to bike and walk is through the use of maps and guides to show that the infrastructure exists, to demonstrate how easy it is to access different parts of the city by bike or on foot, and to highlight unique areas, shopping districts or recreational areas. Biking and walking maps can be used to promote tourism to an area, to encourage residents to walk, or to promote local business districts. Maps can be citywide, district-specific, or neighborhood/family-friendly maps. Maps can be paper or interactive online maps.

The Mountainland Association of Governments is currently publishing a revised regional bicycling map. It is recommended that the City create a map that complements the regional map, including walking facilities and routes, transit routes and stops, bicycle and trail facilities, bike parking, bike friendly businesses, etc.

9.3.3 Family Bicycling Day

Purpose:	Encourage and educate parents about how to bicycle with children; educating children about how to bicycle
Target Audience:	Parents and families
Primary Agency:	Orem Bicycle Retailers
Partners:	City of Orem Parks and Recreation
Priority:	Short to medium-term
Sample Programs:	http://www.sfbike.org/?family_day

Family bicycling programs help parents figure out how to safely transport children by bicycle and help children learn bicycling skills. The format can vary. Some events are panel discussions; others are an open-house style event (e.g. at a park), while others may be a class.

Activities may include:

- Training for kids on how to ride a bicycle without training wheels
- Bicycle skills/safety course for children (e.g. rodeo)
- Information about options to transport children (e.g. trailers, cargo bicycles, kid seats, family tandems) and the opportunity to test ride these devices
- Group ride or parade (possibly with bicycle decorating station)
- Bicycle safety check
- Basic bike maintenance course
- Distribution of bicycling maps & brochures

Sample program: The San Francisco Bicycle Coalition's annual Family Day event, held in Golden Gate Park, includes a bike rodeo, a "freedom from training wheels" training, family bike games and safety clinic, a family biking showcase with vendors and equipment, bike scavenger hunt, a basic bike maintenance workshop, and a family bike parade.

9.3.4 Orem Bike Month

Purpose:	Encourage bicycling to work through fun, social activities and incentives
Target Audience:	General public, with a particular emphasis on commuters
Primary Agency:	City of Orem
Partners:	Orem Bicycle Retailers, Mountainland Association of Governments, UTA, Pedestrian and Bicycle Advisory Committee (if one is formed)
Priority:	Short term
Sample Programs:	http://www.bikeleague.org/programs/bikemonth/

Bicycling to work is a great way to get exercise, save money, reduce pollution, and have fun. Cities and towns across the country participate in Bike to Work Week, Month or Day. The League of American Bicyclists (LAB) can host a

website for commuters and event organizers. The website contains information on nationwide and local events, an organizing handbook, and tips for commuters. Common elements include:

- Commute 101 workshops in advance of Bike-to-Work Day
- Guided commutes or group rides to increase comfort and familiarity with bicycling routes
- "Energizer Stations" to reward commuters with treats and incentives
- Workplace/team bicycling challenges for most miles, highest percentage of days, etc
- Celebrity events (e.g. mayor bikes to work with news team, bike/bus/car race)
- Post-work celebration
- Bike-to-school events

Orem is already on track to expand their Bike Month offerings in 2010, including a ride with the mayor, a pancake breakfast, and a City Council resolution. These are strong advances and should be continued and augmented in the future.

9.3.5 Summer Streets

Purpose:	Encourage walking and biking by providing a car-free street event
Target Audience:	General public, generally within a particular neighborhood, but can be promoted city wide
Primary Agency:	City of Orem Parks and Recreation
Partners:	Mountainland Association of Governments, Pedestrian and Bicycle Advisory Committee (if one is formed)
Priority:	Medium to long term
Sample Programs:	New York City Summer Streets: http://www.nyc.gov/html/dot/summerstreets/html/home/home.shtml http://www.streetsblog.org/2008/08/11/streetfilms-summer-streets-2008/ (video) Portland Sunday Parkways: http://www.portlandonline.com/Transportation/index.cfm?c=46103 http://www.streetfilms.org/portlands-sunday-parkways/ (video)

These programs have many names: Sunday Parkways, Ciclovias, Summer Streets, Sunday Streets. Sunday Parkways are periodic street closures that create a temporary park that is open to the public for walking, bicycling, dancing, hula hooping, roller skating, etc. They have been very successful internationally and are rapidly becoming popular in the United States. They promote health by creating a safe and attractive space for physical activity and social contact, and are cost-effective compared to the cost of building new parks for the same purpose. These events can be weekly events or one-time events, and are generally very popular and well-attended. It is recommended that a demonstration Summer Streets event be organized in conjunction with Summerfest. If that is successful, an expanded Saturday Streets or Parkways event should be created (e.g. monthly during the summer).

9.3.6 Women on Bikes Program

Purpose:	Provide support to and encourage female bicyclists of all levels
Target Audience:	Women who ride bicycles or who want to ride bicycles
Primary Agency:	City of Orem
Partners:	Bicycle Retailers, community volunteers, Pedestrian and Bicycle Advisory Committee (if one is formed)
Priority:	Short term
Sample Programs:	Portland Women on Bikes Program: http://www.portlandonline.com/transportation/index.cfm?c=44100 Beauty and the Bike (Darlington, England): http://www.bikebeauty.org/2010/Bikebeauty_2010_English/The_Project.html

Women are often less comfortable with bicycling (particularly in traffic) than men, and may be intimidated at bicycle shops, which are often aimed at sporty, knowledgeable riders and staffed by young, athletic male employees. Women-only clinics, workshops, and rides, designed to be welcoming and supportive for participants at any stage of comfort, can lower the barrier to entry for women who want to give bicycling a try. Topics may include maintenance basics, bike cleaning, riding in the rain and dark, shopping by bike, or commute tips. Rides are themed (e.g. historic houses, heritage trees, ice cream shops, rain gardens), and are low-mileage; no one is left behind.

One Orem bicycle retailer already host occasional women's nights and weekly women's rides. A local cycling team also hosts "Ride Like a Girl" mountain bike rides during the summer. It is recommended that a partner effort be created that speaks to inexperienced cyclists and encourages casual and transportation bicycling.

9.3.7 Bike Boulevard Launch Party

Purpose:	Inform residents about new bicycle boulevards to encourage use
Target Audience:	Residents living near a newly-completed bicycle boulevard
Primary Agency:	City of Orem Public Works
Partners:	Pedestrian and Bicycle Advisory Committee (if one is formed)
Priority:	Medium to long term
Sample Programs:	City of Vancouver (BC)

When a new bicycle facility is built, some residents will become aware of it and use it, but others may not realize that they have improved bicycling options available to them. A launch party is a good way to inform residents about a new bikeway, and can also be an opportunity to share other bicycling information (such as maps and brochures) and answer resident questions about bicycling. It should be a media-friendly event, with elected official appearances, ribbon cuttings, and a press release that includes information about the new bikeway, other bicycle facilities, and any timely information about bicycling (such as Bicycle Friendly Community designation, any increase in bicycle mode share or user counts, etc.).

Sample Program: When a new bikeway is built, the City of Vancouver throws a neighborhood party to celebrate. Cake, t-shirts, media and festivities are provided and all neighbors are invited as well as city workers (engineers, construction staff and planners) who worked on it.

9.3.8 Senior Mobility Program

Purpose:	Increase walking and bicycling for seniors
Target Audience:	Seniors
Primary Agency:	City of Orem Parks and Recreation
Partners:	Pedestrian and Bicycle Advisory Committee (if one is formed)
Priority:	Medium term
Sample Programs:	http://www.portlandonline.com/transportation/index.cfm?c=41541

Seniors often experience limitations in mobility as they age. Senior programs designed to increase walking and bicycling can help seniors maintain independence and mobility, improve health, and provide an opportunity for social interaction. A senior walking and bicycling program may include any of the following components:

- Group walks (aka "Senior Strolls")
- Group bicycle rides
- Tricycles or upright bicycles at seniors centers for checkout
- Trail maps at senior centers
- Senior participation in Safe Routes to Schools (e.g. crossing guard or Walking School Bus volunteer)

The Orem Parks and Recreation department should seek funding to implement a pilot Senior Walking and Bicycling Program. The program may be continued if public support is high and community resources can be found to support its ongoing management. It should be hosted at the Senior Citizen Center, with activities taking place in the adjacent park.

9.3.9 Bike Friendly Business Promotion

Purpose:	Promote, support and reward businesses that encourage bicycling
Target Audience:	Businesses
Primary Agency:	City of Orem
Partners:	Orem Bicycle Retiailers
Priority:	Medium term
Sample Programs:	http://www.bikeleague.org/programs/bicyclefriendlyamerica/bicyclefriendlybusiness/

A bike-friendly business program trains, supports, and recognizes business that encourage bicycling from their employees and visitors. A program may include a bike-friendly business audit program; an annual bike-friendly business certification program; public recognition of bike-friendly businesses; staff time and/or financial support for building facilities and creating incentives; incentive programs that offer cash, treats, credit at a bike shop, or in-kind items to bicyclists; assistance with bike parking; discounts for customers who arrive by bicycle. This program can be created locally, or the existing national Bicycle Friendly Business certification program, run by the League of American Bicyclists (LAB), can be promoted locally.

Mad Dog Cycles is currently the only LAB-certified Bicycle Friendly Business in Orem. They are considering a challenge/training outreach program for other businesses. The City should support the expansion of Bicycle-Friendly Businesses by encouraging businesses to apply for LAB certification.

9.3.10 University Bicycle Program

Purpose:	Encourage bicycling to Utah Valley University
Target Audience:	University Students
Primary Agency:	UVU Parking Services
Partners:	City of Orem Public Works
Priority:	Short to medium term
Sample Programs:	http://transportation.stanford.edu/alt_transportation/BikingAtStanford.shtml

Recognizing the unique transportation challenges and opportunities related to colleges and universities, university bicycling programs employ a variety of strategies to encourage sustainable transportation. Bicycling and walking can be promoted in many ways, including loaner bike programs, secure bike parking, skills training classes, bicycling clubs and racing teams, organized walks and rides, walking/biking/transit map creation and distribution, etc. While UVU already has a triathlon club, a racing club, and an outdoor adventure center, none of them specifically promotes bicycling to campus. The UVU Parking Services department should organize a program to promote cycling to campus.

9.4 Enforcement

9.4.1 Crosswalk Enforcement Action

Purpose:	Identify and educate motorists who do not yield to pedestrians in crosswalks
Target Audience:	Motorists
Primary Agency:	City of Orem Department of Public Safety
Partners:	City of Orem Public Works
Priority:	Short to medium term
Sample Programs:	http://www.streetfilms.org/portland-or-crosswalk-enforcement-actions/

Orem's livability and safety is degraded when motorists routinely fail to stop for pedestrians in crosswalks. It is recommended that the Orem Department of Public Safety coordinate with the City Public Works Department to conduct a crosswalk enforcement action (sometimes called a "pedestrian sting"). A "decoy" (usually a plain-clothes police officer or a local politician) steps into a crosswalk to exercise his legal right-of-way. Motorists who do not yield are given a citation by a second officer stationed nearby (often a motorcycle officer issues whose car is hidden between nearby parked vehicles). The Department of Public Safety or the City may include media outreach to increase public awareness of the issue of crosswalk safety, and journalists may observe the enforcement action.

9.4.2 Back to School Enforcement Blitz

Purpose:	Increase traffic safety around schools
Target Audience:	Motorists
Primary: Agency:	City of Orem Department of Public Safety
Partners:	City of Orem Public Works, School District
Priority:	Short term
Sample Programs	http://www.corvallis.or.us/index.php?option=com_content&task=view&id=2303&Itemid=1592

A "back to school blitz" is a targeted traffic enforcement campaign centered around schools. School zone speed limits should be enforced, along with failure to yield to pedestrians in crosswalks. Media outreach should precede the blitz.

9.4.3 Share the Path Campaign

Purpose:	Encourage responsible, respectful behavior by path users
Target Audience:	Users of shared-use paths
Primary Agency:	City of Orem Parks and Recreation
Partners:	Pedestrian and Bicycle Advisory Committee (if one is formed)
Priority:	Medium term
Sample Programs:	Share the Trail (Marin, CA): http://www.sharethetrail.org/about/ Share the Path (Portland, OR): http://www.bta4bikes.org/btablog/2007/07/24/path-users-share-300-bike-bells-and-50-scoops-of-ice-cream-on-saturday/

Conflicts between path users can be a major issue on popular, well-used path systems. Some communities have launched successful "share the path" events to help educate users about safety and courtesy. Share the Path campaigns can be run by agencies, nonprofits, or any user group (equestrian, hikers, etc.). These programs educate users about expected behavior and how to limit conflicts. Volunteers often give out brochures and engage with users in a non-confrontational way. Media outreach should be included as well. Common strategies include a bicycle bell giveaway, handing out maps and information, posting signs, tabling, and 'stings' that reward good behavior. In Orem, the campaign should include all path user types, including bicyclists and pedestrians as well as skateboarders and dog walkers.

Provo River Trail at Bridal View Falls

Regulation sign on the Provo River Parkway

9.4.4 Radar Speed Sign Deployment Program

Purpose:	Reduce speeding
Target Audience:	Motorists
Primary Agency:	City of Orem Department of Public Safety
Partners:	City of Orem Public Works, Pedestrian and Bicycle Advisory Committee (if one is formed)
Priority:	Short term

Speeding vehicles endanger cyclists and discourage cycling. A radar speed sign request program will deploy fixed and mobile radar speed signs at the request of neighborhood associations and schools. The signs should be mounted temporarily (e.g. for two weeks) and then be moved to another location to keep motorists from becoming inured to the speed sign effect. The program should prioritize school locations. The City of Orem currently owns several mobile speed reader boards.

9.4.5 Police Department Bicycle Training and Outreach

Purpose:	Educate law enforcement officers on bicycle laws and safety
Target Audience:	Police officers
Primary Agency:	City of Orem Department of Public Safety
Partners:	City of Orem Public Works
Priority:	Short to medium term
Sample Programs:	http://www.webike.org/enforcement.html

Most law enforcement professionals do not receive training specific to bicycle laws, handling, or safety. Police education courses can help officers improve public safety and enforce existing laws more effectively by providing them with the training they need. These courses should include comprehensive information about laws and statutes pertaining to bicycling; information about common crash types and causes, and how to prevent and enforce against the most serious offences; knowing options for enforcement and education (e.g. when a citation vs. warning should be issued, diversion class options, and safety materials that can be handed out during a traffic stop or public event).

Sample program: The Wisconsin Pedestrian and Bicycle Law Enforcement Training Course covers bicycle and pedestrian laws; how bicycle and pedestrian crashes happen; enforcement strategies; education and outreach approaches; crash investigation and reporting; and template materials. The course is open to all law enforcement entities for a fee, which covers instruction and materials.

9.5 Evaluation and Policy

9.5.1 Annual Counts Program

Purpose:	Gather important benchmarking information about cycling rates
Target Audience:	For use by agency staff
Primary Agency:	Mountainland Association of Governments
Partners:	City of Orem Public Works
Priority:	Short term
Sample Programs:	http://bikepeddocumentation.org/

In order to determine this plan's success at meeting pedestrian and bicycle goals, it is necessary to establish an annual data collection program. At a minimum, this program should tally the number of cyclists at key locations around the region (particularly at pinch points); the same locations should be counted in the same manner annually. The Mountainland Association of Governments is already in the process of establishing automated counting systems; some of these should be placed within the City of Orem at strategic locations to gauge ridership. It is recommended that the data collection program use methodology developed by the National Bicycle and Pedestrian Documentation Project (NBPDP).

9.5.2 Annual Walking and Bicycling Report Card

Purpose:	Share information about key bicycling metrics
Target Audience:	General public; elected officials and decision makers
Primary Agency:	Mountainland Association of Governments
Partners:	City of Orem Public Works
Priority:	Short to medium term
Sample Programs:	City of New York – NYC: http://www.nyc.gov/html/dcp/pdf/transportation/bike_survey.pdf City of San Francisco - San Francisco, CA: http://www.sfbike.org/download/reportcard_2006/SF_bike_report_card_2006.pdf

This plan has developed goals, objectives, and performance measures related to walking and bicycling. It can be a useful benchmarking activity to publish an annual report measuring accomplishments and performance against benchmarks. An annual report should include relevant walking and cycling metrics (number of pedestrians/riders, new facility miles, major completed projects, crashes) and may also include information on user satisfaction, public perception of safety, or other qualitative data that has been collected related to walking and bicycling. A report of all education and outreach programs implemented in the previous year should also be included.

9.5.3 Complete Streets Policy

Purpose:	Ensure that city roadways are accessible and safe for all users
Target Audience:	City Planners and Engineers
Primary Agency:	City of Orem Public Works
Partners:	Mountainland Association of Governments
Priority:	Short term
Sample Programs:	http://www.completestreets.org/

Complete Streets policies direct transportation planners and engineers to consistently design with all users in mind (drivers, transit riders, pedestrians, and bicyclists, as well as for older people, children, and people with disabilities). Many jurisdictions around the country have adopted Complete Streets policies, and national model policies can be used as a starting point. A Complete Streets policy is one strong way to institutionalize the goals of this Plan within the city. See Chapter 8 for a recommended Complete Streets Policy for Orem.

9.5.4 Start Pedestrian and Bicycle Advisory Committee

Purpose:	Expand resident involvement in walking and bicycling activities
Target Audience:	Interested citizen volunteers
Primary Agency:	City of Orem
Partners:	n/a
Priority:	Short term

Many cities have a Pedestrian and/or Bicycle Advisory Committee made of citizen volunteers, appointed by City Council, to advise the city on pedestrian and bicycling issues. It is recommended that the City create a Pedestrian and Bicycle Advisory Committee. The committee should be coordinated with the existing Transportation Committee, either as a formal subcommittee or through coordination by a staff liaison. A city staffer from Public Works should be assigned as the liaison to the PBAC.

9.5.5 Create Bicycle/Pedestrian Coordinator Position

Purpose:	Expand City capacity for walking and bicycling efforts
Target Audience:	n/a
Primary Agency:	City of Orem Public Works
Partners:	n/a
Priority:	Medium to long term

To take full advantage of bicycle planning efforts, and to assist with implementation of the many projects and programs recommended in this plan, the City should create a Bicycle/Pedestrian Coordinator position. The job duties for this staff person may include monitoring the design and construction of sidewalks, on-street bikeways and shared use paths, including those constructed in conjunction with private development projects; ensuring pedestrian and bicycle facilities identified in specific plans and as mitigation measures are designed appropriately and constructed expediently; coordinating the implementation of the recommended projects and programs listed in this plan; and identifying new projects. This person should also take the lead on many of the city-designated efforts listed in this

chapter, such as, writing grant requests, staffing a Pedestrian and Bicycle Advisory Committee, writing an annual report card, applying for LAB recognition, etc.

9.5.6 Achieve League "Platinum" Status

Purpose:	Receive highest honor as bicycle-friendly city
Target Audience:	General Public
Primary Agency:	City of Orem Public Works
Partners:	Pedestrian and Bicycle Advisory Committee (if one is formed), Mountainland Association of Governments
Priority:	Long term
Sample Programs:	http://www.bikeleague.org/programs/bicyclefriendlyamerica/communities/

The League of American Bicyclists sponsors an awards program that recognizes cities and counties that actively support bicycling. According to the League, a Bicycle Friendly Community is one that "provides safe accommodation for cycling and encourages its residents to bike for transportation and recreation." The league recognizes four tiers of bicycle friendly communities: bronze, silver, gold and platinum. The City of Orem should regularly apply for Bicycle-Friendly Community designation after the high-priority projects in this plan are implemented.

9.5.7 Safe Routes to School

Purpose:	Encourage and educate students and their parents about walking and biking to school; improve safety through physical improvements and programs
Target Audience:	School-aged children and their parents; School administrators, faculty, and staff
Primary Agency:	School District, School and City staff
Partners:	Parents, neighbors, advocates, law enforcement, Pedestrian and Bicycle Advisory Committee (if one is formed)
Priority:	Short term
Sample Programs:	Marin County National Model Program: http://www.saferoutestoschools.org/index.shtml

Safe Routes to School refers to an international approach aimed at increasing the number and safety of children walking and bicycling to school. Safe Routes to Schools (SR2S) programs are often called "Five Es" programs, because they include Engineering, Education, Encouragement, Enforcement, and Evaluation strategies. The Utah Department of Transportation administers a federally-funded Safe Routes to School grant program, and Orem schools have benefited from numerous infrastructure ("Engineering") projects funded by the statewide program.

Safe Routes to Schools programs directly benefit schoolchildren, parents and teachers by creating a safer travel environment near schools and by reducing motor vehicle congestion at school drop-off and pick-up zones. Students that choose to bike or walk to school are rewarded with the health benefits of a more active lifestyle, with the responsibility and independence that comes from being in charge of the way they travel, and learn at an early age that biking and walking can be safe, enjoyable and good for the environment. Safe Routes to Schools programs offer ancillary benefits to neighborhoods by helping to slow traffic and by providing infrastructure improvements that facilitate biking and walking for everyone. Identifying and improving routes for children to safely walk and bicycle to

school is also one of the most cost-effective means of reducing weekday morning traffic congestion and can help reduce auto-related pollution.

The two most important actions that can be taken in Orem to further Safe Routes to School efforts are to **convene a Safe Routes to School Task Force** and have them lead an effort to create a citywide SR2S Plan. The Task Force should include representatives from the school district, school administrators, teachers, and families; City staff from Public Works (and possibly Parks and Recreation if a significant role is anticipated from them); law enforcement; Mountainland Association of Governments staff; and neighbors and local volunteers/advocates. If a Pedestrian and Bicycle Advisory Committee is convened, their participation should be solicited as well.

The **Citywide Safe Routes to School Plan** should be created based on walking audits for each elementary school, resulting in maps of needed Engineering improvements. It is also strongly recommended that the national standard evaluation activities (parent survey and student travel mode tally) be implemented, along with plans to repeat the evaluation activities annually. Maps of recommended walking and bicycling routes to school should be created and distributed to parents. Finally, Education and Encouragement strategies should be created and prioritized.

Several of the program recommendations already listed in this chapter will directly help achieve SR2S goals, including:

- Youth Bicycle Safety Education Program
- Family Bicycle Day
- Back to School Enforcement Blitz
- Community Speed Reader Board Deployment Program

Other recommended SR2S programs that can be implemented as stand-alone programs or as part of a larger SR2S Plan include:

Start a Freiker (FREquent bIKER) Program – This program uses a solar-powered, wifi enabled RFID tracking device to track and reward students bicycling (and walking, if desired) to school. Because the tracking tags are mounted onto children's helmets, there is an added incentive for children to always wear a helmet. In prototype programs, walking and bicycling has increased by up to 500% in the first year of the program. (Please note that the FREIKER company is changing its name to Boltage.)

Integrate walking and bicycling into the classroom curriculum – Children can keep track of their walking and bicycling miles. Classroom teachers can use this data in different ways depending on the class subject. Mathematics classes can perform calculations using the numbers (e.g. average daily walking/biking miles, predicted mileage over the year); physical education classes can use mileage to help students 'run' a marathon; social studies classes can use the data to "walk across Utah", etc.

Start a Walking School Bus or Park and Walk Program – Walking School Buses are organized groups of students accompanied by one or more adults along a regular route to school. Children join the bus at set times and stops. If a Walking School Bus cannot be formed, a first step or an alternative activity is to designate a Park and Walk location where parents park at a designated spot (such as a community park) and walk their children the rest of the way to school. Both Walking School Bus and Park and Walk programs can reduce traffic congestion at schools. A good opportunity to kick-off a walking school bus program is during International Walk to School Day, held annually in early October. Good resources and start-up material can be found at the City of Portland's new Safe Routes to School website, http://www.trans.ci.portland.or.us/saferoutes/program/. Organized Bike and Walk to School Days should be held monthly or weekly to keep the momentum going and encourage more children and their parents to walk or bike to school. Prizes or drawings for prizes offered to participants have been used in some schools as an incentive.

9.6 Bicycle Parking Recommendations

Lack of secure, convenient bicycle parking is a deterrent to bicycle travel. Bicyclists need parking options that can provide security against theft, vandalism, and weather. Like automobile parking, bicycle parking is most effective when it is located close to trip destinations, is easy to access, and is easy to find. Where quality bicycle parking facilities are not provided, determined bicyclists lock their bicycles to street signs, utility poles or trees. These alternatives are undesirable as they are usually not secure, may interfere with pedestrian movement, and can create liability or damage street furniture or trees. Bicycle parking facilities that are conveniently located and adequate in both quantity and quality can help reduce bicycle theft and eliminate inappropriate parking, benefiting everyone. Bicycle parking is highly cost-effective when compared with automobile parking.

9.6.1 Existing Orem Bicycle Parking Requirements

Sub-section 15.7 of Orem Municipal Code (Chapter 22) covers bicycle parking and facilities. On-site bicycle parking spaces must equal 10% of the required automobile spaces, with a minimum of three spaces provided. A maximum of thirty bicycle parking spaces per building are allowed. The Director of Development Services can waive the bicycle parking requirement if the development is not likely to attract bicycle traffic. Car washes and personal storage units are listed as developments that are not likely to generate bicycle traffic.

Bicycle parking facilities (lockers or racks) are to be provided where bicycle parking is required. Bicycle parking facility requirements are:

1. Provide for storage and locking of bicycles, either in lockers, medium-security racks or equivalent facilities in which the user may lock both the bicycle frame and the wheels.
2. Be located on a raised island no less than six inches in height, or within an area sufficiently projected from vehicular traffic.
3. Be designed so as not to cause damage to the bicycle.
4. Facilitate easy locking without interference from or to adjacent bicycles.
5. Consist of racks or lockers anchored so that they cannot be easily removed and of solid construction, resistant to rust, corrosion, hammers and saws.
6. Be consistent with their environment in color and design and be incorporated whenever possible into building or street furniture design.
7. Be located inconvenient, highly visible, active, well-lighted areas but not interfere with pedestrian movements.

9.6.2 Bicycle Parking Recommendations

The City of Orem's bicycle parking requirements do provide bicycle parking with new development. The City may wish to incorporate some or all of the following recommendations to improve the supply and design of bicycle parking in Orem.

Orem's existing bicycle parking varies dramatically in design and usability. The following guidelines are intended to aid selection of an appropriate rack design and still allow for more exotic or artistic rack designs provided they are designed correctly. The existing requirements within Orem's municipal code does outline many good facility requirements, they do not always result in the selection or placement of a high quality bicycle rack that will provide ease of use and provide reasonable safeguard from accidental damage.

Recommended Bicycle Rack Placement

The City of Orem should consider adding the following to the existing requirements:

8. Bicycle parking shall be located within 50 feet of an entrance to the building in a visible and obvious location to bicylists. Bicycle parking should be permanently secured to a paved surface and be located such that it will not become buried by snow removal operations. Covered bicycle parking is recommended wherever possible.
9. Bicycle parking may be provided within a building, but the location must be easily accessible.
10. Bicycle racks and the area required for parking and maneuvering must meet the following standards:
    a. Bicycle parking spaces must be at least 6 feet long and 2 feet wide, and in covered situations the overhead clearance must be at least 7 feet.
    b. An aisle for bicycle maneuvering must be provided and maintained beside or between each row of bicycle parking. This aisle must be at least 5 feet wide.
    c. Each required bicycle parking space must be accessible without moving another bicycle.
    d. Areas set aside for bicycle parking must be clearly marked and reserved for bicycle parking only.

Longevity of Installed Bicycle Racks

It should be the responsibility of the developer or property owner to maintain required bicycle parking. The City of Orem should modify its Municipal code to state that the conditions for required bicycle parking are valid for the life of the site plan. If bicycle racks are damaged or removed these conditions have then been violated. The City should periodically inspect bicycle parking and issue a violation notice from the Zoning Department if bicycle parking is missing. The City of Orem should work with the property owner to repair/restore bicycle parking to the site and consider penalties if the property owner does not comply.

Recommended Bicycle Rack Design

Orem may wish to provide guidance to developers who are selecting bicycle racks for installation. Many commercially available rack types do not provide a high standard of service to the user. The following is based on guidance published by the Association of Pedestrian and Bicycle Professionals (APBP).

9.6.3 Encouraged Bicycle Rack Types

'Inverted U', or 'Staple' Rack

This type of rack is typically secured to a concrete base and is very secure and easy to use.

Coat Hanger Rack

This rack if used properly can support a bicycle at two points and can operate fixed to a concrete base or can be moved where needed.

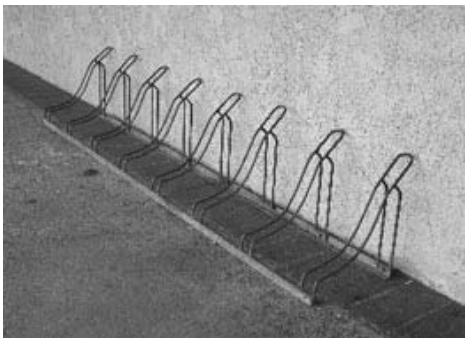
Post and Loop or 'Lollypop' Rack

This rack has many of the same characteristics as the Inverted U rack, but is more compact. Can be installed in series (shown) or along a curb line in the sidewalk furnishing zone.

9.6.4 Discouraged Bicycle Racks

Wheelbender Rack

This rack only supports the wheel of the bicycle and can cause serious damage to the bicycle if twisted while secured in the rack. This rack also does not work with all types of locks.



Comb Rack

This rack suffers from many of the same shortcomings as the wheelbender type rack where only the front or rear wheel of the bicycle is supported. Many users of this rack type lift there bicycle over the top and rest the frame on the rack to allow use of a bicycle lock.

Wave Rack

To properly use this rack the cyclist places the bicycle through the 'wave' pattern where it is only supported at one point. Bicycles parked in these racks are unstable and frequently tip over. Many cyclists park their bicycle sideways in this rack to gain stability, thereby reducing the capacity by 60-80 percent.

9.6.5 Bicycle Parking Recommendations by Land Use

Additionally, the City of Orem may wish to vary its bicycle parking requirements by land use, and type of parking. The following suggestions may be incorporated into existing City Municipal Code.

Short Term Bicycle Parking - Bicycle parking meant to accommodate visitors, customers, and others expected to depart within two hours.

Short Term Bicycle Parking Requirements	
Use Type	Required Bicycle Parking Spaces
Bank, financial institutions	10 percent of required auto parking
Church	10 percent of required auto parking
Community or recreation center	15 percent of required auto parking
Medical and dental offices	15 percent of required auto parking
Manufacturing and industrial uses	1 per 5,000 sq ft of floor space
Motels, Hotels	1 per 10 rooms
Commercial Office	The greater of 2 or 20 percent of required auto parking
Restaurants, cafes, bars and similar uses	10 percent of required auto parking
Retail store and service establishments	10 percent of required auto parking
Schools Elementary and/or Junior High	1 per 5 students
Schools a. Senior High b. Business or similar school	1 per 10 students
Theater, Auditorium or similar	The greater of 10 spaces or 5 percent of seating capacity

Long Term Bicycle Parking - Bicycle parking meant to accommodate employees, students, residents, commuters, and others expected to park more than two hours. This parking is to be provided in a secure, weather-protected manner and location.

Long Term Bicycle Parking Requirements	
Use Type	Required Bicycle Parking Spaces
Residential Categories Multi-Family Single Family	The greater of 2, or 1 per unit (if no garage is available) None
Commercial Office	The greater of 2 or 10 percent of required auto parking
Restaurants, cafes, bars and similar uses	The greater of 2 or 5 percent of required auto parking
Retail store and service establishments	The greater of 2 or 5 percent of required auto parking

9.7 Bicycle / Pedestrian Access to Transit

The Utah Transit Authority currently operates fixed route transit within Orem's city limits. UTA's FrontRunner Commuter Rail line is under construction connecting Provo with Salt Lake City. Two stations will soon be easily accessible to Orem Residents. The northern station (Vineyard Station) will exist along the existing rail line near 800 North. The southern station (Orem Station) will be across I-15 from Utah Valley University (UVU). Additionally, Bus Rapid Transit (BRT) is planned to follow the University Parkway Corridor connecting with UVU.

Improvements to the pedestrian environment around transit stops and transit centers increases pedestrian safety, comfort, and may generate more ridership since most passengers start and end their trips as pedestrians. Integrating bicycles with transit allows the bicyclist to overcome barriers such as hills, inclement weather, night riding, and breakdowns. To improve the pedestrian/bicycle-transit link Orem and UTA should:

- Complete sidewalk and bikeway recommendations presented in Chapters 5-7.
- Provide benches, shelters, lighting, posted maps and schedules and other amenities at transit stops;
- Provide secure bicycle parking at or near transit stops;
- Address the needs of bicycle and pedestrian circulation in the design of future transit centers (including commuter rail and BRT; and
- Ensure that bicycles are always allowed on transit vehicles including buses, BRT, and commuter rail.

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10Implementation Plan

10.1 Introduction

This chapter describes the specific costs associated with the development of the Phase 1 recommendations, general costs of bikeway improvements that can be applied to the Vision Plan network and the cost of maintenance activities. Costs associated with on-street bikeway development vary significantly and are contingent on a variety of factors. On some roadways bicycle lanes can be coordinated to coincide with a roadway resurfacing (overlay) project and therefore the additional costs are relatively minor. Without an overlay, the addition of bicycle lanes can require the removal of existing roadway striping and the addition of new striping, messages and roadway signage.

10.2 Phase 1 High Priority Projects

As part of the implementation process, the City of Orem chose five projects from the Phase 1 recommendations to receive further consideration and analysis. All five projects were chosen by City staff as on-street bike lanes on the following Orem roadways. Some of these segments were not chosen as a direct result of public opinion (see **Figure 5.1 – Public Responses Ranking Phase 1 Projects**), but to gain a block-by-block strategy for adding bike lanes to Orem streets that were seen as potential challenges.

- 400 East – from 2000 North to 800 South (3.64 miles)
- Palisades Drive – from 800 North to 400 South (1.6 miles)
- 1200 North – from 1200 West to 1110 East (2.9 miles)
- 400 West – from 800 North to 800 South (2.0 miles)
- 800 West – from 2000 North to 700 North (1.6 miles)

Each roadway segment was analyzed block by block using curb-to-curb width measurements, existing lane configuration, adjacent land use (including schools, commercial areas, residential areas, and churches), and traffic volumes. During the analysis it became clear that for most situations there were four lane configuration options that were workable alternatives for the purpose of adding bicycle lanes to the street. See **Figures 10.1-10.4** on the following pages for details. These options are as follows:

Option A – retain parking and travel lanes
Option B – removal of parking on one side of the street (allows for center turn lane preservation)
Option C – lane adjustment/lane narrowing. Bike lanes are added without compromising other facilities.
Option D – unneeded parking lanes are repurposed as wide bike lanes

Each option is presented on the following pages with lane configurations for a variety of curb-to-curb roadway widths. The transition of the roadway from a minor signalized intersection to the mid-block configuration is also shown. The total length of the transition is estimated at 470 feet including 100 feet of vehicle storage, 90 feet of gap, and 180 feet of taper. Care was taken to not remove parking in areas where it was needed and to preserve center turn lanes in key areas. Research has shown that Center turn lanes are not required for residential access. Following the roadway configuration options, the five high priority projects are presented with photos, background information and detailed recommendations.

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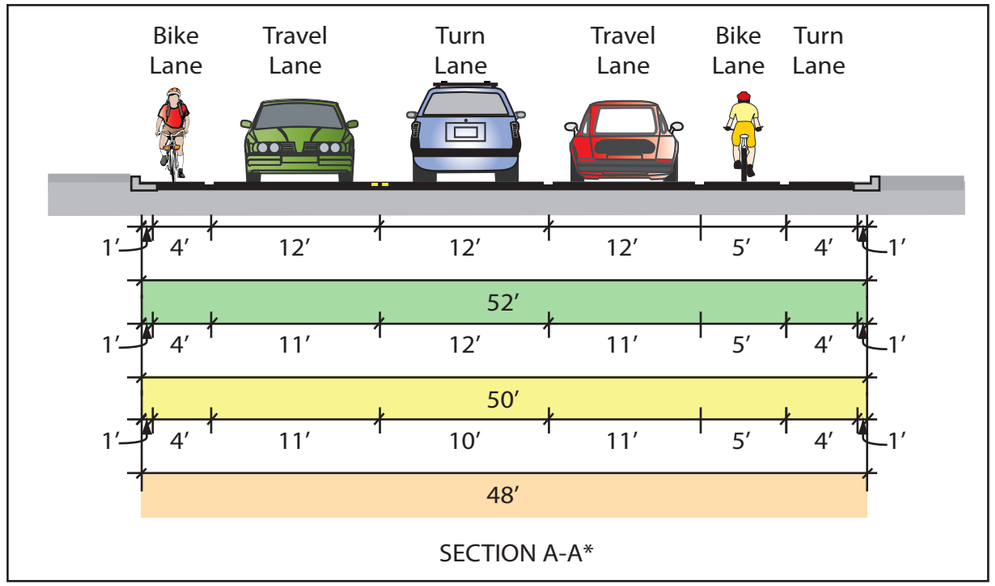
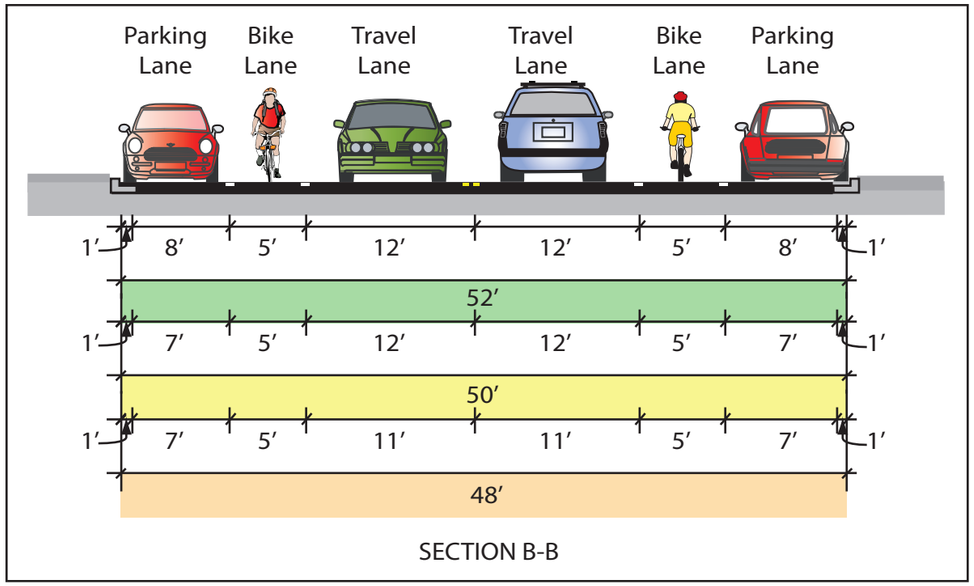
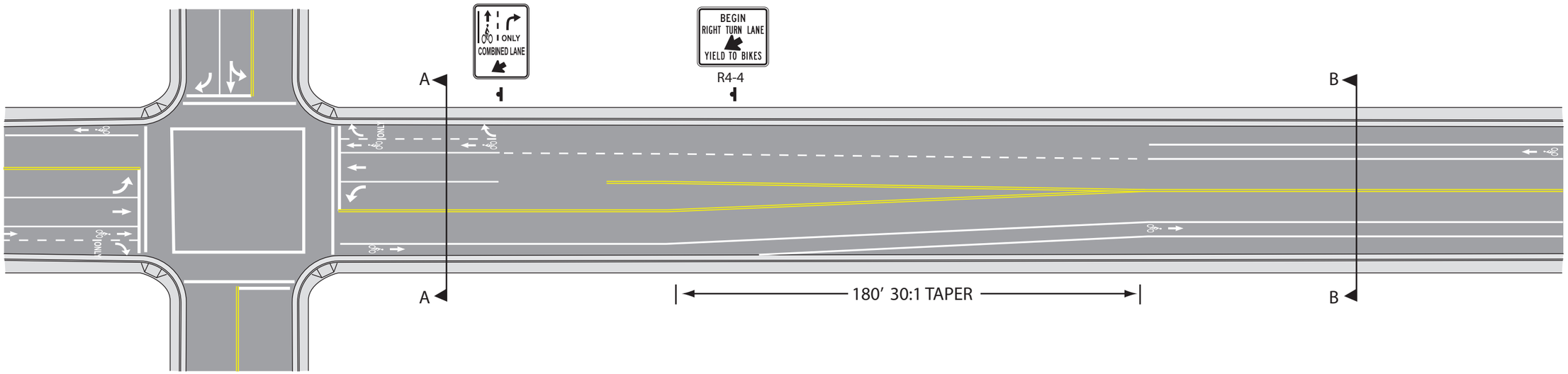


SECTION A-A*



SECTION B-B



* If Section A-A is greater than 54 feet provide bicycle pocket outside of right turn only lane.

Figure 10.1 - Lane Configuration Option A

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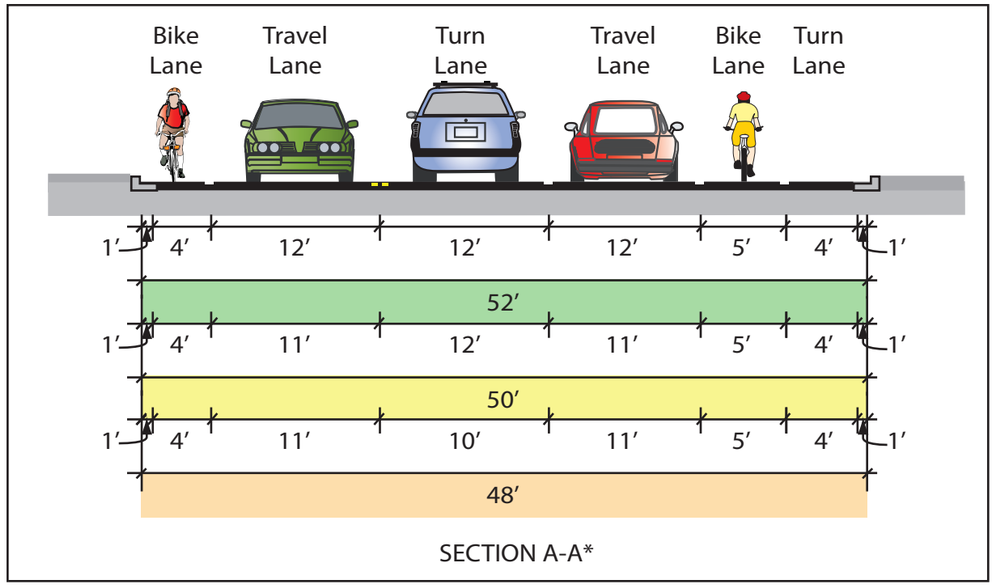
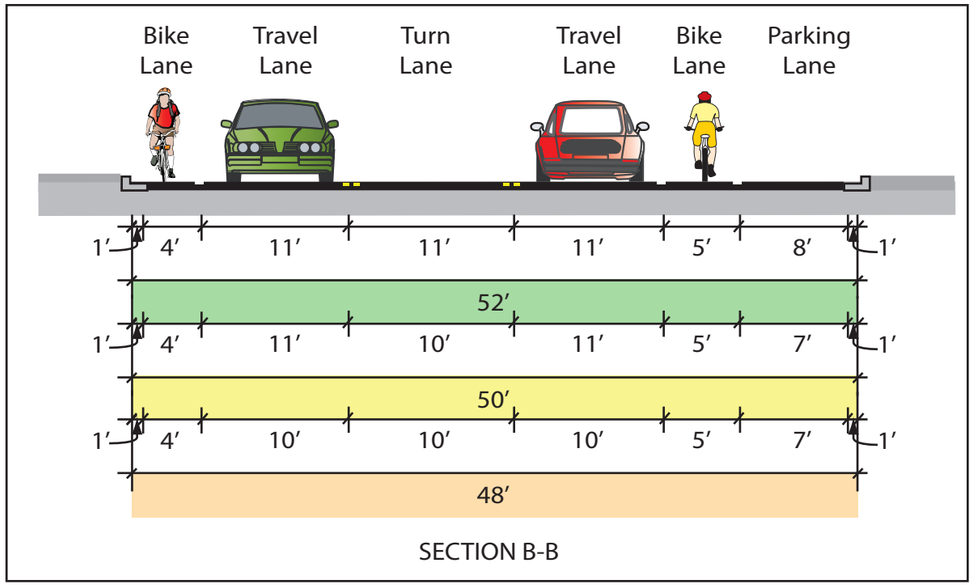
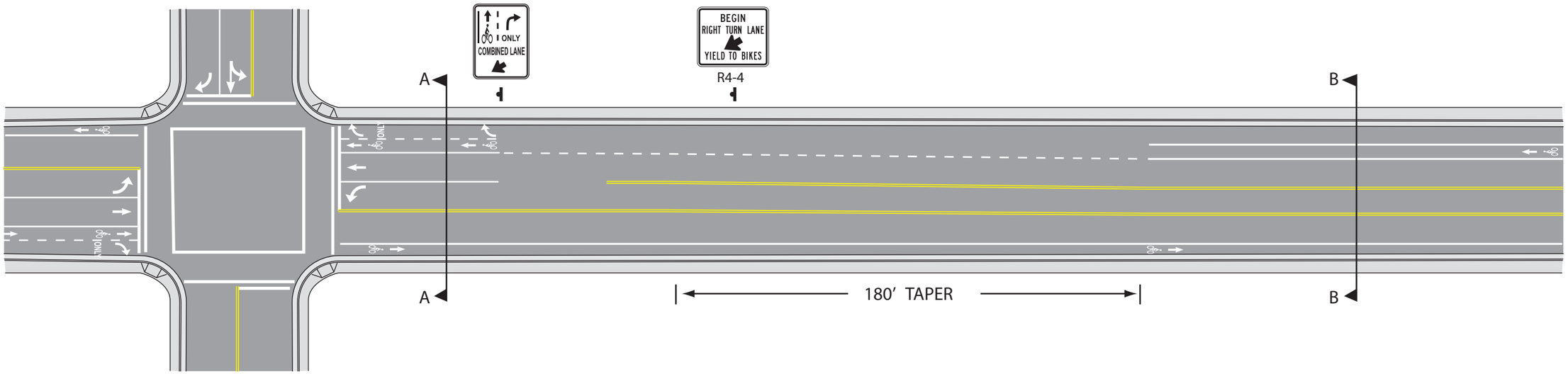


SECTION A-A*



SECTION B-B



* If Section A-A is greater than 54 feet provide bicycle pocket outside of right turn only lane.

Figure 10.2 - Lane Configuration Option B

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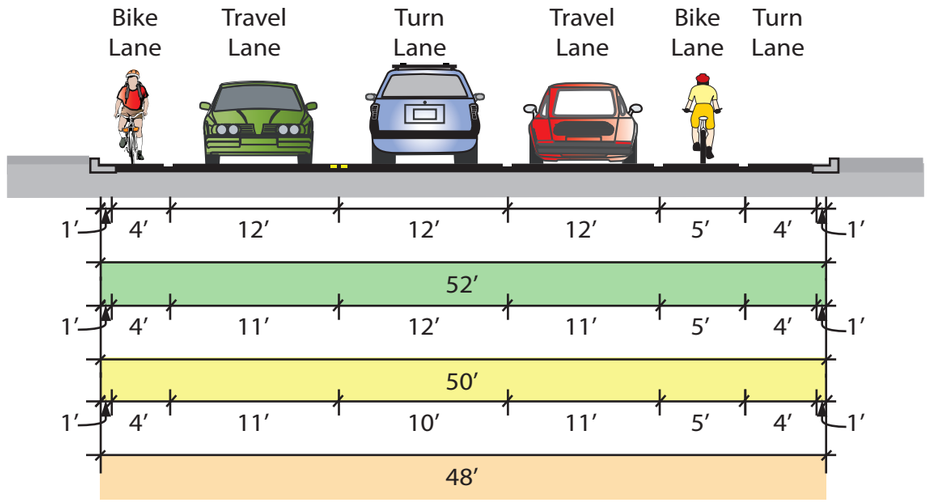

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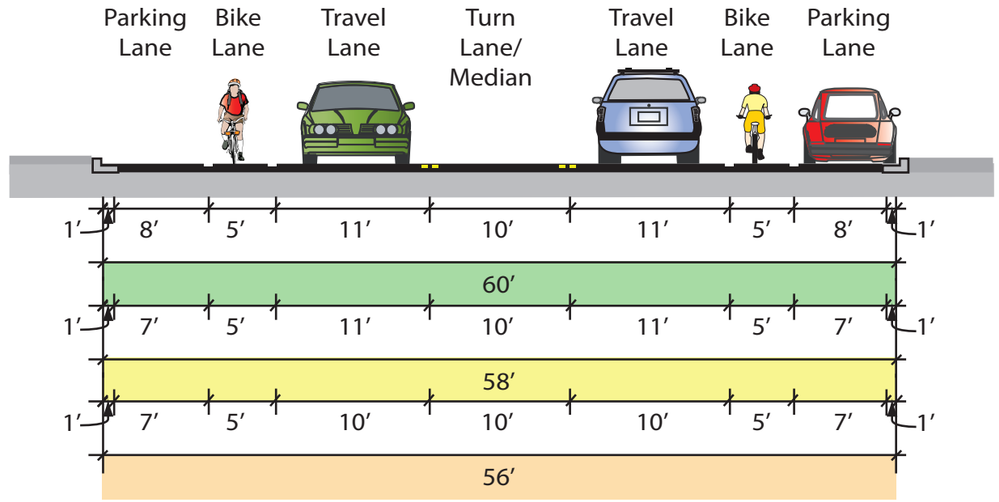
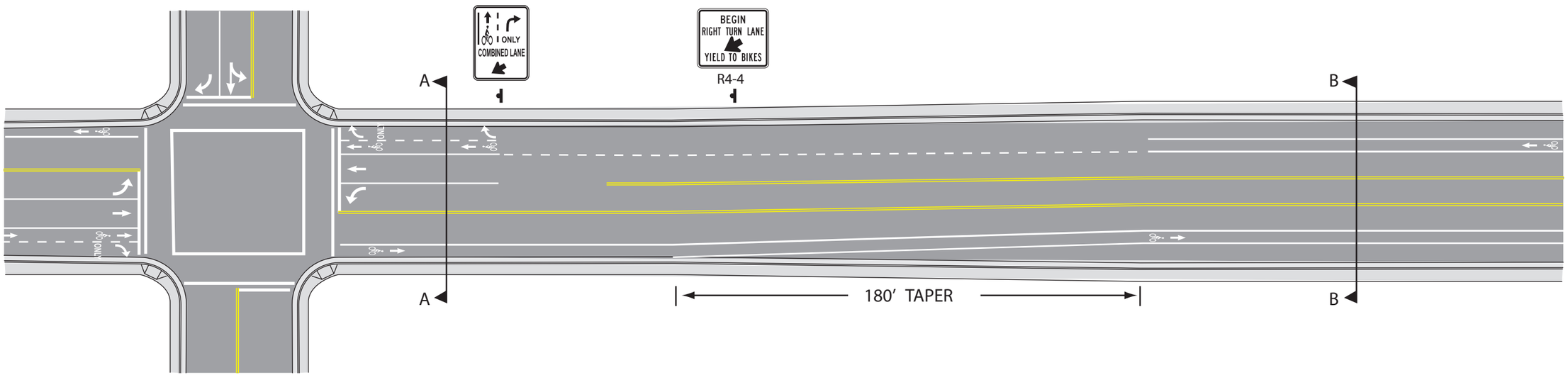


SECTION B-B



* If Section A-A is greater than 54 feet provide bicycle pocket outside of right turn only lane.

Figure 10.3 - Lane Configuration Option C

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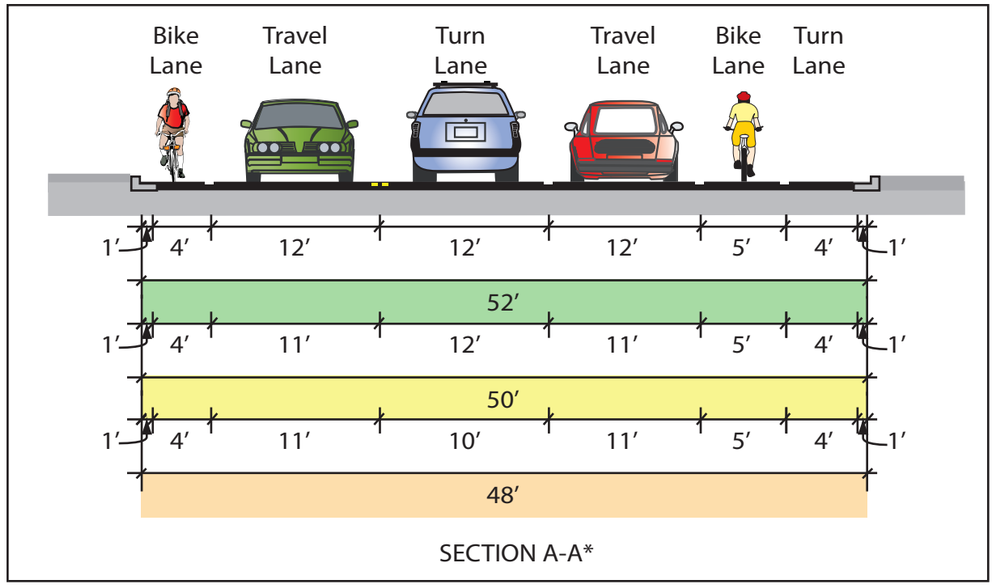
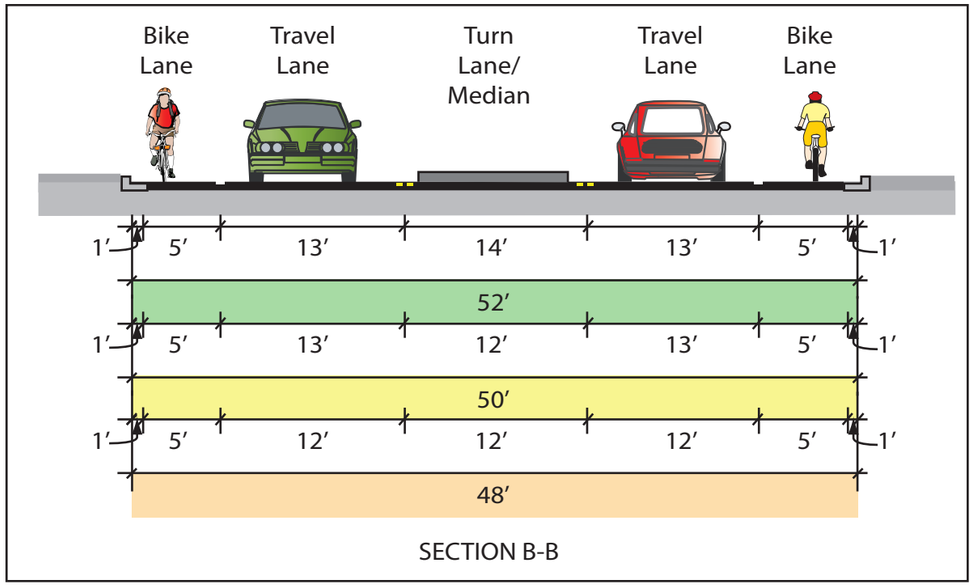
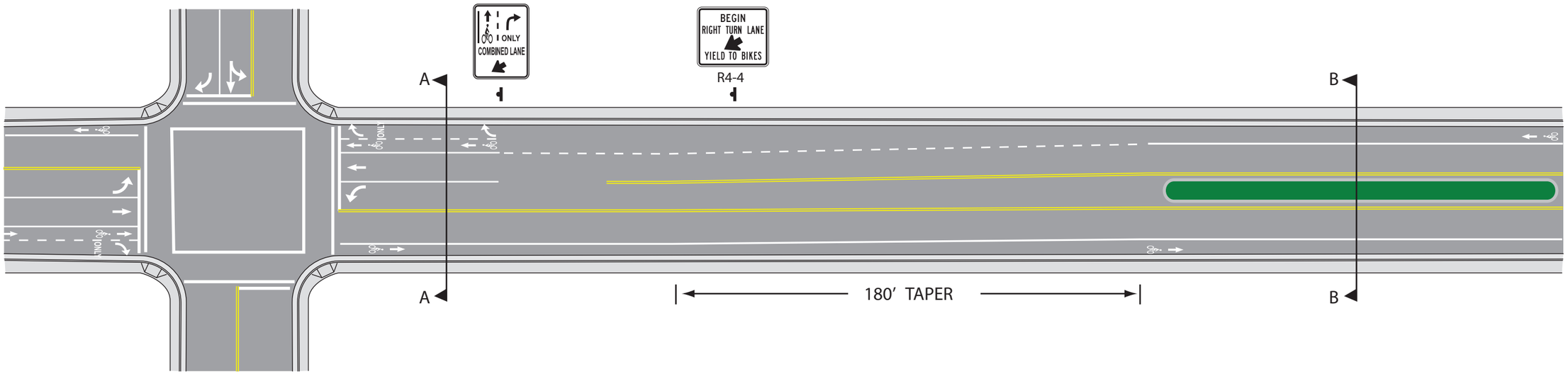


SECTION A-A*



SECTION B-B



* If Section A-A is greater than 54 feet provide bicycle pocket outside of right turn only lane.

Figure 10.4 - Lane Configuration Option D

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400 East Bicycle Lanes

Improvement Summary

400 East is a key north-south link in Orem's bicycle network. It provides this important link while having good proximity to State Street and other destinations.

The corridor ties to major destinations such as the future Murdock Canal Trail, Tipanogos High School, Sharon Elementary School, the Orem Senior Friendship Center, Orem High School, Scera Park Elementary School, many churches and has close proximity to Orem City Hall.

Project Length is 3.64 miles

Description

The roadway width and configuration of 400 East changes frequently, however the roadway width and ADT numbers support the addition of bicycle lanes to all segments. Much of the corridor has relatively low traffic with numbers ranging from 2,500 to 10,000 vehicles per day. The roadway is most commonly 52 feet wide from curb to curb. Several sections are wider with some sections having a raised median or center turn lane.

Project Information

Re striping and reallocation of the roadway space to accommodate bicycle lanes from 2000 North to 800 South. The strategy used attempts to maximize the efficiency of roadway space. See following page for detailed recommendations and previous pages for referenced lane configurations.

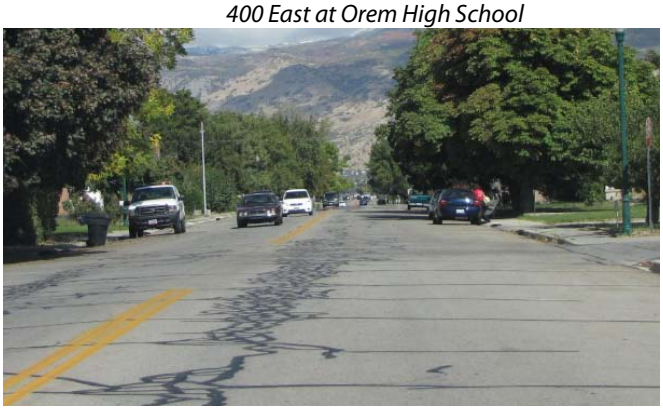
Cost Estimate

Much of the corridor is scheduled for roadway resurfacing. The estimated cost for the entire length (costs associated with adding bike lanes only) is $90,000 for UDOT spec paint with Thermoplastic intersection markings. An overlay is planned from 1600 North to 200 North.

Photos

400 East near Timpanogos Blvd

400 East at Orem High School



400 East near 700 South

400 East Bicycle Lanes – Detailed Recommendations

The following details the recommended roadway configuration for each differing segment of 400 East. Recommendations are based on the StreetPlan Model, field observations, and aerial imagery analysis in Arc GIS.

Link Description	Street Width & ADT	Recommendation
2000 North to 1600 North	52 feet 4,200 ADT	Bike lanes can be added with new paint only (there is a widening at East Heather Rd, bike lanes can be accommodated if the center turn lane is narrowed slightly. **See Option C.**
1600 North to Timpanogas Blvd	52 feet 3,250 ADT	Raised Median exists on this segment with a 12 foot travel lane adjacent to a 8 foot parking lane. This stretch has no driveways or direct access to any homes. It is recommended that the parking lane be striped as a bike lane. If restriped or overlaid, narrow the bike lane to 7 feet and provide a 13 foot travel lane. **See Option D**.
Timpanogas Blvd to 1200 North	52 feet 3,250 ADT	Same configuration as above, however there is no raised median. Again, there are no residentially fronted properties along this section with little to no parking demand. Convert parking lane to bike lane. **See Option D.**
1200 North to 950 North	52 feet 6,250 ADT	The east side of the road has land uses with off street surface parking lots. The center turn lane could be maintained by eliminating the eastern parking lane and restriping the roadway **See Option B.** Alternatively, the center turn lane could be removed in accordance with **Option A.**
950 North to 800 North	53 feet 6,250 ADT	Remove center turn lane and add bike lanes in accordance with **Option A**.
800 North to 500 North	58 feet 4,997 ADT	Narrow road lanes in accordance with **Option C.**
500 North to 400 North	52 feet 6,837 ADT	Remove center turn lane and stripe in accordance with **Option A**.
400 North to 330 North	52 feet 8,050 ADT	Stripe bike lane on east side of street adjacent to the diagonal parking. Consider adding a section of gore striping to space the bike lane out slightly and raise its visibility to motorists. Recommendation similar to **Option B.**
330 North to 200 North	52 feet 8,050 ADT	Remove center turn lane in accordance with **Option A**.
200 North to Center Street	52 feet 8,050 ADT	Parking is mostly redundant on the eastern side of the street. There are two options here, either removing parking on the east side of the street **(Option B)** or the center turn lane **(Option A)**.
Center Street to 100 South	52 feet 6,250 ADT	Remove center turn lane in accordance with **Option A.**
100 South to 300 South	52 feet 6,250 ADT	Remove parking lane on eastern side in accordance with **Option B** along Scera Park North.
300 South to 400 South	52 feet 6,250 ADT	Remove center turn lane in accordance with **Option A.**
400 South to 800 South	49 ft to 50 ft 4,650 ADT	Stripe bike lane on existing street in accordance with **Option A.**

Palisades Drive – Bicycle Lanes

Improvement Summary

Palisades Drive is a key north-south link in Orem's bicycle network. It provides a key link to the 800 North trail and a very important connection to the Provo River Trail. This route is popular with families and more inexperienced cyclists that may feel uncomfortable on some of the busier streets.

The corridor has periodic gentle speed humps that will not pose any significant difficulty to cyclists.

Project Length is 1.6 miles

Description

Palisades Drive has a consistent cross section for much of its length. The street is primarily residential except where it nears 800 North. The low traffic nature of the street attracts bicyclists as does a direct connection to the 800 North Trail and the Provo River Parkway. The roadway is a consistent width of 46 feet for nearly its entire length with the exception of a widening near 800 North. Average Daily Traffic runs from 850 to 1,000 vehicles per day.

Proposed Improvements

- Adding striping and stenciling on Palisades drive for bicycle lanes from 800 North to 500 South. This alteration can be accommodated for the most part without removing existing pavement markings. With bike lanes, the roadway would have a cross section with 7 foot parking lanes, 5 foot bike lanes, and 11 foot travel lanes. Alternatively, 10 foot travel lanes could be implemented to provide a wider parking lane.
- Alternatively, Shared Lane Markings (SLM's) could be used in lieu of bike lanes.
- A new signal is recommended at Center Street to aid crossings of this busy arterial.

Cost Estimate

- Bike Lane option: $28,000
- Shared Lane Marking Option: $20,000

Photos

Palisades Drive near 680 North

Palisades Drive near 400 North (speed hump)

400 East near Center Street

Palisades Drive Bicycle Lanes – Detailed Recommendations

The following details the recommended roadway configuration for each differing segment of Palisades Drive. Recommendations are based on the StreetPlan Model, field observations, and aerial imagery analysis in Arc GIS.

Link Description	Street Width & ADT	Recommendation
Option 1: 800 North to 500 South	46 feet 850-1,000 ADT	Bike lanes can be added with new paint only (there is a widening at 800 North. The roadway would have a cross section with 7 foot parking lanes, 5 foot bike lanes, and 11 foot travel lanes. Alternatively, 10 foot travel lanes could be implemented to provide a wider parking lane. This configuration is similar to **Option A**, but slightly narrower.
	Estimated cost: **$28,000**	 *Bike Lane Concept*
Option 2: 800 North to 400 South	46 feet 850-1,000 ADT	Shared Lane Markings could be added in lieu of bike lanes if desired. Supporting signage including wayfinding could be added to enhance the corridor.
	Estimated cost: **$20,000**	 *Shared Lane Marking Concept*

1200 North Bicycle Lanes

Improvement Summary

1200 North is a key east-west link in Orem's bicycle network. It provides connectivity to other north-south bike lanes and routes in the future Orem bicycle network and has low to moderate traffic levels when compared to nearby 1600 North and 800 North.

Project Length is 2.9 miles

Description

1200 North has a single double center stripe from 1200 West to State Street and a center turn lane striped from State Street to the east. The roadway is typically 50-52 feet in width with the exception of the western extent which is 46 feet wide. The corridor has varying levels of traffic from less than 5,000 in residential areas to nearly 10,000 near state street and the Technology business park. Bonneville Elementary is the only school on this route, however there are significant office and commercial connections.

Proposed Improvements

Restriping the roadway from 1200 West to 1110 East to include bike lanes in accordance with the detailed recommendations on the following page.

Cost Estimate

The section from 1200 West to State Street is scheduled for an overlay. The estimated cost for the entire length (costs associated with adding bike lanes only) is $57,000 for UDOT spec paint with Thermoplastic intersection markings.

Photos

1200 North near 1050 West

1200 North near Bonneville Elementary School

1200 North near 1000 East

1200 North Bicycle Lanes – Detailed Recommendations

The following details the recommended roadway configuration for each differing segment of 1200 North. Recommendations are based on the StreetPlan Model, field observations, and aerial imagery analysis in Arc GIS.

Link Description	Street Width & ADT	Recommendation
1200 West to 950 West	46 feet 3,500 ADT	Bike lanes can be added with new paint only. The roadway would have a cross section with 7 foot parking lanes, 5 foot bike lanes, and 11 foot travel lanes. Alternatively, 10 foot travel lanes could be implemented to provide a wider parking lane. This configuration is similar to **Option A**, but slightly narrower. A second option would be to stripe the uphill bike lane (eastbound) only and apply Shared Lane Markings in the downhill direction as bicyclists would be able to more closely match vehicle speeds.
950 West to State Street	52 feet 5,150 ADT	Bike Lanes can be added with the addition of new paint only in accordance with **Option A.**
State Street to 230 feet east of 475 East	50-52 feet 8,500 ADT	Road needs to be restriped in accordance with **Option A** to include bike lanes.
230 feet east of 475 East to 800 East	50-52 feet 5,350-8,000 ADT	North side of the roadway either fronts the Technology Park or the rear fences of residences. **Option B** is recommended for this stretch so that the center turn lane may be maintained.
800 East to 1110 East	50-52 feet 1,550 ADT	Low traffic volumes indicate that the center turn lane could be utilized to add bike lanes in accordance with **Option A**. There is a pinch point at the Murdock Canal where the center striping should be narrowed to allow the bike lanes to fit.

400 West Bicycle Lanes

Improvement Summary

400 West is a key commuter route to Utah Valley University. There are existing bike lanes on 400 West from 1200 South to 800 South. Average Daily Traffic is approximately 6,000 vehicles per day along most of the corridor with the exception of a lower traffic segment near 800 North which has approximately 2,000 vehicles per day.

Project Length is 2.0 miles

Description

400 West is primarily residential, however it does serve several key destinations. Key destinations include Utah Valley University, Orem Community Hospital, Mountain View High School, Orem Elementary School, and Lakeridge Junior High School. This route also may be popular for accessing commercial areas along University Parkway and Center Street.

Proposed Improvements

Adding striping and stenciling on 400 West for bicycle lanes from 800 North to existing bicycle lanes that terminate at 800 South.

Cost Estimate

400 West is not scheduled for an overlay at this time. The costs associated with adding bicycle lanes are **$47,000.**

Photos

400 West near 580 North

400 West near 310 North

400 West near Orem Elementary School

400 West Bicycle Lanes – Detailed Recommendations

The following details the recommended roadway configuration for each differing segment of 400 West. Recommendations are based on the StreetPlan Model, field observations, and aerial imagery analysis in Arc GIS.

Link Description	Street Width & ADT	Recommendation
800 North to 700 North	36 feet 1,950 ADT	All fronting properties have ample off street parking, Stripe a 5 foot bike lane on each side of the road and prohibit parking.
700 North to 400 North	36 feet 1,950 ADT	Roadway recently resurfaced to have a bike lane sized stripe on one side and a parking lane on the other. Parking has already been removed on one side of the street. Street width makes bi-directional bike lanes difficult and would require 10 foot travel lanes and a sub standard parking lane to accomplish. Alternative strategy would be to add shared lane markings every 250 feet along this segment on the side that does not have a bike lane. This would keep bicyclists out of the door zone of parked cars.
400 North to Center Street	52 feet 6,700 ADT	Orem Community Hospital has extensive parking inside its grounds, other properties on the west side of the street have similar accommodations, only 3 multi-family units would be affected by the removal of on street parking. On street parking could be eliminated in accordance with **Option B**, thus preserving the center turn lane. Alternatively, on-street parking could be maintained in lieu of the center turn lane in accordance with **Option A**.
Center Street to 150 South	52 ft 7,700 ADT	Recommend removing parking lane on west side in accordance with **Option B**.
150 South to 300 South	49 ft 7,700 ADT	Recommend removing center turn lane in accordance with **Option A** to accommodate installation of bike lanes.
300 South to 500 South	52 feet 6,000 ADT	Agricultural property and few homes with off street parking permit the retention of the center turn lane along this segment. From 300 South to 400 South the eastern parking lane could be removed, from 400 South to 500 South the western parking lane could be removed in accordance with **Option B**.
500 South to 800 South	52 feet 6,000 ADT	Recommend removing center turn lane in accordance with **Option A** to accommodate installation of bike lanes.

800 West Bicycle Lanes

Improvement Summary

800 West is a north-south bicycle route that connects several other proposed bicycle facilities. Average Daily Traffic is approximately 3,000 -4,000 vehicles per day along most of the corridor.

Project Length is 1.6 miles

Description

800 West is primarily residential, however it does serve several key destinations. Key destinations Timpanogos Regional Hospital, Bonneville Elementary School, Orem Junior High School, and the 800 North Trail. South of 700 North the roadway cross-section becomes narrow for the inclusion of bike lanes without eliminating on-street parking. If the City of Orem were to go to 10 foot travel lanes south of 700 North, bicycle lanes may be added.

Proposed Improvements

Adding striping and stenciling on 800 West for bicycle lanes from 2000 North to 700 North.

Cost Estimate

800 West is not scheduled for an overlay at this time. The costs associated with adding bicycle lanes are **$38,000.**

Photos

800 West near 1200 North

800 West near Timpanogos Regional Hospital

800 West near Orem Junior High School

800 West Bicycle Lanes – Detailed Recommendations

The following details the recommended roadway configuration for each differing segment of 800 West. Recommendations are based on the StreetPlan Model, field observations, and aerial imagery analysis in Arc GIS.

Link Description	Street Width & ADT	Recommendation
2000 North to 1000 North	52 feet 3,950 ADT	Road needs to be restriped in accordance with **Option A** to include bike lanes.
1000 North to 800 North	62 feet 5,773 ADT	Two options exist, the road is wide enough to stripe bike lanes in accordance with **Option C**. This option will have a very underutilized parking lane to the outside of the bike lane on the eastern side of the street. Bicyclists may not choose to ride in the bike lane. If the parking lane could be removed on the east side as the Hospital has ample off street parking, this would lead to a better situation for bicyclists. Travel lanes would be quite wide in this case. Additional options for this segment could include a 'cycle track' or 'buffered bike lane' either through road markings or raised curb to make use of the extra space. These options would be more expensive however.
800 North to 700 North	46 feet 3,900 ADT	Remove parking lane adjacent to Orem Junior High School and add bicycle lane in accordance with **Option B.**

10.3 General Bike Lane Implementation

In addition to the lane configuration strategies presented in Figures 10.1 through 10.4, flow charts were created to assist the City with installing bike lanes on projects that are not part of the identified Phase 1 projects. Flow charts have been created for Principal Arterials and Minor Arterials/Collectors.

Figure 10.5 - Process for Adding Bike Lanes to Principal Arterials in Orem

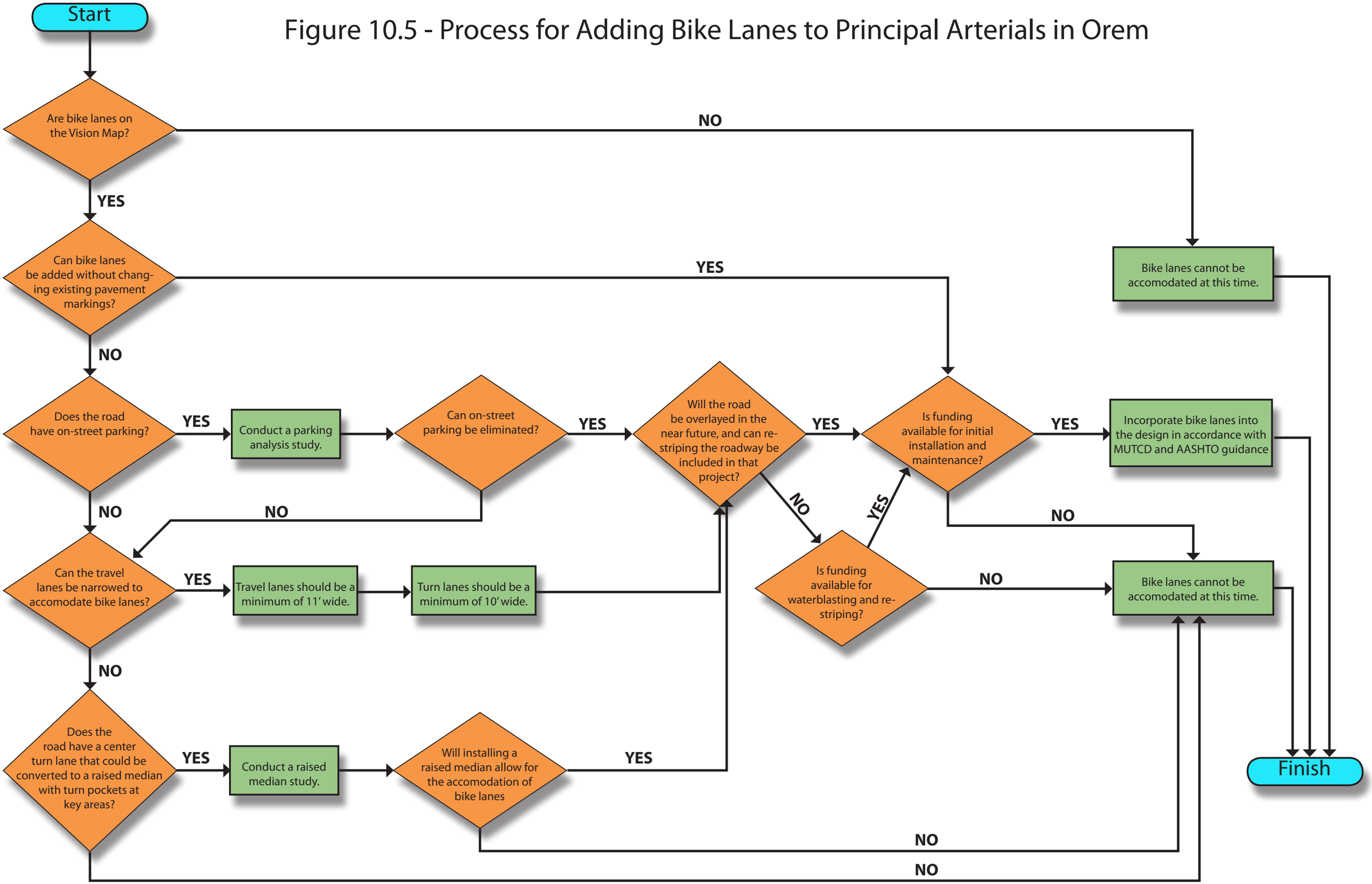


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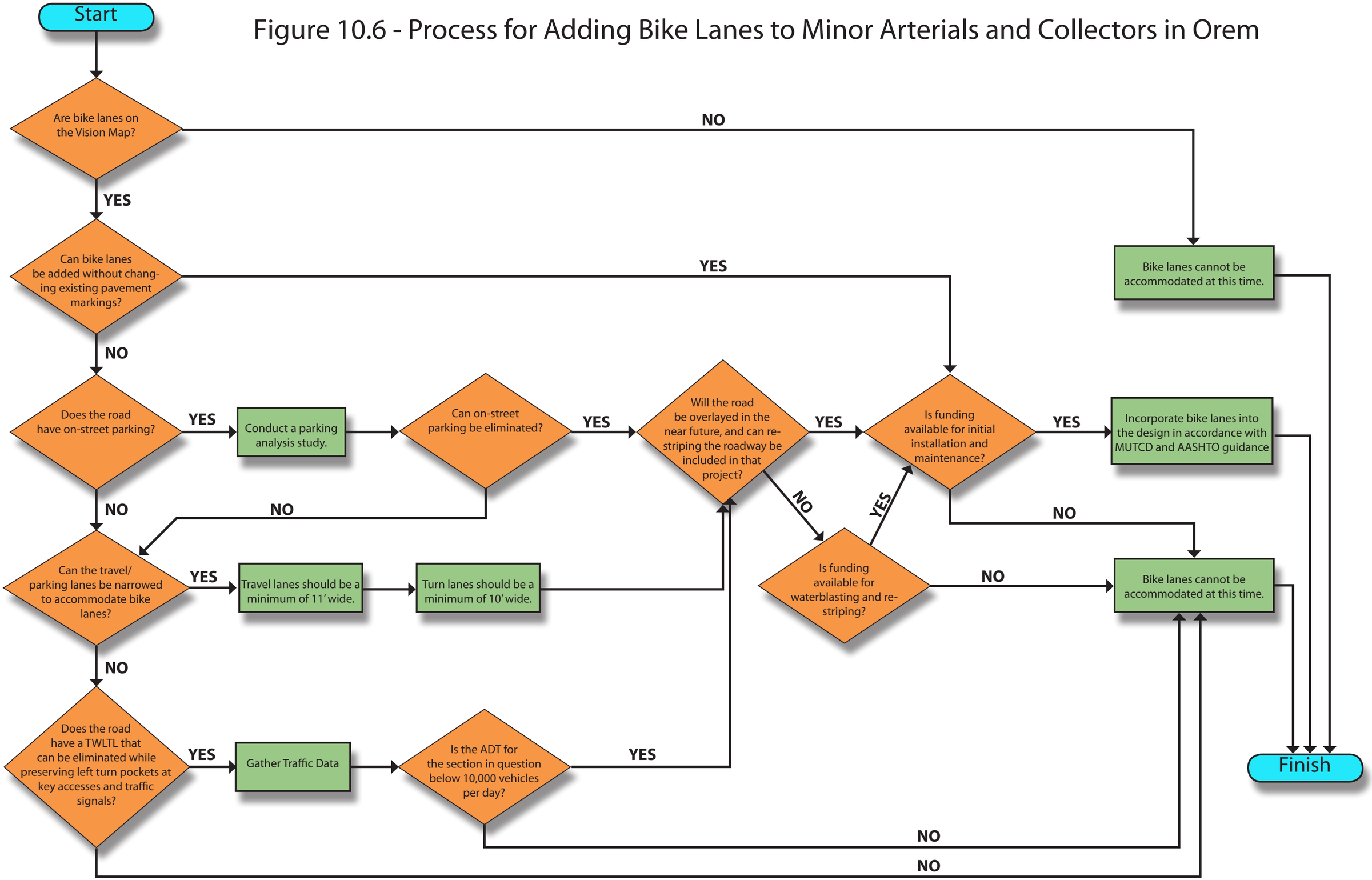
Figure 10.6 - Process for Adding Bike Lanes to Minor Arterials and Collectors in Orem



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10.4 Phase 1 Project Costs

10.4.1 Bicycle Facility Costs

The table below provides the cost of implementing the recommended projects as part of Phase 1. The cost of establishing bike lanes on Orem streets varies considerably depending on the method of application and the materials used. If a roadway is scheduled for resurfacing, the marginal cost of adding bike lanes to the roadway is comparably very low. During the Summer of 2010, bike lanes were applied to sections of 1600 South, South Main Street, Orem Boulevard, and 400 East as a part of routine striping following a pavement overlay or slurry seal. Through the project steering committee and conversations with Orem Public Works staff, that the chosen method for removal of existing pavement markings would be waterblasting, and that new striping would be paint applied in accordance with UDOT specifications with thermoplastic messages at intersections. Thermoplsastic is much more durable than paint, however it is estimated to be approximately 14 times more expensive. Based on this decision, the average cost of removing existing pavement markings and restriping the roadway would be approximately $21,600 a mile. Full cost estimates for the priority projects were worked up taking into account scheduled resurfacing projects over the next few years. For other Phase 1 projects, the average cost of $21,600 per mile was applied. These assumptions result in approximately $501,000 of on-street Phase 1 bike lane costs. The ultimate cost due to adding bike lanes may be considerably lower if combined with other roadway projects.

Table 10.1 – Phase 1 Bike Lane Costs

Street	From	To	Length (Miles)	Estimated Cost
1200 W	1600 N	400 S	2.58	$56,000
800 W	2000 N	700 N	1.63	$38,000
400 W	800 N	800 S	2.03	$47,000
Orem Boulevard	800 N	400 S	1.64	$35,000
400 E	2000 N	800 S	3.64	$90,000
2000 N & Skyline Drive	920 W	1600 N	2.79	$60,000
1200 N	1200 W	1110 E	2.9	$57,000
400 N	State Street	Palisades Drive	1.71	$37,000
800 S	800 W	Eastern City Limit	2.44	$53000
1300 (N Palisades Drive)	800 N	400 S	1.6	$28,000
		Total:	**23 miles**	**$501,000**

Phase 1 designated shared-use pathways are listed in **Table 10.2 – Phase 1 Shared Use** Path Costs. Many shared-use pathways can be complicated to construct with potential issues including right-of-way acquisition, utility impacts, roadway crossings and multi-jurisdictional coordination. It should be noted that the Murdock Canal Trail and the eastern gap in the 800 North trail already have funding identified through the Mountainland Association of Governments.

Table 10.2 – Phase 1 Shared Use Path Costs

Street	From	To	Length (Miles)	Estimated Cost
Murdock Canal Trail	2000 N	800 N	2.33	$2,300,000*
State Street Connector	Termination of existing path on University Parkway	1200 S Street Bike Lanes	0.1	$25,000
800 N Trail	1200 W	600 W	0.66	$900,000
800 N Trail	1000 E	1240 E	0.31	$1,240,000*
		Total:	**3.4 miles**	**$4,465,500** *** Funding secured**

10.4.2 Pedestrian Facility Costs

Sidewalk infill as recommended by this plan totals over 15 miles of new facility. Sidewalk facilities can be complicated to implement if right of way does not exist. Concrete is typically one of the more expensive materials to construct with a typical five foot wide sidewalk costing approximately $22 per linear foot by itself, or $33 per linear foot with curb and gutter. Based on these figures it is estimated that the package of sidewalk improvements would cost between $2,000,000 and $3,000,000.

It is a major objective of this Plan to expand sidewalks in order to increase walking for transportation and recreation, and to overcome gaps in sidewalks that inhibit walking. Completing some sidewalk links can be challenging, especially in older residential areas where residents have developed fencing and landscaping within the public right-of-way and may consider those areas to be part of their personal space. In addition, some residents may not want traditional sidewalks due to the rural look of their neighborhoods, and potential impacts to mature landscaping and trees. Regardless, the public right-of way that is generally located on either side of the paved driving and parking area is intended for walking, whether or not a sidewalk currently exists.

Orem has a good history of providing sidewalk infill. The City has taken a proactive approach with adding missing sidewalks near schools. Each school was evaluated for sidewalk connectivity within a ¼ mile radius of the school. The City has been working steadily to fill those gaps. In time the ¼ mile radius will be increased to encompass a wider area of missing sidewalk. Orem should expand this Sidewalk Infill Program where City staff look for opportunities not only to fill in gaps near schools, but in the identified segments identified by this plan. Opportunities may exist to require sidewalk additions/improvements through development or improvement activity. If possible a dedicated funding source within the city budget should be sought to provide annual improvements to the City's sidewalk network.

10.5 Implementation Strategies

Implementation of Orem Bicycle and Pedestrian Plan will take place in small steps over many years. The following strategies and action items can guide the City toward developing the projects identified in the Plan.

Implementation Strategy 1. Strategically Pursue Projects

Ideally, Orem/MAG staff should pursue capital improvements funding or grant funding for higher-priority projects first found within the Phase 1 recommendations. However, if grant requirements, or construction in conjunction with another roadway project make construction of a project contained within the vision plan possible, then Orem/MAG staff should pursue funding sources for that project regardless of priority.

- Action Item 1.1. Pursue capital improvements funding or grant funding for Phase 1 projects first.
- Action Item 1.2. In the case where grant requirements, or construction in conjunction with another roadway project make construction of a vision plan project possible, pursue funding sources for that project regardless of priority.

Implementation Strategy 2. Incrementally Implement Projects

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

- Action Item 2.1. Consider developing lengthy or expensive projects in either the Phase 1 or vision plan incrementally based on available resources and/or funding.

Implementation Strategy 3. Regularly Revisit Project Prioritization

The Phase 1 recommendations have been developed based on connectivity benefit, constructability, safety and security, and cost, and feasibility. The City of Orem should revisit the Orem Bicycle and Pedestrian Plan every 3 years to evaluate progress on project development and prioritize additional projects from the vision plan as more of the Phase 1 projects are developed. The vision plan should be reviewed as necessary, with new projects added, completed projects removed, and the priorities revised as conditions change.

- Action Item 3.1. Regular review and update of the vision plan project list by Orem staff and with input from Transportation Advisory Committee (TAC), or with the recommended formation of the Pedestrian and Bicycle Advisory Committee (BPAC).

10.6 Bicycle and Pedestrian Facility Maintenance Costs

This section discusses potential strategies the City of Orem can employ to facilitate on-street bikeway and shared-use pathway management.

10.6.1 Paved Shared-Use Path Maintenance

Cracks, ruts and water damage will need to be repaired periodically. In addition, vegetation control will be necessary on a regular basis. Where drainage problems exist along trails, ditches and drainage structures will need to be kept clear of debris to prevent wash outs. Checks for erosion along the trails should occur immediately after any storm that brings flooding to the local area. The trail surface should be kept free of debris, especially broken glass and other sharp objects, loose gravel, leaves and stray branches. Trail surfaces should be swept periodically to keep them clear of debris. Sweeping should be scheduled based on need. Path segments in canopied areas will tend to accumulate surface debris such as leaves and branches at a faster rate than other path segments. These areas should be swept more frequently in order to maintain safe surface conditions on paved shared-use paths.

Table 10.3 – Recommended Shared-use Pathway Maintenance Activities

Maintenance Activity	Frequency
Lighting replacement/repair	As needed
Remove fallen trees	As needed
Irrigate plants/trees/shrubs	As needed
Sign replacement/repair	As needed
Trash disposal	As needed, once a week
Graffiti removal	As needed
Weed control	Monthly (in natural areas)
Pavement sweeping	Monthly, or as needed
Planted Tree, Shrub, trimming/fertilization	6 months - 1 year
Debris removal	Bi-annually or as needed
Clean drainage system	Annual
Maintain irrigation lines/replace sprinklers	Annual
Pavement marking replacement	As needed
Pruning to maintain vertical clearance	1-4 years
Pavement sealing/repairs	5-10 years
* Additional maintenance may be required.	

10.6.2 On-Street Bikeway Maintenance

While implementing bikeway facilities is important, keeping them in good condition is equally important. When a bicycle lane becomes filled with debris, bicyclists are forced into the motor vehicle lane. Poor bikeway maintenance can contribute to accidents and deter potential bicyclists unwilling to risk flat tires and skidding on roadways. Periodic checks should be made of the on-street bikeway network with work being confined to spot fixes and damage response. Street sweeping of on-street facilities will need to be coordinated with the management agency's roadway maintenance program to ensure that the roadway is cleared curb to curb. Activities could also be driven by maintenance requests from the public. If possible bike lanes should be kept clear of snow during the winter months. On streets with a planted strip separating the sidewalk from the traveled way this buffer can be used for snow storage. It is not the policy of the City of Orem to keep all roadways clear of snow during the winter months and Temperatures, storm duration and intensity have a profound effect on the ability of snow plows to clear streets and for salt to melt the snow and ice.

Table 10.4 – Recommended On-Street Bikeway Maintenance Activities

Maintenance Activity	Frequency
Inspections	Seasonal – at beginning of Spring and end of Summer
Pavement sweeping/blowing	As needed, clean up in the Spring, weekly in Fall
Pavement sealing (slurry seal)	5 - 15 years
Pothole repair	1 week – 1 month after report
Culvert and drainage grate inspection	Before Winter and after major storms
Pavement markings replacement	1 – 4 years
Signage replacement	As needed
Major damage response (washouts, fallen trees, flooding)	As soon as possible

On-street bikeways are typically maintained as part of standard roadway maintenance programs, and extra emphasis should be put on keeping bike lanes and roadway shoulders clear of debris and keeping vegetation overgrowth from blocking visibility or creeping into the roadway. Typical maintenance costs for on-street bikeways are shown in **Table 10.5 – On-Street Bikeway Maintenance Frequency and Cost Opinions.**

Table 10.5 – On-Street Bikeway Maintenance Frequency and Cost Opinions

Activity	Materials Type	Frequency	Cost Opinion
Pavement resurfacing	Asphalt	Every 20 years	$50,000/mile
	Concrete	Every 20 years	$50,000/mile
	Aggregate	Every 3 years	$3,000/mile
Pavement sweeping	All	Weekly/monthly as needed	Part of regular street sweeping activities
Snow removal	All	Weekly/as needed	Depends on conditions, ~$150/mile
Tree/shrub trimming	All	5 months – 1 year	Part of regular street maintenance activities
Sign repair/ replacement	Worn	Every 10 years	$600/sign
	Stolen	As needed	$600/sign
Re-striping	Paint	Annually	$2,600/mile
	Thermoplastic striping	Every 10-15 years	$10,600/mile
	Move signs, patch and sweep	2 times/year	$200/mile

10.6.3 Sidewalk Maintenance

The ongoing maintenance of sidewalks is key in providing a safe and convenient access for pedestrians throughout the City. It should be the ultimate goal of the management agencies to clear all sidewalks in the winter and summer to enhance mobility, access to schools, commercial areas, recreational opportunities, and public safety. Sidewalk maintenance is typically the responsibility of the home or business owner unless the sidewalk is along publically owned property in which case it would be maintained by the Public Works Department or UDOT.

Table 10.6 – Recommended Sidewalk/Walkway Maintenance Activities

Maintenance Activity	Frequency
Inspections	Seasonal – at beginning of Spring and end of Summer
Shoulder plant trimming (weeds, trees, brambles)	Twice a year; middle of growing season and early Fall
Tree and shrub plantings, trimming	1 – 3 years
Major damage response (washouts, fallen trees, flooding)	As soon as possible

10.7 Bicycle & Pedestrian Funding Sources

The following section outlines sources of funding for bicycle and pedestrian projects in Utah. The chapter identifies Federal, State, and Private sources of funding. Funding sources can be used for a variety of activities, including: planning, design, implementation and maintenance. It should be noted that this section reflects the funding available at the time of writing. The funding amounts, fund cycles, and even the programs themselves are susceptible to change without notice.

10.7.1 Federal

Federal funding is primarily distributed through a number of different programs established by the Federal Transportation Act. The latest federal transportation act, The Safe, Accountable, Flexible, Efficient Transportation Equity Act – a Legacy for Users (SAFETEA-LU) was enacted August 2005, as Public Law 109-59. SAFETEA-LU authorizes the Federal surface transportation programs for highways, highway safety, and transit for the 5-year period 2005-2009. Since 2009 extensions of SAFETEA-LU have been passed to maintain funding levels. The scheduled update to the Federal Transportation bill has yet to be passed.

Petroleum Violation Escrow Account (PVEA)

PVEA funds come from fines paid by oil companies in the 70's for violating oil price caps set by the federal government. The Department of Energy's State Energy and Weatherization Assistance Program distributes the money at the state level through grants. PVEA funds projects with an emphasis on energy saving, including public transportation and bridge construction or maintenance.

Transportation, Community, and System Preservation Program (TSCP)

Implementation grants under the TCSP Program are intended to provide financial resources to States, metropolitan planning organizations, local governments and tribal governments to enable them to carry out activities that address transportation efficiency while meeting community preservation and environmental goals. Examples of such policies or programs include spending policies that direct funds to high-growth regions of the country; urban growth boundaries to guide metropolitan expansion; "green corridors" programs that provide access to major highway corridors in areas targeted for efficient and compact development.

National Highway System (NHS)

This program funds improvements to rural and urban roads that are part of the National Highway System (NHS), including the interstate system. Bicycle and pedestrian facilities within NHS corridors are eligible activities for NHS funds.

Recreational Trails Program (RTP)

The Recreational Trails Program provides funds to states to develop and maintain recreational trails and trail-related facilities for both non-motorized and motorized recreational trail uses. Examples of trail uses include hiking, bicycling, in-line skating, equestrian use, and other non-motorized as well as motorized uses.

Recreational Trails Program funds may be used for:

- Maintenance and restoration of existing trails.
- Development and rehabilitation of trailside and trailhead facilities and trail linkages.
- Purchase and lease of trail construction and maintenance equipment.
- Construction of new trails (with restrictions for new trails on federal lands).
- Acquisition of easements or property for trails.
- State administrative costs related to this program (limited to seven percent of a State's funds).

- Operation of educational programs to promote safety and environmental protection related to trails (limited to five percent of a State's funds).

Surface Transportation Program (STP)

The Surface Transportation Program (STP) provides States with flexible funds, which may be used for a wide variety of projects on any Federal-aid Highway including the NHS, bridges on any public road, and transit facilities.

Bicycle and pedestrian improvements are eligible activities under the STP. This covers a wide variety of projects such as on-road facilities, off-road trails, sidewalks, crosswalks, bicycle and pedestrian signals, parking, and other ancillary facilities. SAFETEA-LU also specifically clarifies that the modification of sidewalks to comply with the requirements of the Americans with Disabilities Act is an eligible activity.

As an exception to the general rule described above, STP-funded bicycle and pedestrian facilities may be located on local and collector roads that are not part of the Federal-aid Highway System. In addition, bicycle-related non-construction projects, such as maps, coordinator positions, and encouragement programs, are eligible for STP funds.

10.7.2State Funding Sources

Utah has state funding sources for the development and maintenance of bicycle and pedestrian projects and programs.

Centennial Non-Motorized Paths and Trails Crossings (CNMPTC)

This program is administered by the Utah Department of Natural Resources – Parks and Recreation Division. Funding from the CNMPTC is reserved for projects creating safe and continuous paths and trails for bicyclists and pedestrians. This funding source can also be used to give bicycle and pedestrian access across highways or other impediments. A fifty percent local match is required.

Non-motorized Recreation Trails Program

The Parks and Recreation Division of the DNR also provide funding through the Non-motorized Trails program. Funds from this program can be used for signage, trails and rights-of-way. The sponsoring jurisdiction is required to provide local matching funds.

Safe Sidewalk Program

The Utah Department of Transportation administers this program and requires a 25% local match. Funds for the Safe Sidewalk program are for the construction of sidewalks on State roads, with an emphasis on roads that children will be using to get to school.

Safe Routes to School (SRTS) Program

The Safe Routes to School Program was created under Section 1404 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). The objective of SRTS is to encourage children K-8 to walk and bike to school. Consistent with other federal-aid programs, each State Department of Transportation (DOT) is held responsible for the development and implementation of grant funds made available to the states through this program throughout the life of SAFETEA-LU. Utah is a minimum apportionment state and receives $1,000,000 annually. The Utah Department of Transportation (UDOT) solicits grant applications on a yearly basis. However, applications will not be considered in 2010 because UDOT has already awarded two years worth of projects and does not have money for new projects at this time. In addition, reauthorization of the federal transportation bill is underway in the U.S. Congress at the present time, and it is unclear what funding level will be allocated to the SRTS program going forward.

Some expected outcomes of the program include:

- Increased bicycle, pedestrian, and traffic safety around schools.

- More children walking and bicycling to and from schools.
- Decreased traffic congestion around schools.
- Reduced childhood obesity.
- Improved air quality, community safety and security, and community involvement.
- Improved partnerships among schools, local agencies, parents, community groups, and nonprofit organizations.

A minimum of 70 percent of each year's apportionment will be made available for infrastructure projects with up to 30 percent for non-infrastructure projects.

Infrastructure Projects

Infrastructure projects are engineering projects or capital improvements that will substantially improve safety and the ability of students to walk and bicycle to school. They typically involve the planning, design, and construction of facilities within a two-mile radius of a grade school or middle school. The maximum funding cap for an infrastructure project is $1 million. The project cost estimate may include eligible direct and indirect costs. Direct costs include the cost of construction and materials. Indirect costs may include salaried employees or staff time allotted to the project.

Infrastructure projects should directly support increased safety and convenience for children in Kindergarten through 8th grade (including children with disabilities) to walk and bicycle to school.

Eligible projects may include but are not limited to:

- New bicycle trails and paths, bicycle racks, bicycle lane striping and widening, new sidewalks, widening of sidewalks, sidewalk gap closures, curbs, gutters, and curb ramps. They can also include new pedestrian trails, paths, and pedestrian over and under crossings, roundabouts, bulb-outs, speed bumps, raised intersections, median refuges, narrowed traffic lanes, lane reductions, full or half-street closures, and other speed reduction techniques.
- Included in the category of traffic control devices are: new or upgraded traffic signals, crosswalks, pavement markings, traffic signs, traffic stripes, in-roadway crosswalk lights, flashing beacons, bicycle-sensitive signal actuation devices, pedestrian countdown signals, vehicle speed feedback signs, pedestrian activated upgrades, and all other pedestrian and bicycle-related traffic control devices.

Non-Infrastructure Projects

Non-infrastructure projects are education/encouragement/enforcement activities that are intended to change community behavior, attitudes, and social norms to make it safer for children in grades K-8 to walk and bicycle to school. Non-infrastructure projects should increase the likelihood of programs becoming institutionalized once in place. Deliverables from a non-infrastructure project must be clearly stated in the application and tangible samples must be attached to the final invoice or Progress Report, i.e., sample training materials or promotional brochures. The funding cap for a non-infrastructure project is $500,000. Multi-year funding allows the applicant to staff up and deliver their project over the course of four (4) years, thereby reducing overhead and increasing project sustainability.

Non-infrastructure projects must fall into one or more of the following categories. Note: While typical non-infrastructure projects would fall under one or more of the top five E's listed below, it is conceivable that certain non-infrastructure activities may involve design professionals in some capacity. For that reason, it is included as one of the five E's below.

- **Education** – Teaching children about the broad range of transportation choices, instructing them in important lifelong bicycling and walking safety skills, and launching driver safety campaigns in the vicinity of schools.

- **Enforcement** – Partnering with local law enforcement to ensure traffic laws are obeyed in the vicinity of schools (this includes enforcement of speeds, yielding to pedestrians in crossings, and proper walking and bicycling behaviors), and initiating community enforcement such as crossing guard programs or pedestrian right-of-way sting programs.
- **Encouragement** – Using events and activities to promote walking and bicycling.
- **Evaluation** – Monitoring and documenting outcomes and trends through the collection of data, including the collection of data before and after the intervention(s).
- **Engineering** – Creating operational and physical improvements to the infrastructure surrounding schools that reduce speeds and potential conflicts with motor vehicle traffic, and establish safer and fully accessible crossings, walkways, trails and bikeways.

Eligible projects may target a single local school or school district, or the State as a whole. The most effective non-infrastructure activities are conducted within the framework of a community coalition. Thus, it is strongly suggested that an SRTS community coalition be established. A community coalition is generally created through a walkable/bikeable Community Workshop convened of community stakeholders to identify, and then pursue concrete steps to make the community more walkable and bikeable. The workshop serves as the impetus to bring together key partners, including schools, elected officials, local government, parks and recreation, law enforcement, emergency services, public health, business owners, residents, advocacy groups and other organizations that can serve as core members of a community coalition to design and implement a plan, which incorporates the five Es. The following recommendations can be supported through BTA funds, and are found within the BPMP:

- Hiring a Program Manager to coordinate SRTS efforts and volunteers at several schools.
- Conducting a Walkable Community Workshop, which includes a walk and bicycle audit.
- Providing a community with a walkability checklist.
- Providing modest incentives for SRTS contests and other incentives that encourage more walking and bicycling over time.
- Paying for a substitute teacher if needed to cover for faculty attending SRTS functions during school hours.
- Procuring equipment and training needed for establishing crossing guard programs.
- Conducting outreach to local press and community leaders.
- Paying for the cost of additional traffic enforcement or equipment needed for enforcement activities.
- Paying for traffic education and enforcement in the vicinity of schools.
- Forming student sessions on bicycle and pedestrian safety, health, and environmental impacts.
- Developing "Suggested SRTS Maps."

10.7.3 Regional Funding Sources

Congestion Mitigation and Air Quality (CMAQ) Improvement Program

The Mountainland Association of Governments (MAG) administers the CMAQ program for the Utah Valley. The Congestion Mitigation and Air Quality (CMAQ) Improvement Program, provides a flexible funding source to state and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act, and its amendments. CMAQ funds support transportation projects within areas designated by the Environmental Protection Agency as nonattainment or maintenance areas by reducing mobile source emissions. Eligible projects include transit improvements, bicycle and pedestrian facilities.

Surface Transportation Program (STP)

The Mountainland Association of Governments (MAG) administers the STP program for the Utah Valley. STP funds are suballocated within each state between urbanized areas with a UZA population over 200,000 and the rest of the state in proportion to their relative share of the total state population. STP is the largest FHWA flexible funds program. Funding is at 80 percent Federal share and may be used for all projects eligible for funds under current FTA programs including pedestrian and bicycle improvements.

10.7.4Local Funding Sources

Cultural Arts and Recreation Enrichment Tax ("CARE", "RAP" or "ZAP" tax)

This tax levied in Orem is a local sales and use tax of 1/10 of 1%. Started in 2006 for a period of 8 years, this tax could be used to fund recreational trails in Orem.

Local Bond Measures

Local bond measures, or levies, are usually initiated by voter-approved general obligation bonds for specific projects. Bond measures are typically limited by time based on the debt load of the local government or the project under focus. Funding from bond measures can be used for right-of-way acquisition, engineering, design and construction of pedestrian and bicycle facilities.

Street Maintenance Fees

The City of Orem has administers street user maintenance fees generated from individual property owners. The revenue generated by the fee is used for operations and maintenance of the street system, and priorities are established by the Public Works Department. Revenue from this fund should be used to maintain on-street bicycle and pedestrian facilities, including routine sweeping of bicycle lanes and other designated bicycle routes.

Integration into Larger Projects

The State of Utah's "routine accommodation" policy (07-117) states that "it is the policy of the Utah Department of Transportation (UDOT) that bicycle and pedestrian transportation needs will be considered in all new construction and reconstruction State road projects." The City of Orem can expect that some portion of bicycle or pedestrian project costs, when they are built as part of larger transportation projects, will be covered in project construction budgets. This applies to UDOT facilities.

10.7.5Private & Non Profit

The following are funding sources capable of supporting bicycle and pedestrian facilities and programs from private and non-profit sources.

Bikes Belong Coalition, Ltd.

The Bikes Belong Coalition is sponsored by the American Bicycle Industry with a mission of encouraging more people to ride bicycles throughout the United States. Grants of up to $10,000 are administered to develop bicycle facilities through the Federal Transportation Act.

Robert Wood Johnson Foundation (RWJF)

RWJF funds are designed to improve health and health care in the United States. RWJF funds approximately 12 percent of unsolicited projects with grant-funds ranging from $2,000 to $14 million. Bicycle and pedestrian projects applying for RWJF funds would qualify under the programs goal to "promote healthy communities and lifestyles."