

Other Modes of Transportation – White Paper



To: Jim Olson, *City of Ashland*

Cc: Project Management Team

From: Adrian Witte, *Alta Planning + Design*

Date: December 30, 2010

Re: Task 7.1.Y White Paper: "Other Modes of Transportation" - DRAFT

Direction to the Planning Commission and Transportation Commission

Five sets of white papers are being produced to present information on tools, opportunities, and potential strategies that could help Ashland become a nationwide leader as a green transportation community. Each white paper will present general information regarding a topic and then provide ideas on where and how that tool, strategy, and/or policy could be used within Ashland.

You will have the opportunity to review the content of each white paper and share your thoughts, concerns, questions, and ideas in a joint Planning Commission/Transportation Commission meeting. Based on discussions at the meeting, the material in the white paper will be: 1) Revised and incorporated into the alternatives analysis for the draft TSP; or 2) Eliminated from consideration and excluded from the alternatives analysis. The overall intent of the white paper series is to explore opportunities for Ashland and increase the opportunities to discuss the many possibilities for Ashland.

Other Modes of Transportation White Paper Introduction

The intent of this paper is to present innovative ideas that go beyond the foundational pedestrian and bicycle network elements of the transportation system and equip the reader with enough information to determine whether these applications are appropriate for Ashland. It will review current practices in other communities to: better understand what is required to achieve gold or platinum Bicycle Friendly Community status; identify technologies and techniques to overcome topography; present innovative pedestrian and bike parking solutions; explore the opportunity for a local bike share program; and review policies on skateboards, wheelchairs, and other active transportation modes.

“Going Platinum”

The City of Ashland is currently recognized by the League of American Bicyclists as a “bronze level” *Bicycle Friendly Community*¹. This program recognizes community achievements in a variety of bicycle-related areas including education, encouragement, engineering, enforcement and evaluation. City staff has indicated its future desire to achieve platinum status, the highest award possible.

There are a total of 124 communities that have been recognized as Bicycle Friendly Communities in the United States, including 33 communities with populations less than 50,000 people (including Ashland). Only three of 124 cities have achieved platinum status - Portland, OR, Boulder, CO, and Davis, CA - and there are a further 10 gold-level cities. In general, bicycle friendly communities have a number of common elements including:

- A commitment to cycling that includes appropriate planning and political support.
- Identified targets for cycling participation and measures to evaluate progress towards these goals.
- A comprehensive cycling network and a complete streets policy.
- A breadth of programs that covers the “5 E’s”: education, encouragement, engineering, enforcement and evaluation.
- Participation: most importantly they have people riding bikes!

Some of the more innovative features amongst smaller and mid-sized BFCs are summarized in **Table 1**.

Table 1. Small- to Mid-Sized Bicycle Friendly Community Features

Community	BFC Level	Features
Boulder, CO (Pop. 101,500)	Platinum	<ul style="list-style-type: none"> - 380-mile bicycle network including 78 underpasses on the multi-use trail system. - Complete streets policy – 95% bicycle facility coverage of arterial street system. - GoBikeBoulder.net website for routes, terrain, traffic, mileage, calories, etc. - Transit Village development – goal of 55-70% of all trips made by non-auto. - Encouragement programs, cycling events, bicycle business development.

¹ More information on the League of American Bicyclists’ BFC program can be found at <http://www.bikeleague.org>. A similar community rating system for pedestrians has recently been established by the FHWA. More information can be found at <http://www.walkfriendly.org/>.

Table 1 (cont.). Small- to Mid-Sized Bicycle Friendly Community Features

Community	BFC Level	Features
Davis, CA (Pop. 63,722)	Platinum	<ul style="list-style-type: none"> - \$14 million expenditure on bicycle infrastructure in last 10 years. - 95% bicycle facility coverage of arterial and collector streets; 27 grade-separations. - High profile events: e.g. Cyclebration, Tour of California, US Bicycling Hall of Fame. - Comprehensive plan and extensive implementation structure.
Corvallis, OR (Pop. 63,165)	Gold	<ul style="list-style-type: none"> - 97% bike lane coverage of arterial streets. - Enforcement includes education in-lieu of a citation and a “Directed Patrols” list updated from citizen comment.
Jackson and Teton County, WY (Pop. 8,647)	Gold	<ul style="list-style-type: none"> - Approval of \$6 million from an optional 1 cent sales tax for pathways. - Parking for 400 bicycles during “Music in the Hole” concert. - Updated bicycle ordinances and legal framework for bicyclists.
Bellingham, WA (Pop. 73,460)	Silver	<ul style="list-style-type: none"> - Environmentally sensitive design including porous concrete bike lanes, embankment bike lane through sensitive wetland, etc. - Amendment to Concurrency Ordinance to focus on multi-modal transportation. - Individualized TravelSmart marketing – 35% increase in cycle trips.
Columbia, MO (Pop. 96,093)	Silver	<ul style="list-style-type: none"> - Errand Bike program makes bikes available to employees for short trips. - Cycle Recycle and Earn-a-Bike programs to distribute bicycles. - Way To Go To Work and Neighbors on the Go encouragement programs.
Durango, CO (Pop. 15,878)	Silver	<ul style="list-style-type: none"> - 0.25% sales tax increase to fund trails and open spaces. - Enhanced profile through racing and mountain biking.
Missoula, MT (Pop. 57,053)	Silver	<ul style="list-style-type: none"> - Opened a separated cycle track through downtown. - Bicycle Ambassadors provide cycling instruction at busy intersections. - Community bike loan and bike share programs.
San Luis Obispo, CA (Pop. 44,174)	Silver	<ul style="list-style-type: none"> - Bicycle Plan for 100% coverage of arterial street network. - Bicycle detection at all major intersections. - Bike valet services at community events.

Table 1 (cont.). Small- to Mid-Sized Bicycle Friendly Community Features

Community	BFC Level	Features
Santa Cruz, CA (Pop. 54,593)	Silver	<ul style="list-style-type: none"> - Protected two-way on-street bike lane. - Smart Card bicycle lockers. - Zero-interest bike loan program (offered by Ecology Action).
Steamboat Springs, CO (Pop. 9,815)	Silver	<ul style="list-style-type: none"> - 266 miles of natural surface trail. - Land exchange with Bureau of Land Management for trail construction. - Motorist education programs (“Don’t be a Road Hog”).
Arcata, CA (Pop. 16,651)	Bronze	<ul style="list-style-type: none"> - Bike library refurbishes and distributes bikes. - 95% arterial street coverage and bicycle activation at all signals.

* More information on these and other Bicycle Friendly Communities is available from the League of American Bicyclists’ 2010 *Bicycle Friendly America* yearbook.

Select Programs from Table 1:

Bicycle-Oriented Businesses: developments and businesses that encourage cycling or orient themselves around bikes and bicycle infrastructure. Example: The Hub, Portland (corner of NE Williams Avenue and Failing Street).

Directed Patrols: police enforcement targeted at specific locations identified through public complaints and requests.

TravelSmart: targeted marketing materials sent to interested individuals to inform and encourage participation in automobile alternatives.

Errand Bikes: a fleet of bicycles kept at a business location that can be checked out by employees for short errands.

Cycle Recycle: organizations or programs that refurbish old or donated bicycles and then distribute them to targeted communities. **Earn-a-Bike** is similar but requires participants to donate time and/or skills to the program in exchange for the final recycled bicycle.

Way to Go to Work: a festival of bike-related programs to encourage increased cycling, e.g. the program in Columbia, MO includes lunch seminars, guided bike rides, giveaways, etc.

Bike Loan / Bike Library: a publically available fleet of bicycles that can be checked out for a specified time (operates similar to a public library).

Zero- or Low-Interest Bike Loans: allows individuals to borrow up to \$750 interest free for a year to purchase bicycles and related equipment.

There is no prescribed formula towards gaining silver, gold, or platinum BFC status. However these awards require distinguished achievement in each of the five E’s. Based on the common elements of communities achieving these status levels, some suggested goals for Ashland include:

- **Engineering:**

- Bicycle facility coverage of greater than 90% on the boulevard and collector street system. Ashland currently has bike lane or bike shoulder coverage of 78% and 35% for the boulevard and collector street systems respectively.
- Protected facilities in the form of off-street trails, cycle tracks, etc. Ashland currently has approximately 7 miles of off-street trails and should have a goal to provide a comprehensive network of comfortable off-street or low-stress alternatives (e.g. bicycle boulevards and protected facilities).
- Improved intersection crossings including bicycle detection at all signalized intersections and/or grade separated off-street facilities. Grade separated options may not be cost-effective for Ashland, but signal upgrades and new intersections can include bicycle detectors to be installed as standard equipment.
- Innovative funding such as an optional sales tax or expanded transportation SDC program to fund infrastructure and programs.

- **Programs:**

- City Staffing: a dedicated pedestrian/bicycle coordinator or an allocated portion of an existing position dedicated to these activities.
- Encouragement: events and programs that invite participation. The largest benefit comes from high-exposure events and programs targeting audiences with the highest potential such as children and college-level students. Examples: Sunday Parkways, Ride-to-Work Week, or TravelSmart.
- Education: invest in programs that provide both cyclist and motorist education. Examples: the City has been working with the BTA since 1999 to provide bicycle education in Ashland's schools (grades 5 – 8). These programs train approximately 500 students in a 10-hour long course. Other future education programs could include adult skills and driver training courses, professional development courses for staff, etc.
- Enforcement: coordinated and targeted enforcement of bicycling and driving infractions. Added benefit can come from using education in lieu of paying a citation. Examples: advertising campaigns, targeted enforcement strategies.
- Evaluation: monitoring the success of programs through counts and surveys. These can also be education and encouragement tools through public reporting of successes and displays such as bike counters on Highway 99.

- **Access to Bicycles:**

- Emphasize bicycle-oriented and bicycle friendly businesses and developments.
- Provide greater access to bicycles through low-interest bike loans, bike recycling and refurbishment, bike sharing, and other programs.

Overcoming Topography

For many cyclists, grades greater than 5-percent are undesirable because “the ascents are difficult to climb and the descents cause some bicyclists to exceed the speeds at which they are competent or comfortable” (AASHTO). Ashland’s steep topography, particularly on the southern side of OR 99 is a significant barrier to cycle route planning and attracting new riders. Some possible solutions to overcoming topography are discussed below.

Design Solutions

Many hills can be avoided through smart planning of the bicycle network. However the topography and other physical features in Ashland make avoidance of hills almost impossible - particularly south of OR 99. The AASHTO *Guide to the Development of Bicycle Facilities* (1999) suggests that the desirable maximum grade of 5-percent be exceeded only for short sections shown in **Table 2**.

In terms of physical design, sharp turns should be avoided at the end of a descent and in the uphill direction, switchbacks can be incorporated into off-street facility design to make climbs more manageable. For on-street facilities with grades greater than 4-percent and over 300 feet in length, a wider-than-normal uphill bike lane offers protection to bicyclists as their relative speed is reduced significantly compared to motor vehicles. It also allows cyclists “wobble room” as they weave left to right to maintain speed. Providing shared lane markings in the downhill direction allows cyclists, who are generally travelling at speeds similar to vehicles, to share the travel lane and move away from parked cars.

Table 2: Suggested Grade Restrictions (AASHTO)

Grade	Max. Distance
5 – 6%	800 feet
7%	400 feet
8%	300 feet
9%	200 feet
10%	100 feet
11+%	50 feet

There are a number of technological solutions to facilitate uphill bicycling (see below). However, in many ways it is more difficult to design for downhill travel. Many (especially newer) cyclists have concerns about steep descents and where possible these should be signed and space provided for walking a bike downhill. Low volume and low speed traffic environments are also preferable as they provide more space and added comfort to operate downhill.

Bike Technology

Electric bikes can provide power assistance to supplement regular pedaling. The ability to maintain more consistent speed, reduce effort, and cover longer distances has been effective in opening cycling to a number of new rider groups such as those that require additional power to pedal up steep hills or to cover long distances as well as to keep older cyclists cycling for longer or encourage weaker cyclists to ride. The purchase price of an electric bike ranges from \$500 to \$1,500 and a number of communities offer incentives to encourage the purchase and use of electric bikes including:

- Santa Cruz County, California: offered a \$375 rebate through the Ecology Action organization towards the purchase of an electric bike. This program has now finished but 1,200 people made use of it between 2000 and 2006. A survey in 2006 found that 62% of participants had switched from exclusively driving to using an electric bike, some of them travelling between 24 – 28 miles per week.²
- Austin, Texas: the Austin Electric Vehicle organization and Austin Energy offer a \$250 rebate for conversion of a regular bike to an electric bike.
- Pasadena, California: the MyGo - Pasadena demonstration project operated between 2007 and 2008 offered a \$500 purchase rebate for select, locally sold electric bikes and cash incentives for their continued use.
- Paris, France: offers a rebate of 25% towards the purchase price (up to €400).
- New Delhi, India: rebates 27.5% of the purchase price through direct subsidy and tax refunds.
- Chinese Environmental Protection Agency: subsidizes approximately 10% - 15% of purchase price.

Cable Propelled Transit

There are a number of transit systems – primarily cable propelled that can be used to transport cyclists up steep hills. Some of these require significant investment and infrastructure while others are localized technologies that could be more cost effectively implemented.

Funicular

Traditional funiculars use a cable and pulley system under a rail track to move a pair of tram-like vehicles that counterbalance one another up and down a steep slope. Many modern funiculars operate more like inclined elevators driven by a cog and rail system with an electric motor on the car itself (i.e. no cables). Cars can carry 5 – 20 persons and could be equipped to carry bicycles.

² Stern, Rachel (2006). “*Sing the Bike Electric*” North Bay Bohemian.



General costs are hard to determine given the variation and uniqueness of each system, but some recent examples include:

- Cairngorm Mountain Ski Resort, Scotland: \$40 million (2001 – includes operations costs) – 2,200 yards.
- Moses Mabhida Stadium, Durban, South Africa: \$2.8 million (2009 – construction costs only) - 380 yards.

Gondola / Chair Lift

Ski hill technologies such as gondolas and chair lifts that use overhead cable systems are also possible for bicycle carriage and although the expense of these systems probably makes them infeasible in Ashland, their novelty to tourists, potential link with recreational trails and mountain biking, as well as their ability to span difficult terrain (such as creeks and ravines) offer several advantages over traditional and other cable-based systems.



Trampe

A more cost-effective and less intrusive solution may be a bicycle lift. The only known technology of this type is the commercially available Trampe bicycle lift that is installed on a 425-foot hill in Trondheim, Norway that has a grade of 20%.

In Trondheim cyclists pay a nominal fee to use the lift by obtaining a pre-paid key card. The cyclist remains on their bike and whilst in a standing position, places their right foot on a footplate, then pushes a button to initiate the system. Moving cables below the road surface propel the foot plate and the rider up the hill. The cyclist must maintain steering of the bicycle but can detach at any time. The device operates with a theoretical capacity of 300 cyclists per hour. A video of its operation can be found on the manufacturer's website.

Trampe (Trondheim, Norway)

Installation Date: August 1993 – attended facility for first 9 months of operation.

Length: 425 feet (could be built up to 1,300 feet).

Usage: 20,000 – 30,000 trips per year.

Speed: 5.0 – 6.5 feet / second.

Safety Record: No incidents reported.

Cost: \$400 - \$500 / foot.

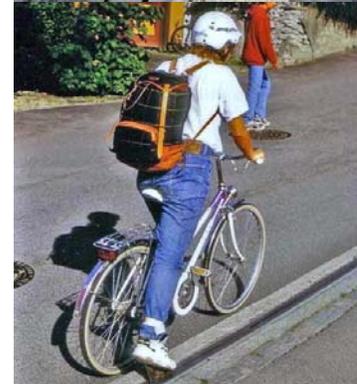
Slopes: appropriate up to 1:5.

Design: Usage envelope approximately 3-feet wide.

Curves: radius not less than 80 feet can be accommodated.

Ease-of-Use: 71% of users found it “easy to use”.

www.trampe.no/english



Bicycle Parking

Bicycle parking and end-of-trip facilities can be a determining factor in whether someone decides to make a bicycle trip. Providing riders “somewhere to park” is one of the cornerstones of the bicycle transportation system along with providing somewhere to ride and a reason to ride. It is valuable in attracting additional clientele and promoting local business, creating a more orderly streetscape by protecting street furniture and preserving the pedestrian right-of-way, and equalizing cyclists with other modes. It includes both long- and short-term parking, which cater to different cycling groups depending largely on their trip duration and desired level of protection from weather and theft.

Parking Types

There are numerous bike parking solutions available that can be tailored to the needs and resources of a specific community. The major categories of parking are described below along with cost information and an example of the application.

Short-Term	
<p>Bike Racks</p> <p>Bike racks permit the locking of the bicycle frame and at least one wheel to the rack and support the bicycle in a stable position without damage to wheels, frame or components. Bike racks should be located as close as possible to destinations. Weather protection can be added through use of building awnings or by adding a shelter (as is the case in a number of locations in Ashland). Custom racks using creative designs can double as public artwork or advertising space for local businesses. “Post and ring” style racks can be retrofitted to parking meters.</p> <p>\$150 - \$300 each (\$75 - \$150 / space)</p>	 <p style="text-align: center;">Ring and Post Bike Racks, Toronto.</p>
<p>Bike Corrals</p> <p>Bike corrals are a series of bike racks that typically replace one or two on-street motor vehicle parking spaces. They should be considered where there is: limited space on the sidewalk; moderate to high demand for short-term bicycle parking; and an over-supply of on-street vehicular parking.</p> <p>In many communities the installation of bike corrals is driven by requests from adjacent businesses, in which case motor vehicle parking is not removed unless explicitly requested, and for which maintenance agreements are established with the business.</p> <p>Up to \$3,000 - \$4,000 each (\$125 - \$165 / space)</p>	 <p style="text-align: center;">Bike Corral, Portland.</p>
<p>Bike Valet</p> <p>Particularly relevant for large and infrequent events (such as summer festivals, farmers markets, Shakespeare Festival events, etc.) valet bicycle parking operates like a coat check. The rider gives the bike to an attendant in exchange for a receipt. The bike is placed in a secure area and is returned to the rider upon presentation of the receipt. These facilities can be provided using secure, portable structures and temporary employees (often these are a revenue generator for the local bicycle advocacy group).</p>	 <p style="text-align: center;">Bike Valet, 2010 Winter Olympics, Vancouver BC.</p>

Long-Term

Lockers

Bicycle lockers are enclosed metal or plastic boxes that securely store bikes horizontally or vertically. Traditionally, users pre-register and are given a key or a code to access a particular locker. Recent technologies have allowed keyless access using a PIN number, SmartCard, or cell phone. This allows multiple users to use the same locker – however does not ensure availability.

Bicycle lockers are most appropriate where demands for long-term parking are highest, e.g. at transit exchanges, park-and-rides and at higher density employment / commercial areas and universities.

\$1,000 - \$4,000 each (\$500 - \$2,000 / space)*



Bike Lockers, Fargo.

Bicycle Compounds / Bicycle Rooms

Bicycle compounds are fully enclosed, stand-alone bicycle parking structures that can accommodate up to 100 or more bicycles. Some are completely modular allowing them to be moved if necessary. Security is enhanced with a locked gate accessed by PIN code, key, or key card and sometimes video surveillance. Secure bike racks within the compound are still necessary to limit theft from others who have access.

Bicycle compounds are recommended for employee bicycle parking areas, at transit exchanges, and at schools. Bicycle rooms tend to be smaller and are located within solid walls, typically within residential buildings.

\$250,000 (\$3,400 / space) – Sunset Transit Center, Portland OR*



Sunset Transit Center, Portland.

Bike Centers

Bike Centers are attended facilities used for short- and long-term bicycle parking that usually also feature an extensive range of bike-related services including: bike retail, rentals, repairs, accessory sales, shower and change facilities, laundry and travel information. Many include cafes, juice bars, or other complementary businesses.

Bike Centers can be “transit-oriented” providing a place to park before completing a trip on transit, or “commuter-oriented” with a central facility providing parking at high-density mixed-use locations.

\$50,000 - \$800,000 (\$3,000 - \$5,000 / space) – transit-oriented

> \$1 million (>\$4,000 / space) - architecturally designed commuter-oriented



Bikestation, Seattle.

Long-Term

Automated Parking

Typically applied in very high-use areas, automated solutions provide a totally secure, weather protected, and unattended form of outdoor parking that stacks bicycles above-, at-, or below-grade to reduce the footprint of bicycle parking and increase visual appeal at street level.

These facilities can process or retrieve a bicycle in less than 30 seconds and many can also accommodate small personal items such as a helmet and back pack. Examples include Eco Cycle (Japan), Josta Bike Tower (Germany), Biciberg (Spain), Bikedispenser (Netherlands) and others.

\$100,000 - \$200,000 each (\$1,000 - \$2,000 / space) Bikedispenser



Bikedispenser, Netherlands.

Modular Facilities

Modular facilities that provide bicycle parking and end-of-trip facilities are gaining more attention as they can be easily expanded or moved as necessary. These can be fitted within existing parking spaces and facilities such as the Green Pod (<http://pushbikeparking.com/green-pod>) use the footprint of a single parking space to provide a shower, a change room, and space for 20 bicycles. This particular system can be powered by solar panels, provides an electronic locking system, lights activated by motion sensor, timed showers, and a self-cleaning mechanism.



Green Pod, Melbourne, Australia.

* Some costs can be recovered through collection of user fees.

Delivering Bicycle Parking

A comprehensive network of bicycle parking can be created through developer requirements supplemented by a bike rack program that retrofits existing areas. These are described below.

Bike Rack Program

- The City can supplement existing bicycle parking either at public expense or jointly funded by interested business and land owners. This can be applied to bike racks, bike shelters, bike lockers, or bike corrals. The City has provided and installed bike racks in the C-1-D zone (Downtown) since the 1990's and more recently (2009) in cooperation with an employee bicycle program funded by Standing Stone Brewing, the City created an on-street bike corral outside the business.

Development Bicycle Parking Rates

- Bicycle parking requirements for development or redevelopment are outlined in Part 18.92.040 of the City's *Municipal Code*. These relate the number of sheltered bicycle parking spaces required as a function of residential units, the number of students for schools, or required vehicle parking spaces for other uses. There are no specified requirements for end-of-trip facilities such as clothing lockers, washrooms, and shower facilities.

Incentives

- Beyond the Municipal Code requirements, incentives can be introduced into ordinances or policies to encourage greater provision of bicycle parking and end-of-trip facilities, e.g.:
 - Providing motor vehicle parking relaxations where bicycle parking is provided beyond the minimum requirements.
 - Providing motor vehicle parking relaxations where complete end-of-trip facilities are provided, i.e. long- and short-term parking plus showers, washrooms, and clothing lockers.
 - In space constrained applications, such as heritage buildings, allow for the conversion of motor vehicle parking spaces into long-term bicycle parking to meet the bylaw requirement (typically 5 bicycle parking spaces can be achieved per motor vehicle parking space).
 - Authorize collection of funds in-lieu of motor vehicle parking to be placed in a sustainable transportation infrastructure fund. Funds can be applied to active transportation infrastructure including parking, but should not replace development bicycle parking requirements.

Inventory

- An inventory of publically available bicycle parking is useful and can be incorporated into a Bicycle Network Map or made available on-line, e.g. New York has a Google map and PDA application that shows the location of outdoor, sheltered, and indoor bicycle parking.



New York City Bicycle Parking Inventory.

Bike Share Programs

Bike share programs provide convenient access to bicycles for short trips, transit-linked trips, and/or tourist trips. Bikes are “rented” from any number of stations set up around a City and can be returned to the same or any other station. The program encourages short trips with a pricing structure that is generally free for trips less than 30 minutes and increasing for longer trips. Access to the program can be purchased through a short-term (typically around \$5/day) or annual (typically around \$60/year) membership.

The international community has experimented with bike share programs for nearly 40 years and until recently had low to moderate success because of theft and vandalism. In the last five years, innovations in technology have resulted in greater accountability and given rise to a new generation of technology-driven bike share programs that are currently operated in Montreal, Minneapolis, Denver, and Washington DC. Lower technology examples have also been successfully implemented in smaller cities and at university and employment campuses. Some examples of smaller-scale bike share systems include:



Nice Ride, Minneapolis.

- Cornell University: 40 bikes at 4 stations funded by allocating \$1 of the student activity fee to the program (annual budget of \$14,000).
- Northern Arizona University: low-technology 45 bike system.
- Washington State University: higher-technology system (similar to BIXI in Montreal and Nice Ride in Minneapolis) that allows bikes to be rented for 24-hours from 3 stations around campus. The 32-bicycle program is funded entirely by students and is an update of the lower technology Wellbeing Green Bike Program.
- Tulsa Townies: operated since 2007 by the Saint Francis Health System, bikes are provided at four stations. Rentals are processed at a terminal at the station using a credit card (for identification and theft deterrence). In addition, Tulsa Transit offers a “bike library” where users can “borrow” a bicycle for up to 24 hours.
- Buffalo Blue Bicycles (see inset).

An initial bike share system in Ashland might consist of 5 – 7 stations (approximately 35 bikes). Clientele could come from a variety of sources, but would be well supported by tourists and students. As such stations should be located in close proximity to hotels and education campuses such as SOU as well as near high activity centers along OR 99 and Main Street - connected with safe bike routes.

Typical costs include capital of approximately \$3,000 - \$4,000 per bike and an annual operating cost in the order of \$1,500 per bike. Current operations in Washington DC and Minneapolis show usage rates of approximately 1.0 – 2.0 trips / bike / day, of which approximately 20% replace a previous driving trip (this could be more in a smaller town setting). The immediacy and accessibility of a bike share system makes it an effective form of personalized public transit. Further, recent North American systems have recorded very low rates of theft and vandalism.

Bike Share Case Study – Buffalo Blue Bicycles

Operator: Green Options Buffalo.

Fleet: 75 recycled bikes.

Stations: 9 stations (bike racks) located at the City's local university and medical campuses (some campuses have multiple hubs to enable internal trips).

Cost: members join the program for an annual fee of \$25 or six hours of volunteer service and “check-out” bicycles on-line for no additional cost.

How it works: Bicycles are locked to racks at the stations. Users “check-out” bicycles on-line where they are provided a unique PIN code to unlock the bike. The database updates to show current bicycle availability. Bicycles may be checked out for up to two days and returned to any station.

Expansion: Stations are added by request – a business wanting a station needs only to provide a bike rack outside their building.

Problems: Stations located off the major campuses have generally failed from lack of ridership, theft, and vandalism.

Statistics: 171 registered members; nearly 1,000 trips (2008).

Pedestrian Innovations

Effective and innovative pedestrian facilities are presented in the attached handouts. These are primarily design techniques that enhance safety and comfort for users. Many involve creating defined spaces for competing modes or slowing traffic in shared settings.

Policies on Other Modes

All cities deal with how to accommodate (or not accommodate) “mobility devices” such as skateboards, scooters, mopeds, motorized wheelchairs, electric mobility devices, and electric assisted devices. There is generally no one-size fits all approach and the diversity of these devices, particularly in terms of power and speed, makes them difficult to categorize as vehicles, bicycles, or pedestrians.

Determining rules for these modes should consider their necessity to mobility, contribution to health benefits, accident risk, and their impact on other users³. In general there are two approaches: to determine what modes are appropriate for what facilities; or to define where, when, and how these modes should be used (and in some cases who can use these modes). The latter approach allows maximum use of these modes while protecting other users, whereas the former approach is much easier to educate and enforce.

³ Litman, T. (2010). *Managing Personal Mobility Devices on Non-Motorized Facilities*. Victoria Transport Policy Institute.

Personal Mobility Devices

The Oregon Vehicle Code defines what devices are allowed on different facilities. These categorizations are generally based on operating speed and power format:

- Electric scooter / gas scooter: can not be used on a sidewalk or on roads with designated speeds greater than 25 mph. On roadways less than 25 mph, must use a bicycle lane or path if one is provided. *Commentary: these restrictions react to the potential severity of crashes on higher speed facilities and the effect on other users on low-speed facilities. These devices do not contribute to active transportation and are generally not essential for basic mobility.*
- Moped: operates as a vehicle or motorcycle on roadways and is prohibited from traveling in bike lanes and on sidewalks. *Commentary: the power and speed capabilities of these devices have potentially severe consequences in crashes vulnerable road users.*
- Electric Personal Assistance Mobility Device (e.g. segway): has the same rights and responsibilities of a bicycle when operated in a roadway (must be operated under 15 mph), bike lane, or on a bike path; and as a pedestrian when operated on a sidewalk (must be operated in a manner that does not endanger any person or property). *Commentary: the low impact power source and speed variability of these devices make them amenable on either facility.*
- Electric Assisted Bike: considered a bicycle rather than a motor vehicle except where their construction exceeds the definition (e.g. operates at speed >20 mph). *Commentary: speed capability is generally too high for sidewalk application but the speed or power output is not sufficient to keep up with vehicle traffic.*
- Motorized Wheelchairs: have the rights and duties of a bicycle when operated in a bike lane or on a bike path. *Commentary: the basic mobility needs provided by these devices need particular consideration. Providing a safe environment for users that truly depend on these devices is required – this may include allowing sidewalk use with the same responsibilities as a cyclist on these facilities.*

Skates and Skateboards

Skateboarders, skaters, bladers, and scooters are defined neither as a pedestrian nor as a vehicle in the Oregon Vehicle Code.⁴ As a result, some municipalities have introduced local ordinances that prohibit the use of these modes on streets and/or sidewalks. The primary concerns with these modes is that they operate at speeds faster than a pedestrian but slower than bicycles and motor vehicles, have limited braking ability, are often difficult to maneuver or maintain control of the “vehicle”, and are vulnerable to pavement defects and surface changes.

⁴ Thomas, R. (2008). *Oregon Pedestrian Rights: A Legal Guide for Persons on Foot*. Willamette Pedestrian Coalition.

In 2008 the National Highway Traffic Safety Administration (NHTSA) reported 188 fatalities and approximately 9,000 injuries involving skateboard riders, roller skaters, and “other pedestrians”. The U.S. Consumer Product Safety Commission estimated in 2007 that approximately 26,000 persons were treated for skateboard-related injuries. It is uncertain how many of these crashes and injuries are “transportation-related” as opposed to “recreational” (such as performing tricks that result in a fall on a public roadway), although a 1998 investigation of National Pediatric Trauma Registry data recorded approximately 18% of skate-related injuries being a result of being hit by a motor vehicle (Osberg et al.).

The City of Ashland currently permits skateboarding on streets with a posted speed of 25 mph or less and on sidewalks, except in the Downtown area. Riders are required to wear a helmet and lighting equipment at night; yield right-of-way to any motor vehicle, bicycle, or pedestrian; and operate in single file, in a standing position, and as close as practicable to the right-hand side of the road. In other places, such as Portland, skateboarders have generally been given the same rights and responsibilities as cyclists. *Commentary: these devices do contribute to active transportation however the maneuverability, loss of control, and speed potential make them less safe in higher use pedestrian environments and in high speed traffic environments.*

Innovative Pedestrian Facilities

Sidewalks

Good sidewalks are continuous, accessible to everyone, provide adequate travel width and feel safe. Sidewalks can provide social spaces for people to interact and contribute to quality of place.



Pedestrian Refuge Islands

Refuge islands allow pedestrians to cross one segment of the street to a relatively safe location out of the travel lanes, and then continue across the next segment in a separate gap in traffic. A median refuge island allows the pedestrian to tackle each direction of traffic separately.



ADA Curb Ramps

Curb ramps are a fundamental element of an accessible public realm. A sidewalk without a curb ramp can be useless to someone in a wheelchair, forcing them back to a driveway and out into the street for access. Truncated domes provide a cue to visually-impaired pedestrians that they are entering a street or intersection.



Curb Extensions

Curb extensions reduce the crossing distance for pedestrians. They allow pedestrians to move safely beyond a lane of parked cars to a position where they can see and be seen as they begin their crossing. Curb extensions can also provide an area for accessible transit stops and other pedestrian amenities and street furnishings.



Transit Stop Enhancements

Providing amenities at transit stops, such as benches, trash receptacles, shelters, and lighting can significantly increase user comfort and willingness to wait. Enhancing transit stops may increase transit usage.



Enhanced Pedestrian Signals

Enhanced pedestrian signals include features designed to make crossing easier, specifically for people with a disability (e.g., audible signals) or in areas where crossing is difficult due to limited traffic gaps or long block lengths (e.g., pedestrian only signals at mid-block crossings).



Innovative Pedestrian Facilities

Streetscape Improvements

Streetscape improvements are features that enhance the pedestrian experience. These include public art, pocket parks, ornamental lighting, gateway features and street furniture. Many of these improvements can easily integrate environmentally-friendly “green” elements.



Grade Separated Crossing

Grade separated crossings physically separate the crossing of pedestrian traffic from motor vehicle flow. They may eliminate vehicular-pedestrian conflicts but are necessarily limited to selected locations where the benefits clearly balance the public investment.



Colored/Textured Crosswalks

Colored or textured crosswalks heighten driver awareness of pedestrian crossings by providing an additional visual cue beyond traditional crosswalk markings.



HAWK Signals

An emerging signal technique, HAWK signals stop vehicle traffic when activated by a pedestrian or bicyclist (either by a push button or in-pavement loop detector). This technique is useful at trail/roadway crossings and other intersections experiencing frequent pedestrian crossing movements.



Pedestrian Countdown Signals

Countdown signals display the number of seconds remaining for a pedestrian to complete a crossing, enabling users to make their own judgment whether to cross or wait. The allotted time can be adjusted to accommodate slower pedestrians, such as seniors or children.



Driveway Consolidation

Consolidating driveways along a roadway reduces the number of conflict points between pedestrians on the sidewalk and vehicles entering or leaving driveways. This strategy may also improve vehicle traffic flow on the roadway.