

Spring 2012

Walking and Cycling in Waterville: Bike and Pedestrian Planning for an Active Community

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Walking and Cycling in Waterville:

Bike and Pedestrian Planning for an Active Community

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Capstone paper for
Master of Community Planning and Development program
Muskie School of Public Service
University of Southern Maine

May 2015
Professor Charlie Colgan, Capstone Advisor

Table of Contents

Introduction	- 6 -
Why Plan for Walking and Cycling?	- 7 -
Improved Mobility for All Citizens.....	- 8 -
Active Transportation is good for Community Health	- 9 -
High Return on Investment in Walking and Cycling	- 10 -
What is a Bike and Pedestrian Plan and What Will it Accomplish?.....	- 10 -
Goals of the Plan	- 11 -
Public Participation in Bike and Pedestrian Planning	- 12 -
Factors to Determine Investments in Walking and Cycling	- 14 -
Traffic Generators	- 14 -
Demographic and Geographic Considerations.....	- 15 -
Major Employment Centers	- 16 -
Schools and Colleges	- 16 -
Parks & Recreation Areas.....	- 17 -
Parks & Playgrounds	- 18 -
Public Transportation and Walking	- 18 -
Policies, Laws and Regulations Affecting Walking and Cycling	- 20 -
Complete Streets Policy	- 20 -
Other Policies Promoting Bicycle and Pedestrian Use	- 21 -
Adequate Pedestrian Access to Publicly Accessible Development.....	- 21 -
Bicycle Parking Ordinance	- 22 -
Laws Impacting Pedestrians and Bicyclists	- 23 -
Motor Vehicle Speed and Bicycle and Pedestrian Safety	- 23 -
Bicycle and Pedestrian Infrastructure Treatments	- 25 -
Sidewalks	- 25 -
Crosswalks	- 26 -
General Intersection Improvements.....	- 27 -
Pedestrian Activated Rapid Flashing Beacons	- 27 -
Speed Tables	- 27 -
Bump Outs	- 28 -
Bicycle Infrastructure Improvements	- 28 -

Shared Lane Markings	- 29 -
Bike Lanes.....	- 30 -
Signage	- 31 -
Off Road Facilities.....	- 32 -
Multi-use pathways	- 32 -
Cut-Through Pathways	- 33 -
Roadway Improvements.....	- 33 -
Road Diet.....	- 33 -
Convert One Way Streets to Two Way.....	- 34 -
Lane Width Reductions	- 35 -
Street Trees.....	- 37 -
Infrastructure Improvement Plan	- 39 -
Emphasis on the Network.....	- 39 -
Pedestrian Infrastructure.....	- 39 -
Intersection of Main St., Front St., Water St., Spring St. and Bridge St.....	- 40 -
Sidewalks to the Upper Main Street Commercial Area	- 41 -
Complete the Sidewalk to Upper Kennedy Memorial Drive	- 42 -
Sherwin Street Intersection in the South End Neighborhood.....	- 43 -
Downtown Waterville Pedestrian Improvements.....	- 45 -
Pedestrian Improvements Silver Street and Carter Memorial Drive.....	- 46 -
Bicycle Infrastructure Investment Plan	- 48 -
Regional Connections	- 49 -
Mayflower Hill Drive/North Street Colby Connector Trail.....	- 51 -
Multi-Use Path Linking the Thayer Campus to Upper Main Street.....	- 55 -
Closing Thoughts	- 56 -
Citations.....	- 57 -
Appendix.....	- 62 -
Major Employers in Waterville, ME.....	- 62 -
Complete Streets Policy for Waterville, ME.....	- 63 -
Maine Bicycle and Pedestrian Laws.....	- 69 -
Laws Applicable to Pedestrians.....	- 69 -
Laws Applicable to Bicycling	- 70 -

Winter Sidewalk Plowing Priorities	- 71 -
Proposed Waterville Bikeways, Shared Lanes and Other Routes	- 72 -

Vision Statement

The vision for mobility in the City of Waterville is of a community in which all residents and visitors, regardless of their age, abilities, or financial resources, can safely and efficiently use the public right-of-way to meet their transportation needs regardless of their preferred mode of travel (Waterville Complete Streets Vision, Adapted from Lewiston-Auburn's Complete Streets Policy).

Introduction

In Waterville, 11% of our citizens walk as their primary means of getting to and from work. Another 2% use modes that include the bicycle and public transit as their primary means of commuting (City of Waterville, 2014). The percentages of those who walk in Waterville surpass both Kennebec County and the state's average. However, these numbers don't include all the human powered travel that goes on in Waterville. The census only captures commutes, ignoring recreational strolls, children walking to school, neighbors walking their dogs, cyclists out for a ride, perhaps running an errand on bike, even athletes on a training run or ride in our community. Thus, walkers, runners, cyclists, wheelchair users, and other non-motorized modes of travel are overlooked in these basic statistics. And while some of the foot and bike travel might be purpose oriented, just as often it is people walking and cycling for recreation, health reasons, and enjoying Maine's natural wonders that we find woven into the fabric of our urban places.

People are walking and bicycling more than ever for health, financial and environmental reasons (Swanson & Alliance for Biking & Walking, 2012). Already in Waterville, our schools are hosting "Walking School Bus" days where students, parents, and school staff form a walking school bus, picking up more children the closer they get to school along the route. Many students of Waterville High School can be seen in all seasons walking to and from our centrally located high school, right in the heart of town. College students at our two colleges walk for nearly all of their intra-campus transportation needs.

Waterville's downtown businesses attract both local customers and visitors from away. Walking is already an important component to our downtown business district. No matter how guests arrived, once they are out of their vehicles, their safety and comfort as pedestrians is an important component to the downtown experience. Similarly, our festivals and fairs, such as the 'Maine International Film Festival' and 'A Taste of Waterville', bring in thousands of visitors.

Many of them will wander through downtown seeking to enjoy what Waterville has to offer for fine dining, shopping and simply relaxing in a wonderful setting. Current and potential walking activity warrants attention from the city in order to provide a safe and pleasurable walking or cycling experience.

Our community has a vested interest in being ahead of the curve on active transportation. People are engaging more in it, they understand how it improves their health, the community and even their financial well-being. Determining project priorities and capital investments in infrastructure, education, encouragement and enforcement are made simpler if the planning board recommends, and the city council adopts a plan for improving infrastructure and encourages both walking and cycling. This plan provides a first step toward making Waterville a safer, more vibrant, healthier and active place to be.

Why Plan for Walking and Cycling?

Walking and cycling as forms of transportation have been marginalized, often overlooked as viable modes of travel by transportation planning and provisioning agencies at varying jurisdictional levels. Historically, there has been a strong Federal push to encourage the automobile as the primary mode of transportation. This is evidenced by the massive funding discrepancies between roadway automobile infrastructure and other modes of travel. While car travel has opened up opportunities for mobility, vehicles and the infrastructure needed to support them, have negative effects on walking, cycling and other measures of livability by creating barriers to safe non-motorized travel (Smart Growth America, 2014).

While the primary emphasis on developing mobility for the last 70 years has focused on automobile travel, recently there has been a renewed interest in developing a more comprehensive transportation system. The reason for this renewed interest is multipart and includes: established health benefits of human powered travel, opportunities for economic justice in our transportation system, ensuring a safer place for vulnerable roadway users who can't drive, improvements to quality of life, increased property values, creating attractive and prosperous business environments, and the list goes on. Building a more walkable and cycling friendly Waterville is one important avenue working to accomplish these worthwhile goals. Our transportation network is the link between our productive places. As our social and economic landscape changes, so too should our transportation network. Below are some of the key reasons why we should plan for more walking and cycling and how it helps our community.

Improved Mobility for All Citizens

Cities that are more walkable and bike friendly offer citizens opportunities for travel modes other than the motorcar. Safe pedestrian and cycling options are important in part because many members of the population can't drive. The American Automobile Association places the cost of automobile transportation at almost \$9,000 per year (Hunter, 2014). For some Waterville citizens, the high cost is prohibitive, walking is nearly free and cycling has a startup cost relative to driving. For individuals with little disposable income, increased mobility options allows for their wider participation in the economy, access to services, and active participation in civic society. Couple walking and cycling improvements to transit options and those opportunities increase even further.

In addition to financial cost, one's age can prevent one from driving as well. Maine's population contains a large proportion of individuals too young to drive and reliant on their parents or the school bus to shuttle them around. In the recent past our compact cities and our propensity to walk more was what allowed younger citizens to reach destinations important to their age and stage. As we focused more on creating higher speed and higher capacity roadways to facilitate more car travel, people began to walk less due to real and perceived safety concerns (Appleyard, 2003). As a result, we stopped walking and began to drive our children more to their destinations. An estimated 10 - 15% of morning commute traffic is comprised of parents dropping off children at school (Safe Routes to School National Partnership, 2015). As mentioned, there are already local efforts to combat these trends. For instance, the Albert S. Hall School has been encouraging active transportation for students, leading to very positive reviews. Initial reactions to the 'walking school bus' program have been consistent with the research that suggests that students who walk and bike to school are better able to concentrate on their work once they have arrived (Vinther, 2012).

Maine is the oldest state in the nation as measured by median age, exceeding the national average by approximately 5 years (Colgan et al., 2013). Many of Maine's senior citizens continue to engage in their community by working, volunteering, and participating in recreational, religious and other civic gatherings. However, whether it is economic realities or a physical inability to drive, many will increasingly rely on other forms of transportation. Improvements to walkability coupled with good access to public transportation modes will be important in their ability to continue leading full lives.

As people age, their ability to move as quickly as they once did, diminishes. Along with that, eyesight and hearing loss makes them more vulnerable as pedestrians and more dangerous as drivers if they continue to do so (Baster, 2012). In the State of Maine, 43% of all

pedestrian traffic fatalities between 2003 and 2012 involved those aged 65 or older. Consider that those 65 years of age and over comprise only 15% of Maine's population, it is clear that our seniors bear a disproportionately larger share of these accidents (Smart Growth America, 2014).

In Waterville several new housing developments for low to moderate income seniors have been established downtown and in core neighborhoods. Some residents will almost certainly not be driving as much as they used to. Some will rely on walking for some or all of their mobility needs. Because of the proximity of these developments to downtown, the core of our pedestrian network will be an important place to invest in, keeping our seniors in mind. Working to ensure that they have a safe and comfortable place to walk will be important.

Active Transportation is good for Community Health

Places that are walkable and bicycle friendly provide people with opportunities to engage in a healthy activity that is inexpensive and easily accessible. In New England, Maine has the highest rate of adult obesity; in Kennebec County the adult obesity rate is above 31% (Safe Routes to School National Partnership, 2015; The Associated Press, 2010). As people rely more on motor vehicle travel, and less on more active forms of transportation we have seen our waistlines surge. Research indicates there is a strong relationship between the amount of miles driven per licensed driver and obesity rates, measured six years after the longer driving pattern emerged for individuals (Jacobson, King, & Yuan, 2011).

Active transportation also plays a role in improving mental health. Anecdotal evidence showing that our children perform better in school after a walk or bicycle ride to school, is supported by research. For instance, one of the largest longitudinal studies performed was an analysis of over 18,000 Britons, examining their commute behaviors and focusing in on their mental health. Holding all other things constant, commutes type positively impacted mental health and acuity. Workers who walked, rode a bicycle or took transit were better able to concentrate and reported less stress. Those who commuted by car had more stress and the longer the automobile commute, the more likely they were to have mental health issues (Martin, Goryakin, & Suhrcke, 2014).

Considering the positive health impacts, both from a physical and mental standpoint, it is clear that active transportation pays off in terms of money saved from the obesity epidemic. The Harvard School of Public Health estimates that the treatment of obesity related disease is costing America over \$190 Billion dollars a year (Harvard School of Public Health, 2015). Considering the modest cost of sidewalks, bicycling infrastructure, and

roadway safety improvements, it may be cheaper to improve how we get around, than the cost of treating all those patients for the ailments related to the epidemic.

High Return on Investment in Walking and Cycling

Places that invest in walking and bicycling amenities have been shown to command a higher value on the market than places that haven't. Commercial retail development in walkable areas command higher rents and see more customers than places that have not focused on walkability when holding all else constant (Pivo & Fisher, 2011). Couple walkability with tree-lined streets and the evidence suggests that places become even more prosperous (Burden, 2006).

Not only does walkability improve our commercial and downtown property values, but it improves residential values as well. In a report published by the planning advocacy organization, "CEO's for Cities", hedonic regression studies of home prices paint a clear picture that in a large part of the US housing market, homes that are in walkable places, as measured by www.WalkScore.com, show a marked increase in value, even when adjusting for other factors (Cortright, 2009; Walkscore.com, 2015).

What is a Bike and Pedestrian Plan and What Will it Accomplish?

A bike and pedestrian plan is a thorough evaluation of the walking and cycling opportunities that exist, and proposed changes to maximize those opportunities in the future. This plan includes the following sections:

1. An evaluation of factors that will help guide investments in walking and cycling throughout the city, including demographics, employment centers, commercial areas and other community assets.
2. A look at policies and ordinance's that can be implemented to improve walking and cycling.
3. Infrastructure treatments that can be used to improve the non-motorized transportation network.
4. Specific projects that will improve walking and cycling in Waterville.
5. Special projects that can be developed with community partnerships that will have a big impact of walking and cycling in Waterville.

Having a plan helps to guide investment and ensures that resources are directed at specific problems or gaps in the existing network. Having a plan not only demonstrates a desire to make a place more walking and bicycling friendly, but opens up avenues for funding opportunities. These opportunities typically come from a variety of sources:

- Monies included a federal and state funded roadway project that includes provisions for bicycling and/or pedestrian amenities through the state DOT.
- Locally funded improvements paid for by the municipality.
- RTP monies for off road trail facilities, funded through the State Department of Conservation.
- Grant funding through the federal grant process, including CDBG grants and TIGER monies.
- Private organizations (non-profits, foundations, or donations from for profit businesses).

Cities have a limited amount of resources with which to operate, so the reliance on external resources becomes important to ensure that envisioned projects can be completed. A guiding plan provides a municipality with an informed basis for requesting funding and indicates that the projects are a priority for city planning. This document is intended to demonstrate a need for a concentrated effort toward expanding the bicycle and pedestrian network and how proposed project and how projects fit into the existing network of bicycling and pedestrian routes. Finally, this plan highlights the ways in which the lives of citizens who use new and existing routes will be improved. Overall, this document should serve as a guide to develop an adequate understanding of the populations; community resources; existing amenities; and other factors that help guide project development.

Goals of the Plan

- Support walking and cycling as a viable alternative to automobile travel through the development of a comprehensive network of bicycle and pedestrian routes.
- Provide leverage for external funding sources for which Waterville is eligible in order to accomplish bicycle and pedestrian projects in the community.
- Make lasting safety improvements that positively impact all roadway users within the City of Waterville.
- Identify policies and ordinances that make walking and cycling a viable form of transportation within the City of Waterville.
- Work towards enforcing existing laws pertaining to walking and cycling, with an emphasis on encouraging the safety of vulnerable roadway users.
- Encourage more people to walk and ride through ongoing support of events and activities.

This is an initial plan for the City of Waterville focused on making realistic headway in building a safer city that accommodates even the most vulnerable transportation system users. While it makes strides to capture every needed improvement and opportunity, it is by no means a complete document and should be accepted as a first of a continuing effort. Future efforts will make evaluations of accomplishments and failures of this plan, and continue this effort.

Public Participation in Bike and Pedestrian Planning

This project relied on considerable input from a diverse array of groups and individuals. Those include neighborhood and housing associations (South End Neighborhood Association & the Waterville Community Land Trust), the Sustain Mid-Maine Transportation Committee, members of Kennebec Messalonskee Trails, interested cyclists and pedestrians, community health officials, public school representatives in the community and other citizens. This process of planning for improved cycling and walking requires considerable community input from the very beginning of the process to guide decision making.

If a bicycle and pedestrian plan is executed as a community led project, the planning process would have a number of steps that would be required to complete the project. One of the better resources comes from Peter Lagerway of the National Center for Bicycling and Walking, from the report, "Creating a RoadMap for Producing & Implementing a Bicycle Master Plan". This guide is a 3 part planning process focused specifically on the development of a Bicycling Master Plan. However, the process is easy to reconfigure for pedestrian planning as well (Lagerway, 2009).

Lagerway emphasizes a few key steps at the start of the planning process that immediately get the planning process in motion.

1. Create a discussion with local leaders stating the case for the development of a planning process.
2. Develop a municipally recognized advisory council to guide the process.
3. Inventory key assets in the community relevant to walking and cycling.
4. Identify groups with an interest in participating in the process.
5. Secure funding for the planning process.

Beyond these initial steps, the organizing principal of developing a bicycle and pedestrian plan is geared towards community improvement. The process may result in a variety of recommendations from stakeholders.

The steps to develop the plan are somewhat fluid in how the process is conducted. The emphasis however remains constant in that it is focused on creating legitimacy through community involvement. At multiple stages of development, key community stakeholders, municipal officials, and the public should be involved in the planning process. Municipal transportation professionals will be instrumental in their ability to steer projects and ideas to feasible outcomes. The public will be able to validate the ideas expressed by planners, but will make substantial contributions resulting in a much more comprehensive plan.

Following the development of the planning document, Lagerway establishes key steps for implementation of the plan.

1. Adopt the plan through the appropriate municipal channels.
2. Implement accountability strategies of the plan.
3. Develop a realistic work-plan for continual improvements.
4. Continue outreach efforts to the public.
5. Document and advertise your successes.

The resultant product is a document that will serve as a roadmap for the city to follow. In conjunction with a complete streets policy, this should connect needed improvements with policy that will bring these projects to fruition.

Factors to Determine Investments in Walking and Cycling

There are many factors that go into the development of a bicycle and pedestrian plan. This chapter begins with a discussion of the criteria often used to determine the need for investments in pedestrian, cycling or other roadway safety treatments. There will also be an investigation of demographics information about the City of Waterville. Other information included is an analysis of Waterville's places of work, commercial areas, parks, and other amenities that people will travel to via their own power.

Routes for pedestrian and/or bicycling treatments as well as automobile roadway traffic safety improvements should be selected based a number of criteria. A bicycling and pedestrian plan should strike a balance between improving places where people are already walking and cycling; and developing improvements in places where there is a potential need yet the infrastructure is so poor that people are discouraged from walking or cycling there.

- Create routes that ensure an even geographic distribution of the network for cyclists and pedestrians. Adequate coverage through a city-side network of walking and biking routes is the fundamental goal of this bicycle and pedestrian plan.
- Focus on places that serve or house vulnerable populations who rely more on walking for transportation, such as neighborhoods with senior housing or neighborhoods with more children. Also, consider that neighborhoods with lower incomes will rely more on walking and cycling for transportation purposes.
- The first and last part of any transit trip is a walk. Interfacing with transit routes/stops and develop a network that serves those locations.
- Emphasize a network based on major trip generators, such as recreation areas, places of work, commercial areas, schools and colleges, senior housing locations, and higher density parts of the city. Often these may overlap.
- Achieve a balance between slow streets and meaningful streets that have more locations that people wish to bike and walk to.

Often the routes will be obvious based on maps, experiencing a place as a pedestrian or cyclists, and/or through conversations with people who already walk and/or bicycle in a given area.

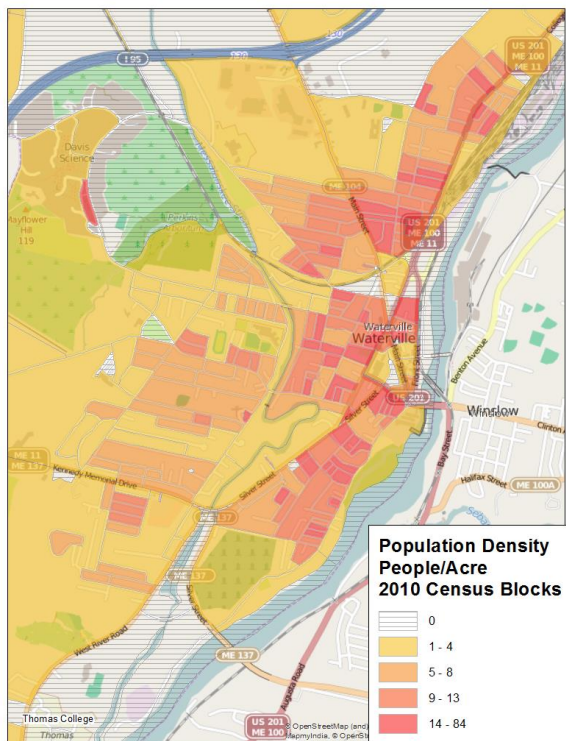
Traffic Generators

Waterville's major employers (and thus sources of traffic) include its two hospital campuses, its two colleges', its beautiful downtown, and industrial areas such as the Hutamaki Mill on College Avenue. Many people who work in Waterville don't live here, adding an important dimension to local traffic patterns. However there is still a sizable population who lives and works locally. Newly developed senior housing has brought more pedestrians to the city's

downtown core. We also have school age children who can and do walk to school. It will be important to understand how these disparate groups use the bicycle and pedestrian network and what will improve the experience.

Demographic and Geographic Considerations

Eleven percent of the population walks to work in Waterville (City of Waterville, 2014). While this may have to do with Waterville's compact size and its legacy as a dense mill town centered on a thriving downtown, practicality and economic necessity also play a role.



Waterville is a small city, covering an area approximately seven miles north to south and two miles east to west. The vast majority of its residents reside in the center of the city in what are walkable neighborhoods. The population density quickly diminishes as one gets further from the urban core.

Many households in Waterville are at the lower ends of the economic spectrum. Waterville has a much lower median household income than the region; the median household income is \$33,461 compared to \$45,973 and \$46,933 for the county and the state. 21% of our families

live below the federal poverty limit (City of Waterville, 2014).

Because many households rely on inexpensive forms of transportation by necessity, this will be a major consideration for prioritizing strategies to improve walkability and to some extent cycling as useful forms of transportation. Those neighborhoods will benefit the most from some of the solutions proposed in this plan.

Major Employment Centers

Waterville is interspersed with a number of commercial, industrial and institutional areas that provide employment to people from across the region. In 2011, there were



10,173 jobs in Waterville, and of those jobs, 83.1% of those were filled by people who come in from outside the City of Waterville. While the adjacent figure depicts some of the major employment centers, employment is spread throughout the community (City of Waterville, 2014). Appendix 12.1 has a more detailed table of major employers taken directly from the 2014 Waterville Comprehensive Plan.

Schools and Colleges

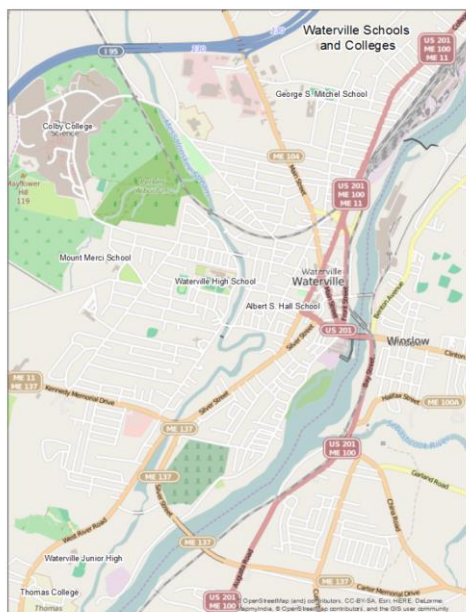
While the general demographic trend in Maine is our aging population, the City of Waterville is also home to many

families that include lots of children. As a city, we are younger than the state average by 5 years (City of Waterville, 2014). Our major employers draw in talented people from all over the world bringing young families with them. Of the 15,722 people who live in Waterville, 3,787 are school age or younger.

Waterville has four publicly funded schools (Waterville High School, Waterville Junior High, Albert S. Hall 4th and 5th Grade School, and Waterville's Elementary School). Waterville is also home to the Mount Merri Academy a Roman Catholic Elementary.

Two public schools are positioned close to the core of Waterville, making them easily walkable for a large number of students in the community. In contrast, the George S. Mitchell

Elementary and Waterville Junior High School are nearly 1.5 and 2 miles from downtown



respectively. While the decision to place the school at the periphery of town represents the best budgetary intentions, it often results in more traffic and higher costs for busing. It is estimated that between 10 and 15% of morning traffic (and pollution from automobiles at this time) is the result of parents driving their children to school (Safe Routes to School National Partnership, 2015). School busing is also costly. The average cost per student per year is \$692 (Routes & Solutions, 2008). This represents an opportunity when the school needs to be rebuilt considering its proximity to the major population it serves and the costs of running its bus routes.

Waterville is also home to two excellent higher education institutions, Colby and Thomas Colleges. Colby College is a residential college with approximately 1,800 students, most of whom live on campus. Thomas College, also a residential college boasts 1,000 students. Thomas College also offers two graduate degrees that attract more of a commuter population. While many college students have access to motor vehicles, many rely on walking and cycling to participate in off-campus activities. In 2014, the City of Waterville and Colby College partnered to include a bike lane on Mayflower Hill Drive in the repaving effort extending from the Messalonskee River to the College's eastern boundary. This is in recognition of the important connection between the City and the College. Much of the year will be appropriate for walking and cycling and considerations for the safety of the student body should be considered as an important transportation system user.

Parks & Recreation Areas

Waterville has some great parks spread throughout its neighborhoods. Some of the parks are small neighborhood playgrounds, and others are larger recreation areas such as North Street Park. When considering the some of the primary users of these facilities will be the most vulnerable roadway users, it makes sense to ensure that there are bicycle and pedestrian

connections that are safe and accessible from the neighborhoods they serve. To guide the process, below is an inventory of Waterville's Public Parks and Recreation Facilities.

Parks & Playgrounds

Some of our most vulnerable roadway users will be the primary users of Waterville's parks, recreation areas, and other open spaces.

- North Street Recreation Area – Consists of Judge Morton A. Brody Playground, picnic shelters, horseshoe pits, shuffleboard courts, tennis courts, lighted basketball court, soccer fields, carry-in boat access, and Alford Municipal Pool.
- Sterling Street Tot Lot – Consists of playground equipment and 1/2 court basketball area.
- Grove Street Playground – Consists of 2 paved basketball courts and playground equipment.
- Green Street Playground – Consists of playground equipment.
- Moor Street Playground – Consists of playground equipment for ages 4-10.
- Western Ave. Tot Lot – Consists of playground equipment.
- Veteran's Memorial Park (located on corner of Park St and Elm St) – Consists of monuments, open space, and benches.
- Castonguay Square (located on Common St) – Consists of monument, open space, and benches.
- Head of Falls – Large open space for special events.
- Chaplin Street Tot Lot – Consists of playground equipment.
- Hillside Street Tot Lot – Consists of playground equipment.
- Kelsey Street Tot Lot – Consists of playground equipment and basketball hoop.
- David Kenneth Quirion Park "Dave's Place" (located on Drummond Ave) – Consists of open space and benches

Public Transportation and Walking

Waterville is served by transit services operated by the Kennebec Valley Community Action Program (KVCAP). The Kennebec Explorer runs transit services throughout the communities along the Kennebec River from Gardiner north to Skowhegan. The routes are primarily fixed, with some slight deviations to accommodate passengers who require special assistance. KVCAP also runs a very popular commuter services between Waterville and Augusta serving morning and evening commutes to Maine General Hospital's new facility in Augusta and the capital area (Kennebec Valley Community Action Program, 2015).

The service is experiencing rapid growth in ridership and has slowly grown its service offerings. The commuter service is experiencing the most rapid ridership growth and is nearly at capacity on its morning and evening routes between Waterville and Augusta. The service is also heavily utilized by people who fall at or below the federal poverty level (Woods, 2015).

The first and last part of every public transit trip is often a short walk to and from the nearest transit stop. This isn't a novel idea, but one understood by nearly everyone who has

taken transit. For the purposes of pedestrian planning, the major considerations around transit and how non-motorized modes meet with a fixed route bus service is the notion that people are usually willing to walk approximately $\frac{1}{4}$ of a mile to a bus stop (Walker, 2011). With this in mind, the focus should be on identifying the user community who relies on transit, where they reside and the places they need to go at those transit stops. Many of the destinations along the Kennebec Explorer Routes are located at very isolated developments, often greater than $\frac{1}{4}$ of mile off the public roadway and require very little consideration of public investment. For those that occur in neighborhoods or downtown, the focus should be on how the pedestrian network meets land use and how best to serve rider's needs.

Policies, Laws and Regulations Affecting Walking and Cycling

There are many avenues to improving active transportation in a community. The most obvious to residents include improved signage or infrastructure projects. It is likely the case that these improvements came about through changes in policy and/or municipal ordinances. This chapter seeks to identify some of the policies that would set the framework for better walking and cycling in the City of Waterville.

Complete Streets Policy

The adoption of a complete streets policy should be one of the key steps to making a community more walkable and bicycle friendly. What exactly is a complete street? A complete street is a roadway facility designed for any user of that facility regardless of travel mode or physical ability. These users could be pedestrians, bicyclists, someone with a physical disability, young children, public transit riders, senior citizens, and motorists. A complete street would be one that maximizes the utility of that roadway facility in a safe manner, without excluding any particular type of transit mode, given practicality (Smart Growth America, 2013).

Streets considered 'complete streets' have no one correct design and use the roadways context, including its existing right-of-way, surrounding land uses, current and future travel needs, to design a travel facility that meets as many mobility needs as is practicable, doing so as safely as possible. For instance, The National Complete Streets Coalition points out that an urban roadway designed as a complete street will be very different than one set in a rural environment (Smart Growth America, 2013).

Complete streets sets up a framework for how transportation projects are developed ensuring that every project must consider the needs of all roadway users. The benefits to developing and then following the Complete Streets Policy have paid off in multiple ways for many communities. Some of the results have seen include:

- Decline in automobile collisions in 70% of projects and decline in accident injuries in 56% of Complete Streets projects.
- Complete streets projects show greater increases in property values over comparable streets, that have no complete streets style treatments.
- Complete Street's Projects have shown an increase in multimodalism in nearly all of the sample projects.
- Complete Street's Projects can be inexpensive to implement and have a high return on investment.

It is clear that by developing complete streets, there is not just a return to the community in terms of safety, but also an economic incentive for cities and its citizens (Anderson & Searfoss, 2015).

A complete street's policy when designed properly includes the following components that make the policy a success and allow for it to impart a lasting change in a community (Smart Growth America, n.d.):

- Create a vision that inspires, and make it so that it is custom tailored to the community.
- The policy must apply to all users of our transportation system, regardless of abilities.
- Any project must have improvements considered, regardless of scope.
- Exceptions must be included for reasons of practicality.
- Work to build the network for all travel modes.
- Ensure the policy applies to all agencies and the roadways they maintain.
- Review design guidelines to ensure they work in conjunction with complete streets.
- Develop performance measures to gauge the success of the policy.
- Develop an implementation strategy that works for the community.

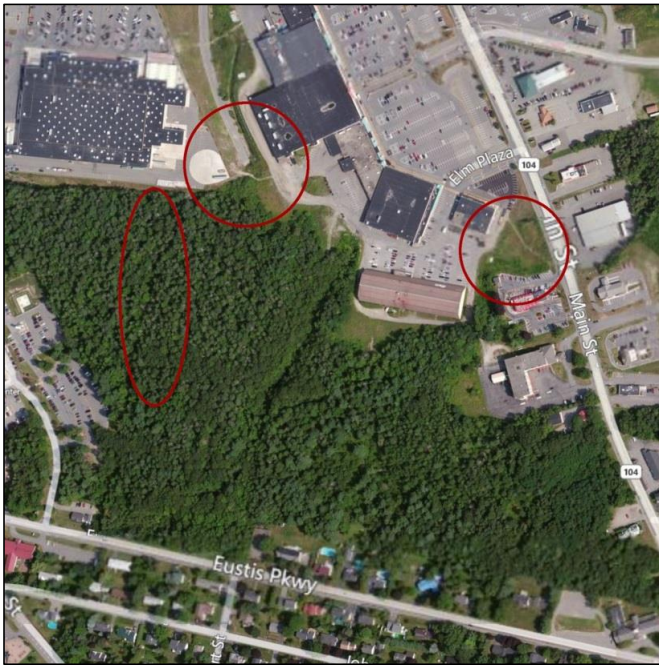
The State of Maine as well as two of Maine's larger cities have developed and passed complete streets policies. The Maine DOT Policy was adopted in 2014, the City of Portland in 2011, and Lewiston-Auburn's award winning policy in 2013. It is important to note that the State's policy applies only to State funded roadways, and not to locally maintained and built roadways hence the importance of a municipal policy.

Other Policies Promoting Bicycle and Pedestrian Use

This plan recommends the development of policies and ordinances that make cycling and walking safer and easier to accomplish in the City of Waterville. These policies are practical considerations for building a more walking and cycling friendly community.

Adequate Pedestrian Access to Publicly Accessible Development

It is frequently the case that even if a parcel of land is easily accessible via the public right-of-way, it is often a treacherous walk through the parking lot or private access road to reach the final destination. Waterville has several such places, many of them near the periphery of the built environment, indicating they were likely developed more recently. In the figure below, there are several paths, often called goat trails or desire paths, generated by repeated use as people walk through the woods or unpaved areas, to reach their destination safely.



An ordinance would require that any public place would have provisions for safe pedestrian access. Ironically, the most egregious examples are the Walmart and the former Walmart where Marden's salvage is currently located. Both have private access roads that lead to the development and both see considerable foot traffic made apparent by the 'desire paths' highlighted in the adjacent image.

Bicycle Parking Ordinance

As most cyclists will tell you," any bicycle trip begins and ends with a safe place to park a bicycle" (Change Labs Solutions, 2012). Waterville requires any development within the city to ensure that adequate motor vehicle parking is available, except in the case of the Downtown developments and redevelopments, which are considered on a per project basis by the Planning Board and City



Code Enforcement Officer (City of Waterville, 2015). However, places to park bicycles are not required. The City of Waterville in coordination with Waterville Main Street has placed bicycle racks throughout the downtown. Some of these are simple inverted U shaped racks, and others allow for parking multiple bicycles at one time. All are branded with the Waterville Two Cent Bridge logo and provide an attractive addition to town and support bicycle parking in a place that is considered a common area.

An update to the zoning ordinance that requires bicycle parking for any commercial, industrial or multi-family residential project will go a long way to help address limitations felt by cyclists due to shortages of bike parking.



Some basic guidelines for bicycle parking are that the rack should support the bicycle in two places, should be located in a visible and secure area (as opposed to behind a building), be convenient to the entrance, secured to the group and somewhat out of the way of pedestrian or vehicle

movements (Professionals, 2002). An ordinance should be helpful in guiding policy, without being so rigid that it is difficult for developers to follow.

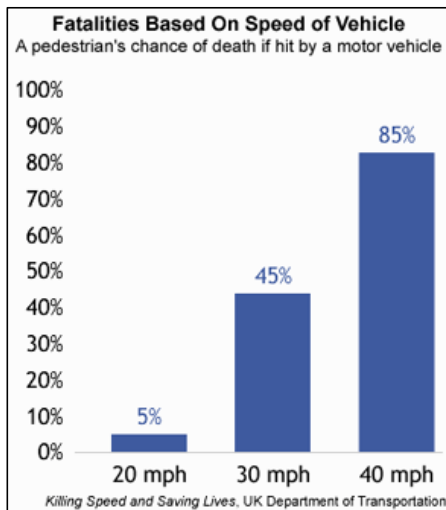
Laws Impacting Pedestrians and Bicyclists

Laws centered on pedestrian and bicycling issues in Maine do a considerable service to protecting vulnerable roadway users. The most recent addition is LD 1460 passed in 2013 making it illegal to pass a cyclists or pedestrian within 3 feet, with contact being sufficient evidence of neglectful driving (Bicycle Coalition of Maine, n.d.). The Maine Department of Transportation has posted these laws, expressed in layman terms, on its website and is available in the appendix (Maine Department of Transportation, 2015).

Motor Vehicle Speed and Bicycle and Pedestrian Safety

Speed is one of the biggest impediments to both pedestrian safety and making a place where people feel comfortable walking and cycling. We know that vehicle speed is a predictor of

accident severity (Tefft, 2013). A similar trajectory occurs in accidents involving motor vehicles and cyclists as well.



How do municipalities identify areas that were at one effectively rural or sparsely developed, but now serve a much larger role in the municipal economy? For instance, roadways such as Kennedy Memorial Drive and Upper Main Street were rural highways that linked towns together. Now those highways serve land use patterns much different than before. And as development continues people will want opportunities to travel these roads using modes other than the automobile. However, they are currently too large, too fast, and lack needed infrastructure to ensure safe non-motorized travel.

Bicycle and Pedestrian Infrastructure Treatments

Numerous types of infrastructure improvements can be made to the transportation system to improve conditions for walking and cycling. There is also a growing awareness among planners that it is often an over-provisioned automobile environment that makes for unsafe walking and cycling. Interestingly, developing safer streets for automobile traffic can work to improve not only the safety of automobile travel, but the safety of non-motorized vehicle users.

This planning document is not designed to set engineering standards for the City of Waterville or repeat the work of the National Association of City Transportation Officials, American Association of State Highway and Transportation Officials, or other engineering design standards associations. The intention is to bring to light the number of ways in which the built transportation environment can be improved for those who walk, ride a bicycle or use other non-motorized modes of travel.

Pedestrian Infrastructure Improvements

Efforts to improve the pedestrian environment can be as simple as the installation of sidewalks and crosswalks, or as technical as user activated rapid flashing beacons and delicately timed intersections signaling. Through the judicious use of both high and low tech improvements, changes can be made to the pedestrian network that allow for safer and more efficient pedestrian travel.

Sidewalks

Sidewalks for pedestrians are the central and most crucial component of a pedestrian network. Access to safe sidewalks that link places within urban areas should be a requirement of any roadway transportation project with the exception of restricted access highways, such as interstates or freeways. The Federal Highway Administration's Office of Planning, Environment, and Realty states that "the decision to install sidewalks should not be optional", referencing the Institute for Transportation Engineers Technical Brief stating that, "Sidewalks should be built and maintained in all urban areas, along non-Interstate public highway rights-of-way, in commercial areas where the public is invited, and between all commercial transportation stops and public areas" (Federal Highway Administration, 1999). As the notion of economic justice has begun to seep into the parlance of transportation planning, the importance of sidewalks to any group who doesn't drive, whether their situation be economic, age, religion (such as the Sabbath for observant Jews), and/or physical ability is tantamount.

Because sidewalks will be used by people with a diverse array of abilities and needs, developing sidewalks that are safe and effective are important. For instance, someone who is disabled will have the ability to be independent and travel on one's own could be instrumental in that person living independently. For our senior citizens safe sidewalks may be the key to keeping active in the community.

Building a safe and effective sidewalk requires attention to maximizing width to ensure it meets user needs. The FHWA references the City of Portland, Oregon, for their development of the sidewalk zone system. This system breaks a sidewalk down into 4 unique zones with the following minimum widths:

- Curbing should be 6 inches wide.
- Esplanade or planting area should be 24 to 48 inches wide, depending on if trees are present (considering the positive impact trees have on traffic safety and so many other things, 48 inch planting areas should be a must).
- The minimum width for the pedestrian zone is 60 inches wide, which will more than accommodate a single wheelchair and a passing pedestrian.
- The frontage zone is the space between the sidewalk and the built property. If the sidewalk is built to the building, there should be at least 30 inches of space between the building and the pedestrian zone. However, if the sidewalk is adjacent to open space, this can be ignored. In Waterville's situation, the frontage zone will be key in the Downtown.

Another consideration in sidewalk development that is important to safety is slope. There are a number of ways in which slope can impact safety, especially for the disabled, young children, and those in non-motorized wheeled vehicles, such as strollers or wheelchairs. More guidance can be found in engineering standards manuals.

Crosswalks

Crosswalk markings are used to delineate pedestrian crossing areas and to warn roadway users (motorists as well as non-motorized vehicles) that pedestrians may be present and to yield and/or stop if necessary. In the State of Maine, it is unlawful for a vehicle to fail to yield the right-of-way to pedestrians within a crosswalk (State of Maine, 2015). Crosswalks can be used at mid-block (non-intersection) locations as well as intersections (Federal Highway Administration, 2009).



Crosswalks should be between 6 and 24 inches thick and no less than 6 feet wide, painted as two parallel lines, or in a piano-key fashion. When crosswalks are used without adequate traffic control signs or signals, such as at mid-block crossings where often motorists don't expect pedestrians, engineering studies should be conducted to ensure that adequate measures

are taken to ensure pedestrian safety (Federal Highway Administration, 2009). There is also no reason to discourage the creative design of crosswalks in special locations, such as this crosswalk painted prior to the Maine International Film Festival.

General Intersection Improvements

While crosswalks can increase the visibility of pedestrians, they often fail to adequately ensure that pedestrians are prioritized at these locations. There are intersection improvements to the roadway itself by narrowing intersections and eliminating slip lanes, will alter how motorists drive, making intersections safer. In support of this notion, the National Association of City Transportation Officials recommends that intersections be designed to be as compact as possible.

Pedestrian Activated Rapid Flashing Beacons

Pedestrian Activated Rapid Flashing Beacons aka. Rectangular Rapid Flashing Beacons (RRFBs) are user activated amber LED flashing beacons at crosswalks. RRFBs are typically accompanied by signage and painted crosswalks; they are often included in problem areas where there is a significant speed issue, or where other treatments haven't been adequate in traffic calming (U.S. Department of Transportation, 2009).

Speed Tables

One way to go about calming traffic is through the installation of speed tables. Locally, Colby College has installed a number of speed tables on Mayflower Hill Drive and Rice Rips Road to further encourage slower motor vehicle speeds in the heavily walked campus area.

The City of Brunswick has also worked to develop speed tables in their downtown to slow traffic in the commercial core of their City.

Bump Outs

A bump out, also known as a curb extension improves pedestrian safety in two ways. First, they decrease the distance pedestrians must cross and provide a safer landing with which to observe traffic to ensure it is safe to cross. Second, bump outs calm traffic by narrowing



the roadway which leads to a reduction in motor vehicle speeds. Implemented at problem intersections, bump outs have been shown to reduce motor vehicle speeds 3 to 6 mph. Bump outs also result in a significant amount of vehicles yielding to waiting pedestrians when they are included in the crossing infrastructure

(Johnson, 2005). Although they tend to be costly to implement due to drainage considerations that must be mitigated, they present an opportunity to add a second traffic calming element by providing space for planting street trees. thus increasing their benefit to traffic safety. The image below was taken in Bangor, Maine and shows a bump out with crosswalk signage.

Bicycle Infrastructure Improvements

There are numerous treatments for improving the safety and roadway user experience of cyclists. This plan is meant to be an improvement plan; primarily emphasizing particular projects where there are needed infrastructure investments. For the sake of this document, there are two primary roadway treatments that are discussed, the shared lane marking, and the bike lane. Signage will also be considered.

Shared Lane Markings

Shared lane markings are on-street pavement markings, often called “Sharrows” that are used to delineate bicycling routes for both cyclists and motorists. They indicate that the roadway facility is a shared space and is designated for both modes of travel. Sharrows have been shown to have the following positive results according to a Federal Highway Administration Study:

- reduce sidewalk bicycle riding by 25 to 35%
- provide riders with more space between their bicycle and parallel parked vehicles
- increase the space between cyclists and passing motor vehicles
- reductions in in wrong way riding
- designation for cycling routes

One of the major safety issues for cyclists is facilities that keep cyclists too far to the side of a roadway and therefore out of view. Motorist and cyclist collisions occur disproportionately more frequently when cyclists are not where they are visible or expected. Shared lane facilities help because they place the cyclist in the roadway where he or she is more visible (Federal Highway Administration, 2010).

Shared lane markings have many other benefits, one of the most important of which is solving the problem of providing bicycle facilities on streets that are too narrow for bike lanes, yet are crucial to providing a complete bicycle network. In the case of Waterville, shared lane markings could be important for delineating bicycle friendly routes where there is no room in the public right-of-way.

Waterville has many streets where on street parking is essential to provide adequate space for residences and businesses. Those facilities are an important amenity for occupants of more dense areas without ample off-street parking. For streets with on-street parking facilities, sharrows would encourage a lane position that would put the cyclist clear of the door zone.

The Manual on Uniform Traffic Control Devices (MUTCD) offers guidance for where and how to incorporate Sharrows into the existing roadway network.

- Sharrows should be used on streets that have posted speed limits no greater than 35 mph.
- When used on streets that also have on-street parallel parking, the Sharrow should be at least 11 feet from the curb or edge of the pavement.
- On streets without on-street parking that are less than 14 feet wide, sharrows should begin at least 4 feet from the curb or edge of the pavement.

- "Bikes May Use Full Lane" signs may be used to indicate that cyclists may be occupying the travel lane. Signage with "Share the Road" messaging is falling out of favor due to confusion over who is to share the roadway.

Another benefit of Shared Lane Markings is that they are inexpensive to implement. The City of Portland, ME estimates their cost at \$20/symbol (Hyman, 2013). Because of this, they can set the framework for a functioning bicycling network at a smaller cost than more involved treatments. As time permits, they can be evaluated for effectiveness and routes that have been identified for bike lanes could be engineered and developed when funding permits.

Bike Lanes

Bike lanes provide cyclists a designated space on a roadway for bicycle travel.

Typically bike lanes are located adjacent to motor vehicle travel lanes on the right side of



the roadway. On roadways without parking, bicycle lanes are recommended to be six feet wide. However in cases of limited roadway space, lanes three foot in width are acceptable. The distance of a bike lane should be measured from the longitudinal joint of the curb. When on-street parking is allowed, bike lanes should be at a minimum 5 feet wide and the lane should be no less than 14.5 feet from the face of the curb, allowing ample room for parking, the door zone and a bicycle lane. Bicycle lanes are designated with a solid white stripe, between 6 and 8 inches wide and within the lane, a few different symbols can be used (NACTO

2015). The Manual on Uniform Traffic Control Devices, recommends the cyclist on bike symbol, arrows, and the word: "BIKE LANE", be used to ensure adequate understanding of what the space designated for (Federal Highway Administration, 2009).

Intersection treatments for bike lanes can be as elaborate as budgets allow or kept simple to get the idea across to the users. The primary goal is to ensure adequate visibility of vulnerable roadway users, a safe queuing process, and clarity for merging maneuvers if

necessary. Examples of a simple and effective treatment could include striped lines through the intersection and merge areas. Much more elaborate treatments would include bike boxes which have been popularized in major cities. These provide starting positions for cyclists ahead of motorized vehicle traffic. They would be extravagant in Waterville until further demand is present.

As with all infrastructure treatments that are discussed, there are more definitive resources available. The National Association of City Transportation Officials offers more cutting edge treatments and the Federal Highway Administrations Manual on Uniform Traffic Control Devices are both good industry approved sources for further guidance.

Signage

Adequate signage can make a place safer for cycling in several ways. Some cities use signage to provide cyclists a useful tool for wayfinding or route designation. Furthermore, any type of signage will

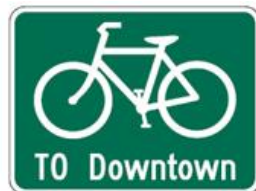


serve as a constant reminder to motorists that bicyclists may be present.



Often signage is used in conjunction with on-road striping and markings, to ensure that roadway users adequately understand what traffic to expect.

In Waterville, a number of recommended signs could be implemented to improve the cycling experience. To let roadway users know they are on a bike route, the use of wayfinding signs is a practical measure that accomplishes both goals, one improving awareness, and second to help people understand where the route is taking them. When there are key intersections where an on-road bicycle facility splits, having adequate wayfinding signs can help. One of the recommendations this plan offers is to use shared lane markings to delineate bikeways. On these shared facilities, the “Bikes May Use Full Lane” sign is especially useful. This document isn’t meant to serve as a engineering guidebook, or to set standards for roadway signs. For a more complete discussion on signage, the Manual on



Uniform Traffic Controls is the definitive guide in the United States and can be found here: <http://mutcd.fhwa.dot.gov/>.

It is important to mention, “Share the Road” signage has lost favor with a number of organizations because advocates fear that it can be misinterpreted. Instead they have begun to use “Bikes May Use Full Lane” signage to indicate to roadway users that cyclists have full rights to the lane. The State of Delaware was the first state to removed the signs from its repertoire of tools (James, 2013).

Off Road Facilities

When possible, taking pedestrian and bicycling travel away from motorized vehicle traffic is always a good idea. Sometimes it mitigates unsafe situations. In other places it provides a more efficient pathway to access a destination. Two configurations have already been successfully implemented in Waterville: a shared (or multi-use pathway) and a cut through, which is a multi-use path with special land use considerations requiring adequate land use planning.

Multi-use pathways

Multi-use or shared-use pathways (used interchangeably throughout this document) are off-road facilities that can be surfaced with concrete, asphalt or crushed aggregates, (often called stone dust). They allow for most non-motorized travel, including walking, cycling, skating, and in Maine’s case, cross country skiing and snow-shoeing during the winter months. They can be adjacent to a roadway, but more often than not are located in their own right-of-way. Examples of shared-use pathways that have been implemented in the Greater Waterville Region are the North Street Park Connector Trail, The Rotary Centennial Trail from Benton to Winslow, and the Winslow School Trails, all heavily used and wonderful community assets.

As mentioned, the surface can be comprised of expensive treatments such as concrete or asphalt, than can provide a smooth surface for all users. It can also be successfully built from crushed aggregate material and provide a very good surface that is handicapped accessible as



well. Of the trails mentioned above, the North Street Park Connector Trail is the only one that uses a prepared surface material. The others are comprised of crushed stone.

Cut-Through Pathways

Cut-through pathways are one way to get bicyclists and pedestrians off of roadways and quickly to their destination, often providing a short-cut. These are typically multiuse pathways and often no larger than a sidewalk, but can be built much wider. These treatments are special in that they reflect foresight of planners to allow for right-of-way between developed properties. Thus they illustrate the importance of creating ordinances that make them possible. When land is developed or redeveloped, it is important to consider if there are any adjacent land users that may currently or in the future benefit from a transportation easement to safely reach an adjacent property.

In Waterville, a good example of this is the cut-through to Waterville High School from both the north and south side of the campus. Roadways surrounding the campus get busy during the morning and afternoon rush hours and the cut-through provides students a safe and effective way to circumvent that traffic.

Roadway Improvements

Over the last seventy years, engineers have specifically designed roads to facilitate traffic flow and speed. Since then, we have found that, although we have made places that are safe to drive in, roads are difficult to navigate in other ways. This results in more trips by car and eventually more traffic, which ironically necessitates more engineering to eke out more efficiency so it can alleviate more traffic (Vanderbilt, 2008). As we attempt to design transportation systems for the people who live, work and travel through our cities and towns, we are forced at some point to question what we obtain (and at what cost) with a faster more efficient roadway system for motor vehicles.

Road Diet

Motorists tend to drive at a speed at which they feel comfortable. Thus they pay less attention to the posted speed limits of a roadway and more to the feel of a roadway and their perception of safety. Roadway design, or a lack of consideration of design, is a key culprit in roadway safety (Petritsch, n.d.; US Department of Transportation, 2014).

A "Road Diet" attempts to address the problem by reducing the number of lanes on a roadway, and/or by reducing the lane widths in the roadway. Put another way, a road diet is a way to alter a roadway to make it a safer, more pedestrian and bicycling friendly roadway, by

making the space for automobiles smaller. Although counter intuitive, narrowing roads make them safer in our urban places. It also frees up space for walking, cycling, parking, and other amenities that bring value to our communities. A road diet can be a very low cost improvement to a roadway, often involving some initial reengineering of street width, and new paint, something we do annually after winter sand wears off the previous year's paint.

The benefits of a road diet include:

- Improved motor vehicle safety with the inclusion of a left-hand turning lane, resulting in 49% reduction in crashes. Many of these crashes are due to rear ending a left turning vehicle.
- Provide a place for bicycle travel, parking, sidewalks or aesthetic amenities within the roadway right-of-way where once car traffic was located.
- Natural reduction in speeds due to the reconfiguration of the roadway, improving pedestrian safety.
- Road diets result in improved property values, due to increases in safety and aesthetics. According to one study from the North Carolina DOT, it resulted in a 47% improvement in property values above comparable streets where a road diet was not performed.

What is clear is that when implemented, a road that has been dieted sees a reduction in crashes; provides more transportation options; handles traffic more smoothly and it is safer than it was before; and is demonstrated to increase property values of abutting properties (Rosales, 2006).

Convert One Way Streets to Two Way

Urban renewal of the 1960's and 1970's was federal planning's best effort at dealing with the suburban push that had been characterized by the growing role that increasingly easy automobile travel played. As people began to commute farther distances, the major goal for transportation planners and engineers became creating an efficient automobile focused transportation network. This resulted in design decisions that facilitated faster and smoother traffic flow, such as converting streets to one-way traffic patterns. While the effort achieved the goal of increasing speeds and operational capacity (estimated at 10-20% efficiency gains) of roadways, it produced lasting negative effects on the communities in which it occurred.

For instance, in downtown areas where traffic should be slow to increase pedestrian safety, one-way streets actually increase traffic and reduced pedestrian safety. In downtown areas, an estimated 30% of traffic consists of drivers looking for parking close to their destinations, and circling blocks to reach their destination (Speck, 2012). If the 30% figure given for vehicles looking for parking and looping to get closer to their destination is

accurate, it is clear that the efficiency gains of one-way streets are severely mitigated (Spahr, 2013). Waterville suffers these negative byproducts from our two one-way couplers, Front and Main Street.

Downtowns often represent a significant portion of a community's property (and sales) tax base. They have more improvements per square foot of the underlying parcel than large lot style suburban development. However, properties on one-way coupled streets show a significantly lower value than properties on two way streets. While there are multiple factors that determine property value and desirability, the transportation network also plays a key role (Speck, 2012). As mentioned that there are numerous studies showing that places that are more walkable rather than less, will command a higher value on the market (Pivo & Fisher, 2011). It is true that businesses rely on multiple factors for their success but it is clear that a dangerous street in a downtown is less walkable and will often be less valuable.

One way streets on small neighborhood streets stand as an exception to this rule. Waterville has a few of these smaller one ways streets on narrow roadways that have a primary role of providing access to private residences. Center Street in downtown Waterville is one of these. It is narrow in nature and sees very little traffic. Consequently, these should not be considered for two-way access as they don't share in the problem that larger arterial streets do.

Lane Width Reductions

When considering what makes an urban place more dangerous and less likely to be a place where people walk or ride bicycles, places with wide streets top the list. Jeff Speck, author of *Walkable City* argues that wide streets are traffic engineering's best intentions for standardizing roadway design standards without consideration of the context in which streets are placed. He makes the case that for urban arterial roadways, 10 feet not 12, should be the maximum roadway width (Speck, 2014). Engineering dogma hasn't been questioned very often, but when it is, the research suggests that greater lane width of a roadway is associated with higher traffic speeds (Fitzpatrick, Carlson, Brewer, & Wooldridge, 2001). As speed increases, mortality rates increases in pedestrian and motor vehicle crashes (Speck, 2014). Research also indicates that while speeds decrease as roadways narrow, capacity doesn't decrease on streets that have 10 foot lanes, opposed to 12 foot travel lanes (Petritsch, n.d.).

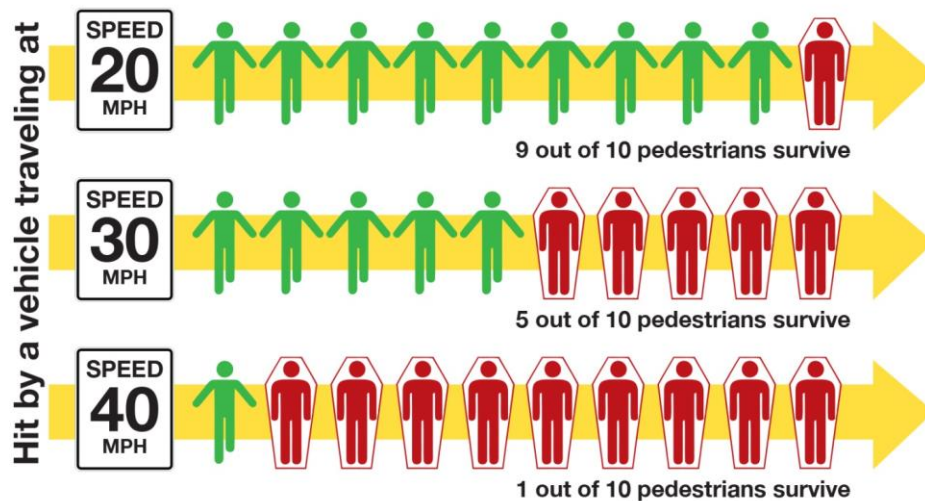
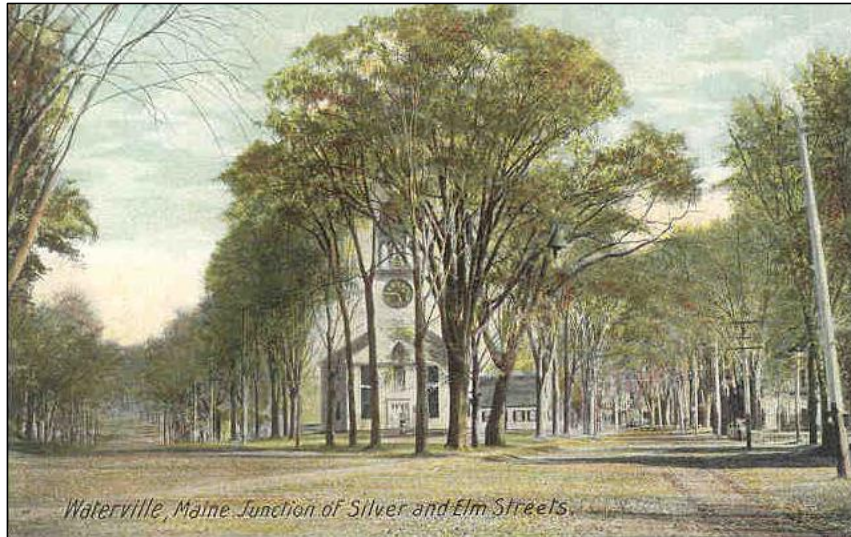


Image source: <http://bettercities.net/news-opinion/blogs/scott-doyon/21544/better-streets-whats-priority>

This then begs the question of what cities like Waterville, should do about wide streets. There are two approaches that one could take. Excess roadway width can be dedicated to other users, such as on-street parking or bicycle lanes. Many roadways are wide enough to accomplish at least one of these and in some cases both goals can be achieved. The second option is to consider a roadway width reduction during a reconstruction effort. Roadway reconstruction projects are infrequent, but when they occur are ideal times to reduce roadway widths and build safer facilities. There is a practical consideration in Maine for what to do with all the snow during winter months on a roadway that has been narrowed. However, by reducing roadway width, there is ample space for snow storage in the esplanade that is left behind.

Street Trees

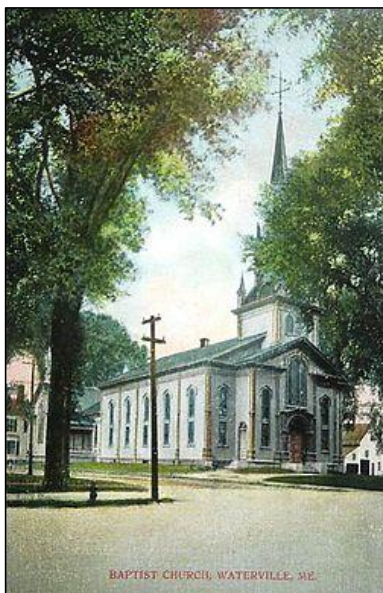


The role of street trees in fostering a safe and attractive urban environment is well documented. At one time, Waterville was dubbed the City of Elms with its neighborhood and downtown streets flanked by the graceful vase shape of the elm tree, arching above our streets. Historic imagery shows us what once the norm in Waterville was. After the blight that obliterated a large percentage of the elm trees across North America, many cities failed to replace their street trees and return our cities to their former enduring charm, and also their former safety.

Conventional engineering dogma has been to reduce obstructions along roadways in an effort to make places safer for motorists. Applied in the context of an Interstate Highway or other high speed rural highway context, this may be true. However, these standards were applied to our urban areas with disastrous results. Efforts to widen avenues and remove fixed objects such as trees, have made the roadways in urban places more dangerous. Research by Eric Dumbaugh of Texas A & M University looked at accident records and concluded that "wide, unobstructed roadways" had statistically significant increases in vehicles crashes versus roadways with trees or other fixed immovable objects which showed lower crash rates. Recent efforts have led many municipalities and State DOT's to reconsider their positions, but progress has been slow (Dunbaugh, 2005).

For pedestrians, street trees increase safety in a number of ways. By creating an overhead canopy and their trunks forming a vertical wall, a sense of enclosure is given to the street, making the driver feel as if he is on a smaller roadway. This in turn, alters driver behavior, resulting in a 3-15% reduction in speed along tree lined streets. Additionally street trees directly benefit pedestrians by creating a physical barrier between the roadway and sidewalk when carefully considered (U.S. Department of Transportation, 2003).

Treed urban places have other benefits aside from that involving traffic safety.



Where trees are present they absorb approximately 30% of precipitation through their leaves. Root systems loosen soil allowing for further groundwater infiltration. Both of these result in reducing the amount of water burdening municipal storm water systems. Other environmental benefits of street trees include their ability to absorb tailpipe emissions from automobile and truck traffic, as well as their role in the carbon cycle, converting carbon dioxide to oxygen (Burden, 2006).

Further, street trees positively impact business viability in shopping districts. In a report published by the State of Michigan, Urban Designer Dan Burden, makes the claim that street trees lead to a 12% increase in income streams for businesses, compared to streets without trees (Burden, 2006). Tree lined streets arguably make for more attractive places to shop, dine and walk.

Infrastructure Improvement Plan

“Remember, when asked to prove that [#bikelanes](#) would be well used, it’s hard to justify a bridge by the # of people swimming across a river.”

– Brent Toderian, Vancouver Planner via Twitter.

Emphasis on the Network

While any bicycle or pedestrian infrastructure improvements would be heralded as a step in the right direction, a sidewalk or bike lane that ends abruptly or hasn’t been fully developed will be frustrating to many users. It will be especially discouraging to users who are attempting to try something new, such as cycling or walking to work, only to find that it is more trouble than it is worth. The emphasis then should focus on the development of a functional network that achieves transportation goals for system users.

Pedestrian Infrastructure

Waterville has a well-established pedestrian infrastructure network. Established neighborhoods and downtown Waterville have sidewalks that are connected and allow for easy access to most places within the City. This reflects a decades-long investment in developing and maintaining a network to ensure walkability. The existing network serves a broad swath of the population, evidenced by the number of people commuting to work on foot, and anecdotally by the number of people who can be seen walking in Waterville.

However, there are many places for improvement. Certain areas of town have very poor or even non-existent connectivity for pedestrians, with some areas being unreachable without traveling over private property, or on higher speed arterials such as Upper Kennedy Memorial Drive or Upper Main Street. There are also a substantial number of improvements to the network that would result in increased



pedestrian safety. These include intersection improvements through the installation of adequate signage and signals, decreasing intersection lane widths, and improvements to the overall roadway network.

Some of the key projects in Waterville that would either improve the pedestrian experience (from either a safety or an efficiency standpoint) identified by the combined Sustain Mid-Maine Transportation Committee and the Waterville Active Community Environment Team are listed below.

Intersection of Main St., Front St., Water St., Spring St. and Bridge St.

It is well documented that people are happy to walk longer distances. However they will only do so when walking in a place with a contiguous built environment and/or surroundings that



make them feel comfortable walking. People will avoid walking in places that offer little to enjoy between point A and B (Speck, 2012). They will also not be comfortable walking in places with large expanses of asphalt and motorists zooming by.

The intersection of Front, Main, Bridge, Spring and Water Streets, that pedestrians are likely to avoid has been

affectionately dubbed, "The Hydra" (see figure above). As it currently stands the intersection is excessively large for the volume of traffic it sees. Lane widths are excessive by even Interstate Highway standards and slip lanes (arced large radius turn lanes) allow for motor vehicles to corner at high rates of speed; much higher than what is safe for a downtown intersection. The intersection and adjacent streets are much wider than need be, and unsafe places to walk; they are certainly not enjoyable. Considering the importance of the further development of the Marden's and CMP buildings and reconnecting the South End Neighborhood to Downtown in a

meaningful manner, the redevelopment of this intersection is extremely important to making Waterville a more walking friendly city.

The City of Waterville is currently engaged in a planning effort to slay the 'hydra' by investigating options for the repair of this intersection and to do so in a manner that allows for Waterville's one way streets to be converted back to two-way streets in the future. The City of Waterville made a promise to rebuild the intersection in conjunction with the private redevelopment of the Hathaway, Mardens and CMP buildings by a forward-thinking local developer who sees the value in close knit downtown development. He wishes for his properties to be connected to the downtown in a more meaningful manner.

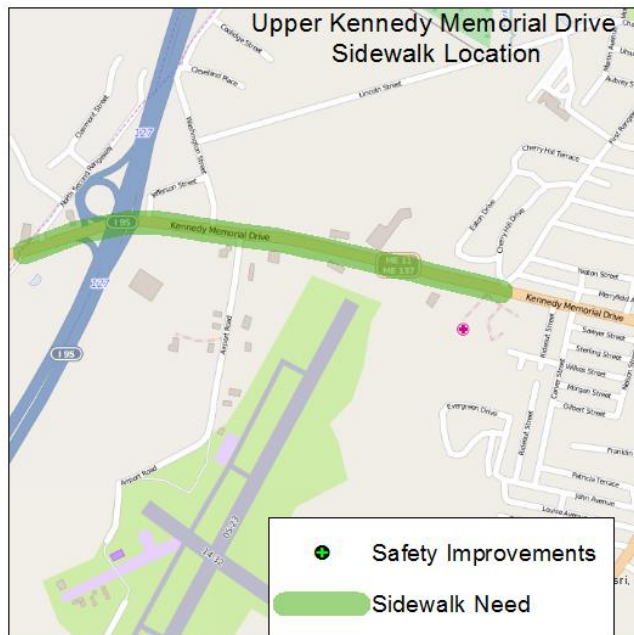
Sidewalks to the Upper Main Street Commercial Area

The sidewalk heading north on Upper Main Street comes to an abrupt halt at the southernmost entrance to Elm Plaza Shopping Center. There is no sidewalk on the East side of the Upper Main Street/Route 104 north of High Street, yet there is considerable commercial development on both sides of the street. To the south are two neighborhoods that generate considerable traffic, and one is an economically depressed neighborhood that may rely on walking more for access to economic opportunity.



This plan proposes that the city complete the sidewalk to the Upper Main Street commercial area on both sides of Upper Main Street. Upper Main Street is an important economic area in Waterville, flanked on both sides by many well established businesses. These businesses provide for both employment and retail opportunities with close proximity to established neighborhoods in both the North End Neighborhood and the neighborhood bounded by Eustis Parkway and North Street.

Traffic on this route flows freely from the signaled intersection at Armory Road and Elm Plaza down to the signalized intersection of Eustis Parkway. Additionally locations for a mid-



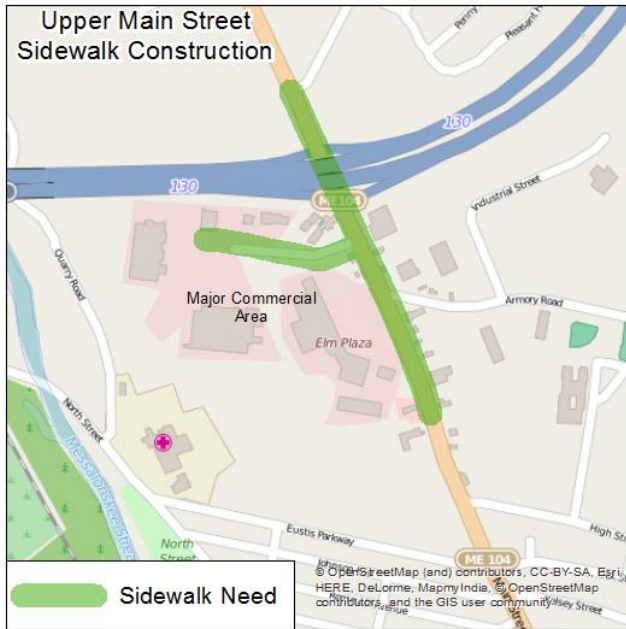
block flashing beacon crosswalk should be identified to allow for pedestrians to safely cross, especially considering hotel guests on the west side of Main Street, and eateries on the east side of the street. The crosswalk location should ensure that sight lines are considered due to the topography of the

roadway. Another opportunity for safety and ensuring an efficient pedestrian network include the inclusion of a crosswalk button on all four corners of the Armory Road/Upper Main Street intersection.

A project of this magnitude could be conducted outside the scope of a roadway reconstruction effort, but that is unlikely that funding could be obtained without a grant or other opportunity. The likeliest scenario is that sidewalks could be implemented during the next reconstruction or paving effort. Practical considerations should include intersection improvements at ingress/egress points into commercial properties to ensure crossing safety as well as the mid-block crosswalk with flashing beacons to ensure adequate pedestrian safety where people often cross to reach other amenities. There is also a need to connect the small neighborhoods north of Interstate 95 which could be a consideration for this project.

Complete the Sidewalk to Upper Kennedy Memorial Drive

Develop a sidewalk along the north side of Upper Kennedy Memorial Drive (KMD) linking the existing sidewalk along KMD East of First Rangeway and the sidewalk on First Rangeway. As with Upper Main Street, Upper KMD was developed in the latter half of twentieth century and with that, pedestrian access wasn't an initial consideration along the arterial strip. Much of the land wasn't developed at the time, and the sidewalk wouldn't have linked to productive places. Today however, the land use consists of commercial properties, including grocery and drug stores, a movie theater and several professional buildings with medical



services being provided.

The close proximity between a substantial Waterville neighborhood area and the Shaw's Plaza with its eateries, grocery store, and Movie Theater are ideal venues for many, especially teenagers who may be independent enough to enjoy these venues without supervision, yet require a ride to get there.

A consideration for this project is to develop the project as a separated multi-use pathway that can be accessible to both

pedestrians and cyclists. The nature of upper KMD is a higher speed roadway. Although it has a posted speed limit of 35 mph, the current design of this roadway and its extensive clear zones, often results in motorists speeds much greater. Similar to the proposed sidewalk project on Upper Main Street, this too has a substantial development that has now slipped past the artificial (and apparently porous) boundary created by the Interstate. Extending the sidewalk or multi-use path to that development would be useful.

Sherwin Street Intersection in the South End Neighborhood

The South End Neighborhood Association indicates that the Water and Sherwin Street intersection is one of the most dangerous in the neighborhood. The wide turning radii allows for turning movements to be made without the need to slow down to a safe rate of speed. While this intersection was likely developed for a vastly different economy, today the corner is overbuilt and unsafe for vulnerable roadway users. Recommendations are to tighten the radius and the width resulting in restricted speeds at which vehicles corner at this intersection.

There is often the concern that by reducing lane widths, emergency vehicles will have a slower response time to emergencies. The National Association of City Transportation Officials state that:

“Large emergency vehicles, such as fire trucks, have certain ideal dimensions for operation often tied to response times. Assume that emergency vehicles are permitted full use of the right-of-way in both directions, especially where tight curb radii may necessitate use of the opposite lane during a turn.”

Engineering a curb that tapers to street level at a corner is an option to allow for occasional roadway departures as long as the curb returns to normal height outside the corner area (National Organization of City Transportation Officials, 2015).



As noted in the recommended treatments section, street trees do a tremendous service to our urban places in their role as traffic calming devices. Not only do mature street trees provide a physical barrier to protect pedestrians, but have been shown to reduce speed when holding all other variables the same. Additionally street trees improve property values and the impacts would be widely felt in the South End Neighborhood. The South End Neighborhood Association indicates a strong desire to ensure that a tree is planted on this corner (among others) to ensure that the corner is aesthetically pleasing as well as safe for pedestrians.

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Downtown Waterville Pedestrian Improvements

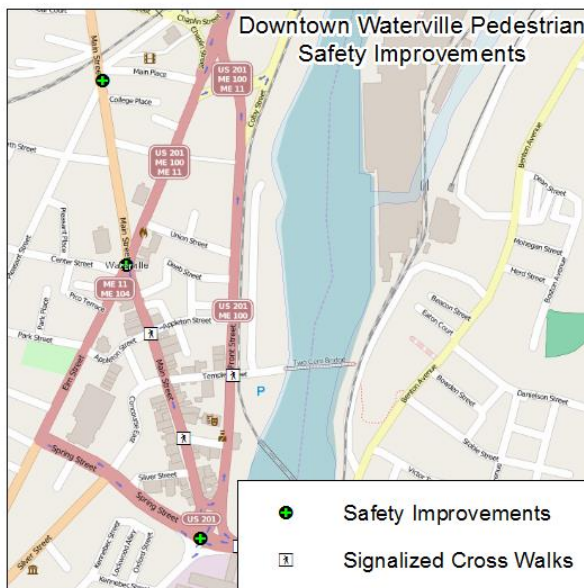
The continuation of Downtown Waterville intersection improvements is vitally important to the ongoing improvements to the local business district. Downtown Waterville is defined by its two main thoroughfares which are a set of one-way couplers on Front and Maine Street (State Route 201). Not only are multi-lane one way routes dangerous for pedestrians, but they have a tendency to be a detriment to business development and viability (Speck, 2012). From a pedestrian safety standpoint, one way streets by their nature allow for smoother and therefore faster traffic flow. A two-way street creates “friction” which results in slower traffic speeds.

In lieu of the engineering and subsequent signalization and striping necessary to change

these streets to two-way

traffic, an initial improvement that offers short term gain would be to put the pedestrian in more control of their fate at more of the downtown intersections. The recent installation of the Rectangular Rapid Flashing Beacon at the intersection of Appleton and Main Streets is a significant improvement to walkability for that one intersection.

Intersections without other traffic controls that encounter significant pedestrian traffic can benefit from these types



of installations.

Other candidates for the installation of rapid flashing beacons include:

- The intersection of Front and Temple Street allowing for safe pedestrian access from the Two Cent Bridge, as well as the underutilized park and a key parking asset in the Head of Falls area.
- The Main Street Silver Street Intersection is also unsignaled at this point and would allow for safer access to businesses, workplaces as well as Downtown Waterville's great eateries along Silver Street.

There are other significant opportunities for improvement, but evaluation should occur in a phased approach after these primary improvements are completed.

Pedestrian Improvements Silver Street and Carter Memorial Drive

Summer in Waterville wouldn't be complete for many without an ice cream from one of Waterville's fine purveyors of frozen dairy products. However, getting across the street to Gifford's Ice Cream on Silver Street is quite a challenge for pedestrians. The southeast side of the street has no sidewalk and traffic is transitioning from a wide multilane approach, to a two lane minor arterial street in a mixed use transitional neighborhood that serves as a gateway street to downtown.



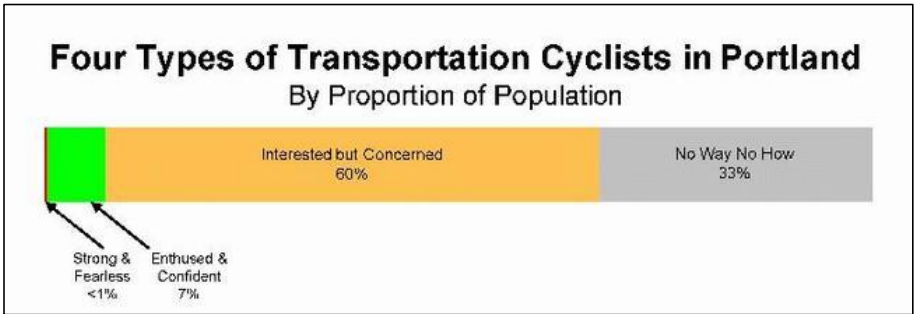
This area is problematic for a number of reasons. The first and most obvious, is that there is a destination that attracts a number of people from surrounding neighborhoods and many of them walk or ride their bikes in a location with inadequate infrastructure to support their safety. Roadway traffic along this street heading into downtown, experiences a funnel effect that often results in a race condition as automobiles merge into one lane. Because the transition to the two lane roadway is exaggerated in length, much of the traffic heading into downtown hasn't slowed sufficiently reflects the smaller roadway.

Immediate improvements to the area should include the installation of a crosswalk from the western side of the road to the eastern side. Because the traffic on the street can be fast due to the transition from Kennedy Memorial Drive to Silver Street, additional safety improvements can be made by installing rectangular rapid flashing beacons at the intersection. Additional safety improvements to the intersection would involve reducing lane widths on Silver Street after the intersection with Carter Memorial Drive and to funnel traffic heading into downtown at the Carter Memorial Drive intersection, not after the intersection. Additionally,

Silver Street would benefit from having the sidewalk completed on the southeast side of the street.

Bicycle Infrastructure Investment Plan

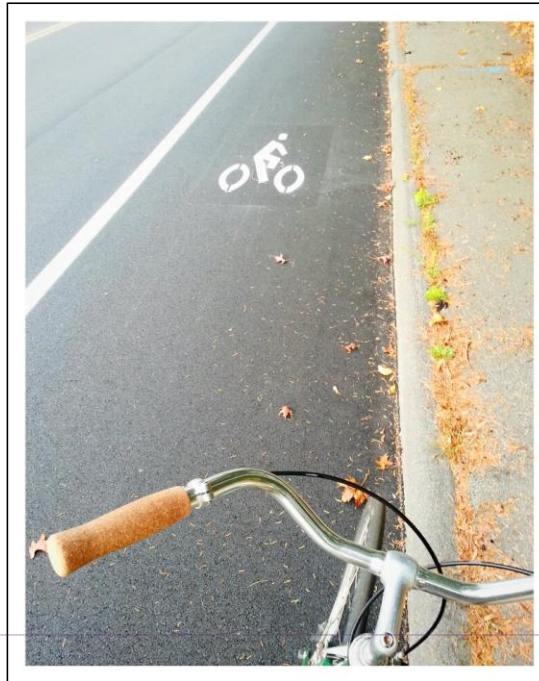
The development of a complete bicycling network is an important development for enhancing and promoting cycling in the City of Waterville. For much of the year, Waterville has some of the most amenable weather for cycling in the country. For the vigorous few, winter cycling is an option. There is a strong contingent of cyclists in Waterville already, anecdotally evidenced by the number of cyclists on our roadways and bicycle parking racks (and often random places used for bicycle parking). Many cyclists are recreational cyclists, but some bicycle for transportation either by choice, or in many cases, by necessity due to a variety of circumstances. A study that has been widely referenced in planning literature was done by the City of Portland, Oregon, which classifies the entire population by their interest in cycling. The study shows that there is a majority contingent in the population who is interested in cycling, whether it is for transportation or recreational purposes. There is a small contingent of cyclists who require no infrastructure development and will likely ride in all but the most inhospitable roadway environments. However, bicycle infrastructure is meant for the 60% who are interested but concerned and would like a safe place to ride (City of Portland, 2015).



The interest in Waterville may not directly mirror this studies result, but the growing awareness of the benefits of active transportation, the environment, or other factors encourage people to give cycling a try. Because of the growing demand for transportation choices in our community, delineating a bicycle network and developing an improvement plan to accomplish projects as they become viable is a good way to go about making substantial headway in developing a functioning network.

The design guidelines section alluded to the different types of treatments for delineating a bicycle network. Some projects require significant capital expense that is often coupled with roadway reconstruction or repaving efforts. Other projects require specific trail building efforts to develop multi-use pathways. There is however one method for quickly and cheaply delineating a bicycle network throughout a City that can make the initial foray into providing a city-wide bicycle network. Through the use of shared lane markings, or Sharrows, a network can be established that immediately acts a guide for cyclists as to what routes they can take to get to important destinations.

The map in section 12.2 of the appendix is an overall bicycle route map for the City of Waterville. While there are



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a number of opportunities for improving cycling in the City, the most important projects include:

- Completion of the Mayflower Hill bike lane to Colby College from Downtown Waterville
- Develop a bicycle route to Thomas College along West River Road, to Silver Street and downtown.
- Road diet on College Avenue, including bike lanes to the Fairfield town line.
- Considerations for bicycling from downtown to the South End Neighborhood along Summer Street or Water Street.
- Develop an implementation plan for traffic calming throughout Waterville creating a safer city for bicyclists and pedestrians.

As roadway projects are developed, opportunities will arise for improvements on an incremental basis. Slowly, the network will become more comprehensive and therefore more useful to those who use it.

Regional Connections

Because of Waterville's status as a service center, its population increases substantially during the day, adding nearly 50% more daytime visitors. Many of those residents come from one of the four adjoining towns: Winslow, Fairfield, Oakland and Sidney. There are key routes to

each of these towns that can be developed to facilitate a safer riding experience and encourage bicycle travel for much of the year.



The most immediate concern is facilitating connections to Fairfield. There are two primary routes that can be taken advantage of; Drummond Avenue which is a major urban collector and College Avenue a minor arterial, both leading to the heart of Fairfield's small but rapidly emerging urban center. College Avenue is an ideal candidate for a "road diet". The roadway is currently configured as a four lane roadway north of Waterville's downtown. By developing College Avenue as

a three lane roadway, it will not only maintain current and future automobile traffic capacity demand, but will allow for cycling.

Winslow is another important connection to Waterville. There are three primary routes of significance. The Two Cent Bridge is already a bicycle and pedestrian friendly connection that links downtown Waterville to Winslow. Bridge Street is significant because of its role in the downtown intersection planning process that is already occurring. The Carter Memorial Bridge is the third connection. Regional coordination efforts should be employed to ensure that there is continuity in the regional network.

Mayflower Hill Drive/North Street Colby Connector Trail

Project Description: This plan recommends the development of an off-road connection linking Colby College to the Quarry Road Recreation Area, Maine General Hospital's Thayer Campus, the Waterville Connector Trail and the neighborhood's flanking North Street. This project should be developed to ensure vulnerable roadway users can reach these important places as safely and efficiently as possible via either a multi-use pathway through the Colby Arboretum or a multi-use pathway along Mayflower Hill Drive between Colby College and the railroad bridge.



Problem Statement: The roadway to Colby College via North Street and Mayflower Hill while widely used by both the Colby and greater Waterville community is an unsafe travel-way for those using modes other than automobile travel. The curving sloped roadway has limited sight distances for motorists and presents an unsafe situation for those heading up or down the hill, especially those on foot and slowed cyclists heading up the hill. The steep slope is nearly impossible for those with disabilities to navigate. The steepness of the slope increases the potential for accidents due to limited sight distance. The roadway as it is currently designed has limited shoulder space for cyclists and/or pedestrians to share, making it unsafe for any vulnerable roadway users.

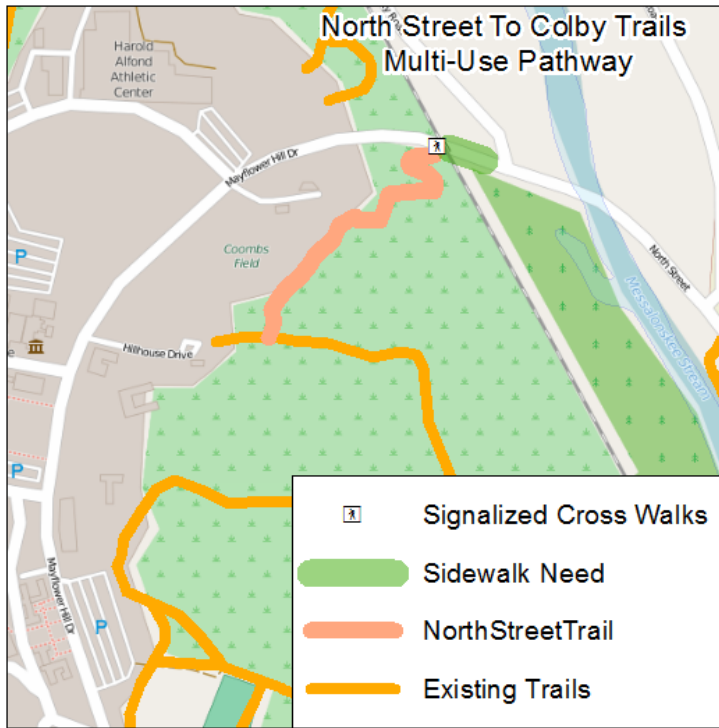
Considerations: There are many considerations for the project that will shape overall outcomes, project costs and involvement between different government jurisdictions and institutions, both commercial and academic.



One of the biggest issues this project faces is the consideration of the Pan Am Rail line that crosses Mayflower Hill Drive Northwest of the intersection with County Road. Any infrastructure (pedestrian safety signals), trail signage, that is involved with their property will increase project expenses significantly and should be avoided if at all possible.

If developing the project without significant infrastructure changes to the rail crossing, adequate warning signals (such as rectangular rapid flashing beacons) should be used to warn motorists of pedestrians. Significant improvements to visibility should also be included in the project to ensure motorists can see vulnerable roadway users in the area of the railroad crossing. This can be done through the installation of light fixtures of adequate power to increase visibility.

If it is decided that a multi-use pathway is the best option for improving traffic, a second major consideration is a request for a break in access on Mayflower Hill Drive uphill from the rail crossing that involves placing a trail or pathway entry against the roadway for trail use access. This option will involve some drainage work to ensure continued adequate flow along the roadway, likely a culvert to be installed.



The option which develops a trail through the Arboretum will seek to connect to existing pathways in the Arboretum following a route that provides for as gentle of a slope as is practicable considering the topography and provides the greatest amount of use to as many constituent groups as possible. Because the slope is somewhat steep along the roadway, making use of the topographic nuances will be necessary to accomplish this goal.

If a multiuse path is developed, trail surfaces can be as expensive as paved concrete or asphalt, which also require space for equipment to be cleared. Another surface to consider is crushed stone dust, which has shown durability in many local projects including the Winslow School Trails, which was developed by the KM Trails organization. Costs are kept to a minimum and the trail surfaces have been shown to be useful for all modes of travel on these trails.

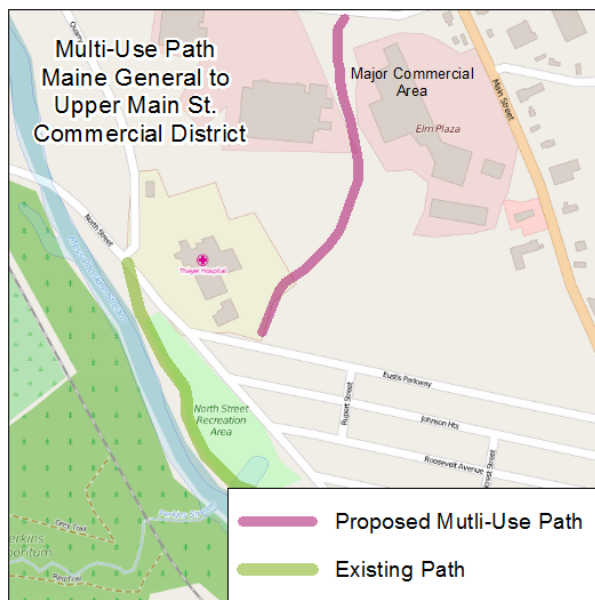
Project Goals and Outcomes

A successful implementation of this project would be the development of a trail or roadway project that decreases the amount of pedestrian and cyclists on what is a dangerous intersection. The Colby Community will benefit greatly as student athletes will have a safer route to run and faculty and staff who live in the neighborhoods flanking North Street will have better access to Colby College. Other members of the community who use “The Colby Loop” for exercise will also benefit. This will also encourage more members of the community to experience the Colby Arboretum and the natural wonder it has to offer.

Multi-Use Path Linking the Thayer Campus to Upper Main Street

This project is a great opportunity to connect a significantly sized neighborhood, a hospital, and an existing multi-use path to a major retail and commercial area. Between the Thayer Campus of Maine General Hospital and the Upper Main Street Commercial area is a sewer main that has a permanent easement. Already people travel between the two locations via the cleared easement, but it lacks a decent surface suitable for the wetter periods of the year. It also lacks legitimacy from the city, the hospital and the commercial areas to the north.

The project could be quickly developed and implemented with a suitable crushed stone trail surface. Agreements would have to be made between the hospital and the commercial areas for ingress/egress issues. The inclusion of adequate signage would also be beneficial.



Closing Thoughts

The transportation system that we currently have is the results of decades of development and represents a significant investment in our mobility. It can be argued that the investment is lopsided in that it represents a myopic vision of mobility in America, primarily focused on automobile travel. This has resulted in a built environment that is unsafe for all roadway users, has disconnected land uses that increase transportation costs, and has created downtown business environments that struggle to prosper and thrive. While the overbuilt and unbalanced transportation system can't take the entirety of the blame, it sets the framework for how our cities and towns function culturally, socially, environmentally and economically.

The transportation system we currently have is overbuilt. The engineering profession has been directed to meet service levels that would only be seen under the most extreme of circumstances, resulting in more roadway than necessary. Lanes are much wider than necessary resulting in faster motor vehicle speeds in our neighborhoods; corners are designed for higher speed travel in places where speeds should be slower; and ultimately all this results in urban places that are less livable. There is however a silver lining to having an overprovisioned roadway system. Places like Waterville that were built for a time that is long since passed, has ample right-of-way for the development of bicycling and walking facilities with minimal investment in reconstruction efforts. Overprovisioned roadways with lane widths in excess of 15 feet only lack some paint for the development of a bike lane, at very low cost to provisioning agencies.

Through the development of good policy including a complete streets policy; along with a capital investment strategy that remedies known problem areas, we can make a place that is safer for all transportation users, more prosperous for our local business community; more inclusive of all transportation users' needs; places that encourage healthy lifestyles; and ultimately resulting in a better community.

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Appendix

Major Employers in Waterville, ME

MAJOR EMPLOYERS IN WATERVILLE

EMPLOYER	APPROXIMATE NUMBER OF EMPLOYEES	TYPE OF BUSINESS	NOTES
MaineGeneral Health	3,800 including part-time and per diem employees	Hospital, Rehabilitation, Nursing Care, Retirement Community	Includes jobs in Augusta, 43 at Jackman Regional Health Center, 56 at Granite Hill Estates, 270 at HealthReach Network
Colby College	719		500-999 (DOL)
Inland Hospital	650		
Waterville School Dept.	542 as of June 2009	Pre-AOS 92	(Source: City Finance Dept.)
Huhtamaki	432	Paper Products	500-999(DOL)
Wal-Mart Super Center	251-500		100-249 (DOL)
Mid-State Machine Products, Inc.	55 at the Wyandotte Mill on Trafton Road	Precision Machining	Plus 160 employees in Winslow
City of Waterville	110 full-time + 140 part-time & seasonal employees		Includes call fire fighters, election workers, and board members, but not library employees.
Hannaford	100-249 Elm Plaza 100-249 JFK Mall		(DOL)
Shaw's	100-249 (DOL)		
Pan Am Railways	101-250	Railroad	Formerly Guilford Transportation, Maine Central Railroad
Kennebec Behavioral Health	100-249 (DOL) 340 at 4 sites	Mental Health	*Sites in Waterville, Augusta, Skowhegan, Winthrop
Care & Comfort	121		87 production staff + 34 admin staff/clinicians
Home Depot	100-249 (DOL)		
TD Bank	101-250	Banking & Insurance	Waterville, Winslow, Oakland, Fairfield
Lakewood Continuing Care	100-249 (DOL)		
Oak Grove Living & Rehab	100-249 (DOL)		27 Cool Street
KVCAP	100-249	Social Services	Water Street
Thomas College	92 full-time + 56 part-time		

Sources: Maine DOL Labor Market Analysis and businesses contacted . January 2012.

Complete Streets Policy for Waterville, ME

Important Disclaimer: This Complete Streets Policy is based upon the award-winning policy created by Lewiston/Auburn, ME. It is edited for use as a starting point to begin the development process for Waterville, ME through the Sustain Mid-Maine Transportation Committee and affiliated groups and stakeholders. We recommend that it be adapted for use by Winslow, Fairfield and Oakland as a cooperative agreement following Lewiston and Auburn's lead in cooperative planning.

DRAFT PROPOSAL - 3/15/15

COMPLETE STREETS POLICY – WATERVILLE, ME

1. Rationale

Promoting pedestrian, bicycle, and public transportation travel reduces negative environmental impacts, promotes healthy living, advances the well being of travelers, supports the goal of sustainable development, and meets the needs of the diverse populations that comprise our communities.

2. Vision

The vision of the City of Waterville is of a community in which all residents and visitors, regardless of their age, abilities, or financial resources, can safely and efficiently use the public right-of-way to meet their transportation needs regardless of their preferred mode of travel.

3. Policy

The City will plan for, design, construct, operate, and maintain an appropriate and integrated transportation system that will meet the needs of motorists, pedestrians, bicyclists, wheelchair users, transit vehicles and riders, freight haulers, emergency responders, and residents of all ages and abilities.

Transportation facilities that support the concept of complete streets include, but are not limited to:

- amenities such as pavement markings and signs;
- street and sidewalk lighting;
- sidewalk and pedestrian safety improvements;
- Americans with Disabilities Act and Title VI compliance;

- transit accommodations;
- bicycle accommodations including appropriate signage and markings; and
- streetscapes that appeal to and promote pedestrian use.

The system's design will be consistent with and supportive of local neighborhoods, recognizing that transportation needs vary and must be balanced in a flexible, safe, and cost effective manner.

4. Projects

Those involved in the planning and design of projects within the public right-of-way will give consideration to all users and modes of travel from the start of planning and design work. Transportation improvements shall be viewed as opportunities to create safer, more accessible streets for all users. This shall apply to new construction, reconstruction, and rehabilitation. Emphasis will be made to reach out to organizations such as Kennebec Messalonskee Trails (KMTrails), the Greater Waterville Bike and Pedestrian Action Committee, and Sustain Mid-Maine's Transportation and Active Community Environment Committee, to brief them on potential future projects of this nature during or immediately following the annual development of the city's capital improvement program. This will allow these groups to provide their views regarding complete streets policy early in the City's planning and design process.

6. Exceptions

Exceptions to this policy may be made under the circumstances listed below:

- a. Street projects may exclude those elements of this policy that would require the accommodation of street uses prohibited by law;
- b. Ordinary maintenance activities such as mowing, snowplowing, sweeping, spot repair, joint or crack sealing, or pothole filling do not require that elements of this policy be applied beyond the scope of that maintenance activity;
- c. Ordinary maintenance paving projects may only exclude the elements of this policy that would require increasing pavement width. However, when such projects do occur, the condition of existing facilities supporting alternate transportation modes should be evaluated as well as the appropriateness of modifying existing pavement markings and signage that support such alternate modes. This exception does not apply to street reconstruction projects;

d. Street reconstruction projects and maintenance paving projects which involve widening pavement may exclude elements of this policy when the accommodation of a specific use is expected to:

- require more space than is physically available, or
- be located where both current and future demand is proven absent, or
- drastically increase project costs and equivalent alternatives exist within close proximity, or
- have adverse impacts on environmental resources such as streams, wetlands, floodplains, or on historic structures or sites above and beyond the impacts of currently existing infrastructure.

In order for an exception to be granted under the conditions stated above and prior to finalizing the design and budget for the intended project, the City Engineer and Director of Public Works must first consult with the City Planner and City Administrator. If the City Manager concludes that an exception to the policy is warranted, the Administrator or the staff representative to the KMTrails, the Greater Waterville Bike and Pedestrian Action Committee, and Sustain Mid-Maine's Transportation Committee shall consult with the Committees regarding the project and the requested exception. If, after this consultation, a difference of opinion exists between the Committees and staff regarding an exception that has been granted, the Committees may forward their concerns to the City Council for its consideration.

e. Street projects may exclude the development of sidewalks in areas falling outside those identified as appropriate for sidewalks on the basis of an adopted sidewalk policy.

5. Intergovernmental Cooperation (if completed in cooperation with Winslow, Fairfield and/or Oakland)

The Cities/Towns will cooperate together and with other transportation agencies including the Maine Department of Transportation (MDOT) and the Kennebec Valley Council of Governments (KVCOG) to ensure the principles and practices of complete streets are embedded within their planning, design, construction, and maintenance activities. The City will specifically cooperate to ensure the transportation network flows

seamlessly between it and its surrounding Towns in accordance with local and regional road, transit, bicycle, and pedestrian plans and mutually agreed upon design criteria.

6. Design Criteria

The City, through their Public Works and Planning Departments, shall develop and adopt design criteria, standards, and guidelines based upon recognized best practices in street design, construction, and operation. To the greatest extent possible, the City shall adopt recognized standards with particular emphasis on pedestrian and bicycle markings and wayfinding signage. Resources to be referenced in developing these standards shall include, but not necessarily be limited to, the latest editions of:

- American Association of State Highway Transportation Officials (AASHTO) Policy on Geometric Design of Highways and Streets,
- Guide for Planning, Designing, and Operating Pedestrian Facilities, and Guide for the Development of Bicycle Facilities;
- Institute of Transportation Engineers (ITE) Designing Walkable Urban Thoroughfares: A Context Sensitive Approach;
- National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide;
- U.S. Access Board Public Right-of-Way Accessibility Guidelines;
- Highway Capacity Manual and Highway Safety Manual; and
- Manual on Uniform Traffic Control Devices.

The City will be permitted to consider innovative or non-traditional design options that provide a comparable level of safety and utility for users as those listed above.

7. Community Context

Implementation of this Policy shall take into account the goal of enhancing the context and character of the surrounding built and natural environments. Transportation facilities, including roads, should be adapted to fit and enhance the character of the surrounding neighborhood.

8. Network

Special attention should be given to projects that enhance the overall transportation system and its connectivity. Specifically, high priority should be given to:

- a. Corridors providing primary access to one or more significant destinations such as a parks or recreation areas, schools, medical facilities, shopping/commercial areas, public transportation, or employment centers;
- b. Corridors serving a relatively high number of users of non-motorized transportation modes;
- c. Corridors providing important continuity or connectivity links to existing pedestrian or bicycle networks;
- d. Projects identified in regional or local bicycle pedestrian plans prepared by organizations such as the KVCOG, KMTrails, and other associated groups.

9. Performance Measures

The City Manager and/or designee shall report to the Planning Board and City Council on an annual basis on the transportation projects undertaken within the prior year and planned within the coming year and the extent to which each of these projects has met the objectives of this policy. Advanced notice of future transportation projects should also be given to enable early input of ideas consistent with this policy.

10. Implementation

This policy will be primarily implemented through developing bike and pedestrian network plans on a regional basis through City of Waterville involving the KMTrails and Greater Waterville Bike and Pedestrian Action Committee. These plans shall specify the type and location of improvements and shall be implemented as funding becomes available or routine work is completed. Special emphasis shall be placed on those elements of plans that can be accomplished with little or no additional expense, such as providing bike lanes where existing pavement is adequate and road shoulders are sufficient to allow for safe bicycle use.

Additional implementation activities will include, but not be limited to:

- developing project checklists that incorporate complete streets elements in the Cities' overall design processes;

- establishing design manuals that clearly set forth the standards to be followed for bike and pedestrian installations including signs and markings; and
- directing the Planning Board to evaluate changes to the Cities' respective land development codes that will extend the complete streets concept into private developments through appropriate subdivision and site plan regulations.

Right-of-Way projects included within the City's annual or multi-year capital improvement plan shall specifically reference how the project addresses complete streets issues.

Maine Bicycle and Pedestrian Laws

This is a summary of Maine's bicycle and pedestrian laws copied verbatim from the Maine DOT web site (Maine Department of Transportation, 2015).

Laws Applicable to Pedestrians

- Pedestrian traffic. When use of a sidewalk next to a public way is practicable, a pedestrian may not walk on that public way.
- Pedestrian on way. Where sidewalks are not provided, a pedestrian shall walk facing approaching traffic on the left side of the public way or the way's shoulder when practicable.
- Pedestrians on sidewalks. An operator shall yield the right-of-way to a pedestrian on a sidewalk.
- Pedestrians in marked crosswalks. When traffic-control devices are not in operation, an operator must yield the right-of-way to a pedestrian crossing within a marked crosswalk.
- Pedestrian crossing. A pedestrian must yield the right-of-way to a vehicle when crossing a way:
 - Other than within a marked crosswalk; or
 - With an available pedestrian tunnel or overhead pedestrian crossing.
- Pedestrian prohibitions. A pedestrian may not:
 - Cross between adjacent intersections at which traffic-control devices operate, except in a marked crosswalk;
 - Cross an intersection diagonally, unless authorized by official traffic-control devices; or
 - Suddenly leave a curb or other place of safety and walk or run into the path of a vehicle that is so close that it is impossible for the operator to yield.
- When vehicle stopped. When a vehicle is stopped at an intersection or a marked crosswalk to permit a pedestrian to cross, the operator of another vehicle approaching from the rear may not overtake and pass the stopped vehicle.
- Due care. Notwithstanding other provisions of this chapter or of a local ordinance, an operator of a vehicle shall:
 - Exercise due care to avoid colliding with a pedestrian;
 - Give warning by sounding the horn when necessary; and
 - Exercise proper caution on observing a child or any obviously confused, incapacitated or intoxicated person.
- Failure to yield right-of-way to a visually impaired pedestrian. Notwithstanding other provisions of this section, an operator who fails to yield the right-of-way to a visually impaired pedestrian who is carrying a cane that is predominately white or metallic in color, with or without a red tip, or using a guide or personal care dog as defined in Title 17, section 1312, commits a traffic infraction. Notwithstanding section 103, subsection 3, the fine for a violation of this subsection may not be less than \$50 nor more than \$1,000.

Laws Applicable to Bicycling

- [Maine bicycling laws](#) generally give bicyclists the same rights and responsibilities as motor vehicle operators. Bicyclists may use public roads, and they must obey traffic laws such as stopping at red lights and stop signs, yielding to pedestrians at crosswalks and yielding to traffic when entering a road from a driveway.
- Bicyclists must ride with traffic, not against it.
- Bicyclists are expected to ride on the right as far as is "practicable," but there is a variety of situations in which a rider may legally take a larger share of the travel lane, including: setting up for a left turn, proceeding straight where a right turn is also permitted, passing other vehicles, and to avoid obstacles or other unsafe situations.
- Bicyclists MAY ride on designated bike paths and in bike lanes, but they are NOT required to do so, even when such paths or lanes parallel a road. Bicycles have a right to be on most roads in Maine, but may be prohibited from riding on divided highways and other roads as per local and state ordinances and rules. Bicycles are not required to ride in shoulders or bike lanes in Maine.
- Bicyclists must have and use headlights at night, as well as rear reflectors and foot/ankle/pedal reflectors. They also must have functional brakes on their bikes.
- Cyclists under 16 must wear bike helmets.
- In most cases, sidewalk riding is allowed and legal unless specifically prohibited by a municipality/local ordinance. Please check with your local municipalities.
- Maine Motor Vehicle Laws Related to Biking:
 - Motorists must give at least three feet of clearance when passing bicyclists.
 - Motorists who are passing bicyclists proceeding in the same direction may not make a right turn unless they can do so with reasonable safety.
 - Motorists may cross the centerline in a no-passing zone in order to pass a bicyclist if it is safe to do so.
 - Motorists should not unnecessarily sound a horn. Honking your horn when approaching a bicyclist could startle them and cause a crash. Maine law states "a person may not unnecessarily sound a signaling device or horn". (Title 29A, Chapter 17, Section 1903)
 - Motorists may open car doors only after checking to see that it can be done safely, without interfering with traffic.



Proposed Waterville Bikeways, Shared Lanes and Other Routes

