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Oak Hill Pedestrian Plan

Scarborough, Maine
FINAL PLAN

Prepared for:



And:
PACTS

Portland Area Comprehensive Transportation System

Prepared by:



With:



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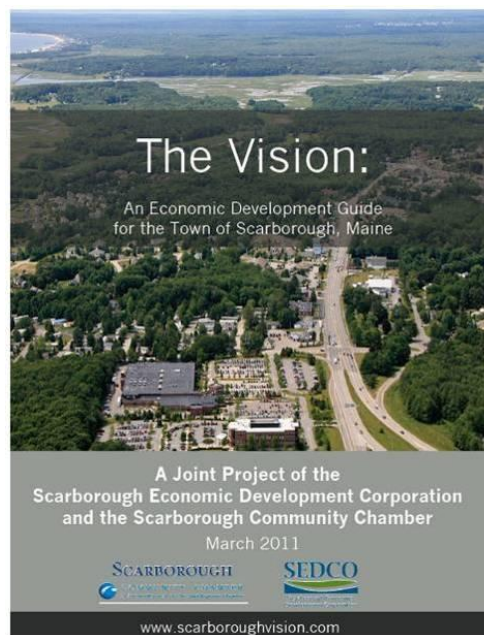
1 Introduction

In 2010, the Town of Scarborough matched a grant awarded by the Portland Area Comprehensive Transportation System (PACTS) and the Maine Department of Transportation (MaineDOT) to develop the Oak Hill Pedestrian Plan. This Plan combines past planning efforts with new analysis and design ideas, and includes public input. The result is a complete, up-to-date framework for moving forward with tangible pedestrian improvements in the Oak Hill area of Scarborough.

The Town of Scarborough is clearly committed to becoming more pedestrian-friendly, especially in the Oak Hill commercial district and with connections to surrounding residential areas. Also critical are the walking links to affordable housing areas, bus stops and the grocery store. Development regulations in Oak Hill require future projects to provide the necessary infrastructure to promote walking. The recent Walgreens project is a good example as is the multi-phased effort to create the Eastern Village Development project. Developing in a more walkable manner is also consistent with the Green Development, Quality-of-Life and Transportation and Infrastructure goals set forth in the Scarborough Economic Development Corporation and Scarborough Community Chamber's report, *The Vision: An Economic Development Guide for the Town of Scarborough* (March 2011). The *Vision* also spelled out the Town's desire to improve other forms of more sustainable transportation and to become a more transit-oriented and bike-friendly community.

Current pedestrian conditions within the Oak Hill area are not adequate to serve the needs of its users. Sidewalks are not always continuous and don't exist on some critical streets in the area. Marked crosswalks are missing from some signalized intersections or across roadways where a clear pedestrian desire line exists. The PACTS 2009 Bicycle and Pedestrian Plan ranks the Oak Hill area as "poor" and in need of improvement.

The Oak Hill Pedestrian Plan will begin to address the identified regional "concern" as stated in the PACTS planning document. It will also provide guidance for enhancing conditions for pedestrians particularly in areas identified by the project's Advisory Committee and Town staff. Beyond physical improvements, this Plan also outlines policies and programs to help encourage people to walk more often, drive more safely, and to grow as a town with the needs of pedestrians taken into full consideration.



1.1 Project Goals

The project goals were developed early in the planning process, in consultation with the project Advisory Committee. The Oak Hill Pedestrian Plan Project Goals include:

- ❖ Create a more walkable environment throughout all of Oak Hill
- ❖ Provide pedestrian connectivity and access throughout the study area, especially to the schools
- ❖ Control and enforce traffic speeds to create a calmer walking environment
- ❖ Provide safe pedestrian facilities, treatments, and programs to make it safe for children and teenagers to walk to school, the library, Memorial Park and the play fields
- ❖ Maintain the current pedestrian infrastructure, but improve where necessary and possible
- ❖ Develop education and encouragement programs to facilitate safe walking
- ❖ Provide for pedestrian user groups of all ages and abilities
- ❖ Where possible, provide improvements for safer travel by bicyclists
- ❖ Address growing obesity issue through the fostering of healthy lifestyles and active living
- ❖ Create a more economically vibrant community, partly through making Oak Hill more attractive and walkable
- ❖ Reduce Oak Hill's general auto-dependency
- ❖ Reduce the number of pedestrian-related auto collisions



Creating a more walkable environment in Oak Hill will require pedestrian improvements at the US Route 1/Black Point Road/Gorham Road intersection.

1.2 Community Planning Process

This planning project included numerous meetings with an Advisory Committee appointed by the Town. The committee was made up of a diverse set of stakeholders and included a Town Councilor, the Director of Public Works, the Town Planner, the library director, and representatives from the Community Services Department, the Planning Board, the local business community, and five residents of the greater Oak Hill area. In total, there were four meetings, which included:

- Meeting 1: an introduction to the scope of work, a Pedestrian-Friendly Streets 101 PowerPoint presentation by the consultant team and a round-robin discussion of the committee's goals and objectives for the Plan
- Meeting 2: a site walk and bus tour of the Oak Hill area to discuss the on-the-ground conditions and the opportunities for improvements and the on-going challenges to making a more walkable Oak Hill and surrounding area.
- Meeting 3: A presentation of the draft recommendations for improvement projects and preparation for the upcoming public meeting
- Meeting 4: Finalizing the recommendations for improvement projects as well as the evaluation of the projects to develop prioritization. Also reviewed was the draft Pedestrian Plan report.

On June 7, 2011, a public meeting was held in Town Hall's Council Chambers. The meeting featured an introduction to Complete Streets policies and design principles and why they are needed to make Oak Hill a more walkable, bikable and transit-oriented area. After the presentation, the 25-30 attendees gathered in front of a large map that featured the pedestrian infrastructure recommendations and made a series of comments and suggestions for Town staff and the consultant team.



Scarborough residents gather around the large-scale map of Oak Hill at the June 7 community meeting.

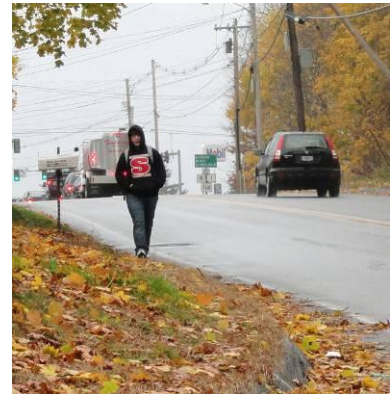
1.3 Public Benefits of Pedestrian Transportation

When considering the level of dedication in time and valuable resources that it will take to fulfill the goals of this Plan, it is also important to measure the immense value of pedestrian transportation. Walking helps to improve people's health and fitness, enhance environmental conditions, decrease traffic congestion, and will contribute to a greater sense of community.

Scores of studies from experts in the fields of public health, urban planning, urban ecology, real estate, transportation, sociology, and economics have supported such claims and have acknowledged the substantial value of supporting walking as it relates to active living and alternative transportation. Communities across the United States and throughout the world are implementing strategies for serving the walking needs of their residents, and have been doing so for many years. They do this because of their obligations to promote health, safety and welfare, and also because of the growing awareness of the many benefits of walking.

1.3.1 Increased Health and Physical Activity

A growing number of studies show that the design of our communities—including neighborhoods, towns, transportation systems, parks, trails and other public recreational facilities—affects people’s ability to reach the recommended daily 30 minutes of moderately intense physical activity (60 minutes for youth). According to the Centers for Disease Control and Prevention (CDC), “physical inactivity causes numerous physical and mental health problems, is responsible for an estimated 200,000 deaths per year, and contributes to the obesity epidemic.” The increased rate of disease associated with inactivity reduces quality of life for individuals and increases medical costs for families, companies, and local governments.



While a healthy activity, walking in Oak Hill is discouraged due to lack of sidewalks.

The CDC determined that creating and improving places to be active could result in a 25% increase in the number of people who exercise at least three times a week. This is significant considering that for people who are inactive, even small increases in physical activity can bring measurable health benefits. The establishment of a safe and reliable network of sidewalks in Oak Hill will have a positive impact on the health of local residents. The Rails-to-Trails Conservancy puts it simply: “Individuals must choose to exercise, but communities can make that choice easier.”

1.4 Economic Benefits

Walking is an affordable form of transportation. According to the Pedestrian and Bicycle Information Center (PBIC), of Chapel Hill, NC, the cost of operating a car for a year is approximately \$5,170, while walking is virtually free. The PBIC explains, “When safe facilities are provided for pedestrians and bicyclists, more people are able to be productive, active members of society. Car ownership is expensive, and consumes a major portion of many Americans’ income.”

Walking becomes even more attractive from an economic standpoint when the rising price of oil (and decreasing availability) is factored into the equation. The unstable cost of fuel reinforces the idea that local communities should be built to accommodate people-powered transportation, such as walking and biking.

From a real estate standpoint, consider the positive impact of sidewalks and greenways, which are essential components of a complete pedestrian network. According to the recent CEOs for Cities report: *2009 Walk the Walk*, “houses [in neighborhoods] with above-average levels of walkability command a premium of about \$4,000 to \$34,000 over houses with just average levels of walkability in the typical metropolitan areas studied.”

Finally, another potential cost savings for the Town lies in reduced busing costs. If a more pedestrian- and bicycle-friendly environment evolved in the Oak Hill area, more children would walk, leading to reduced demand for busing students from nearby neighborhoods. The reduced costs associated with less busing could potentially be used by the Town to improve sidewalk snow clearance programs in the winter to ensure that children could walk to school year-round.

1.5 Environmental Improvements

When people choose to get out of their cars and walk, bike or take transit, they make a positive environmental impact and improve air quality. They reduce their vehicle miles traveled, reducing traffic, congestion and the volume of pollutants in the air.

Other environmental impacts can be a reduction in overall neighborhood noise levels and improvements in local water quality as fewer automobile-related discharges wind up in the local wetlands, streams, rivers and lakes. Furthermore, every car trip replaced with a pedestrian trip reduces U.S. dependency on fossil fuels, which is a national goal.

Trails and greenways are also part of the pedestrian network, conveying their own unique environmental benefits. Greenways protect and link fragmented habitat and provide opportunities for protecting plant and animal species. Aside from connecting places without the use of air-polluting automobiles, trails and greenways also reduce air pollution by protecting large areas of plants that create oxygen and filter air pollutants such as ozone, sulfur dioxide, carbon monoxide and airborne particles. Finally, greenways improve water quality by creating a natural buffer zone that protects wetlands, streams, rivers and lakes, reducing soil erosion and filtering pollution caused by agricultural and roadway runoff.

1.6 Transportation Benefits

In 2001, the National Household Travel Survey found that roughly 40% of all trips taken by car are less than 2 miles. By taking these short trips on foot, rather than in a car, citizens can have a substantial impact on local traffic and congestion. Additionally, many people do not have access to a vehicle, are not able or choose not to drive. An improved pedestrian network provides greater and safer mobility for these residents.

According to the Brookings Institution, the number of older Americans is expected to double over the next 25 years. All but the most fortunate seniors will confront an array of medical and other constraints on their mobility even as they continue to seek an active community life. Senior citizens deserve access to independent mobility, and providing safe places for them to walk is an essential factor in meeting this important need.

Children under the age of 16 also deserve access to safe mobility. According to the U.S. Environmental Protection Agency, fewer children walk or bike to school than did so a generation ago. In the past few decades, the percent of students between the ages of 5 and 15 who walked or biked to or from school has dropped from roughly 50% to about 15%, while one-third of Maine's children are overweight or obese.



Fewer children are walking and bicycling as a mode of transportation.

1.7 Plan Components

This Plan document includes the following components:

This **Introduction** that presents the background, visions and goals, and the benefits of a walkable community (Chapter 1).

Chapter 1

Pedestrian Friendly Streets create livable, walkable neighborhoods through the use of various facilities (Chapter 2).

An assessment of **Existing Conditions** that reviews existing pedestrian conditions, land use, demographics, trip attractors, and also summarizes existing related plans of the Oak Hill area (Chapter 3).

Infrastructure Recommendations put forth a framework of recommended facilities (pedestrian corridors, intersection improvement projects, and shared-use paths) (Chapter 4). These recommendations are further prioritized in the next section (Chapter 5).

Program Recommendations for education, encouragement, enforcement that address pedestrian needs for future development (Chapter 6).

Funding Source recommendations that outline specific steps for procuring funding for facility development and other programs that promote more active transportation (Chapter 7).

Design Guidelines to help guide the Town of Scarborough with pedestrian facility design and standards for projects that may result from this planning effort (Appendix A).

Finally, an **Executive Summary** is a companion to this planning report.

2 “Complete Streets” Design

Developing Complete Streets policies and programs are important elements in creating a high quality of life for a community. Many factors go into determining the quality of life for the citizens of a community: the local education system, prevalence of quality employment opportunities, and affordability of housing are all items that are commonly cited in surveys. Increasingly though, citizens claim that access to alternative means of transportation and access to quality recreational opportunities, such as parks and greenways, are important factors for them in determining their overall pleasure within their community. Communities with such amenities can attract new businesses, industries, and in turn, new residents. Furthermore, quality of life is positively impacted by walking through the increased social connections that take place by residents being active, talking to one another and spending more time outdoors and in their communities. Providing a safe and well-connected sidewalk system is key to creating this quality of life.

Several facility types comprise a well-connected and safe pedestrian system. The combination of these elements serves to create what are known as “Complete Streets”. Complete Streets are streets for everyone – allowing students to walk to school, seniors to bike to the Senior W.O.W. programs, and neighbors and visitors to access local shopping centers and retail establishments, as well as community destinations such as the library, parks and residential areas. This model of a transportation network creates an environment where all users are provided safe access – pedestrians, bicyclists, motorists and public transit users alike.

Although the primary focus of this planning effort is pedestrian accessibility and safety, many of the infrastructure proposals throughout the report have a secondary benefit on transit access—sidewalks adjacent to bus stops, for instance—and for bicyclists. A number of the improvement recommendations are intended to calm traffic and/or provide a safer place beyond the roadway pavement for non-motorists. It is very likely that many of these improvements, such as refuge islands, sidewalks and new pathways, will be utilized by bicyclists as well as pedestrians. While experienced cyclists will likely ride with vehicles in the roadway, because there are no restrictions on sidewalk bicycling in Oak Hill, many less experienced riders, children on their way to school and families will use the sidewalk for some portion of their trip. (With this said, however, it’s important to note that one of the recommendations of the plan is for the Town to explore funding for a more comprehensive bicycle master plan or Safe Routes to School plan to promote additional forms of sustainable transportation, especially for children.)

There is no single ‘design’ for a Complete Street but it often includes sidewalks, bike lanes (or other bicycle accommodations), bus lanes if applicable, multiple safe crossing opportunities utilizing median islands and accessible pedestrian signals, narrow travel lanes, and more, depending on the surrounding land use and community context.

Complete Streets can offer many benefits in all types of communities. These benefits cover a wide range, including:

- **Economic** – Complete Streets can encourage economic growth by providing viable connections between places where people live and where they work, play and shop.
- **Safety** – Complete Streets reduce crashes for people using all modes of transportation.

Chapter 2

- **Transportation** – Complete Streets encourage walking and bicycling, increase travel choices, which can reduce congestion, and increase the overall capacity of the transportation network.
- **Health/Fitness** – Complete Streets create an environment where people can more easily meet their recommended activity levels. Physical activity and a sense of independence are particularly important for children.
- **Air Quality** – Complete Streets allow people to replace car trips with trips that do not generate carbon dioxide and other emissions.

These benefits can manifest themselves in areas like Oak Hill by using the “Three P’s” approach:

- **Projects** are infrastructure improvements that calm traffic and improve pedestrian and bicycle safety. These can include a mix of short-term projects, such as striping and signage, and more long-term efforts that may require state or federal funding.
- **Policies** are new policies and regulations that accommodate all modes of transportation in roadway and redevelopment projects or provide incentives for multi-modal transportation.
- **Programs** are education and encouragement measures, which promote a more active lifestyle, and enforcement techniques, which create safer streets for all users.



Raised crosswalks are an effective means to calm traffic on lower-volume streets.

2.1 Pedestrian-friendly Street Design Characteristics

2.1.1 Sidewalks and Crossings

Sidewalks are the most fundamental element of the walking network, as they provide an area for pedestrian travel that is separated from vehicle traffic. Sidewalks are typically constructed out of concrete and are separated from the roadway by a curb or gutter and sometimes a landscaped planting area. Sidewalks are a common application in both urban and suburban environments.

Installing entirely new sidewalks can be costly, particularly if drainage improvements such as undergrounding of roadside culverts and installation of curb/gutter are part of the design. However, fixing short gaps in an existing sidewalk network—some of which can be found on US Route 1 in Oak Hill—are important to maximize system continuity, and can be a relatively low-cost fix to improve the network.

Attributes of well-designed sidewalks include the following:

- **Accessibility:** A network of sidewalks should be accessible to all users, including those who are blind, use wheelchairs or other mobility devices.
- **Adequate width:** Ideally, two people should be able to walk side-by-side and pass a third comfortably. Different walking speeds should also be possible.

- **Safety:** Design features of the sidewalk should allow pedestrians to have a sense of security and predictability. Sidewalk users should not feel they are at risk due to the presence of adjacent traffic.
- **Continuity:** Walking routes should be obvious and should not require pedestrians to travel out of their way unnecessarily.
- **Landscaping:** Plantings and street trees should contribute to the overall psychological and visual comfort of sidewalk users, and be designed in a manner that contributes to the safety of people.
- **Drainage:** Sidewalks should be well graded to minimize standing water.
- **Social space:** There should be places for standing, visiting, and sitting. The sidewalk area should be a place where adults and children can safely participate in public life.
- **Quality of place:** Sidewalks should contribute to the character of neighborhoods and business districts.
- **Maintenance:** a proper budget needs to be sustained to keep sidewalks clean, cleared of snow and in good condition.

In principle, every intersection is a legal crosswalk, regardless of markings or signs, unless crossing is expressly forbidden. Marked crosswalks are used to alert motor traffic to expect pedestrian crossings at higher volume walking routes, near schools, in retail districts, at signalized intersections, and other locations where pedestrian right-of-way needs emphasis. Crosswalk markings indicate to pedestrians the appropriate route for higher volume crossings of motor traffic. They facilitate crossing by the visually impaired, and remind turning drivers of potential conflicts with pedestrians.

High visibility continental/ladder crosswalk markings should be used at crossings with high pedestrian use or where vulnerable pedestrians are expected, including:

- School crossings
- Across arterial streets for pedestrian-only signals
- At mid-block crosswalks, where applicable
- At intersections where there is expected high pedestrian use and the crossing is not controlled by signals or stop signs



Continental/ladder crosswalk designs are highly visible to passing motorists.

2.1.2 ADA Compliant Curb Ramps

Curb ramps are the design elements that allow all users to make the transition from the street to the sidewalk without encountering a vertical step. There are a number of factors to be considered in the design and placement of curb ramps at corners.

The 2010 ADA standards define two types of curb ramp systems: “perpendicular ramps” and “parallel ramps.” The first provides a ramp into a crosswalk, while the second provides a ramp into a landing that is flush with the street surface, sometimes called a “dropped landing.”

2.1.3 Accommodating Pedestrians at Intersections with Traffic Signals

Pedestrians benefit from information provided by signal head indications, push buttons, countdown signals, and audible signals.

Traffic signal timing should assume a pedestrian walking speed, meaning that the length of a signal phase with parallel pedestrian movements should provide sufficient time for a pedestrian to safely cross the adjacent street. According to the 2009 Manual on Uniform Traffic Control Devices (MUTCD) standards, this amounts to 3.5 ft/second. At crossings where older pedestrians or pedestrians with disabilities are expected, lower crossing speeds could be considered for those more-vulnerable users.

No Right on Red

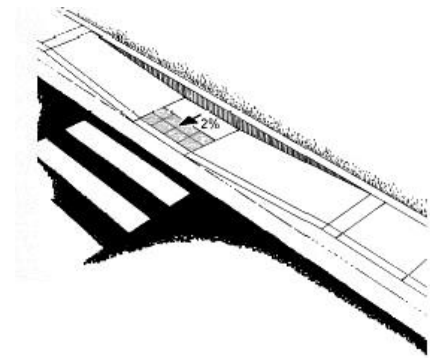
When motorists are accustomed to being able to turn right on red at all times, there is a tendency to roll through a red light when there is no cross traffic. This can lead to collisions with pedestrians who have the right of way but are less visible to the motorist wishing to turn right. Restricting “right on red” turning at key intersections can be an effective means to improve pedestrian safety.

Leading Pedestrian Interval (LPI)

At intersections where there are conflicts between turning vehicles and pedestrians, pedestrians are given a “walk” designation a few seconds before the associated green phase for the intersection, allowing them to enter the roadway and be more visible to traffic. This can be an especially effective technique where there is heavy right-turning movement, such as Gorham or Black Point Roads to US Route 1 in Scarborough.

Pedestrian Push Buttons

Pedestrians can be accommodated by an automatic pedestrian phase or by using a push button (demand-actuated signal). Pedestrian push buttons detect pedestrians desiring to cross at an actuated or semi-actuated traffic signal, at intersections with low pedestrian volumes, and at mid-block crossings.



When sidewalks are too narrow to provide a typical perpendicular ramp, a dropped landing should be used (source: FHWA website).



Pedestrian push buttons need to be very visible from the adjacent sidewalk.

Audible Pedestrian Traffic Signals

Audible pedestrian traffic signals at signalized intersections provide crossing assistance to pedestrians with vision impairment. Audible signals should be activated by a pedestrian push-button.

Pedestrian Signal Indication ("Ped Head") and Countdowns

Pedestrian signal indicators use a symbol to indicate when to cross at a signalized crosswalk. All traffic signals should be equipped with pedestrian signal indications except where pedestrian crossing is prohibited by signage. Countdown pedestrian signals are particularly beneficial, as they indicate—based on the MUTCD walking speed standards—whether a pedestrian has time to cross the street before the signal phase ends.

2.1.4 Signs and Road Markings

Signage can serve both wayfinding and safety purposes including:

- Helping to familiarize users with the pedestrian network
- Helping users identify effective routes and walking times to destinations
- Helping to address misperceptions about time and distance
- Helping overcome a "barrier to entry" for infrequent pedestrians

Signs are typically placed at key locations leading to and along routes, including the intersection of multiple routes. Too many signs tend to clutter the right-of-way, and it is recommended that these signs be posted at a level most visible to pedestrians, rather than per vehicle signage standards.

2.1.5 Shared-use Paths

Shared-use paths serve bicyclists and pedestrians and provide additional width over a standard sidewalk.

Facilities may be constructed adjacent to roads or through parks and wooded areas. Regardless of the type, paths constructed next to the road should have some type of vertical (e.g. curb or barrier) or horizontal (e.g. landscaped strip) buffer separating the path area from adjacent vehicle travel lanes.

Shared-use paths should be constructed according to the American Association of State Highway and Transportation Officials (AASHTO) *Guide for the Development of Bicycle Facilities* and be designed according to ADA standards.

Most shared-use paths are located on publicly-owned, publicly-managed or publicly-accessed land (e.g. street rights-of-way or parks.) As such, existing on-site conditions, master plans, land use permits, easements, natural resource protection plans, significant tree locations, and other current and planned-for uses must be taken into account when determining path alignment, width, and location of any associated path amenities. In Oak Hill, it is possible to develop shared-use paths within an easement on private property, based on negotiations with the land owner.

2.1.6 Traffic Calming Facilities

Curb Extensions

A curb extension (sometimes referred to as a “bump out” or “bulb out”), is a place where the sidewalk extends into the parking lane or wide shoulder of a roadway. Because curb extensions physically narrow the roadway, a pedestrian’s crossing distance—and consequently the time spent in the street—is reduced. They can be placed either at mid-block crossings or at intersections and can help reduce roadway travel speeds because they create a visual pinch point for motorists. Curb extensions should always be carefully considered so as not to impede bicycle movement along the edge of the travel lane or in the shoulder.

Refuge Islands

Median refuge islands help improve safety by providing a crossing refuge, allowing pedestrians and bicyclists to gauge safe crossing of one direction of traffic at a time, and slowing motor vehicle traffic. This treatment is especially appropriate when helping to connect to a school, or where the roadway to be crossed is greater than 50 feet wide or more than four travel lanes. A median refuge island can also be used at shorter crossing distances to take advantage of available safe gaps in traffic. Like curb extensions described above, they also create visual pinch points for motorists which helps to reduce speeds.

Median refuge islands can be used at signalized or unsignalized crosswalks. The refuge island should be accessible, preferably with an at-grade passage through the island rather than ramps and landings.

A median refuge island should be at least five feet wide between travel lanes and at least 20 feet long. If a refuge island is landscaped, the landscaping should not compromise the visibility of pedestrians crossing in the crosswalk.



Medians provide ideal opportunities for refuge islands at critical crosswalk locations.

2.1.7 Lighting

Pedestrian scale lighting improves visibility and can provide a vertical buffer between the sidewalk and the street, defining pedestrian areas. Pedestrian scale lighting should be used in areas of high pedestrian activity and where feasible based on available right-of-way, utilities, and cost. Pedestrian scale lighting is a significant capital improvement and should be provided only where it will have a maximum benefit, such as public safety. Lighting can also be considered on shared-use paths that are located away from the right-of-way or in areas that are not otherwise lit. In locations where vehicle-scaled lighting is desired, decorative street lights in a variety of styles should be considered over cobra-head or other highway style lights.

2.1.8 Pedestrian Amenities and Gateways

Benches

Providing benches at key rest areas encourages people of all ages to walk by providing a place to rest along the way or at bus stops. Benches can be simple (e.g. wood slats) or more ornate (e.g. stone, wrought iron, concrete). Benches and all other site furniture must always be selected and placed in accordance with ADA clearance requirements.



Benches provide a place for walkers to take a break.

Bicycle Parking

Where space allows, bicycle parking should be provided to promote bicycling into Oak Hill. Bike racks should only be located where a minimum 5' clear walkway width can still be provided and when there is a business or office building within 50' of the sidewalk. Bike racks isolated from the adjacent land use by an open space or parking lot will not be used.

Interpretive Signs

Interpretive installations and signs can enhance the user's experience by providing information about the history of Oak Hill and the surrounding area. Installations can also discuss local ecology, environmental concerns, and other educational information. One location for an interpretive sign is the current location of the large American Elm along US Route 1, just west of Gorham Road that is not healthy and may soon be replaced by a small memorial plaza space and new tree.



A simple interpretive sign can go a long way to helping the community understand its past.

Art Installations

Local artists can be commissioned to provide art for Oak Hill, making it uniquely distinct. Many art installations are functional as well as aesthetic, as they may provide places to sit and play, have a drink or lock up a bicycle. Art should be carefully considered for use at designated "gateway" locations along US Route 1, or at the recommended memorial plaza that could replace the dying Elm tree.

Landscaping and Stormwater Features

Landscape features, including street trees, native plants or flowers can enhance the visual environment and improve the pathway user experience. Bioswales are natural landscape elements that help manage water runoff from a roadway. Either of these could potentially be incorporated into the US Route 1 gateways.

Chapter 2

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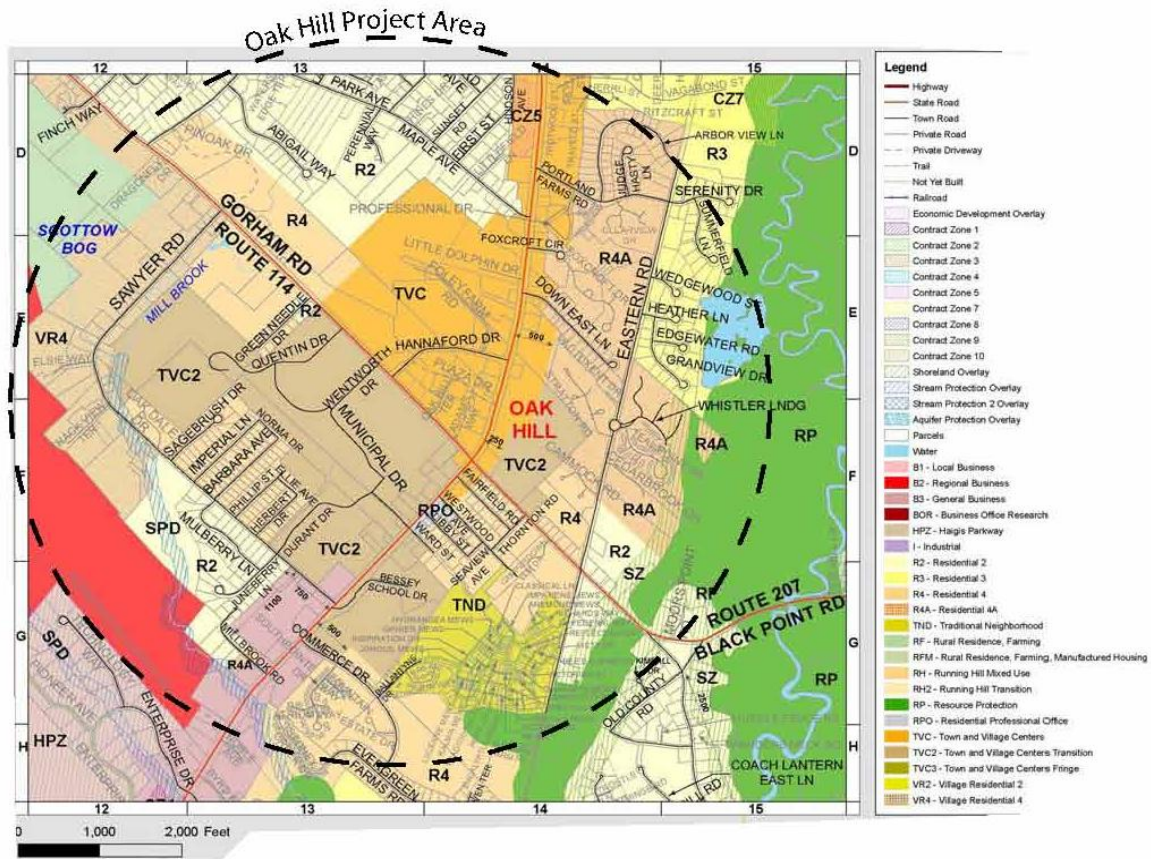
3 Existing Conditions

3.1 Study Area

The Oak Hill Study Area is an area of approximate one mile radius from Scarborough High School. As part of this study, the existing conditions of the study area were documented and analyzed using both GIS maps provided by the Town of Scarborough, on-site field work and site walks with Town staff and the Advisory Committee. The documentation included, but was not limited to, the extent and condition of sidewalks, the presence of crosswalks, road widths, quality of traffic intersections, circulation routes, pedestrian desire lines, potential location of transit shelters and current and future development patterns that could influence walking patterns.

3.2 Land Use Patterns and Zones

Within the Oak Hill Study Area there are multiple planned zoning types, but predominately the area is zoned for residential, business or town center uses (see town zoning map below).



Zoning Map (Source: Town of Scarborough)

This zoning typology creates two distinct core areas of Oak Hill: a “Cultural and Business Core” along US Route 1 and Gorham Road; and residential areas to the north and south of US Route 1. The Cultural and Business Core zone is centrally located in the Oak Hill Study area and is zoned by the Town as “Town and Village” or “TVC” which permits a mix of residential, commercial and retail uses.

Chapter 3

The Cultural and Business Core consists of the following facilities:

Businesses

- Along US Route 1 and within shopping plazas, i.e. Oak Hill Plaza or Hannaford Supermarket

Schools

- Wentworth Intermediate School
- Scarborough High School
- Scarborough Middle School

Municipal Buildings

- Town Hall
- Public Safety Building
- Scarborough Public Library

Recreational Facilities and Open Spaces

- Sports fields associated with the schools
- Memorial Park

The residential zones north and south of US Route 1 include traditional neighborhoods, housing sub-divisions, apartment complexes and private housing facilities such as Maine Veterans' Home and Bessy Commons. Because of the land use pattern and zoning of the study area people either live, work, shop, conduct business or go to school in the Oak Hill area. It is truly a mixed use area. Predominately, people drive to their destination, but once at their destination, some people occasionally walk to other places within Oak Hill, though infrastructure is somewhat minimal. For example, many high school students drive to school, but walk to the Oak Hill Plaza for lunch or after school. Accommodating this demand is one purpose of this planning effort.

3.3 Proposed Development Projects

There are two future development projects, Eastern Village Development and the Jarvis property, which will increase the number of people living and working in the area, potentially affecting the need for pedestrian infrastructure.

- **Eastern Village Development**

The Eastern Village Development is a nearly 200-lot mixed-density residential development with the first phase currently under construction. This development is located south of US Route 1 and Maine Veteran's Home and abuts Eastern Road. With the increased number of people living in the area, the future demands on the streets and pedestrian infrastructure in Oak Hill will certainly increase.

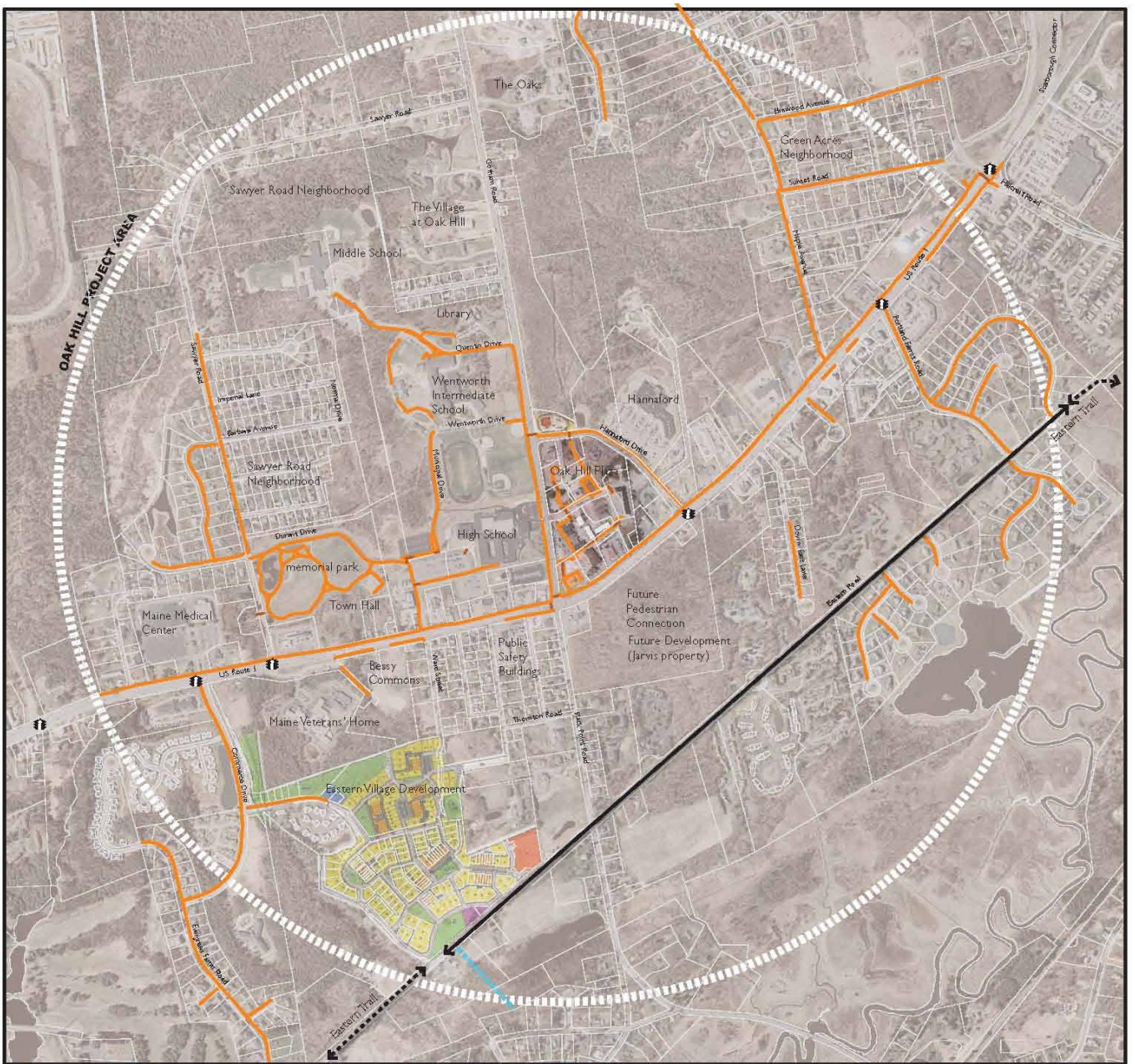
- **Jarvis Property**

The Jarvis property abuts US Route 1 and Black Point Road and will be developed at some point in the future. The exact configuration or impact to the road or sidewalk infrastructure is currently not known, but presumably will increase its capacity.

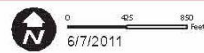
On the long-term horizon is the redevelopment of the Wentworth Intermediate School. The site plan for any potential new facility should provide prioritized access for children walking and bicycling to school. Strategies include a complete network of sidewalks and path connections, prominently-located bike racks and a vehicle drop-off area that does not impede access for those coming on foot or by bike.

3.4 Sidewalk Infrastructure Conditions

The conditions and extent of the pedestrian infrastructure varies widely in the Oak Hill Area. The majority of sidewalks shown in orange in the GIS map below are concentrated in the Cultural Core and along US Route 1, though primarily along one side. The sidewalks in the neighborhood districts are sporadic to none at all and do not really constitute a network. Fragments of the Eastern Trail sit at the far southwest and northeast edges of Oak Hill. The gap contains Eastern Road which features a low volume of traffic that travels occasionally at high speeds. Currently, there is no sidewalk, path or bike lanes along Eastern. All users share the same roadway space.



Oak Hill_EXISTING SIDEWALKS



3.5 Sidewalks Along US Route 1

US Route 1 is a state-regulated, highly traveled road with four to six lanes of traffic that runs east-west through Oak Hill. The road is a major obstacle for pedestrians trying to navigate it due to its high traffic speed, the volume of vehicular traffic, the conditions and extent of sidewalks and crosswalks and the timing of pedestrian traffic signals. Much like the other sidewalks in Oak Hill, the sidewalks along US Route 1 vary in conditions as shown in the images below.



Five foot sidewalk next to traffic.



Obstacles in sidewalk.



Portions with no sidewalk.

3.6 Sidewalks along Gorham Road

Because of its proximity to the schools, library, and Oak Hill Plaza, Gorham Road is another road that experiences high volumes of traffic with very little pedestrian infrastructure. The existing sidewalk runs on the west side of this road from US Route 1 to the library at Quentin Drive. Students living north of Quentin Road or seniors who live in the Village at Oak Hill must walk in the shoulder of the road, if they choose to walk this road to school or to the shopping area, respectively.

On a daily basis, students cross Gorham Road from the high school to Oak Hill Plaza. This is done mainly in the roadway because the desired route lacks any crosswalks.



A student walking in the shoulder of Gorham Road.



High school students crossing Gorham Road.

3.7 Shuttle Bus service along US Route 1

ShuttleBus is a bus service company operating a public transportation bus service from Portland to Biddeford using US Route 1 as its major route through Scarborough. Currently, there are two designated bus stops in the Oak Hill area, one by the Public Safety Facility and one by Portland Farms Road. The signs for these bus stops are small, inconspicuous metal signs attached to utility poles, making them difficult to find unless you know specifically where they are located.



One of Oak Hill's bus stops along US Route 1.

3.8 Accessibility to the High School, Wentworth Intermediate School and the Middle School

The clustering of the three schools in the Oak Hill area provides an opportunity to encourage older students and parents with younger students to walk to school. The existing sidewalk network lacks the necessary connectivity between the schools and the neighborhoods. The students that do walk to school frequently need to walk on the shoulders of the road when no sidewalk is present. However, the inter-connectivity between the schools and the library is generally good.

3.9 Opportunities and Constraints Analysis

The Opportunities and Constraints Analysis Diagram maps out the “opportunities” (existing conditions that provide an opportunity for enhancement, such as a wide shoulder of a road) and the “constraints”, which are conditions that present challenges or obstacles to improvements to the pedestrian network.

The Opportunities and Constraints Analysis Diagram on the following page also shows the existing sidewalks (solid orange), as well as the gaps in sidewalk circulation (blue dashed) that are considered pedestrian desire lines. The combination of the existing and the dashed blue desire lines generally forms a network that—if developed—would provide for a far more walkable Oak Hill. The diagram is a base line of information that helped to inform the project recommendations that were developed in the next phase of the planning project.



6/16/2011

3.9.1 Strengths of Existing Pedestrian System

- FINAL Oak Hill Pedestrian Plan | 21

3.9.2 Weaknesses of Existing Pedestrian System

- There are sidewalk gaps along major roadway corridors such as Black Point Road, sections of both Gorham Road and US Route 1, and nearly all of the side streets in Oak Hill. The majority of students are unable to walk to school safely.

Sidewalks gaps exist at driveways where the driveways intersect the adjacent arterial. The pedestrian is not given priority via a well-marked crosswalk, stop line or speed table to encourage motorists to yield to pedestrians.

Lack of Crosswalks. Crossing any of the state routes in Oak Hill is difficult due to the lack of well-located and safe marked crosswalks. On US Route 1, there are currently no marked crosswalks at the Sawyer Road or Hannaford Drive signalized intersections. Additionally, there are no mid-block marked crossings along US Route 1 and only a single marked crosswalk across Gorham Road at the Hannaford Drive intersection. Most intersections in Oak Hill lack:

- High-visibility, marked crosswalks
 - Pedestrian signalization and count downs
 - Curb extensions or refuge islands
 - Sufficient curb ramps
- **Critical Desire Lines** – there are a number of locations where students are currently walking and crossing the street despite the lack of facilities and infrastructure.
 - **The Oak Hill area is designed almost exclusively for automobiles.** The missing pedestrian infrastructure encourages driving from one location to another adjacent location when shopping in the area, despite the proximity of the businesses to each other.
 - According to Maine DOT, there were 19 reported crashes involving pedestrians or bicyclists in Scarborough between 2006-2010 and only one of these occurred in Oak Hill. While this might imply that Oak Hill is a safe area for pedestrians, more realistically, it might also be an indication of how few people are walking and bicycling in the area.

4 Infrastructure Recommendations

Recommended changes to Oak Hill's physical environment are intended to create a safe, accessible, and connected pedestrian network throughout Oak Hill. The projects are based on a *qualitative* assessment of Oak Hill, though some data was reviewed by the planning team when making recommendations.

4.1 Methodology

A variety of sources were consulted during the development of these recommendations: input from the Town staff and Pedestrian Plan Advisory Committee, previous plans and studies, maps of existing pedestrian conditions, consultant's fieldwork and public input from the community meeting on June 7, 2011. Fieldwork included an examination of conditions at key roadway crossings, primary roadway corridors, and a consideration of trail opportunities. Map discussion and analysis was conducted at the Advisory Committee meetings and during the public meeting.

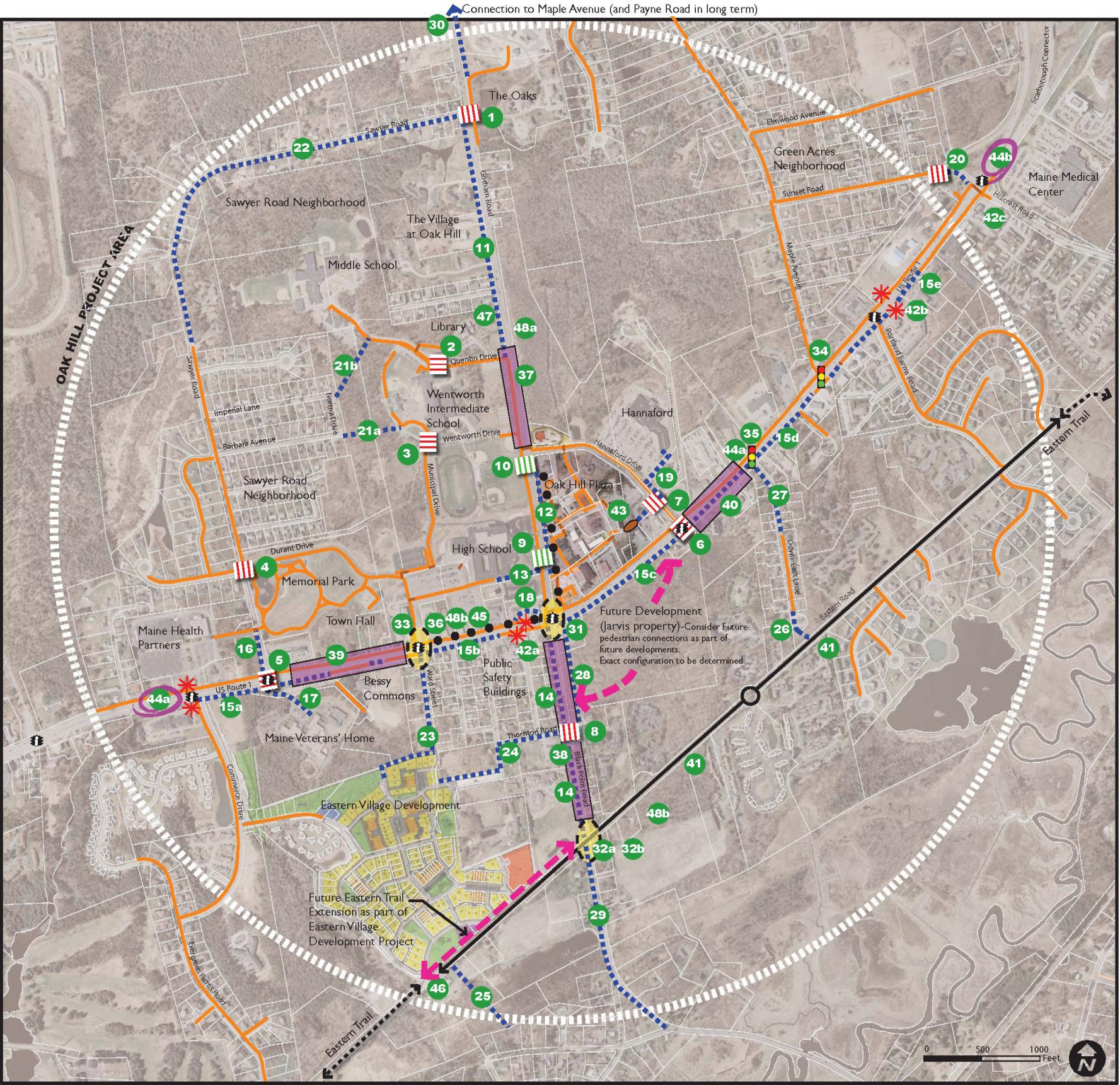
4.2 The Pedestrian Network

Numerous types of pedestrian improvement projects have been identified for Oak Hill and are outlined on the following pages. They include crosswalks, median refuge islands, sidewalks/paths, bus shelters, a small pedestrian bridge, grading and drainage, intersection improvements, traffic signals, parking, and school zone signs. All of these projects are also intended to make the Oak Hill area ADA-compliant. A pedestrian network that is fully accessible for those with disabilities will be a network that is safe and user-friendly for the entire able-bodied community as well.














The complete recommended network of sidewalks, crossing improvements, and traffic calmed areas can be found on the Recommendations Diagram found on the following page.

Chapter 4




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PROPOSED RECOMMENDATIONS LEGEND

- **Crosswalks**
1-8. Provide high-visibility painted crosswalks to encourage connectivity and safe crossings at key intersections.
- **Refuge Islands**
9-10. Provide Refuge Islands to allow safe passage across Gorham Road between the High School and Oak Hill Plaza.
- Sidewalks/Path Ways**
Note: All existing sidewalks should be maintained and repaired to keep them in good condition.
- **Sidewalk/Path Improvements**
11. Provide a sidewalk and/or esplanade on the west side of Gorham Road to connect Quentin Drive and Sawyer Road. Future improvement should consider existing culverts and shoulder widths and include discussion with adjacent property owners when developing the sidewalks or esplanade
12. Provide a sidewalk on the east side of Gorham Road to connect between the Refuge Islands (#9-10).
13. Provide a sidewalk along the side of the drive/road to the High School to encourage a safe pedestrian / student circulation.
14. Provide a sidewalk on the west side of Black Point Road to establish a pedestrian circulation route between Eastern Road and Route 1.
15. Provide sidewalk improvements along the entire length of Route 1 that consider adding new sidewalks where needed to provide a continuous walking experience. Where possible, provide a separation between the road and the sidewalk.
16. Provide a sidewalk on the west side of Sawyer Road from Route 1 to the entry drive and crosswalk at Maine Medical Center.
17. Provide a sidewalk connection from Maine Veterans' Home to Route 1.
18. As part of removing the dying Elm tree incorporate a new sidewalk into a small memorial plaza with a bus stop, interpretive sign, and new landscape material including a new tree(s).
19. Establish a sidewalk connection to Hannaford Supermarket by creating a sidewalk along Hannaford Drive.
20. Continue the existing sidewalk along Sunset Road to Route 1.
21A/B. Institutionalize the existing dirt path from Norma Drive to Wentworth Drive by paving it as a multi-use path, and potentially add lighting. Add a new multi-use path from the North end of Norma Drive to Quentin Drive.
22. Continue the existing sidewalk along the entire length of Sawyer Road.
23. Provide a sidewalk connection between the Eastern Village Development and Route 1 along Ward Street.
24. Provide a sidewalk connection between the Eastern Village Development and Black Point Road along Thornton Road and Westwood Avenue.
25. Institutionalize the existing path from Eastern Road and the neighborhoods south of this road by paving it as a multi-use path.
26. Institutionalize the existing path from Eastern Road and Down East Lane by paving it as a multi-use path.
27. Continue the existing sidewalk on Down East Lane to Route 1.
28. Develop new sidewalk along the east side of Black Point Road as part of any future Jarvis Property Development.
29. Extend sidewalks along west side of Black Point Road to the intersection of Winnocks Neck Road and Old County Road
30. Establish a sidewalk connection between Gorham Road and Maple Avenue, and in the long term, to Payne Road. In the short term, establish wayfinding signs to guide pedestrians through The Oaks apartment complex.
- **Intersection Improvements**
31. Establish intersection improvements to the Route 1 and Black Point Road intersection that may include new and wider sidewalks, reduced encroachments, bump-outs, enhanced crosswalks, pedestrian-activated crossing beacon signs, and lighting.
32a. (near term) - Repaint existing crosswalks, clear vegetation for enhanced visibility, and install signs as needed at the Black Point Road and Eastern Road Intersection.
32b. (long term) - Establish new intersection improvements at Black Point Road and Eastern Road Intersection as part of the Eastern Village Development.
33. Establish intersection improvements at Route 1 and Ward Street.
- **Traffic Signals**
34-35 Explore the possibility of a pedestrian-activated traffic signal and crosswalk, or a pedestrian-activated flashing beacon with median Refuge Island and crosswalk.
36. Explore the possibility of traffic signal enhancements for the existing traffic signal to allow more pedestrian crossing time.
- **Traffic Calming Measures**
37 - 40. Establish traffic-calming measures along Route 1, Black Point Road, and Gorham Road to slow traffic, enhance pedestrian safety, and brand the Oak Hill Area.
41. Explore traffic calming to improve pedestrian/bicyclist access and include features that calm traffic.
- **Transit Shelters**
42a,b,c. Establish visible bus shelters along Route 1 that include shelters, benches, trash cans, signs, schedules, and maps.
- **Pedestrian Bridge**
43. Develop an accessible pedestrian bridge over the brook behind Oak Hill Plaza.
- **Gateways**
44a. Oak Hill gateway. Improvements may include signs, landscaping, public art and lighting.
44b. Scarborough gateway. Improvements may include signs, landscaping, public art and lighting.
- **Lighting**
45. Establish improved decorative or pedestrian-scale lighting along portions of Route 1 and Gorham Road.
- **Parking**
46. Establish a legitimate parking configuration along Eastern Road to alleviate vehicular and pedestrian conflicts. Provide clear signs marking the parking areas and the Eastern Trail.
- **Grading and Drainage**
47. Mitigate the drainage issues causing ponding and icing at the Library entrance and Quentin Drive causing interruptions to pedestrian circulation.
- **Signs**
48a. Provide additional Speed Limit School Zone signs along Gorham Road and Rt. 1 between Ward and Black Point.
48b. Provide wayfinding and bike route signs along Eastern Ave to better define the on-road connection of Eastern Trail.

EXISTING CONDITIONS LEGEND

-  Existing Traffic Signal
-  Existing Sidewalk Locations
-  Existing Crosswalks

Oak Hill Recommendations Diagram



July 2011

Richardson & Associates, Landscape Architects

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4.3 Priority Project List

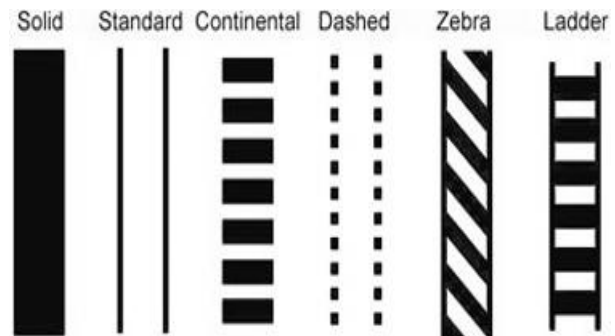
The projects on the following pages are the key projects identified during this planning process as having a significant impact on pedestrian connectivity and safety in Oak Hill. The projects are placed in no particular order and prioritized in Section 5 based on the evaluation criteria developed in conjunction with the Town of Scarborough and the Pedestrian Plan Advisory Committee. The cost estimates for each project is considered a rough, order-of-magnitude cost that follows these guidelines:

- \$ = <\$5,000
- \$\$ = \$5,000–25,000
- \$\$\$ = \$25,000–100,000
- \$\$\$\$ = >\$100,000

It is important to note that more detailed engineering analysis is required to implement many of these projects. Many of these recommendations occur on state roadways, so coordination with MaineDOT will be necessary for approval and implementation of recommended treatments.


4.3.1 Project: Marked Crosswalks

A marked crosswalk designates a pedestrian right-of-way across a street. It is often installed at controlled intersections or at key locations along the street (e.g. mid-block crossings). There is a variety of form, pattern, and materials to choose from when creating a marked crosswalk. Where possible, it is best to install “Yield to Pedestrians” bollards at unsignalized crosswalk locations at the roadway centerline, especially where a raised refuge island is not provided.



Marked Crosswalks

(see section Design Guidelines section 2.1 in the Appendix)

Cost	#	Location	Description
\$	1	Corner of Sawyer Road/Pinoak Drive and Gorham Road	Stripe high visibility crosswalk
\$	2	Quentin Drive at Wentworth Intermediate School	Stripe high visibility crosswalk
			
\$\$	3	Wentworth Drive and Municipal Drive	Stripe high visibility crosswalk and small sidewalk extension to promote connection from the north end of Municipal Drive to the Wentworth Intermediate School (see above)
\$	4	Durant Drive/Juneberry Lane and Sawyer Road	Stripe high visibility crosswalk
\$	5	Sawyer Road and US Route 1	Stripe high visibility crosswalk
\$	6	Hannaford Drive and US Route 1	Stripe high visibility crosswalk
\$	7	Crossing at Hannaford Drive	Stripe high visibility crosswalk
\$	8	Black Point Road and Thornton Road	Stripe high visibility crosswalk (long-term project after redevelopment of Jarvis property)

4.3.2 Project: Pedestrian Refuge Islands

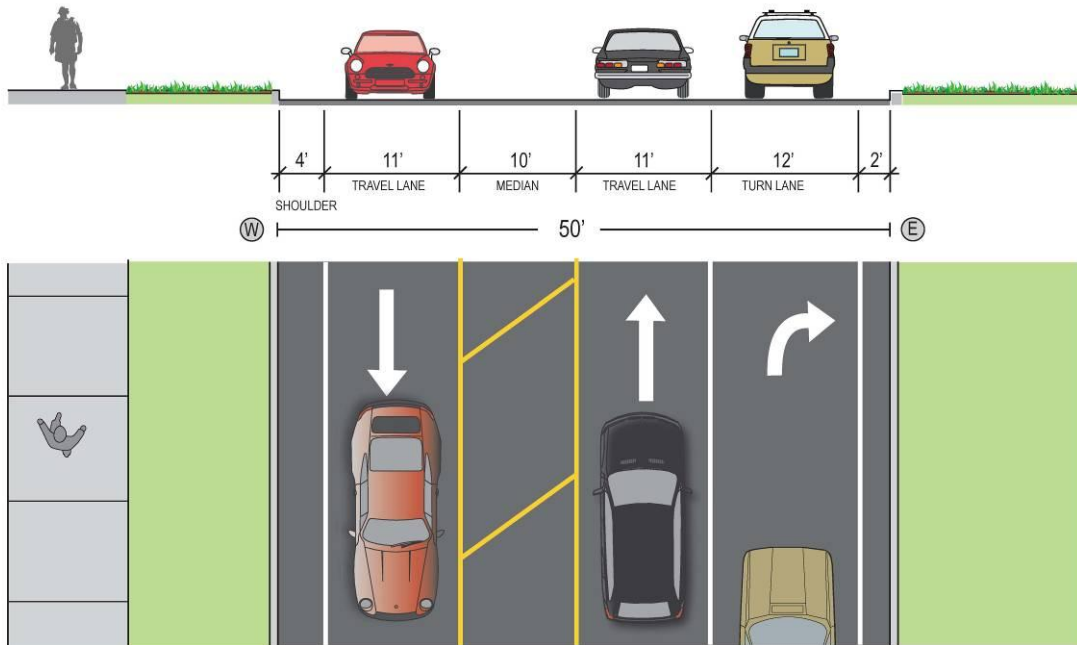
Refuge islands are pedestrian refuge areas raised to curb height typically located in the center of street, intersections or midblock crossings. Center crossing islands protect pedestrians from vehicles and subsequently allow users to watch one direction of traffic at a time. Because one of the main pedestrian destinations in Oak Hill is the High School, providing refuge islands will promote safe passage across Gorham Road to/from the Oak Hill shopping plaza. Also consider the use of raised crosswalks or speed tables in conjunction with the refuge islands to further slow traffic on the approach to the marked crosswalks. Because Gorham Road is a state route, all safety enhancements will need to be coordinated with the Maine Department of Transportation.

Pedestrian Refuge Islands			
(see section Design Guidelines section 2.1.2 in the Appendix)			
Cost	#	Location	Description
\$\$	9	Gorham Road - between the High School and Oak Hill Plaza	Median refuge island with high visibility crosswalks
\$\$	10	Gorham Road - Just south of Hannaford Drive intersection	Median refuge island with high visibility crosswalks

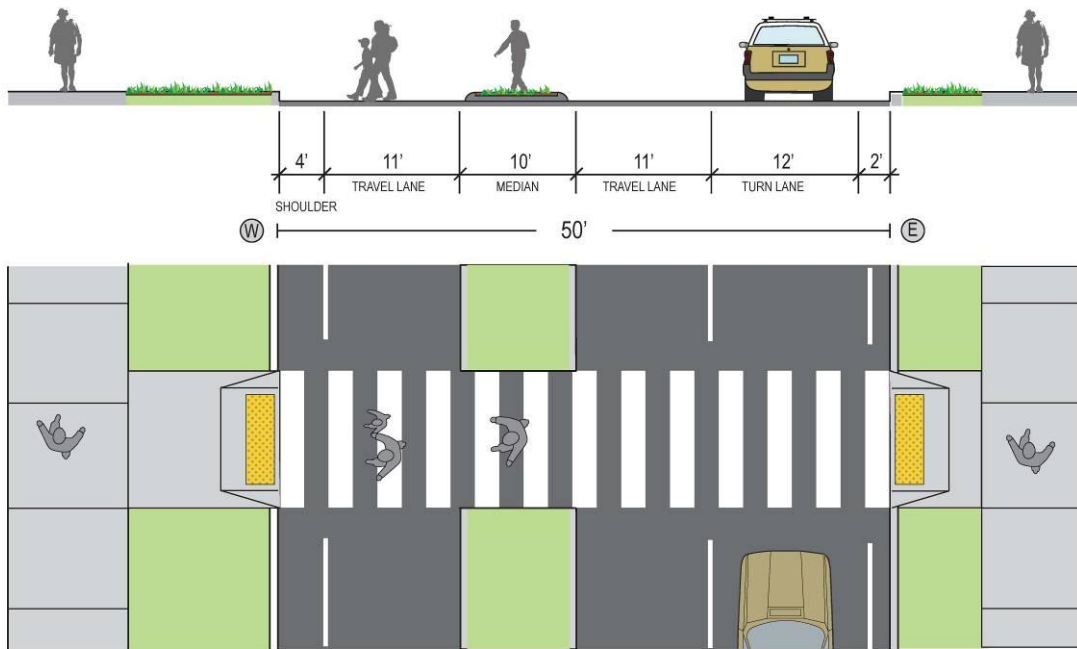


Simulation of the proposed crosswalk and refuge island as part of Project #9.

GORHAM ROAD : EXISTING CONDITIONS



GORHAM ROAD : PROPOSED CROSSWALK



Proposed Pedestrian Refuge Island along Gorham Road, just south of Hannaford Drive intersection.

4.3.3 Project: Sidewalks and Pathways

Sidewalks and walkways are extremely important public right-of-way components that are most often adjacent to, but separate from automobile traffic. In many ways, they act as the seam between private residences, stores, businesses, and the street.

In general, sidewalks are walkways along roadways that are separated from the roadway with a curb and/or planting strip and have a hard, smooth surface (usually concrete). The travel path for pedestrians should be clear of utility poles, sign posts, fire hydrants and other furnishings. FHWA (Federal Highway Administration) and the Institute of Transportation Engineers both suggest five feet as the minimum width for a sidewalk. This is just enough space for two people to walk abreast or for two pedestrians to pass each other. However, because downtown areas, near schools, transit stops, or other areas of high pedestrian activity benefit from much wider sidewalks, minimum six-foot-wide sidewalks are recommended for Oak Hill with consideration for even wider sidewalks as future redevelopment projects introduce more pedestrian-oriented retail and other land uses in Oak Hill.



The ideal condition along most sections of US Route 1 would be a 6' sidewalk with a grassy strip separating pedestrians from traffic.

A pathway/ shared-use path is often viewed as a recreational facility but it is also an important corridor for utilitarian (work, shopping or other function) trips as well. Shared-use paths can provide a desirable facility for pedestrians and bicyclists of all skill levels particularly because they are separated from traffic. Per guidelines from the American Association of State Highway and Transportation Officials (AASHTO), the recommended width for shared use paths is 12 feet, with a minimum of 10 feet in width. Short stretches of as narrow as 8 feet width may be acceptable in constrained locations or at pinch points.

Sidewalks/Shared-Use Path Improvements

(see section Design Guidelines section 1 in the Appendix)

Cost	#	Location	Description
\$\$\$\$	11	Gorham Road - Sidewalk on the west side of road between Quentin Drive and Sawyer Road	+/- 2100 length of 6' wide sidewalk with planting strip where feasible, potentially on private property easement with consent of the abutting property owner.
\$\$\$	12	Gorham Road - Sidewalk on the East side of the road connecting proposed Refuge Islands per project #9 and 10	+/- 1040' length of 6' sidewalk

Sidewalks/Shared-Use Path Improvements

(see section Design Guidelines section 1 in the Appendix)

Cost	#	Location	Description
\$\$	13	High School- Extend existing sidewalk along driveway/entry road	+/- 400' length of 6' sidewalk
\$\$\$\$	14	Black Point Road - New sidewalk, west side of road	+/- 1900' length of 6' sidewalk
\$\$\$\$	15a	US Route 1, south side - sidewalk infill from Commerce Dr to Ward Street	+/-3200' length of 6' sidewalk
\$\$\$	15b	US Route 1, south side - sidewalk infill from Ward Street to Black Point Road	+/-1100' length of 6' sidewalk
\$\$\$	15c	US Route 1, south side - sidewalk infill from Black Point Road to Hannaford Dr	+/-1300' length of 6' sidewalk
\$\$\$\$	15d	US Route 1, south side - sidewalk infill from Hannaford Dr to Portland Farms Road	+/-2400' length of 6' sidewalk
\$\$	15e	US Route 1, south side - sidewalk infill from Portland Farms Road to Hillcrest Road	+/-450' length of 6' sidewalk
\$\$	16	Sawyer- Sidewalk on the west side of the road between US Route 1 and Maine Health Partners	+/- 360' length of 6' sidewalk
\$\$	17	Maine Veteran's Home- Sidewalk to US Route 1	+/- 400' length of 6' sidewalk
\$\$	18	New Sidewalk and memorial plaza to replace dying historic Elm tree	+/- 200' length of 6' sidewalk
\$\$	19	Hannaford - New sidewalk from Hannaford Drive to Hannaford Supermarket	+/- 340' length of 6' sidewalk
\$\$\$	20	Sunset Road - Extend sidewalk to US Route 1	+/- 420' length of 6' sidewalk
\$\$\$	21a	Shared-use Path from Barbara Ave/Norma Drive to Wentworth Drive	+/- 420' length of 10'-12' wide Shared-use Path with Lighting and Signage
\$\$\$	21b	Shared-use Path from Imperial Lane/Norma Drive	+/- 470' length of 10'-12' wide Shared-use Path with Lighting and Signage
\$\$\$\$	22	Sawyer Road - Extend existing sidewalk improvements to Gorham Road	+/- 4000' length of 6' sidewalk

Sidewalks/Shared-Use Path Improvements

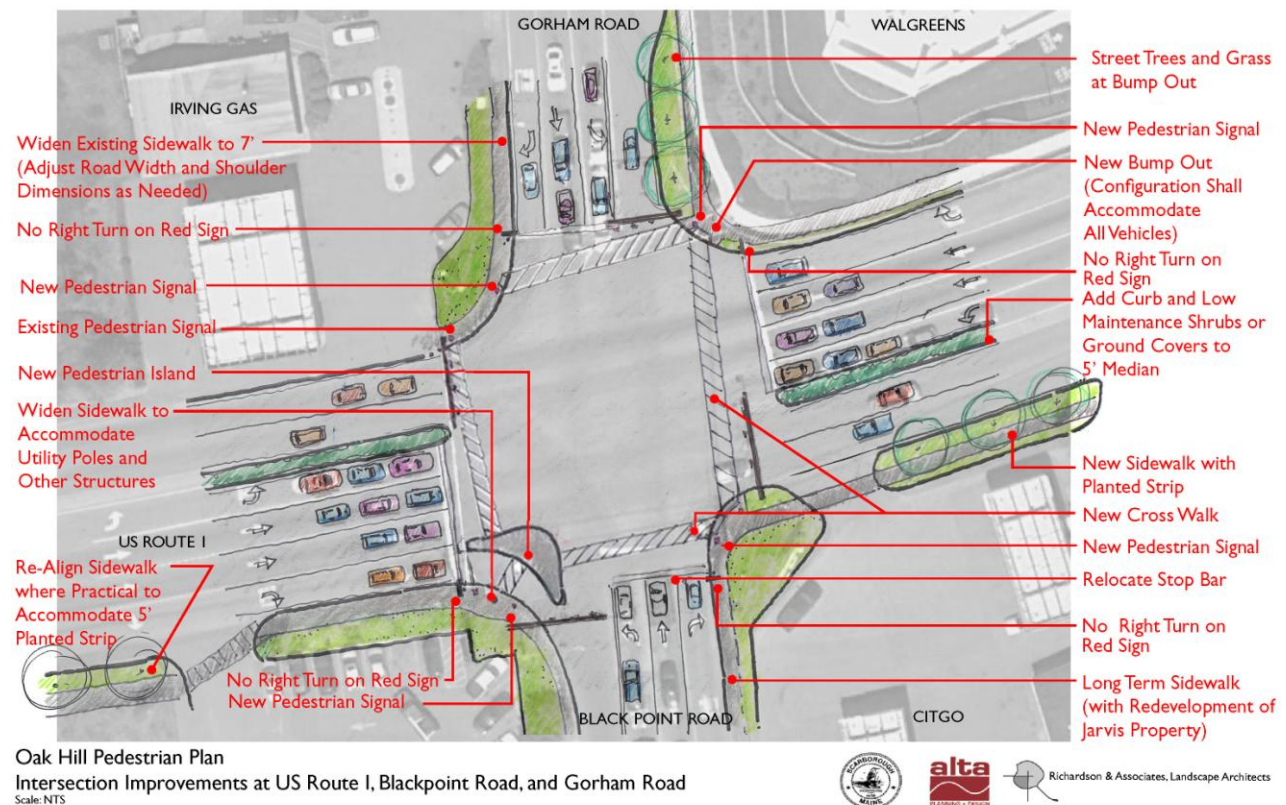
(see section Design Guidelines section 1 in the Appendix)

Cost	#	Location	Description
\$\$\$	23	Ward Street sidewalks between US Route 1 and Eastern Village Development	+/- 1200' length of 6' sidewalk
\$\$\$	24	New sidewalks between Eastern Village Development and Black Point Road along Thornton Road and Westwood Ave	+/- 1600' length of 6' sidewalk
\$\$\$	25	Shared-Use Path between Eastern Road and Old County Road	+/- 800' length of 10' Shared-Use Path with Signage (8' segments may be required at obstructions)
\$\$	26	Shared-use Path between Eastern Road and Down East Lane	+/- 180' length 10' Shared-use Path with Signage (8' segments may be required at obstructions)
\$\$\$	27	Down East Lane - Extend existing sidewalk to US Route 1	+/- 1500' length of 6' sidewalk
\$\$\$	28	Black Point Road - New sidewalk on East Side of road as part of future Jarvis Property Development	+/- 900' length of 6' sidewalk
\$\$\$	29	Black Point Road - Extend sidewalk along west side of road to the intersection of Winnocks Neck Road and Old Country Road	+/- 1800' length of 6' sidewalk
\$\$\$	30	Gorham Road - Extend east sidewalk to Maple Ave and Payne Road (long term)	+/- 1000' length of 6' sidewalk

4.3.4 Project: Intersection Improvements

These improvements include such facilities as curb extensions, pedestrian activated signals, lighting and signage.

Intersection Improvements			
Cost	#	Location	Description
\$\$	31a	Near term: US Route 1 and Gorham/Black Point Road	Improved crosswalks and signage
\$\$\$\$	31b	Long term: US Route 1 and Gorham/Black Point Road	Curb extensions, “pork-chop” crossing island (similar to design at the US Route 1/Haigis Road intersection), pedestrian activated signals, lighting, signage



Conceptual design drawing featuring potential pedestrian-accessibility and safety improvements at the US Route 1/Black Point Road/Gorham Road intersection.

Intersection Improvements (cont.)

Cost	#	Location	Description
\$\$-\$\$\$	32a	Near term: Black Point Road and Eastern Road	Improvements include repainted crosswalks, pedestrian-activated beacon, lighting and signs
NA	32b	Long term: Black Point Road and Eastern Road	Improvements per approved Eastern Village Development agreement
\$\$\$	33	US Route 1 and Ward Street	Curb extensions, enhanced crosswalks, pedestrian activated signals, lighting, signage

4.3.5 Project: Traffic Signals

Traffic signals assign the right of way to motorists and pedestrians and produce openings in traffic flow, allowing pedestrians time to cross the street. When used in conjunction with pedestrian friendly design, proper signalization should allow for an adequate amount of time for an individual to cross the street.

Engineering, as well as urban design judgment, must be used when determining the location of traffic signals and the accompanying timing intervals. Fixed timed sequencing is often used in high traffic volume commercial or downtown areas to allow for a greater efficiency of traffic flow.

Traffic Signals

Cost	#	Location	Description
\$\$\$	34	US Route 1 and Maple Avenue	Explore possibility of a new marked crosswalk with pedestrian-activated traffic signal, or a flashing beacon with median refuge island
\$\$\$	35	US Route 1 and Down East Lane	Explore possibility of a new marked crosswalk with pedestrian-activated traffic signal, or a flashing beacon with median refuge island
\$	36	US Route 1 and Ward Street	Explore the possibility of retiming traffic signal to provide additional pedestrian crossing time

4.3.6 Project: Traffic Calming Measures

Traffic calming measures include any facilities that serve to reduce the speed and/or volume of automobile traffic and that make the pedestrian environment more comfortable and more navigable. Examples include traffic lane reductions (“road diets”), raised medians, mini-roundabouts, diverters, chicanes, etc. At a very minimum, traffic calming can begin with lower speed limits and more rigorous enforcement of pedestrian right-of-way and speeding laws. Besides the specific projects listed below, the Town should work with MaineDOT and others to explore reducing the current 35 mph speed limit within the core Oak Hill commercial area along US Route 1, Black Point Road and Gorham Road.

Traffic Calming Measures			
Cost	#	Location	Description
\$\$\$ - \$\$\$\$	37	Gorham Road from Quentin Drive to Hannaford Drive	Improvements may include: landscaped medians, pedestrian refuge island, signs and enhanced crosswalk. See graphics on following page
\$\$\$ - \$\$\$\$	38	Black Point Road from US Route 1 to Eastern Road	Improvements may include: landscaped medians, pedestrian refuge island and signs.
\$\$\$ - \$\$\$\$	39	US Route 1 from Sawyer Road to Ward Street	Improvements may include: landscaped medians, pedestrian refuge island and signs.
\$\$\$ - \$\$\$\$	40	US Route 1 from Hannaford Drive to Down East Lane	Improvements may include: landscaped medians, pedestrian refuge island and enhanced crosswalk.
\$\$\$ - \$\$\$\$	41	Eastern Road	Emphasize walking and bicycling by including “share the road”, Eastern Trail and other signs. Also consider traffic calming measures such as additional mini-roundabouts, striping the already narrow travel lanes and possibly speed humps.



Bird's eye view of Gorham Road between Quentin at left and Hannaford at right showing current conditions (above) and proposed traffic-calming features such as landscaped medians, pedestrian refuge island and relocated crosswalk (below).



4.3.7 Project: Transit Shelters

ShuttleBus stops should be located in places that are most suitable for the passengers. For example, stops should be provided near destinations in residential areas, commercial or business areas and schools, and connected to these areas by sidewalk. Some of the most important elements to consider are the most basic: sidewalk connectivity to the stops, proper lighting, legible and adequate transit stop signage, shelter, seating, trash receptacles, bicycle and even automobile parking. Transit stops create an area of activity and may generate additional business and pedestrian traffic.

As with any human scale design element discussed, safety is an important factor to consider when locating bus stops. Special attention should be paid to the number of lanes and direction of traffic when deciding to locate a stop on the near or far side of an intersection. Also special consideration must be paid to the wheelchair lifts in terms of how and where the mobility impaired will exit and enter the bus. Local walking and biking maps should also be provided at bus stops, so that people are aware of the nearby destinations and how best to get there without an automobile.

No matter the level of improvements, coordination with local transit providers will be critical to ensure that locations for shelters or other amenities are properly planned, coordinated and maintained.



ShuttleBus stops should include amenities such as a shelter, bench and trash cans.

Transit Shelters			
Cost	#	Location	Description
\$\$	42a	At Commerce Drive intersection (adjacent to Maine Health Partners)	Concrete pad, signage, shelter and bench
\$\$	42b	Just west of Gorham Road and US Route 1 intersection	Concrete pad, signage, shelter and bench
\$\$\$	42c	Just north of US Route 1 and Portland Farms Road intersection	Concrete pad, signage, shelter and bench

4.3.8 Project: Pedestrian Bridge

Pedestrian Bridge			
Cost	#	Location	Description
\$\$\$	43	Pedestrian Bridge over brook behind Oak Hill Plaza	8'-10' wide footbridge to accommodate the low-volumes of bicycle and pedestrian traffic

4.3.9 Project: Gateway Entrance

Establish marked gateways at the vehicular entry points to the Oak Hill area.

Gateway Entrance			
Cost	#	Location	Description
\$\$\$	44a	US Route 1, at Commerce Drive and at Downeast Lane	Oak Hill gateway location that may include a “welcome to Oak Hill” sign, special landscaping features, public art or enhanced lighting
\$\$\$	44b	US Route 1, at Hillcrest Road	Town of Scarborough gateway location that may include a “welcome to Scarborough” sign, special landscaping features, public art or enhanced lighting



A gateway design for Oak Hill or Scarborough could include a landscaped median and sign.

4.3.10Project: Lighting

Lighting			
Cost	#	Location	Description
\$\$\$	45	Portions of Gorham Road between Hannaford Drive and US Route 1 and along Route 1 from Ward Street to Black Point Road	Install pedestrian-scale and/or decorative lighting along these short portions of roadway where pedestrian traffic is and will continue to be the highest in the Oak Hill area.



Two different scales of lighting in Somerville MA

4.3.11 Project: Automobile Parking

Parking			
Cost	#	Location	Description
\$\$\$	46	West end of Eastern Road	Enlarge existing parking area (formerly occupied by a pumping station) and explore shuttle buses to the municipal lots between the high school and Town Hall

4.3.12 Project: Grading and Drainage

Grading and Drainage Improvements			
Cost	#	Location	Description
\$\$	47	The Library entrance area at Quentin Drive	Mitigate the drainage issues at this location that cause ponding and icing and interfere with pedestrian circulation.

4.3.13 Project: Signage

Signage			
Cost	#	Location	Description
\$	48a	Gorham Road from Quentin Drive to US Route 1	Install additional school zone signs and pavement markings
\$	48b	Eastern Road between the two ends of the Eastern Trail	Provide wayfinding and bike route signs to better define on-road connections to Eastern Trail

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5 Prioritization of Recommendations

The description of the various infrastructure recommendations made in Section 4 of this report was done as if all projects were on the same level playing field. The reality is that the projects are intended to serve as a compendium of improvements to ultimately make the Oak Hill area a more pedestrian-friendly district. Each project differs significantly in how much it provides enhanced safety and connectivity, whether it helps to provide a better connection to the schools or bus stops and whether cost, engineering or permitting challenges preclude an expedited implementation. Because of this, each of the project recommendations was evaluated using a weighted criteria that was developed in consultation with the Town and the Advisory Committee. The criteria include:

- Improves safety (weighted 3x)
- Improves safe routes to schools (weighted 3x)
- Provides access to destinations (weighted 2x)
- “Completes” the street (weighted 2x)
- Impact on traffic safety and circulation (weighted 2x)
- Increases regional/local connectivity (weighted 2x)
- Provides access to transit (weighted 1x)
- Public input provided (weighted 1x)

Ease of Implementation, Order-of-Magnitude Cost and a Timeline are included separately in the evaluation so as not to throw off the scoring based on the safety and accessibility criteria listed above. The matrix on the following pages includes all projects ranked in order of how they scored in the evaluation process, from high to low (with high scores going to the prioritized projects). Regardless, even after prioritization, these projects do not have to be built in that order. In fact, when opportunity arises, any portion of the comprehensive pedestrian network should be addressed immediately, regardless of priority order.

Prioritization Matrix Legend

Improves Safety	Major improvement = 3
	Significant improvement = 2
	Modest improvement = 1
	Pedestrian-car collisions in the past three years = up to 2 additional points
Provides Safe Routes to School	Within .25 miles of school = 3
	Within .5 miles of school = 2
	Within 1 mile of school = 1
Community Destinations	Within .25 miles of destinations = 3
	Within .5 miles of destinations = 2
	Within 1 mile of destinations = 1
"Completes" the Street	"Completing the street" for a significant length of an arterial or collector roadway = 3
	"Completing the street" for a short length of an arterial or collector roadway = 2
	"Completing the street" for a short length of a local street = 1
Impact on Traffic	No impact = 3
	Some perceived impact (e.g.: longer queues) = 2
	Significant impact (e.g.: signal operations, intersection capacity) = 1
Increased Connectivity	Within a quarter mile of an existing facility or trail = 3
	Within a half mile of an existing facility or trail = 2
	Within a half mile of a planned facility = 1
Access to Transit	Within direct access of a bus stop = 3
	Within a quarter mile of a bus stop = 2
	Within a half mile of a bus stop = 1
Public Input	Identified by the public as a desirable future facility multiple times = 2 -3 (varies)
	Identified by the public as a desirable future facility once = 1
	Not identified = 0
Ease of Implementation	Exclusively in the public right-of-way with few cost complications or changes to traffic patterns = 3
	Some modifications to curbs/traffic lanes required, use of private property and/or modest engineering challenges = 1 - 2
	ROW negotiation/acquisition and sidewalks along multiple private properties required; expensive engineering required = 0
Order-of-Magnitude Cost	\$ = <\$5,000 / \$\$= \$5,000-25,000 / \$\$\$ = \$25,000-100,000 / \$\$\$\$ = >\$100,000
Improves Safety	major improvement = 3
	significant improvement = 2
	modest improvement = 1
	Pedestrian-car collisions in the past three years = up to 2 additional points

ID	Project Type	Project Location	Improves Safety	Provides Safe Routes to School	Provides Access to Destinations	"Completes" the Street	Impact on traffic safety and circulation	Increases Regional/Local Connectivity	Provides Access to Transit	Public Input Provided	Total (max. of 48)	Ease of Implementation	Order-of-magnitude Cost	Timeline (near, medium or long term)
15b	Sidewalks/Pathways	US Route 1, south side - Sidewalk infill from Ward Street to Black Point Road	3	3	3	3	3	3	3	2	47	2	\$\$\$	near
14	Sidewalks/Pathways	Black Point Road - New sidewalk, west side of road	3	3	3	3	2	3	1	2	43	1	\$\$\$\$	medium
39	Traffic Calming	US Route 1 from Sawyer Road to Ward Street	3	3	3	3	2	2	2	3	43	1	\$\$\$\$	medium
31a	Intersection Improvement (short term)	US Route 1 and Gorham/Black Point Road (crosswalks and signage)	3	3	3	3	1	3	2	3	43	2	\$\$	near- med
31b	Intersection Improvement (long term)	US Route 1 and Gorham/Black Point Road (bump outs, crossing island and intersection geometry)	3	3	3	3	1	3	2	3	43	2	\$\$\$\$	long
12	Sidewalks/Pathways	Gorham Road - Sidewalk on the East side of the road connecting proposed Refuge Island 9 and 10	3	3	2	3	3	2	1	2	41	2	\$\$\$	medium
11	Sidewalks/Pathways	Gorham Road - Sidewalk on the west side of road between Quentin Drive and Sawyer Road	2	3	2	3	3	3	0	3	40	1	\$\$\$\$	medium
9	Refuge Island	Gorham Road - between the High School and Oak Hill Plaza	3	3	3	2	2	2	0	3	39	1	\$\$	medium
15a	Sidewalks/Pathways	US Route 1, south side - Sidewalk infill from Commerce Drive to Ward Street	3	1	3	3	3	2	3	2	39	1	\$\$\$\$	medium
15d	Sidewalks/Pathways	US Route 1, south side - Sidewalk infill from Hannaford Drive to Portland Farms Road	3	2	2	3	3	2	2	1	38	1	\$\$\$\$	medium
42b	Transit Shelter	Just west of Gorham Road and US Route 1 intersection	2	1	3	3	3	3	3	2	38	3	\$\$	near
15c	Sidewalks/Pathways	US Route 1, south side - Sidewalk infill from Black Point Road to Hannaford Drive	3	1	2	3	3	3	2	1	37	2	\$\$\$	long
10	Refuge Island	Gorham Road just south of Hannaford Drive	3	3	3	2	2	1	0	2	36	1	\$\$	medium
37	Traffic Calming	Gorham Road from Quentin Drive to Hannaford Drive	3	3	1	3	2	2	0	2	36	1	\$\$\$ - \$\$\$\$	medium
3	Crosswalk (& small sidewalk extension)	Wentworth Drive and Municipal Drive	3	3	2	2	2	2	0	1	35	3	\$\$	near
36	Traffic Signal enhancements	US Route 1 and Ward Street (potential for longer pedestrian crossing time)	3	3	2	2	1	2	1	2	35	2	\$	near
38	Traffic Calming	Gorham Road from US Route 1 to Eastern Road	3	3	2	3	2	1	0	1	35	1	\$\$\$ - \$\$\$\$	medium
40	Traffic Calming	US Route 1 from Hannaford Drive to Down East Lane	3	1	3	3	2	2	1	2	35	1	\$\$\$ - \$\$\$\$	medium
48a	Signage/pavement markings	Gorham Road - school zone signs and pavement markings	2	3	2	3	2	2	0	2	35	3	\$	near
15e	Sidewalks/Pathways	US Route 1, south side - Sidewalk infill from Portland Farms Road to Hillcrest Road	3	1	1	3	3	2	3	1	34	2	\$\$	medium
13	Sidewalks/Pathways	High School- Extend existing sidewalk along driveway/entry road	2	2	3	3	3	2	0	0	34	2	\$\$	long
45	Lighting	US Route 1 from Municipal Drive to Gorham Road and Gorham Road along Oakhill Plaza	2	2	2	3	3	2	1	1	34	1	\$\$\$	long
21a	Sidewalks/Pathways	Multi-Use Path from Barbara Ave/Norma Drive to Wentworth Drive	1	3	3	1	3	2	0	2	32	2	\$\$\$	medium
21b	Sidewalks/Pathways	Multi-Use Path from Imperial Lane/Norma Drive to Quentin Drive, adjacent to Middle School entry	1	3	3	1	3	2	0	2	32	2	\$\$\$	medium
23	Sidewalks/Pathways	Ward Street sidewalk between US Route 1 and Eastern Village Development	1	2	2	3	3	2	2	1	32	1	\$\$\$	long
28	Sidewalks/Pathways	Black Point Road - New sidewalk on East side of road, part of future Jarvis Property Development	2	2	2	3	3	1	1	0	31	1	\$\$\$	long
30	Sidewalks/Pathways	Gorham Road - Extend east sidewalk to Maple Ave (and eventually Payne Road in long term)	2	2	1	3	3	2	0	1	31	1	\$\$\$	long
47	Grading and Drainage	Library Entrance area at Quentin Drive	3	1	2	3	3	1	0	1	31	2	\$\$	medium
35	Traffic Signal or flashing beacon with refuge option	US Route 1 and Down East Lane	3	1	2	3	1	2	1	1	30	1	\$\$\$	long
42c	Transit Shelter	Just north of US Route 1 and Portland Farms Road intersection	2	0	2	3	3	2	3	1	30	3	\$\$	near
48b	Signage	Eastern Road - Eastern Trail signs	1	1	3	2	3	3	0	2	30	3	\$	near
25	Sidewalks/Pathways	Shared-Use Path between Eastern Road and Old County Road	3	1	2	1	3	2	0	1	29	2	\$\$\$	medium

ID	Project Type	Project Location	Improves Safety	Provides Safe Routes to School	Provides Access to Destinations	"Completes" the Street	Impact on traffic safety and circulation	Increases Regional/Local Connectivity	Provides Access to Transit	Public Input Provided	Total (max. of 48)	Ease of Implementation	Order-of-magnitude Cost	Timeline (near, medium or long term)
16	Sidewalks/Pathways	Sawyer- Sidewalk on the west side of the road between US Route 1 and Maine Medical Center	2	1	2	2	3	2	1	1	29	2	\$\$	medium
33	Intersection Improvement	US Route 1 and Ward Street	1	3	3	2	1	1	1	2	29	3	\$\$\$	medium
1	Crosswalk	Corner of Sawyer Road/Pinoak Drive and Gorham Road	2	2	1	1	3	2	0	2	28	3	\$	medium
4	Crosswalk	Durant Drive/Juneberry Lane and Sawyer Drive	2	2	2	1	3	2	0	0	28	3	\$	medium
18	Sidewalks/Pathways	New sidewalk and memorial plaza to replace dying historic Elm tree	1	1	2	2	3	1	3	3	28	2	\$\$	near
22	Sidewalks/Pathways	Sawyer Road - Extend existing sidewalk improvements to Gorham Road	2	1	1	3	3	2	0	1	28	0	\$\$\$\$	long
27	Sidewalks/Pathways	Down East Lane - Extend existing sidewalk to US Route 1	1	1	2	3	3	2	1	1	28	2	\$\$\$	long
42a	Transit Shelter	At Commerce Drive intersection	2	0	1	3	3	2	3	1	28	3	\$\$	near
2	Crosswalk	Quentin Drive at Wentworth Intermediate School	2	2	2	1	3	1	0	1	27	3	\$	near
34	Traffic Signal or flashing beacon with refuge option	US Route 1 and Maple Avenue	3	0	2	3	1	2	2	0	27	1	\$\$\$	long
41	Traffic Calming	Eastern Road	3	0	1	2	2	3	0	2	27	3	\$\$\$ - \$\$\$\$	near
43	Pedestrian Bridge	Pedestrian Bridge over brook behind Oak Hill Plaza	2	1	2	2	3	2	0	0	27	2	\$\$\$	long
29	Sidewalks/Pathways	Black Point Road - Extend sidewalk along west side of road to the intersection of Winnocks Neck Road and Old Country Road	2	1	1	3	2	2	0	1	26	0	\$\$\$	long
24	Sidewalks/Pathways	New sidewalks between Eastern Village Development and Black Point Road along Thornton Road and Westwood Ave	1	1	1	3	3	2	1	1	26	1	\$\$\$	long
26	Sidewalks/Pathways	Shared-use Path between Eastern Road and Down East Lane	1	1	2	2	3	2	1	1	26	2	\$\$	long
32a	Intersection Improvement (near term)	Black Point and Eastern Roads - Repaint crosswalks, improved lighting and signs	2	1	1	2	2	2	0	3	26	2	\$\$\$	near
32b	Intersection Improvement (long term)	Black Point and Eastern Roads - improvements per Eastern Village Development project (new x-walk treatment and crossing beacon)	2	1	1	2	2	2	0	3	26	2	NA	long
17	Sidewalks/Pathways	Maine Veteran's Home- Sidewalk to US Route 1	2	0	2	2	3	2	1	0	25	1	\$\$	long
5	Crosswalk	Sawyer Drive and US Route 1	2	1	2	2	2	1	0	1	24	2	\$	medium
6	Crosswalk	Hannaford Drive and US Route 1	2	1	2	2	2	1	0	1	24	2	\$	medium
7	Crosswalk	Crossing at Hannaford Drive	2	1	2	1	3	1	0	1	24	3	\$	medium
19	Sidewalks/Pathways	Hannaford - New sidewalk from Hannaford Drive to Hannaford Supermarket	2	1	1	2	3	1	0	0	23	2	\$\$	medium
8	Crosswalk	Black Point Road and Thornton Road	2	0	1	1	3	2	0	1	21	3	\$	long
20	Sidewalks/Pathways	Sunset Road - Extend sidewalk to US Route 1 (includes new crosswalk to connect existing sidewalk on the north side to the south side)	1	0	1	2	3	2	2	0	21	2	\$\$\$	medium
44a	Oak Hill Area Gateways	US Route 1, south of Commerce Drive and at Down East Lane	1	0	0	1	3	1	0	2	15	1-2	\$\$\$	medium
44b	Scarborough Town Gateway	US Route 1, north of Hillcrest Road	1	0	0	1	3	1	0	2	15	1-2	\$\$\$	medium
46	Parking	Expanded parking area at the Eastern Trail trailhead	1	0	1	1	2	1	0	1	14	1	\$\$\$	long

6 Education, Encouragement and Enforcement Recommendations

Meeting the goals of the Oak Hill Pedestrian Plan will not only require new facilities; it also requires implementation of pedestrian-related programs and policies. A comprehensive approach is necessary to create a pedestrian-friendly community. The approach must focus on overall livability and walkability in all planning decisions involving land use, growth and transportation. Programs that encourage walking, educate about safety and enforce safe behavior are also key components. This chapter outlines recommended policies and programs for the Town of Scarborough to meet the needs of pedestrians that cannot be met through facility construction alone.

6.1 Policy Recommendations

Pedestrian safety and accessibility should be made the highest mobility priority in Oak Hill, even if this leads to a modest degradation of level of service for motorists. Without this policy shift, it will be difficult for Oak Hill to develop into a more vibrant, mixed-use area that is accessible and friendly to walkers. Oak Hill should be designated a “Pedestrian Activity Zone” in which the safety and movement of people on foot and bicycle take priority over speedy vehicle access. Though designing for pedestrians typically has an indirect benefit for bicyclists, further policy changes and planning for bike safety and access should be seriously considered as well. This report recommends that the Town develop both a town-wide bicycle plan and a Safe Routes to School (SRTS) plan to become further eligible for bike and SRTS project funding opportunities in the future.

6.2 Program Recommendations and Resources

Pedestrian-related programs fall into three main categories: Education, Encouragement, and Enforcement. The programs listed below are provided to demonstrate the variety of opportunities that exist for promoting walking and active lifestyles in the Oak Hill area. The Town should work with local volunteers and local community organizations to initiate at least one of the following programs or events (whichever are deemed the most appropriate and/or feasible to those organizing) within the first year of adopting this plan.

6.3 Education

6.3.1 Pedestrian Advocacy Group

The Town of Scarborough should support the creation of a local pedestrian (and potentially combined with bicycle) advocacy group or advisory committee. Even though this is a pedestrian plan, the needs and objectives of bicycle and pedestrian advocates are closely related, and stand to benefit mutually from their combined efforts. Local advocacy groups are beneficial resources for promoting safety, providing feedback on opportunities and obstacles within the bicycle and pedestrian system, and coordinating events and outreach campaigns (such as the programs outlined throughout this section). Advocacy groups also play a critical role in encouraging and evaluating the progress of overall plan implementation.

6.3.2 Public Education

Educational materials can focus on safe behaviors, rules, and responsibilities. Information may include important pedestrian laws, bulleted keys for safe pedestrian travel, safe motor vehicle operation around pedestrians, and general facility rules and regulations. This safety information is often available for download from national pedestrian advocacy organizations, such as the Pedestrian and Bicycle Information Center website, <http://www.walkinginfo.org>. Another interesting link is <http://www.walkscore.com/walkable-neighborhoods.shtml/> where readers can learn more about the kinds of projects and techniques that make for a more pedestrian-friendly community.



Information can be distributed through brochures, newsletters, newspapers, bumper stickers, and other print media that can be inserted into routine mailings. It can also be posted on municipal websites. Local events should be utilized to distribute information and a representative from the pedestrian advocacy group can answer questions related to pedestrian safety. A booth could also be used to display safety information at various community events.

6.3.3 Internal Education

'Internal' education refers to the training of all people who are involved in the actual implementation of the Pedestrian Plan. Internal training will be essential to institutionalizing pedestrian issues into the everyday operations of public works, planning, and community services departments. Key Town staff, members of the local planning board, MaineDOT staff, and Cumberland County staff should all be included in training sessions whenever possible. This training should cover all aspects of the transportation and development process, including planning, design, development review, construction, and maintenance. This type of 'inreach' can be in the form of brown bag lunches, professional certification programs and attendance at special sessions or conferences. Even simple meetings to go over the Pedestrian Plan and communicate its strategies and objectives can prove useful for staff and newly elected officials that may not have otherwise learned about the plan. Guidance and materials for internal education methods is available from the MaineDOT Bicycle and Pedestrian Program Manager <http://www.maine.gov/mdot/opt/bicycle-transportation.php> and the Institute for Transportation Research and Education (ITRE) at <http://itre.ncsu.edu>.

6.3.4 Interpretive Trails/Guided Tours

An educational component to the pedestrian network could be added by developing historical, cultural, and environmental themes for the facilities. This idea can be adapted to create walking tours throughout the Town, using signage to identify the events, architecture, and culture that make Oak Hill unique. These tours should be simple to navigate and should stand alone as an amenity. However, brochures can be used to supplement signage with more detailed information and a map of the tour. Other ideas to supplement the signage could be organized "talks" or lectures by local experts.

6.3.5 Education Actions Summary

- The Town of Scarborough should support the creation of local bicycle and pedestrian advocacy group with members from the Oak Hill area.

- The Town of Scarborough should consider sponsoring a training session for pedestrian design/review.
- Create a self-guided walking tour of historical/cultural sites in the Oak Hill area.
- Download a variety of safety materials for distribution to various age groups and at multiple events and locations.

6.3.6 Education Resources

America Walks is a national coalition of local advocacy groups dedicated to promoting walkable communities. Their mission is to foster the development of community-based pedestrian advocacy groups, to educate the public about the benefits of walking, and, when appropriate, to act as a collective voice for walking advocates. They provide a support network for local pedestrian advocacy groups. <http://americawalks.org>.

Safe Communities is a project of the National Highway Traffic Safety Administration (NHTSA). Nine agencies within the U.S. Department of Transportation are working together to promote and implement a safer national transportation system by combining the best injury prevention practices into the Safe Communities approach to serve as a model throughout the nation. <http://www.nhtsa.dot.gov/safecommunities>.

Speed Campaign Tool Kit. The intent of this National Highway Traffic Safety Administration (NHTSA) tool kit is to provide marketing materials, earned media tools, and marketing ideas for communities to distribute to fit local needs and objectives while at the same time partnering with other states, communities, and organizations all across the country on a speed management program. It includes messaging and templates you may choose from to support your speed management initiatives. Free TV and radio materials, posters, and other media materials can be downloaded here: <http://www.nhtsa.gov/speed/toolkit/index.cfm>

Stepping Out is an online resource for mature adults to learn about ways to be healthy by walking more often, and walking safely.

<http://www.nhtsa.dot.gov/people/injury/olddrive/SteppingOut/index.html>

Pedestrian Fatalities Related to School Travel' is a fact sheet pertaining to school age children (NHTSA).

<http://www.nhtsa.gov/gtss/kit/pedestrian.html>

Safe Kids Worldwide is a global network of organizations whose mission is to prevent accidental childhood injury, a leading killer of children 14 and under. More than 450 coalitions in 15 countries bring together health and safety experts, educators, corporations, foundations, governments and volunteers to educate and protect families. Visit their website to receive information about programs, involving media events, device distribution and hands-on educational activities for kids and their families.

<http://www.safekids.org>

Rules of the Road for Grandchildren: Safety Tips is an information website for grand parenting. If you are a grandparent, you can play an important role in teaching your grandchildren the "rules of the road." AARP.

<http://www.aarp.org/confacts/grandparents/rulesroad.html>

Streets in America are Unsafe and Unforgiving for Kids'. Article by the Pedestrian Safety Roadshow. U.S. Department of Transportation. Federal Highway Administration.



<http://www.tfhrc.gov/safety/pedbike/articles/unsafe.htm>

‘Focusing on the Child Pedestrian.’ Pedestrian information related to children from the FHWA.

<http://safety.fhwa.dot.gov/roaduser/pdf/PedFacts.pdf>

MaineDOT Division of Bicycle and Pedestrian Transportation provides significant information related to pedestrian programming.

<http://www.maine.gov/mdot/opt/bicycle-transportation.php>

6.4 Encouragement

6.4.1 Healthy Maine Partnerships

The Town should coordinate all encouragement activities with Healthy Maine Partnerships (HMP) program. Funded with tobacco-settlement funds, one of the four broad areas the HMP oversees are programs and organizations dedicated to promoting healthy living throughout the state. Scarborough’s local HMP is able to offer technical assistance and program support for all physical activity promotion, including lifestyle choices and programs associated with walking and bicycling. For more info, contact Jennifer Thibodeau at JThibodeau@propeople.org.

6.4.2 School Programs

Many programs focus on developing safer pedestrian facilities around schools. Programs can be adopted by parents and schools to provide initiatives for walking.

Community leaders, parents and schools across the U.S. are using Safe Routes to School programs to encourage and enable more children to safely walk and bike to school. The National Center for Safe Routes to School aims to assist these communities in developing successful Safe Routes programs and strategies. The Center offers a centralized resource of information on how to start and sustain a Safe Routes to School program, case studies of successful programs as well as many other resources for training and technical assistance.

6.4.3 Awareness Days/Events

A specific day of the year can be devoted to a theme to raise awareness and celebrate issues relating to that theme. A greenway and its amenities can serve as a venue for events that will put the greenway on display for the community. Major holidays, such as July 4th, and popular local events serve as excellent opportunities to include pedestrian information distribution. The following are examples of other national events that can be used to increase use of pedestrian facilities:

International Walk to School Month

This month-long event is held each October. It gives children, parents, teachers, and community leaders the opportunity to be part of a global event. For more information, visit <http://www.iwalktoschool.org>.

National Trails Day

This event is held every year in June. Other events, competitions, races, and tours can be held simultaneously to promote trails in the Scarborough/Portland area and Cumberland County.

Earth Day

Earth Day is April 22nd every year and offers an opportunity to focus on helping the environment. Efforts can be made to encourage people to help the environment by walking to destinations and staying out of their vehicles. This provides an excellent opportunity to educate people of all ages.

6.4.4 Use Facilities to Promote Other Causes

Pedestrian facilities, especially trails, could be used for events that promote other causes, such as health awareness. Not only does the event raise money/publicity for a specific cause, but it encourages and promotes healthy living and an active lifestyle, while raising awareness for pedestrian activities. Non-profit organizations such as the American Cancer Society, American Heart Association, and the Red Cross sponsor events such as Breast Cancer Walk, Diabetes Walk, the MS Walk, Alzheimer's Association events, etc.

6.4.5 Pedestrian Activities/Promotion within Local Organizations

The Town of Scarborough and Oak Hill in particular have numerous organizations that could help to promote pedestrian activities (e.g. the Scarborough Community Chamber, Buy Local Scarborough, local schools/PTOs, etc.). Education, enforcement, and encouragement programs can be advertised and discussed in local organization newsletters, seminars, and meetings. Such organizations could even organize their own group walks, trail clean-ups, and other activities listed in this section.

6.4.6 Art in the Landscape

The inclusion of art along pedestrian corridors and future trails would encourage use of facilities and provide a place for artwork and healthy expression to occur. Artwork could be displayed in a variety of ways and through an assortment of materials. Sculpture gardens could be arranged as an outdoor museum. Art through movement and expression could be displayed during certain hours during the day or during seasonal events. An "Art Walk" could be established as an event featuring destinations throughout the Town that display local

art. Artwork can be provided by local schools, special interest clubs and organizations, or donated in honor or memory of someone.



Public art can be functional as well as decorative, such as this outdoor seating area.

6.4.7 Walking/Running Clubs

Neighborhoods, local groups, or businesses could promote walking or running clubs for local residents or employees to meet at a designated area and exercise on certain days before or after work, during lunch breaks, or anytime that works for the group. This informal group could be advertised on local bulletin or information boards. These clubs could be specialized to attract different interest groups.

Examples include:

- Relay for Life (American Cancer Society support)
- Parents' Morning Club (parents with strollers)
- Walking Wednesdays (senior groups)
- Lunch Bunch (workers who run during their lunch hour)

6.4.8 Adopt-A-Trail

Local clubs and organizations provide great volunteer services for maintaining and patrolling trails. This idea could be extended to follow tour routes or specified streets/sidewalks. A sign to recognize the club or organization could be posted along sections of the Eastern Trail as an incentive to sustain high quality volunteer service. The Boy Scouts of America serve as a good model for participation in this type of program.

6.4.9 Revenue Generating Events

Oak Hill Area should consider holding events that can help fund future facilities. Program and event ideas that could be used to generate revenue in Oak Hill include:

- Races/triathlons (fees and/or donations)
- Educational walks/Nature walks/Historic walks (fees and/or donations)
- Fundraisers such as auctions
- Concerts (fees and/or donations)
- Events coincident with other local events such as fairs, festivals, historic/folk events, etc.

6.4.10 Encouragement Actions

- Encourage children to walk to school, safely, through a combination of programs, listed under encouragement resources.
- Establish awareness days and promote International Walk to School Month.
- Encourage the establishment of walking clubs.
- Use pedestrian facilities, particularly trails, to promote causes and hold special events for causes.
- Utilize future greenways for artwork and plantings.

6.4.11 Encouragement Resources

Safe Routes to School is a national program that had \$612 million dedicated from Congress from 2005 to 2009 and continues to receive additional funds from Congress intermittently. Local Safe Routes to School programs are sustained by parents, community leaders, and citizens to improve the health and well-being of children by enabling and encouraging them to walk and bicycle to school. Recently, the state of Maine has started the Maine Safe



Routes to School Program based on the national program. The state has funding for infrastructure improvements within 2 miles of schools. This funding can also be used towards the development of school related programs to improve safety and walkability initiatives. The state requires the completion of a competitive application to apply for funding and a workshop at the school to determine what improvements are needed.

<http://www.saferoutesinfo.org>

National Walk our Children to School Day is usually held in October with the objective of encouraging adults to teach children to practice safe pedestrian behavior, to identify Safe Routes to School, and to remind everyone of the health benefits of walking. To register walking events in Oak Hill Area, go to the main webpage, and follow the International Walk to School links: www.walktoschool-usa.org

'Preventing Pedestrian Crashes: Preschool/Elementary School Children' provides information to parents on pedestrian risks for preschool and elementary school children. Information about the Safe and Sober Campaign is available on the NHTSA website. <http://www.nhtsa.dot.gov/people/outreach/safesobr/15qp/web/sbprevent.html>

Kidswalk-to-School is a resource guide to help communities develop and implement a year-long walk-to-school initiative; sponsored by the Centers for Disease Control and Prevention.

<http://www.cdc.gov/nccdphp/dnpa/kidswalk/>

6.5 Enforcement

6.5.1 Motorist Enforcement

Based on crash data analysis and observed patterns of behavior, local police can use targeted enforcement to focus on key issues such as motorists speeding, not yielding to pedestrians in crosswalks, distracted driving, etc. All of these key issues should be targeted and enforced consistently. The goal is for pedestrians and motorists to recognize and respect each other's rights on the roadway.

6.5.2 Enforcement Actions

- Local police should use targeted enforcement to focus on key issues such as motorists speeding, not yielding to pedestrians in crosswalks, parking on sidewalks, etc.
- Establish a crossing guard program for peak school hours
- Require all crossing guards to complete a Crossing Guard Training Program

6.5.3 Enforcement Resources

Laws related to Pedestrians in Maine can be found here <http://www.legislature.maine.gov/legis/statutes/29-A/title29-Asec2056.html>

For an online resource guide on laws related to pedestrian and bicycle safety (provided by the National Highway Traffic Safety Administration), visit

<http://www.nhtsa.dot.gov/people/injury/pedbimot/bike/resourceguide/index.html>

Chapter 6

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7 Funding Sources

7.1 Overview

When considering possible funding sources for Oak Hill's pedestrian projects, it is important to consider that it is highly unlikely that all construction activities will be accomplished from a single funding source since these projects—in aggregate—are expected to be in the millions of dollars. It will be necessary to consider several sources of funding that, when combined, would support full project construction. It is also worth noting that funding can sometimes come more easily with a “Complete Streets” or “Accessible Streets” design strategies. The inclusion of bike facilities and transit enhancements can make—in some circumstances—a more competitive project with a higher probability of success in certain contexts. This paper outlines the most likely sources of funding for the projects at the federal, state, local government level and from the private sector.

7.2 State and Federal

Federal funding is typically directed through State agencies to local governments either in the form of grants or direct appropriations. These projects do not qualify for the recently passed federal stimulus funding (2009 American Recovery and Reinvestment Act) since they are not “shovel ready.” Also, State budget shortfalls may make it extremely difficult to accurately forecast available funding for future project development. The following is a list of possible Federal and State funding sources that could be used to support construction of the many pedestrian projects. Federal funding requires a 20% local match; however, the recent stimulus money does not require a match. Since these funding categories are difficult to forecast, it is recommended that the Town continue to work with PACTS on getting pedestrian projects listed in the TIP (Transportation Improvement Program), as discussed below.

7.2.1 Department of Energy (DOE)

The Department of Energy's Energy Efficiency and Conservation Block Grants (EECBG) grants may be used to reduce energy use and fossil fuel emissions and for improvements in energy efficiency. Section 7 of the funding announcement states that these grants provide opportunities for the development and implementation of transportation programs to conserve energy used in transportation including development of infrastructure such as bike lanes and pathways and pedestrian walkways. Although, this grant period has passed, more opportunities may arise. More information can be found at <http://www.eecbg.energy.gov/>

7.2.2 SAFETEA-LU

Federal funding is primarily distributed through a number of different programs established by Congress. The latest act, the Safe, Accountable, Flexible, Efficient Transportation Equity Act – a Legacy for Users (SAFETEA-LU) was enacted in August 2005 as Public Law 109-59.

SAFETEA-LU authorized the federal surface transportation programs for highways, highway safety, and transit for the five-year period 2005-2009. SAFETEA-LU legislation expired on September 30, 2009, but at the time of writing had been extended to September 30, 2011. It is expected that Congress will extend the bill into 2011 or reauthorize the legislation. It should therefore be noted that it is not possible to guarantee the continued

availability of any listed SAFETEA-LU programs, or to predict their future funding levels or policy guidance. Nevertheless, many of these programs have been authorized in some form in repeated federal transportation reauthorization acts, and thus may continue to provide capital for improvements.

In Maine, federal funding is administered through state (MaineDOT) and regional planning agencies such as PACTS. Most, but not all, of these funding programs are oriented toward transportation versus recreation. Programs that provide funding for pedestrian-oriented improvements emphasize the reduction of auto trips and providing inter-modal connections. Federal funding is intended for capital improvements and safety and education programs, and projects must relate to the surface transportation system.

There are a number of programs identified within SAFETEA-LU that provide for the funding of bicycle and pedestrian projects, described in the following section.

7.2.3 Surface Transportation Program

The Surface Transportation Program (STP) provides states with flexible funds which may be used for a wide variety of projects on any Federal-aid Highway including the National Highway System, bridges on any public road, and transit facilities. Pedestrian, bicycle and trail improvements are eligible activities under the STP. This covers a wide variety of projects such as on-street facilities, off-road trails, crosswalks, bicycle and pedestrian signals, bike parking, and other ancillary facilities. SAFETEA-LU also specifically clarifies that the modification of sidewalks to comply with *Americans with Disabilities Act* requirements is an eligible activity.

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

7.2.4 Statewide Multimodal Improvement Program

The Statewide Multimodal Improvement Program (SMIP) includes the Local Transportation Enhancement (TE), Bicycle and Pedestrian Facilities Program (BPFP) and STP-Discretionary (STP-D) programs. TE funding is used to enhance traditional highway projects, including providing bicycle and pedestrian facilities and increasing bicycle and pedestrian safety. Facility development can include both development of new facilities as well as modifications of existing facilities. Bicycle facilities must be transportation-oriented (not solely for recreational purposes), can be located within or outside of the highway right-of-way and could include riding or walking surfaces and related amenities. Eligible projects under the safety category include non-construction safety-related activities, such as safety and educational activities. Projects must be accessible to the general public or targeted to a broad segment of the general public.

BPFP has replaced STP-D and provides funding for bicycle and pedestrian projects. Generally, projects that are eligible for TE funds are also eligible for BPFP, with the exception of pedestrian-only projects such as sidewalks or pedestrian-only bridges (even if only a portion of the total project) as well as streetscaping projects. In addition, bicycle and pedestrian planning projects are eligible under BPFP.

7.2.5 Quality Community Program

MaineDOT sponsors the Quality Community Program, a new name for existing programs, such as Transportation Enhancements, Safe Routes to School, Small Harbor Improvement Program, and various other community

programs. The Department has consolidated the former individual applications into a “common” Quality Community Program application to improve overall program and project delivery, as well as to simplify application processes.

MaineDOT’s Quality Community Program includes federal and state funding opportunities to improve the quality community environment in Maine. This competitive program is intended to improve community transportation related facilities through small harbor improvements, bicycle and pedestrian improvements, safety improvements, environmental improvements, scenic, historic, and other quality community improvements. The next application is expected in July of 2012 to compete for funding available in fiscal years 2014-2015.

7.2.6 Community Development Block Grant Funds

Community Development Block Grant (CDBG) funds are available to local municipal or county governments for projects that enhance the viability of communities by providing decent housing and suitable living environments and by expanding economic opportunities, principally for persons of low- and moderate-income. State CDBG funds are provided by the U.S. Department of Housing and Urban Development (HUD) to the state of Maine. Some urban counties and cities in Maine receive CDBG funding directly from HUD. Each year, CDBG provides funding to local governments for hundreds of critically-needed community improvement projects throughout the state. These community improvement projects are administered by the Division of Community Assistance and the Commerce Finance Center under eight grant categories.

7.2.7 Safe Routes to School Program (managed by MaineDOT)

The MaineDOT Safe Routes to School Program is a federally funded program that was initiated by the passing of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) in 2005, which establishes a national SRTS program to distribute funding and institutional support to implement SRTS programs in states and communities across the country. SRTS programs facilitate the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity of schools. The Department of Transportation at MaineDOT is charged with disseminating SRTS funding.

The state of Maine was allocated \$ 7,252,255 million in Safe Routes to School funding for fiscal years 2005 through 2011 for infrastructure or non-infrastructure projects. All proposed projects must relate to increasing walking or biking to and from an elementary or middle school. An example of a non-infrastructure project is an education or encouragement program to improve rates of walking and biking to school. An example of an infrastructure project is construction of sidewalks around a school. Infrastructure improvements under this program must be made within 2 miles of an elementary or middle school. The state requires the completion of a competitive application to apply for funding. For more information, visit www.ncdot.org/programs/safeRoutes/ or contact MaineDOT, (207) 624-3252.

7.2.8 Highway Safety Improvement Program

This program funds projects designed to achieve significant reductions in traffic fatalities and serious injuries on all public roads, bikeways and walkways. This program includes the Railway-Highway Crossings Program and the High Risk Rural Roads Program.

7.2.9 Congestion Mitigation/Air Quality Improvement Program

The Congestion Mitigation/Air Quality Improvement Program (CMAQ) provides federal funding for projects and programs in air quality non-attainment and maintenance areas for ozone, carbon monoxide, and particulate matter, which reduce transportation related emissions. These federal funds can be used to build bicycle and pedestrian facilities that reduce travel by automobile. Recreational facilities generally are not funded. Every year, each state receives a minimum of 0.5 percent of the total CMAQ funds, with additional funds assigned to states according to the size of population located in areas experiencing excess levels of air pollution. Language in SAFETEA-LU changed CMAQ funding restrictions, allowing each state's 0.5 percent minimum apportionment to be distributed to any jurisdiction, not just air quality non-attainment areas.

7.2.10 Recreational Trails Program

The Recreational Trails Program (RTP) provides funds to states to develop and maintain recreational trails and trail-related facilities for both non-motorized and motorized recreational trail uses. Example trail uses include hiking, bicycling, in-line skating, and equestrian use. These funds are available for both paved and unpaved trails, but may not be used to improve roads for general passenger vehicle use or to provide shoulders or sidewalks along roads.

Recreational Trails Program funds may be used for:

- Maintenance and restoration of existing trails.
- Development and rehabilitation of trailside and trailhead facilities and trail linkages.
- Construction of new trails (with certain restrictions on Federal lands).
- Acquisition of easement or property for trails.

In Maine, the Recreational Trails Program is administered by the Bureau of Parks and Land.

7.2.11 Transportation, Community and System Preservation Program

The Transportation, Community and System Preservation Program (TCSP) provides federal funding for transit-oriented development, traffic calming, and other projects that improve the efficiency of the transportation system, reduce the impact on the environment, and provide efficient access to jobs, services, and trade centers. The program is intended to provide communities with the resources to explore the integration of their transportation system with community preservation and environmental activities.

The Transportation, Community and System Preservation Program funds require a 20 percent match, with a maximum federal share of 80 percent. States, MPOs, and local governments can apply. Grants are evaluated by a team of representatives from several federal transportation departments and agencies, as well as the Environmental Protection Agency. For 2006 to 2009, the TCSP Program was authorized to award up to \$61.5 million in grants. Grants are awarded on an annual cycle, but application deadlines vary from year to year, usually between January and July.

7.2.12 Partnership for Sustainable Communities

Founded in 2009, the Partnership for Sustainable Communities is a joint project of the Environmental Protection Agency (EPA), the U.S. Department of Housing and Urban Development (HUD), and the U.S. Department of

Transportation (USDOT). The partnership aims to “improve access to affordable housing, more transportation options, and lower transportation costs while protecting the environment in communities nationwide.” The Partnership is based on five Livability Principles, one of which explicitly addresses the need for bicycle and pedestrian infrastructure (“Provide more transportation choices: Develop safe, reliable, and economical transportation choices to decrease household transportation costs, reduce our nation’s dependence on foreign oil, improve air quality, reduce greenhouse gas emissions, and promote public health”).

The Partnership is not a formal agency with a regular annual grant program. Nevertheless, it is an important effort that has already led to some new grant opportunities (including both TIGER I and TIGER II grants).

7.2.13 State and Community Highway Safety Grant Program (Section 402)

Administered by National Highway Traffic Safety Administration (NHTSA) and Federal Highway Administration (FHWA), as well as by the designated State Highway Safety Offices (SHSO), Section 402 monies support State highway safety programs that are intended to reduce traffic crashes and resulting deaths, injuries, and property damage. Grant funds are provided to States each year according to a statutory formula based 25 percent on population and 75 percent on road mileage. States must submit a Performance Plan with goals and performance measures as well as a Highway Safety Plan, which should describe how they will achieve the Performance Plan.

Funds may be used for a wide variety of highway safety activities and programs including those that improve pedestrian and bicycle safety. States are to consider highly effective programs (previously known as National Priority Program Areas), including bicycle and pedestrian safety, when developing their programs, but are not limited to this list of activities.

7.3 Local Government

As part of Act 28 passed in June, 2009, state statutes now include a requirement for the inclusion of bicycle and pedestrian accommodations as part of projects that involve state or federal funding (FDM 11-45-10 Bicycle Facilities).

Local funding sources that would support sidewalk and pedestrian project construction will most likely be limited but should be explored.

7.3.1 Portland Area Comprehensive Transportation System

The Portland Area Comprehensive Transportation System (PACTS) is the Metropolitan Planning Organization for the Portland, Maine region. It was established to improve the coordination of transportation planning and investment decisions by state, municipal and public transportation organizations. The PACTS manages plans for the area’s surface transportation needs, including highways, transit, bicycle, and pedestrian facilities. There are three subcommittees of the PACTS: the Planning, Technical and Transit Committees. An important part of the transportation planning process is to identify transportation needs and to explore feasible alternatives to meet those needs. Plans and programs are often conducted in partnership with the Maine Department of Transportation to identify needs and projects to enhance Oak Hill Area’s transportation infrastructure. In particular, PACTS offers funding for shelters and other bus-stop improvements that should be utilized for

ShuttleBus stops in Oak Hill. (In addition, if the Town joins the ShuttleBus compact, they may be available to receive free shelters from the company.)

7.3.2 Town of Scarborough Capital Improvement Programming and Reserve Funds

The Town of Scarborough may have funding available to support some elements of construction or repair. It will be important to meet with Town Council representatives and the Town Manager to judge the availability of this funding.

7.3.3 Other Potential Local Funding Options

- Bonds/Loans
- Taxes
- Impact fees
- Exactions
- Tax increment financing
- Partnerships

7.4 Private Sector

Many communities have solicited funding assistance for trail projects from private foundations and other conservation-minded benefactors. Below are several examples of private funding opportunities available.

7.4.1 The Robert Wood Johnson Foundation

The Robert Wood Johnson Foundation was established as a national philanthropy in 1972 and today it is the largest U.S. foundation devoted to improving the health and health care of all Americans. Grant making is concentrated in four areas:

- To assure that all Americans have access to basic health care at a reasonable cost
- To improve care and support for people with chronic health conditions
- To promote healthy communities and lifestyles
- To reduce the personal, social and economic harm caused by substance abuse: tobacco, alcohol, and illicit drugs

For more specific information about what types of projects are funded and how to apply, visit <http://www.rwjf.org/applications/>.

7.4.2 Bank of America Charitable Foundation, Inc.

The Bank of America Charitable Foundation is one of the largest in the nation. The primary grants program is called Neighborhood Excellence, which seeks to identify critical issues in local communities. Another program that applies to trails is the Community Development Programs, and specifically the Program Related Investments. This program targets low and moderate income communities and serves to encourage

entrepreneurial business development. Visit the web site for more information:

<http://www.bankofamerica.com/foundation>.

7.4.3 American Greenways Eastman Kodak Awards

The Conservation Fund's American Greenways Program has teamed with the Eastman Kodak Corporation and the National Geographic Society to award small grants (\$250 to \$2,000) to stimulate the planning, design and development of greenways. These grants can be used for activities such as mapping, conducting ecological assessments, surveying land, holding conferences, developing brochures, producing interpretive displays, incorporating land trusts, and building trails. Grants cannot be used for academic research, institutional support, lobbying or political activities. For more information visit The Conservation Fund's website at:

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

7.4.4 National Trails Fund

American Hiking Society created the National Trails Fund in 1998, the only privately supported national grants program providing funding to grassroots organizations working toward establishing, protecting and maintaining foot trails in America. 73 million people enjoy foot trails annually, yet many of our favorite trails need major repairs due to a \$200 million backlog of badly needed maintenance. National Trails Fund grants help give local organizations the resources they need to secure access, volunteers, tools and materials to protect America's cherished public trails. To date, American Hiking has granted more than \$240,000 to 56 different trail projects across the U.S. for land acquisition, constituency building campaigns, and traditional trail work projects. Awards range from \$500 to \$10,000 per project.

Projects the American Hiking Society will consider include:

- Securing trail lands, including acquisition of trails and trail corridors, and the costs associated with acquiring conservation easements.
- Building and maintaining trails which will result in visible and substantial ease of access, improved hiker safety, and/or avoidance of environmental damage.
- Constituency building surrounding specific trail projects - including volunteer recruitment and support.

<http://www.americanhiking.org/alliance/fund.html>.

7.4.5 Volunteer Work

It is expected that many citizens will be interested about the development of pedestrian improvements in Oak Hill. Individual volunteers from the community can be brought together with groups of volunteers from church groups, civic groups, scout troops and environmental groups to work on path development or landscape projects on special community workdays. Volunteers can also be used for fund-raising, maintenance, and programming needs.

7.5 Potential Local Funding Sources

7.5.1 Local Eastern Trail Sponsors

A sponsorship program for trail amenities allows smaller donations to be received from both individuals and businesses. Cash donations could be placed into a trust fund to be accessed for certain construction or acquisition projects associated with the greenways and open space system. Some recognition of the donors is appropriate and can be accomplished through the placement of a plaque, the naming of a trail segment, and/or special recognition at an opening ceremony. Types of gifts other than cash could include donations of services, equipment, labor, or reduced costs for supplies.

7.5.2 Tax Increment Financing/Urban Renewal Funds¹

Tax Increment Financing (TIF) is a tool to use future gains in taxes to finance the current improvements that will create those gains. When a public project (e.g., sidewalk improvements) is constructed, surrounding property values generally increase and encourage development or redevelopment in the area. The increased tax revenues are then dedicated to finance the debt created by the original public improvement project. Tax Increment Financing typically occurs within designated Urban Renewal Areas (URA) that meets certain economic criteria and is approved by a local governing body. To be eligible for this financing, a project (or a portion of it) must be located within the URA.

7.5.3 General Fund

The General Fund is often used to pay for maintenance expenses and limited capital improvement projects. Projects identified for reconstruction or re-pavement as part of the Capital Improvements list should also implement recommendations for bicycle or pedestrian improvements in order to reduce additional costs.

7.5.4 Local Improvement Districts (LIDs)

Local Improvement Districts (LIDs) are frequently often used by cities to construct localized projects such as streets, sidewalks or bikeways. Through the LID process, the costs of local improvements are generally spread out among a group of property owners within a specified area. The cost can be allocated based on property frontage or other methods such as traffic trip generation.

Several cities have successfully used LID funds to make improvements on residential streets and for large scale arterial projects. LID formed to finance commercial street development can be “full cost,” in which the property assessments are entirely bourn by the property owners.

7.5.5 Local Bond Measures

The Town could issue bonds to fund pedestrian improvements. This would spread the cost of the improvements over the life of the bonds. Certain types of bonds would require voter approval. The debt would have to be retired, so funding for repayment on the bond and the interest would be required.

¹ <http://www.rcgov.org/Growth-Management/tifprojectplanhistory.html>

A bond issued in Denver, Colorado funded \$5 million for trail development and also funded the city's bike planner for several years. The City of Albuquerque, New Mexico and Bernalillo County have a 5 percent set-aside of street bond funds for trails. This has amounted to approximately \$1.2 million for the City every two years.

7.5.6 Street User/Street Utility Fees

The Town could administer street user fees through residents' monthly water or other utility bills. The revenue generated by the street user fee is used for operations and maintenance of the street system, and priorities are established by the Public Works Department. Revenue from this fund could be used to maintain on-street bicycle and pedestrian facilities, including routine sweeping of bicycle lanes and other designated bicycle routes. Additionally, this type of fee may free up more general fund money for off-street projects. Implementation of street user fees would require a public vote.

7.5.7 Property Tax Levy

Seattle, Washington is receiving \$5 million a year for nine years for bicycle and pedestrian projects as a result of a levy (property tax) approved by voters in 2006.

7.5.8 Developer Impact Fees

Another potential local source of funding is developer impact fees, typically tied to trip generation rates and traffic impacts produced by a proposed project. A developer may reduce the number of trips (and hence impacts and cost) by paying for on- and off-site bikeway improvements that will encourage residents to bicycle rather than drive. Establishing a clear nexus or connection between the impact fee and the project's impacts is critical in avoiding a potential lawsuit.

Chapter 7

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Appendix A. Design Guidelines

1. Sidewalks

Design Summary

	Curb	Planting Strip (Buffer)*	Sidewalk Width
Arterials and Collectors	1 ft.	6-8 ft.	8 ft.†
Land Access Streets	0-1 ft.	6-8 ft.	5 ft. †
Bus Stops	1 ft.	varies	5'x8' area‡
Commercial Walkways	1 ft.	6-8 ft.	6-10 ft.

* In constrained locations, the full sidewalk width should be provided, with a reduced-width planting strip/buffer.

† Note: sidewalk segments can have narrower widths in physically-constrained areas.

‡ Required minimum by ADA



A well-designed sidewalk provides plenty of pedestrian space.

Discussion

Recommended widths enable two pedestrians (including wheelchair users) to walk side-by-side, or to pass each other comfortably. Proposed sidewalk guidelines apply to new development and depend on available street width, motor vehicle volumes, surrounding land uses, and pedestrian activity levels. Standardizing sidewalk guidelines for different areas of the region, dependent on the above listed factors, ensure a minimum level of quality for all sidewalks. As part of a roadway reconstruction project on a street with a narrow sidewalk corridor, planners should analyze the impact of reclaiming a portion of the existing right-of-way. If this proves impractical, the feasibility of acquiring additional right-of-way should be examined. Acquisition should be considered where cost is reasonable in proportion to the overall project cost.

Guidance

- United States Access Board. (2002). Accessibility Guidelines for Buildings and Facilities.
- United States Access Board. (2007). *Public Rights-of-Way Accessibility Guidelines* (PROWAG).

1. Sidewalks

1.1 Addressing Sidewalk Obstructions

Design Summary

- Place obstructions such as sign posts, utility and signal poles, mailboxes, fire hydrants and street furniture between the sidewalk and the roadway to create a buffer for increased pedestrian comfort.
- Where sidewalks abut perpendicular or angled on-street parking, use wheel stops to prevent parked vehicles from overhanging in the sidewalk.
- Where sidewalks abut hedges, fences, or buildings, add two feet of lateral clearance for shy distance.

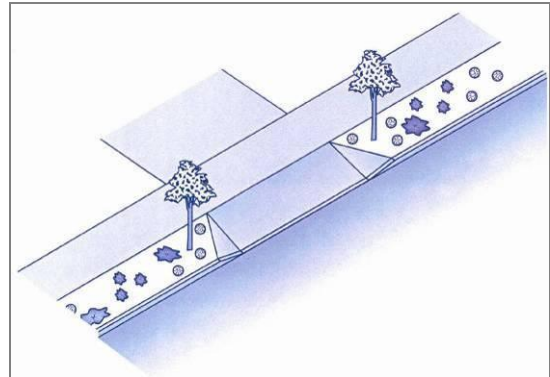
Discussion

Driveways are a common obstacle to the sidewalk network and should be minimized where possible. Where access management is not feasible, options for minimizing the impact of driveways to the sidewalk environment include:

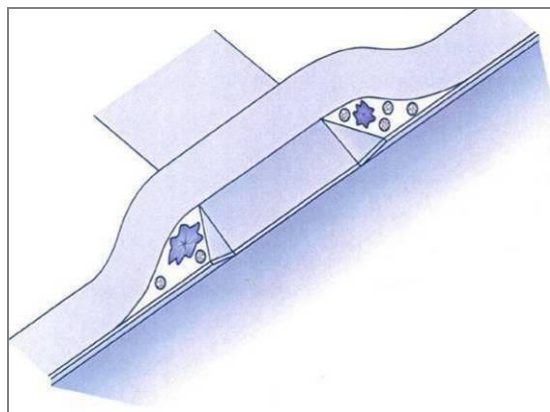
- Provide a planter strip allowing sidewalks to remain level, with the driveway grade change occurring within the planter strip (top graphic).
- Wrap the sidewalk around the driveway (middle graphic). However, this may have disadvantages for visually-impaired pedestrians who follow the curb line for guidance.
- Dip the entire sidewalk at the driveway approach to maintain a constant grade on the cross-slope (bottom graphic). However, this may be uncomfortable for pedestrians where driveways are frequent and could create drainage problems behind the sidewalk.

Guidance

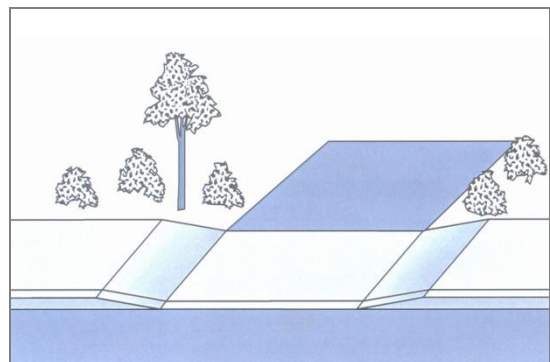
- United States Access Board. (2002). Accessibility Guidelines for Buildings and Facilities.
- United States Access Board. (2007). Public Rights-of-Way Accessibility Guidelines (PROWAG).



Driveway apron utilizing the planter strip.



Sidewalk wrapped around driveway.



Entire sidewalk dips at driveway.

1. Sidewalks

1.2 Sidewalk Maintenance

Design Summary

- Minimize barriers for pedestrians, particularly with mobility and sensory impairments, by providing a level surface with a minimum of ¼ inch grade changes.
- Trim tree limbs to leave at least 8 feet of clear space above the sidewalk.

Discussion

Root Protection

Street trees are a desirable part of the street environment, to shade pedestrians and improve aesthetics. However, sidewalk damage can occur, primarily from improper tree selection and from soil freeze and thaw. To minimize sidewalk damage from trees, choose appropriate trees based on water and light availability, the quantity of air, and root space available at the specific location.

Grates

Designers should consider using tree well grates or treatments such as unit pavers in high pedestrian use areas. All grates within the sidewalk should be flush with the level of the surrounding sidewalk surface, and should not interfere with pedestrian zone.

Hatch Covers

Hatch covers should be located within the sidewalk furnishings zone. Hatch covers must have a surface texture that is rough, with a slightly raised pattern. The surface should be slip-resistant even when wet. The cover should be flush with the surrounding sidewalk surface.

Curb Ramp Maintenance

The interface between a curb ramp and the street be maintained adequately. Asphalt street sections typically have a shorter life cycle than a concrete ramp, and can develop potholes at the foot of the ramp, which can catch the front wheels of a wheelchair. Existing ramps, and crossings without ramps, must be brought to current accessibility standards during reconstruction periods.



Subsurface tree roots can lift concrete sidewalk slabs, causing the surface to become uneven.



Tree well grates can create uneven sidewalk conditions and should not be placed within the thru-pedestrian zone.

Guidance

- United States Access Board. (2007). *Public Rights-of-Way Accessibility Guidelines (PROWAG)*.

2. Intersections

Design summary

- Intersection frequency on mixed-use streets and other high pedestrian use areas:
 - Generally not farther apart than 200-300' where blocks are longer than 400'.
 - Generally not closer together than 150'.
- Intersection frequency on residential or local streets:
 - Frequency based on adjacent uses. Do not prohibit for more than 400'.
 - Generally not closer together than 150'.



Intersections with many user types should provide good crossing opportunities and clearly delineate crossing patterns.

Discussion

In general, pedestrians are not inclined to travel very far out-of-direction to access a designated crosswalk, so providing sufficient crossings is critical for a safe pedestrian environment. Crosswalks can also be designed for increased visibility of pedestrians, and curb ramps and vehicle turning radii should also be considered for the pedestrian environment.

In areas of high pedestrian use, the convenience and travel time of pedestrians deserves special consideration when considering signal placement and timing. In these locations, pedestrian mobility and access may need to be weighted against the efficiency of vehicle progression.

Attributes of pedestrian- and bicycle-friendly intersection design include:

- Clear Space – Corners should be clear of obstructions. They should also have enough room for curb ramps, for transit stops where appropriate, and for street conversations where pedestrians might congregate.
- Visibility – It is critical that pedestrians on the corner have a good view of vehicle travel lanes and that motorists in the travel lanes can easily see waiting pedestrians.
- Legibility – Symbols, markings, and signs used at corners should clearly indicate what actions the pedestrian should take.
- Accessibility – All corner features, such as curb ramps, landings, call buttons, signs, symbols, markings, textures, must meet accessibility standards.
- Separation from Traffic – Corner design and construction must be effective in discouraging turning vehicles from driving over the pedestrian area.

Guidance

- United States Access Board. (2007). *Public Rights-of-Way Accessibility Guidelines* (PROWAG).

2. Intersections

2.1 Marked Crosswalks

Design Summary

- See MUTCD for pavement marking spacing.
- Mark all crosswalks at signalized intersections. At unsignalized intersections, mark crosswalks under the following conditions:
 - At a complex intersection, to orient pedestrians in finding their way across.
 - At an offset intersection, to show pedestrians the shortest route across traffic with the least exposure to vehicular traffic and traffic conflicts.
 - At an intersection with visibility constraints, to position pedestrians where they can best be seen by oncoming traffic.
- At mid-block locations, mark crosswalks where:
 - There is a demand for crossing AND
 - There are no nearby marked crosswalks.



Parallel markings are the most basic crosswalk marking type, and are applied where textured concrete crosswalks are used.



Zebra striped crossings can increase the visibility of pedestrians to motorists.

Discussion

Marking crosswalks signals to drivers that they should stop for pedestrians, and encourages pedestrians to cross at safer locations. Crosswalk markings also indicate to pedestrians the appropriate route across traffic, to facilitate crossing by the visually impaired and remind turning drivers of potential conflicts with pedestrians.

Use ladder pavement markings at crossings with high pedestrian use or where vulnerable pedestrians are expected, including:

- School crossings.
- Across arterial streets for pedestrian-only signals.
- At mid-block crosswalks.

Guidance

- United States Access Board. (2007). *Public Rights-of-Way Accessibility Guidelines (PROWAG)*.
- FHWA. (2005). *Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations Final Report and Recommended Guidelines*. <http://www.fhwa.dot.gov/publications/research/safety/04100/>

2. Intersections

2.2 High-Visibility Crosswalk Techniques

Design Summary

- Additional treatments can be used to increase visibility of the crosswalk at high-use locations and in locations with high use from school children, elderly pedestrians, or pedestrians with disabilities.

Discussion

Rapid Flash Beacon

Designed to encourage motorists to stop for a pedestrian waiting at a mid-block crossing, rapid flash beacons call attention to the crossing location. These devices use a stutter flash pattern similar to that used on emergency vehicles.



Rapid flash beacon.

Raised Median

A raised median eliminates grade changes from the sidewalk and gives pedestrians greater prominence. Raised crosswalks should be where a special emphasis on pedestrians is desired such as at a mid-block crossing.

Additional guidelines include:

- Use detectable warnings at the curb edges to alert vision-impaired pedestrians that they are entering the roadway.
- Design approaches to the raised crosswalk to be similar to speed humps, so they also act as traffic calming.
- Use post-mounted pedestrian crosswalk signs placed on the median and on the right side of the roadway for each approach.



Raised medians require drivers to slow down.

In-Street “Yield to Pedestrians” Signs and Flashers

In-street “Yield to Pedestrian” signs are flexible plastic ‘paddle’ signs installed in the center of a roadway to enhance a crosswalk at uncontrolled crossing locations. In-pavement flashers may be appropriate on undivided roadways in densely developed areas that do not offer median refuges for crossing pedestrians.



In-street yield to pedestrian sign.

Guidance

- United States Access Board. (2007). *Public Rights-of-Way Accessibility Guidelines (PROWAG)*.

2. Intersections

2.3 Reducing Crossing Distance

Design Summary

- Minimize pedestrian exposure to travel lanes by shortening the crossing distance; 50-foot or four travel lanes is generally the longest uninterrupted crossing of an unsignalized crosswalk.

Discussion

Curb Extension

Curb extensions may be constructed where there is a parking lane adjacent to the curb. They can be used as bus stop locations to improve safety for transit riders. However, if there is no parking lane, the extensions may impede bicycle travel (where no bike lane is striped).

Guidelines for use:

- Design curb extensions to transition between the extended curb and the running curb in the shortest practicable distance.
- For street sweeping, use the minimum radius for the reverse curves of 10 feet and balance the two radii to be nearly equal.
- Stop the curb extensions one foot short of the parking zone for bicycle safety.

Median Refuge Island

In addition to narrowing the crossing distance, median refuge islands provide a crossing refuge, allowing pedestrians to gauge safe crossing of “one direction” of traffic at a time, and slowing motor vehicle traffic.

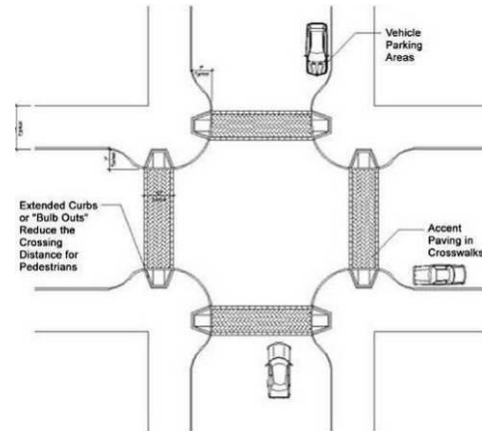
The refuge island must be accessible, preferably with an at-grade passage through the island rather than ramps and landings.

A median refuge island should be at least 6' wide between travel lanes and at least 20' long. On streets with posted speeds over 25 mph, include double centerline marking, reflectors, and “KEEP RIGHT” signs.

If a refuge island is landscaped, the landscaping should not compromise the visibility of pedestrians crossing in the crosswalk. Tree species should be selected for small diameter trunks and tree branches should be no lower than 14 feet. Shrubs and ground plantings should be no higher than one foot, six inches.

Guidance

- United States Access Board. (2007). *Public Rights-of-Way Accessibility Guidelines (PROWAG)*.



Curb extensions improve visibility of pedestrians and provide additional sidewalk space at street corners.



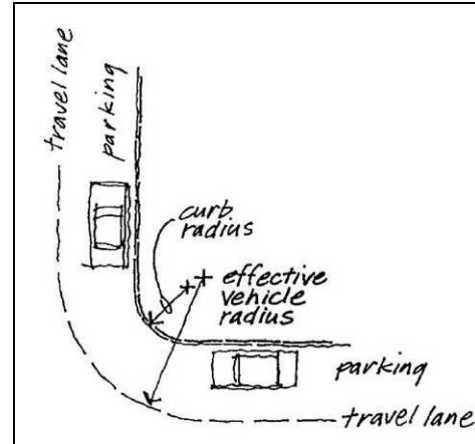
Median refuge islands break up a crossing and allow pedestrians to cross one side of a street at a time.

2. Intersections

2.4 Minimizing Curb Radius

Design Summary

- Consider the desired pedestrian area of the corner, traffic turning movements, the turning radius of the design vehicle, the geometry of the intersection, the street classifications, and whether there is parking or a bicycle lane (or both) between the travel lane and the curb.
- Use the smallest possible curb radius for the circumstances:
 - May be three-feet where there are no turning movements.
 - Increase to five-feet where there are turning movements and there is adequate street width and a larger effective curb radius created by parking or bicycle lanes.



An "effective radius" is created by the presence of a parking lane or bike lane.

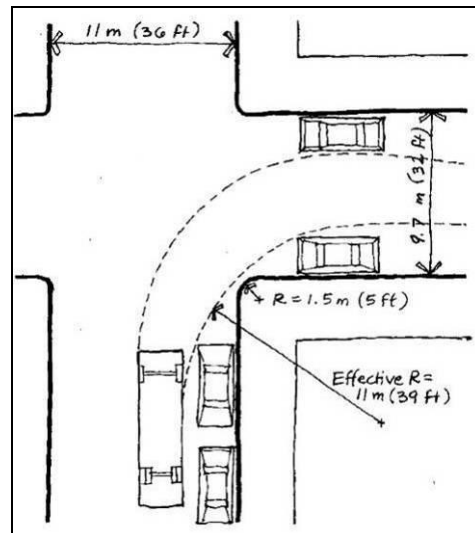
Discussion

Factors that govern the choice of curb radius in any given location include:

- The desired pedestrian area of the corner
- Traffic turning movements
- Turning radius of the design vehicle
- Geometry of the intersection
- Street classifications
- Whether there is parking or a bike lane (or both) between the travel lane and the curb

In general, smaller curb radii are preferred for pedestrians. A tight curb radius provides more pedestrian area at the corner, allows more flexibility in the placement of curb ramps, results in a shorter crosswalk, and requires vehicles to slow more as they turn the corner. A small curb radius is also beneficial for street sweeping.

The presence of a parking or bike lane creates an 'effective radius' that allows the designer to choose a radius for the curb that is smaller than the turning radius required by the design vehicle.



Where there is an effective curb radius sufficient for turning vehicles, the actual curb radius may be as small as 5 ft (1.5 m).

Guidance

- United States Access Board. (2007). *Public Rights-of-Way Accessibility Guidelines* (PROWAG).

2. Intersections

2.5 Minimizing Conflict with Automobiles

Design Summary

- Separating pedestrians and motor vehicles at intersections improves safety and visibility.

Discussion

Parking Control

Parking control improves visibility in the vicinity of the crosswalk. Prohibit parking within all intersections and crosswalks unless otherwise signed. At “T” and offset intersections, where the boundaries of the intersection may not be obvious, this prohibition should be emphasized with signage.

Advance Yield Bars

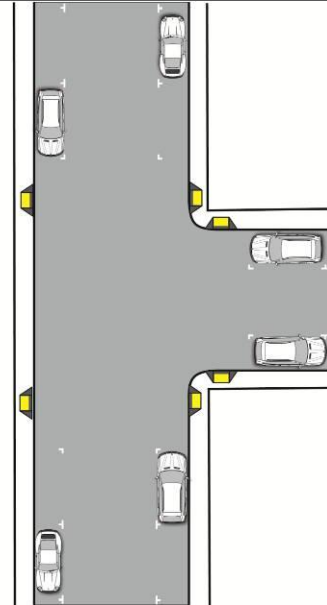
Advance yield bars increase pedestrian comfort and safety by stopping motor vehicles well in advance of marked crosswalks, allowing drivers a better line of sight of pedestrians.

They give drivers in the traffic inner lane time to yield to pedestrians, minimizing the danger of a multiple threat crash. Without an advance yield bar, the driver in the outer lane may yield to the pedestrian, but the vehicle in the inner lane proceeds, increasing the possibility of a vehicle-pedestrian conflict.

Pedestrians may also feel more comfortable since motor vehicles are not stopped adjacent to the crosswalk.

Advanced stop bars should be used:

- On streets with at least two travel lanes in each direction.
- Prior to a marked crosswalk
- In one or both directions of motor vehicle travel
- Recommended 30-feet in advance of the crosswalk.
- A “Yield Here for Pedestrians” sign must accompany the advance yield bar.



Prohibit parking in advance of intersections and at 'T' intersections to improve pedestrian visibility.



Advance stop bars alert motorists of pedestrians.

Guidance

- United States Access Board. (2007). *Public Rights-of-Way Accessibility Guidelines* (PROWAG).

2. Intersections

2.6 ADA-Compliant Curb Ramps

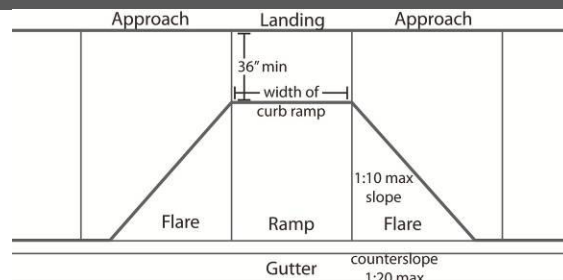
Design Summary

- Provide a landing at the top of every curb ramp that:
 - Is at least 4' long
 - Is at least the same width as the ramp itself.
 - Slopes no more than 1:50 (2.0%) in any direction
- Maximum ramp slope: 1:12 (8.3%) with a cross slope of no more than 1:50 (2.0%).
- Minimum width of a ramp: 40"

Discussion

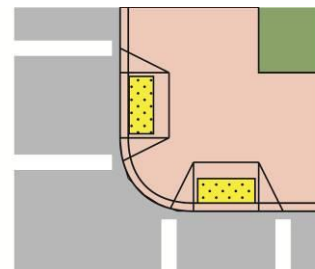
The 2010 ADA Standards (Section 405) define a curb ramp as, “a short ramp cutting through a curb or built up to it.” Curb ramps provide a transition from the street to the sidewalk at a street corner. Properly designed curb ramps ensure that the sidewalk is accessible to all types of pedestrians from the roadway. A sidewalk without a curb ramp can be useless to someone in a wheelchair, forcing them back to a driveway and out into the street for access.

The ADA defines two types of curb ramp systems, “perpendicular ramps” and “parallel ramp,” shown right. Diagonal curb ramps, which are a single ramp at a corner, are not recommended because they place the pedestrian in the middle of the intersection, rather than at the crosswalk.

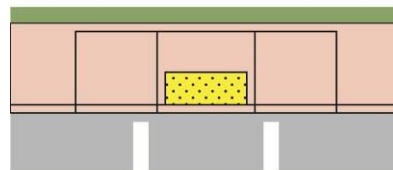


Source: 2010 ADA Standards for Accessible Design, Section 406, Curb Ramps

ADA standards for curb ramps.



PERPENDICULAR CURB RAMP



PARALLEL CURB RAMP

Curb ramp options identified by the U.S. Access Board.



Example of an ADA-compliant perpendicular curb ramp.

Guidance

- 2010 ADA Accessibility Standards
- United States Access Board. (2007). *Public Rights-of-Way Accessibility Guidelines (PROWAG)*.

2. Intersections

2.7 Raised Tactile Devices Used as Detectible Warnings

Design Summary

- Raised tactile devices (also known as truncated domes) alert people with visual impairments to changes in the pedestrian environment and should be used at:
 - The edge of depressed corners.
 - The border of raised crosswalks and intersections.
 - The base of curb ramps.
 - The border of medians.
 - The edge of transit platforms where railroad tracks cross the sidewalk.



A diagonal curb ramp with detectable warning.

Discussion

Contrast between the raised tactile device and the surrounding infrastructure is important so that the change is readily evident. These devices are most effective when adjacent to smooth pavement so the difference is easily detected. The devices must provide color contrast so partially sighted people can see them.

Raised Tactile Devices Used for Wayfinding

Raised tactile devices can also be used for wayfinding along a pathway or across a road. This is particularly useful to visually impaired pedestrians in areas where the pedestrian environment is unpredictable. Complex intersections, roundabouts, wide intersections and open plazas are areas where raised tactile devices could be considered. No standards or guidelines for these devices have been adopted nationally. Raised devices with bar patterns can indicate the proper walking direction. Textured pavement that provides enough material and color contrast can be used to mark the outside of crosswalks, in addition to white paint or thermoplastic.

Guidance

- 2010 ADA Accessibility Standards, <http://www.ada.gov/regs2010/2010ADAStandards/2010ADAstandards.htm>
- United States Access Board. (2007). *Public Rights-of-Way Accessibility Guidelines* (PROWAG).

3. Traffic Calming

Design Summary

- Traffic calming treatments reduce vehicle speeds to the point where they generally match bicyclists' operating speeds, enabling motorists and bicyclists to safely co-exist on the same facility while improving the pedestrian environment.

Discussion

Speed Humps, Lumps, and Tables

Speed humps are rounded raised areas requiring approaching vehicles to reduce speed. Emergency vehicle response times should be considered. Speed humps can be designed to leave gaps in the center or three to four feet by the curb for bicyclists and drainage (called speed lumps).

Speed tables are longer than speed humps and flat-topped. The 22-foot table with a vertical rise of three inches high and 10-foot plateau is the most common. Because a speed table cannot be straddled by a truck, it decreases the risk of bottoming out. A raised crosswalk is a speed table that is marked and signed for pedestrian crossing.

Chicanes

Chicanes are a series of raised or delineated curb extensions, edge islands, or parking bays on alternating sides of a street forming an S-shaped curb, which reduce vehicle speeds by requiring drivers to shift laterally through narrowed travel lanes.

Mini Traffic Circles

Mini traffic circles are raised or delineated islands placed at intersections that reduce vehicle speeds by narrowing turning radii and narrowing the travel lane. They can be used to replace four-way stops with yield controls, although they are typically not signed as such. Mini traffic circles can also include a paved apron to accommodate the turning radii of larger vehicles like fire trucks or school buses. Larger circles should include splitter islands at the approaches. Left turns in front of the islands may be allowed to accommodate larger trucks at small intersections.

Curb Bulbs

Curb bulbs expand the sidewalk or curb face into the parking lane at an intersection, visually narrowing the roadway. The curb bulbs should only extend across the parking lane and should not obstruct bicyclists' path of travel or the travel lane. Curb bulbs can increase the amount of space available for street furniture and trees or act as stormwater management features.

Guidance

- Ewing, Reid and Steven J. Brown. 2009. *U.S. Traffic Calming Manual*



Speed humps are a common traffic calming treatment.



Speed lumps or cushions are divided to allow emergency vehicles to pass unaffected.



Chicanes require all vehicles to reduce their speeds to maneuver around the obstacle.



Traffic circles require both drivers and bicyclists to reduce speeds.



Curb bulb-outs can be a good location for pedestrian amenities, including street trees.

4. Accommodating Bicyclists and Pedestrians at Signals

4.1 Pedestrian Push-Buttons

Design Summary

- Locate so that someone in a wheelchair can reach the button from a level area of the sidewalk without deviating significantly from the natural line of travel into the crosswalk.
- Mark (for example, with arrows) so that it is clear which signal is affected.
- Raise buttons above or flush with their housing.
- Provide button that are large enough for people with visual impairments to see, minimum 2.”
- The U.S. Access Board recommends the force to activate the signals should be no more than 22.2 Newtons.

Discussion

Pedestrian push buttons are used to permit the signal controller to detect pedestrians desiring to cross. They can be used at an actuated or semi-actuated traffic signal at intersections with low pedestrian volumes, and at mid-block crossings.

Accessible pedestrian signals should be installed whenever major signalized intersection upgrades are undertaken or when new signals are installed.

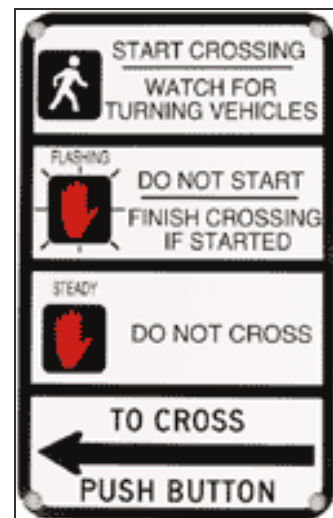
Signalized crossings in areas of high pedestrian use may automatically provide a pedestrian crossing phase during every signal cycle, excluding the need for pedestrian push-buttons. In high pedestrian use areas, there should be a demonstrated benefit for actuated signals before push buttons are installed. The following are some criteria for that benefit:

- The main street carries through traffic or transit, such as a major city traffic or transit street, or a district collector.
- Traffic volumes on the side street are considerably lower than on the main street.
- The pedestrian signal phase is long (for example, on a wide street) and eliminating it when there is no demand would significantly improve the level of service of the main street.

Where push buttons must be installed in high pedestrian use areas, designers should consider operating the signal with a regular pedestrian phase during off-peak hours.



*Example standard pedestrian push button.
(Polaris Navigator)*



*Pedestrian push buttons can be accompanied
by informational signage.*

Guidance

- United States Access Board. (2007). *Public Rights-of-Way Accessibility Guidelines (PROWAG)*.

4. Accommodating Bicyclists and Pedestrians at Signals

4.2 Accommodating Pedestrians at Signals

Design Summary

- Assume a pedestrian walking speed of three feet per second to provide sufficient time for a pedestrian to safely cross during the signal phase (per MUTCD guidance).
- Assume slower crossing speeds at crossings where older pedestrians or pedestrians with disabilities are expected.
- Provide special pedestrian phases to increase visibility or crossing time for pedestrians at certain intersections.



Pedestrian signal indication.

Discussion

Pedestrian Signal Indication (“Ped Head”) and Countdowns

Pedestrian signal indicators use a symbol to indicate when to cross at a signalized crosswalk. All traffic signals are now required to be equipped with pedestrian signal indications except where pedestrian crossing is prohibited by signage. Countdown pedestrian signals are particularly beneficial, as they indicate whether a pedestrian has time to cross the street before the signal phase ends.



Traffic signals should provide sufficient time for pedestrians of all ages and abilities to cross.

Audible Pedestrian Traffic Signals

Audible pedestrian traffic signals provide crossing assistance to pedestrians with vision impairment at signalized intersections. To be considered for audible signals, the location must:

- Be suitable to the installation of audible signals (safety, noise level, and neighborhood acceptance).
- Have a need, demonstrated through a user request.

Audible signals should be activated by a pedestrian push-button with at least a one second-delay to activate the sound.

Pre-Timed Signal

Pre-timed signals use automatic “phasing” concurrent with parallel vehicle traffic, as opposed to actuated signals, where pedestrians push an activation button to trigger the walk signal.

Leading Pedestrian Interval (LPI)

At intersections where there are conflicts between turning vehicles and pedestrians, pedestrians are given a “walk” designation a few seconds before the associated green phase for the intersection.

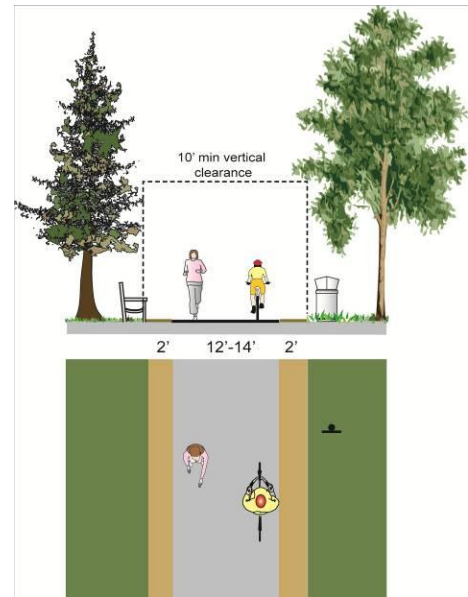
Guidance

- United States Access Board. (2007). *Public Rights-of-Way Accessibility Guidelines (PROWAG)*. MUTCD

5. Shared-Use Path Design Guidelines

Design Summary

- Width:
 - Minimum for a two-way shared-use path (only recommended for low traffic situations): 10' , 8' in constrained situations
 - Minimum for one-way shared-use path: 6'
 - Recommended for high-use areas with multiple users such as joggers, bicyclists, rollerbladers and pedestrians: 12' or greater
- Lateral clearance: 2' or greater shoulder on both sides.
- Overhead clearance: 8' minimum, 10' recommended.
- Maximum design speed for shared-use paths: 20 mph. Speed bumps or other surface irregularities should not be used to slow bicycles.
- Grade:
 - Recommended maximum: 5%
 - Steeper grades can be tolerated for a maximum of 500 feet



Recommended multi-use path design.

Discussion

A hard surface should be used for shared-use paths. Concrete, while more expensive than asphalt, is the hardest of all shared-use path surfaces and lasts the longest. However, joggers and runners prefer surfaces such as asphalt or decomposed granite due to its relative “softness”. While most asphalt is black, dyes (such as reddish pigments) can be added to increase the aesthetic value of the path itself.

When concrete is used the path should be designed and installed using the narrowest possible expansion joints to minimize the amount of ‘bumping’ cyclists experience on the path.

Guidance

- U.S. Access Board, Public Rights-of-Way Accessibility Guidelines (PROWAG).
- FHWA. Designing Sidewalks and Trails for Access.



Multi-use paths should provide sufficient width to accommodate a variety of users.

5. Shared-Use Path Design Guidelines

5.1 Shared-Use Paths Along Roadways (Side Paths)

Design Summary

- Shared-use paths should **not** be considered a substitute for street improvements
- Shared-use paths may be considered along roadways under the following conditions:
 - The path will generally be separated from all motor vehicle traffic.
 - Bicycle/pedestrian use is anticipated to be high.
 - To provide continuity with an existing path through a roadway corridor.
 - The path can be terminated onto streets with good bicycle and pedestrian facilities or onto another well-designed path.
 - There is adequate access to local cross-streets and other facilities along the route.
- Minimum 5' separation between the edge of the shoulder and the path.



Example of a substandard side path

Discussion

Also known as “sidepaths”, these facilities create a situation where a portion of the bicycle traffic rides against the normal flow of motor vehicle traffic and can result in wrong-way riding where cyclists enter or leave the path. This can create an unsafe situation where motorists entering or crossing the roadway do not notice bicyclists coming from their right, as they are not expecting traffic from that direction. Stopped cross-street motor vehicle traffic or vehicles exiting side streets or driveways may frequently block path crossings. Bicyclists coming from the left may also be unnoticed, particularly if sight distances are poor.

As bicyclists gain experience and realize some of the advantages of riding on the roadway, some riders stop using paths adjacent to roadways. Bicyclists may also tend to prefer the roadway as pedestrian traffic on the shared-use path increases due to its location next to an urban roadway. When designing a bikeway network, the presence of a nearby or parallel path should not be used as a reason to not provide adequate shoulder or bike lane width on the roadway, as the on-street bicycle facility will generally be superior to the “sidepath” for experienced cyclists and those who are cycling for transportation purposes. Bike lanes should be provided as an alternate (more transportation-oriented) facility whenever possible.

Guidance

- AASHTO Guide for the Development of Bicycle Facilities

5. Shared-Use Path Design Guidelines

5.2 Path/Roadway Crossings

Design Summary

- Type 1: Marked/Unsignalized Unprotected crossings include path crossings of residential, collector, and sometimes major arterial streets or railroad tracks.
- Type 1+: Marked/Enhanced - Unsignalized intersections can provide additional visibility with flashing beacons and other treatments.
- Type 2: Route Users to Existing Signalized Intersection - Shared-use paths that emerge near existing intersections may be routed to these locations, provided that sufficient protection is provided at the existing intersection.
- Type 3: Signalized/Controlled - Shared-use path crossings that require signals or other control measures due to traffic volumes, speeds, and path usage.
- Type 4: Grade-separated crossings - Bridges or under-crossings provide the maximum level of safety but also generally are the most expensive and have right-of-way, maintenance, and other public safety considerations.



An offset crossing forces pedestrians to turn and face the traffic they are about to cross.

Discussion

While at-grade crossings create a potentially high level of conflict between path users and motorists, well-designed crossings have not historically posed a safety problem for path users. This is evidenced by the thousands of successful paths around the United States with at-grade crossings. In most cases, at-grade path crossings can be properly designed to a reasonable degree of safety and can meet existing traffic and safety standards.

Evaluation of path crossings involves analysis of vehicular and anticipated path user traffic patterns, including:

- Vehicle speeds.
- Street width.
- Sight distance.
- Traffic volumes (average daily traffic and peak hour traffic).
- Path user profile (age distribution, destinations served).

Crossing features for all roadways include warning signs both for vehicles and path users.

Consideration must be given for adequate warning distance based on vehicle speeds and line of sight, with visibility of any signing absolutely critical. Catching the attention of motorists jaded to roadway signs may require additional alerting devices such as a flashing light, roadway striping or changes in pavement texture. Signing for path users must include a “STOP” sign and pavement marking, sometimes combined with other features such as bollards.

Guidance

- Federal Highway Administration (FHWA), Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations.