2 Best Practices

This chapter discusses pedestrian and bicycle issues encountered in urban areas and information on the types of measures that can be implemented to address them. The subsequent six chapters describe specific pedestrian and bicycle issues for each of the urban centers evaluated in this study and the recommended actions for addressing them. The estimated capital costs of these measures are included in this chapter, as well as potential sources of funding.

This chapter is strongly informed by *Bicycle and Pedestrian Improvements in Town Centers* (Boston Region MPO, May 2007), mentioned in Chapter 1. A major source of information for both that study and this one is MassDOT Highway Division's *Project Development and Design Guide* (January 2006). This *Design Guide* provides a framework for incorporating context-sensitive design for all transportation modes, from trucks to pedestrians.

The main source of information for general costs of materials and treatments is *Weighted Average Bid Prices from Highway and Bridge Projects*, which MassDOT Highway Division produces annually.

The four E's—engineering, education, enforcement, and encouragement—are a description of ways to address bicycling and pedestrian issues. While this report is concerned primarily with engineering and design issues, the others issues are also important.

Walking and bicycling are very healthy for individuals and therefore should be encouraged. The laws that protect people who are walking and bicycling need to be enforced. Likewise, pedestrians and bicyclists need to follow the law. And all road users need to be educated and reminded that following the rules does not guarantee safety. Many pedestrians, for example, are hit while lawfully crossing a road in a crosswalk. Pedestrians need to be certain that oncoming motorists see them and yield to them before crossing.

Traveling on the roads without the surrounding armor of a motor vehicle makes bicyclists very vulnerable to injury in a collision. Unsafe bicycling habits include riding against motor vehicle traffic, going through stop signs and red lights, and passing too closely. Some bicyclists, including children, were observed disobeying traffic laws in the urban centers evaluated for this study. It is especially important for children to be educated about how to ride safely on and off the roads. Parents need to model safe bicycling and pedestrian behavior to their children. Educating children about safe walking and bicycling is one component of the Commonwealth's Safe Routes to School program, described later in this chapter.

2.1 PEDESTRIAN ENVIRONMENT

We can divide walking areas into two major categories: shared use paths, or trails, and facilities that are integrated into the roadway system. The former are separated from motor vehicles everywhere except at intersections. The only trail system discussed in this report is in Weymouth. The bulk of this study deals with walking within the street system. The major physical components of the walking environment are sidewalks, crosswalks, and the connections between them—curb ramps. Other important items are street furniture, buffers between sidewalks and roadways, and signage.

A comprehensive pedestrian network provides safe, convenient, and pleasant access to places pedestrians want to go. Sidewalks should be located strategically to connect centers of activity, including residential and commercial areas, schools, libraries, places of worship, and recreation areas. A well-maintained, attractive sidewalk designed to meet safety standards can reduce crashes, as well as encourage more people to walk.

The *sidewalks* discussed in this study are made of concrete, brick, or asphalt. Brick and concrete are found more often in urban areas than in suburban and rural areas. These materials wear differently over time, and the installation and maintenance costs vary considerably. While cost and durability are major factors in deciding which treatment to employ, connectivity, character, aesthetics, and accessibility for persons with disabilities are also important. Table 2-1 indicates the median bid prices for items related to the pedestrian environment.

As are our roads, so are sidewalks subject to the vicissitudes of New England winters. Freezing and thawing can cause cracking and buckling of a sidewalk's surface. The roots of nearby trees can push upward on a sidewalk, creating bumps and cracks. General wear over time causes deterioration of the surface. All sidewalk surface materials require periodic maintenance, some more frequently than others. The condition of sidewalk surfaces is discussed in each chapter devoted to a municipality.

A six-foot width allows two pedestrians to walk side by side comfortably. Sidewalks should be at least five feet wide to allow pedestrians to pass one another. Likewise the Massachusetts Architectural Access Board requires a five-foot width for the passage of two wheelchairs.[1] A three-foot width is considered acceptable in order to bypass obstructions. If there is no buffer between the roadway and the sidewalk, a six-foot width is desirable in residential areas, eight feet in commercial areas.

Curb ramps connect sidewalks to intersecting roadways or driveways, providing a smooth pedestrian transition. Curb ramps make sidewalks accessible for those with limited mobility, as well as for people pushing strollers. Curb ramps should be at least three feet wide, preferably four.

Every street crossing needs an exclusive curb ramp. In many instances in the urban centers in this study, a shared curb ramp is installed at the corner of an intersection. Crosswalks are then

[1] Commonwealth of Massachusetts Regulations: 521 CMR Section 6.2.

TABLE 2-1

MassHighway Weighted Bid Prices, All Districts, Pedestrian Environment, 9/07-9/08

http://www.mhd.state.ma.us/PE/WeightedAverageBook.aspx

Surface Treatments	**Recommendation**	**Item Number**	**Median Average Bid**
Sidewalks Surface Treatment	Cement Concrete Sidewalk	701.	$50/sq. yd.
	Cement Concrete Sidewalk at Driveways	701.1	$60/sq. yd.
	Cement Concrete Wheelchair Ramp	701.2	$78/sq. yd.
	Brick Walk	706.	$170/sq. yd.
	Hot Mix Asphalt Walk Surface	702.	$135/ton
Curb Cut Ramps	Granite Transition Curb for Wheelchair Ramp - Straight	509.	$38/ft.
	Granite Transition Curb for Wheelchair Ramp - Curved	509.1	$43/ft.
	Cement Concrete Wheelchair Ramp	701.2	$78/sq. yd.
Curbs	Granite Curb	501. to 506.1	$32 to $52/sq. ft.
	Granite Transition Curb for Wheelchair Ramp - Straight	509.	$38/ft.
	Granite Transition Curb for Wheelchair Ramp - Curved	509.1	$43/ft.
	Concrete Curb	520.	$24/ft.
	Hot Mix Asphalt Curb	570. to 572.3	$5 to $10/ft. or $182.50 to $225.00/ton
Buffers	Brick Walk	706.	$170/sq. yd.
	Loam Borrow	751.	$40/cu. yd.
	Topsoil Rehandled and Spread	752.	$20/cu. yd.
	Impervious Soil Borrow	760.	$35/ cu. yd.
	Seeding	765.	$1.60/sq. yd.
	Lawn Sodding	770.	$10/sq. yd.
	Plantings (Trees, Shrubs, Bushes)	772.058 to 796.853	$30 to $1,035/each
Street Furniture	Park Bench	707.1	$1810/each
	Plantings (Trees, Shrubs, Bushes)	772.058 to 796.853	$30 to $1035/each
	Area Lighting Luminare 400Watt	823.17	$10,000/lump sum
Crosswalk Markings	Cross Walks and Stop Lines Reflectorized White (painted)	865.	$2.25/sq. ft.
	Cross Walks and Stop Lines Reflectorized White (thermoplastic)	865.1	$1.50/sq. ft.
Signage	*Pedestrian Traffic, School, State Law Yield to Peds*		
	Demountable Reflectorized Reference Location Sign	834.	$34.50/each
	Removed and Reset	734.	$200/each
	Traffic Sign Removed and Stored	874.4	$40/each
Stop Lines	Cross Walks and Stop Lines Reflectorized White (painted)	865.	$2.25/sq. ft.
	Cross Walks and Stop Lines Reflectorized White (thermoplastic)	865.1	$1.50/sq. ft.
Signalized Pedestrian Crosswalks	Traffic Control Signal	815.	$122,000/lump sum

marked to connect to such shared curb ramps, resulting in longer crossing distances for pedestrians. All such shared curb ramps should be replaced with exclusive ones.

Sidewalks with asphalt surfaces often slope down to the level of intersecting roadways and driveways. This requires pedestrians to go down when crossing the road or driveway and then back up again. There is also a psychological message established: you are now entering the domain of the motor vehicle. The corresponding message goes to the drivers, that this crossing is their territory, albeit a shared one.

An alternative to constructing curb ramps is to increase the height of the intersecting roadway or driveway to the height of the sidewalk. This not only eliminates the need to go down and up, but also reinforces that this is the realm of the pedestrian, and that motorists have permission to cross when there are no conflicts. Most of the sidewalks evaluated for this study have either curb ramps or sloping asphalt at intersecting roadways and driveways.

Curbs between a sidewalk and a roadway improve pedestrians' perceived and real safety, forming a physical barrier from traffic. Curbs also help deter motorists from parking on sidewalks and channel roadway water runoff. Curbs are made of granite, concrete, or asphalt.

Curb extensions are an extension from the curb line of the sidewalk at crosswalks. A curb extension shortens the crossing distance for a pedestrian, thereby decreasing the time of exposure to traffic and the time required to cross. The extension also allows motorists and pedestrians to be more visible to each other. Curb extensions also preclude motorists from parking too closely to intersections and decreasing sight distance on cross streets. The space made available by the curb extension can be used for such items as plantings, fire hydrants, or benches.[2]

Buffers between the sidewalk and the roadway increase the distance between the walking area and moving traffic. For pedestrians, this creates a sense of security and a more pleasant environment. Buffers that are landscaped with grass, brick, or plants, including trees, further enhance the walking experience, as well as that of drivers. There are buffers along some of the sidewalks in each of the urban centers evaluated in this study.

It is important to keep sidewalks clear for safe passage. In many cases, it is the responsibility of owners to clear the sidewalks that front their property. In the winter, snow and ice can make sidewalks hazardous, or even impassable. People clearing roads and driveways sometimes plow extra material onto sidewalks. Throughout the year, but especially in late winter and early spring, sand and debris collect on sidewalks. The accumulation of leaves, most common in autumn, can be a hazard, especially when they are wet and slippery.

Street furniture items such as benches offer a welcome respite to many, from parents with young children to the elderly. Benches under shade trees are wonderful respites from the summer heat. After dark, lighting not only allows pedestrians to see where they are going and motorists to see pedestrians, but also provides a sense of security. If street furniture needs to be located in places where it partially obstructs the sidewalk, then it should not reduce the width to less than three feet.

[2] *Design Guide*, p. 16-29.

Crosswalks connect sidewalk segments across roadways and sometimes across driveways. A well-designed crosswalk includes a highly visible treatment in the roadway, usually consisting of a painted pattern or inlaid brick, curb ramps on both sides, and sometimes signs to alert motorists. Crosswalks should be installed at intersections and at other locations where it is safe and desirable for pedestrians to cross a roadway or a driveway. They should be strategically placed where pedestrians make connections to high-traffic destinations.

There are several treatments that make crosswalks more visible to pedestrians and motorists. MassDOT Highway Division allows three crosswalk-marking patterns: ladder-style (the agency's preferred option), parallel-bar-style, and zebra-style. These patterns are shown in Figure 2-1. Many crosswalks evaluated in this study are a modified parallel-bar-style. In many cases, those crosswalks are accented by a solid painted color (yellow or green), or inlaid bricks, between two parallel white lines.

The condition of the crosswalk markings in this study varies widely. Some crosswalks had recently been repainted and were highly visible, but others were very faded. Generally, municipal staff members repaint crosswalks annually, usually in the spring. Crosswalks therefore get increasingly less visible through the fall and into the winter. The lack of visibility in winter is compounded by the accumulation of sand and other materials on roadways.

Signs are often installed near crosswalks to warn motorists of the possible presence of pedestrians. Several types of signs were observed in the Urban Centers study areas: pedestrian-traffic, school, and state-law-yield-to-pedestrians signs, with or without an indication of a fine for not yielding. Yield-to-pedestrian signs on movable posts are often placed in, or adjacent to, the roadway, particularly at crosswalks near schools.

Medians or crossing islands provide a refuge for pedestrians. Pedestrians can cross one half of a roadway and wait for an opening to cross the other side. Medians also can help slow down motor vehicles. These islands need to be at least six feet wide. Fifty feet is considered the longest acceptable length for an uninterrupted crosswalk, but medians can be used for much shorter crossings.[3]

Stop lines, indicating where vehicles should stop at a stop sign or traffic signal, should be positioned at least four feet before the crosswalk.[4] Stop lines remind motorists to look for pedestrian traffic. They are also very important to pedestrians. By stopping well before the crosswalk, motorists indicate to the pedestrians that they are seen.

This is even more critical on multilane roads. If a motorist in the lane closest to the sidewalk stops well before the crosswalk, a motorist coming up in an adjacent lane has more time to see the pedestrian in the crosswalk, and respond. Likewise, the pedestrian has more time to react to the motorists in the adjacent lane.

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[3] Ibid., p. 6-63.
[4] Ibid., p. 6-61.

Figure 2-1
Various Crosswalk Designs in the Urban Centers

Parallel Bars with Inlaid Brick
Harvard and Brighton Avenues, Allston

Ladder Style with Parallel Bars
Harvard and Linden Streets, Brookline

Ladder Style with Parallel Bars
Concord and Clinton Streets, Framingham

Parallel Bars, Solid Green Infill
Jackson Square, Weymouth

Zebra Style
Beacon Street off-ramp, Tobin Bridge, Chelsea

Parallel Bars
Alpine Place, Franklin

Signals allowing pedestrians to cross are typically integrated into traffic signals located at intersections. Sometimes separate pedestrian signals are placed where there is significant pedestrian traffic or where it may be unsafe to cross while automobile traffic is moving. At intersections, these signals provide either an exclusive pedestrian phase, when only pedestrians are allowed to traverse the intersection, or a concurrent pedestrian phase, when pedestrians cross a crosswalk while motor vehicle traffic is allowed to move in a parallel direction. A concurrent phase decreases the time pedestrians have to wait to cross. A variant on this is a leading pedestrian interval that allows pedestrians to begin crossing before the traffic light turns green for the parallel-moving motorists. This increases the visibility of pedestrians and helps prevent motorists from making turns ahead of the pedestrians, resulting in, at best, delays, and at worst, crashes.[5]

The pedestrian phase of a signalized crosswalk consists of a walk signal, which indicates when pedestrians may enter the crosswalk, and a flashing don't-walk signal, which indicates that pedestrians already in the crosswalk may continue to the other side of the roadway, but pedestrians not yet in the crosswalk should not begin to cross. The pedestrian phase should be long enough for a pedestrian walking at a speed of 3.5 feet per second to cross to the other side.[6]

Countdown signals indicate how much time remains to complete the crossing. They allow pedestrians to make a more informed decision as to whether to initiate a crossing or not. They are particularly recommended where crossing time is limited or where there have been signal-related crashes.[7] One study in San Francisco reported that countdown signals were associated with a 53 percent decrease in pedestrian injuries. In addition, 92 percent of those interviewed preferred them to traditional signals.[8]

The time allotted to pedestrians was measured for the 25 signalized crossings in this study. The time was called adequate if there was enough from the beginning of the "Walk" phase to the end of the flashing "Don't Walk" phase. It would be more conservative, however, to measure the walk time from the end of the "Walk" phase to the end of the "Don't Walk" phase, as pedestrians are allowed to begin crossing up until the "Don't Walk" phase begins. Municipal staff are urged to adjust the timing on signals so that the "Don't Walk" phase allows enough time to cross.

In addition to good accommodations, the pedestrian environment is greatly affected by the *speed of motor vehicles* on adjacent roadways. Slower-moving motorists are less likely to hit a pedestrian and, if there is a collision, less likely to inflict serious injury. As indicated in Table 2-2, in a crash, the speed of the motor vehicle largely determines the fate of the pedestrian. A pedestrian's chance of survival in a crash goes from 95 percent when the motorist is traveling at 20 miles per hour to 55 percent when the motorist is traveling at 30 miles per hour, only 10 miles per hour faster.

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[5] Ibid., p. 6-20.
[6] The *Manual on Uniform Traffic Control Devices* changed the walking speed from 4.0 to 3.5 feet per second in January 2010.
[7] Ibid., p. 6-21.
[8] F. Markowitz, S. Sciortino, "Pedestrian Countdown Signals: Experience with an Extensive Pilot Evaluation," *ITE Journal,* 76, No. 1, 2006, as reported in *Pedestrian Safety, Report to Congress*, FHWA, August 2008, p. 13.

TABLE 2-2
Effect of Impact Speed of Motor Vehicle on Fatality and Injury Rates of Pedestrians[9]

	Speed of Motor Vehicle			
Probability of:	**20 mph**	**30 mph**	**40 mph**	**50 mph**
Death	5%	45%	85%	100%
Injury	65%	50%	15%	-
No Injury	30%	5%	-	-

There are many recommendations in this report to reduce the *width of travel lanes*. The reduced widths not only slow down motorists but also make more of the roadway width available to bicyclists. A travel lane width of 10 feet is considered appropriate when the intent is to calm traffic. Wider travel lanes are necessary on roadways with a large number of trucks or buses, and on arterials.[10]

Right-turn (auxiliary) lanes are generally not recommended in areas where the emphasis is on accommodating pedestrians. The extra pavement width for the right-turning traffic requires pedestrians to walk a longer distance to cross the street, and there is an increased potential for conflicts between pedestrians and motorists. *Left-turn lanes* should also be used sparingly. The slowing of traffic due to waiting for left-turning vehicles can have a positive effect in areas of high pedestrian activity. Removing on-street parking from both sides at an intersection can accommodate left-turn lanes where they are needed.[11]

2.2 BICYCLE ENVIRONMENT

Other than the Back River Trail discussed in the Weymouth chapter (Chapter 8), the focus on bicycling in this study is on accommodating that mode within the roadway system. In general, given the rarity of rights-of-way available for trails, almost all bicycling in our region, in the Commonwealth, and in our country, is on the roadway system. Costs of items associated with bicycling on the roadway system are shown in Table 2-3.

While many factors affect how safe and welcome a bicyclist feels on a road, the *roadway width* is perhaps the main factor. The width of available space determines whether there is room for a bicycle lane or a shoulder or whether bicyclists need to share lanes with motor vehicles.

Bumps, cracks, and potholes are a nuisance to motorists, sometimes resulting in damage to their vehicles. These nuisances can be much more dangerous to bicyclists, possibly causing falls or last-minute swerves into motor vehicles. Unfortunately, bumps and cracks occur more often near the edge of a roadway, where bicyclists travel. This is why this study assessed the *condition of the roadway surface,* particularly near the edge, because it is a major factor in bicyclist safety and comfort.

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[9] US DOT, Leaf WA, Preusser DF, 1999.
[10] *Design Guide*, p. 16-19.
[11] Ibid., p. 16-21.

TABLE 2-3

MassHighway Weighted Bid Prices, All Districts, Bicycle Environment, 9/07-9/08

www.mhd.state.ma.us/PE/WeightedAverageBook.aspx

Surface Treatments	Recommendation	Item Number	Median Average Bid
On-Street Bicycling			
Roadway Surface	Hot Mix Asphalt	460.	$82/ton
Shoulders	Hot Mix Asphalt	460.	$82/ton
	Drainage Grates	222. to 222.2	$500 to $600/each
Bicycle Lanes	6" Reflectorized White Line (painted)	860.06	$0.45/ft.
Signage	*Bicycle Traffic, Bike Lane Ahead, Bike Lane Ends, Share the Road*		
	Demountable Reflectorized Reference Location Sign	834.	$34.50/each
	Traffic Sign Removed and Reset	734.	$200/each
	Traffic Sign Removed and Stored	874.4	$40/each
Bicycle Parking	Bicycle Rack	707.9	$1,000/each

Paved shoulders provide space for bicycling outside of the travel lane. Shoulders that are at least four feet wide can fully accommodate bicyclists, but even narrower shoulders provide some space for bicyclists. Shoulders should be kept free of debris (sand, gravel, and refuse) so as not to obstruct bicyclists. Drainage grates that are set back from the roadway so that bicyclists do not have to ride over them make for a smoother, safer bicycle ride.

Bicycle lanes are delineated by a six-inch wide solid stripe and symbols on the pavement. Bicycle lane markings increase a bicyclist's confidence that motorists will not stray into their path of travel. Likewise, passing motorists know that this space is for bicyclists. When there is no delineation, some motorists overcompensate for bicyclists and swerve left out of their own travel lane. Bicycle lanes should be at least four feet wide, but five feet is preferred in most situations.[12] Many of the roadways in the urban centers evaluated in this study are not wide enough to accommodate bicycle lanes. Bicycle lanes need to be wider when they are adjacent to parking lanes (see further discussion below).

On-street parking may constitute a hazard for bicyclists. Both motorists and bicyclists must be alert. Bicyclists should ride outside the reach of an opened car door to avoid a collision. Likewise, motorists wishing to exit their parked vehicle should look behind them for bicyclists before opening the door. Bicyclists should reduce their speed and ride to the left of parked cars in a straight, predictable line. Bicycle lanes and shoulder lines between on-street parking and travel lanes guide bicyclists to a safe location on the roadway. They also remind motorists to be alert for passing bicyclists.

[12] Ibid., p. 5-6.

An on-street configuration that is safer for bicyclists is *back-in diagonal parking*. This is similar to traditional angle parking except instead of driving into the parking spot, the motorist backs in. Because the parking is angled away from the curb, the maneuver is less difficult than parallel parking. A major reason for this being an improvement is that bicyclists have a much better view of the drivers wishing to exit, and vice versa. With head-in diagonal parking, the motorist is looking through the vehicle and around any adjacent parked vehicles. Likewise, the bicyclist cannot see if anyone is in the vehicle until passing it.

Back-in parking is also better than head-in for motorists and their occupants. First, the car doors open facing the sidewalk, blocking access to the roadway, the opposite of head-in parking. This is especially important with children in the car, who might suddenly run in the direction of the opened door. Second, the trunk or storage area of the vehicle is on the sidewalk side, not the street side.

Diagonal parking also has benefits over parallel parking. As noted above, it is easier to back into a diagonal parking spot than a parallel one. Also, no car doors have to be opened into traffic. This latter reason is the most important one for bicyclists. When traveling alongside parallel-parked cars, bicyclists have to be constantly on the alert for a door suddenly opening in front of them.

The width required for diagonal parking varies, depending primarily on the angle of the parking. The City of Vancouver, Washington, allows 12 feet for parking at 45 degrees from the curb.[13] Less width is required as the parking angle approaches zero degrees, or parallel to the curb. More width is required as the angle approaches 90 degrees, perpendicular to the curb (the configuration in most parking garages).

Bicycle-route signs are used to mark a suggested route for bicyclists. The only long-distance bicycle route in Massachusetts is the Claire Saltonstall Bikeway, between Boston and Cape Cod. *Share-the-road signs* are used when there is not enough width to create bicycle lanes or shoulders. These signs remind motorists to be on the alert for bicyclists sharing the roadway. None of the urban centers evaluated in this study have bicycle-route or share-the-road signs. MassDOT Highway Division sometimes installs these signs along state highways if several criteria are met. For more information, see MassDOT Highway Division's Bicycle Route and Share the Road Signing Policy (Policy Directive P-98-003, August 25, 1998).

Bicyclists need safe, convenient places to store their bicycles at a destination. *Bicycle racks* should be located at important activity centers, such as town halls, libraries, post offices, schools, commercial areas, recreational facilities, and transit stations. They should be located near the main entrance to these facilities, and should be highly visible, not only so that bicyclists can easily find them and but also to discourage theft and vandalism. Where possible, racks should be positioned so that bicycles are protected from precipitation.

The MPO's Bike Rack Program, described later in this chapter, provides some reimbursement for bicycle racks. The guidelines recommend that bicycle racks: support the bicycle frame in two

[13] Back-in/Head-out Angle Parking, Nelson\Nygaard Consulting Associates, January 2005.

locations, enabling the frame and one or both wheels to be secured; allow both front-in and back-in parking; and be compatible with today's bicycle frames and locks.

Among racks that meet the above guidelines are the inverted-U, the *A* (an inverted-U with a horizontal bar), and the post-and-loop (also known as *bike hitch*). Each of these racks supports two bicycles. Many manufacturers produce these or similar styles. These racks are often arranged in a row; the spacing between the racks should be a minimum of 30 inches (on centers), but preferably 36 to 42 inches.

2.3 SOURCES OF FUNDING

The following state programs are potential sources of funding for the improvements to pedestrian and bicycle networks recommended in this study. Many of these programs in turn receive funds from the federal government.

Some municipal transportation projects are funded through the Commonwealth's Chapter 90 program. These funds, distributed by MassDOT Highway Division, may be used for many types of transportation projects, including roadway resurfacing, sidewalk construction, the installation of street lighting, and the construction and maintenance of trails. Municipalities pay for the projects they choose to undertake and are reimbursed for eligible expenditures.

In state fiscal year (SFY) 2009, MassDOT Highway Division allocated $150 million in Chapter 90 funds to municipalities. Funding is made available annually based on a municipality's population, employment, and number of miles of local roadways. For more information on the Chapter 90 program, visit www.massdot.state.ma.us.

Since federal fiscal year (FFY) 2007, the Regional Bike Parking Program reimbursed municipalities in the Boston region for the purchase of bicycle racks. The program, administered by the Metropolitan Area Planning Council (MAPC) and funded by the Boston Region MPO, MassDOT, and the Federal Highway Administration (FHWA), had three participating vendors that provided a variety of styles of bicycle racks and other related products. Municipalities paid up front for their purchases and then were reimbursed. The cost of shipping and installation were the responsibility of the municipality. In FFY 2010, the program was incorporated into the MPO's Clean Air and Mobility Program. Bike parking infrastructure projects are eligible under the new program, and the same guidelines apply. For further information, go to www.bostonmpo.org.

The Commonwealth's Transit-Oriented Development (TOD) Infrastructure and Housing Program (also known as the TOD Bond Program) was created to increase the supply of compact, mixed-use, walkable development close to transit stations. The program provides financial assistance for the construction of pedestrian improvements, bicycle facilities, housing projects, and parking facilities within a quarter mile of a commuter rail station, subway station, bus or bus rapid transit station or stop, or a ferry terminal. The program also funds the preliminary design of pedestrian and bicycle facility projects near transit stations.

In SFY 2006, $7 million was awarded to four projects. In SFY 2007, $6 million was awarded to 16 projects. No awards were given in SFY 2008, and awards are still pending for SFY 2009. All public entities, including municipal governments, are eligible for the program.

Massachusetts' Safe Routes to School (SRTS) program aims to improve walking and bicycling conditions for children traveling to school in the commonwealth. Elementary schools that are partnered with the program help implement education programs, activities to encourage bicycling and walking, traffic enforcement, and engineering solutions.

Mass*RIDES* administers the program for MassDOT. The SRTS Manual has been sent to all elementary school principals in Massachusetts. The program is funded by the FHWA, which allocated over $2.7 million in SFY 2008 to Massachusetts for its SRTS program. Massachusetts is projected to receive over $3.4 million in SFY 2009. For more information, visit www.commute.com.

The Commonwealth's Public Works Economic Development (PWED) program, administered by MassDOT, assists municipalities in funding transportation infrastructure projects that stimulate economic development. The program supports transportation projects that are consistent with the Commonwealth's Sustainable Development Principles. For more information, visit www.massdot.state.ma.us.