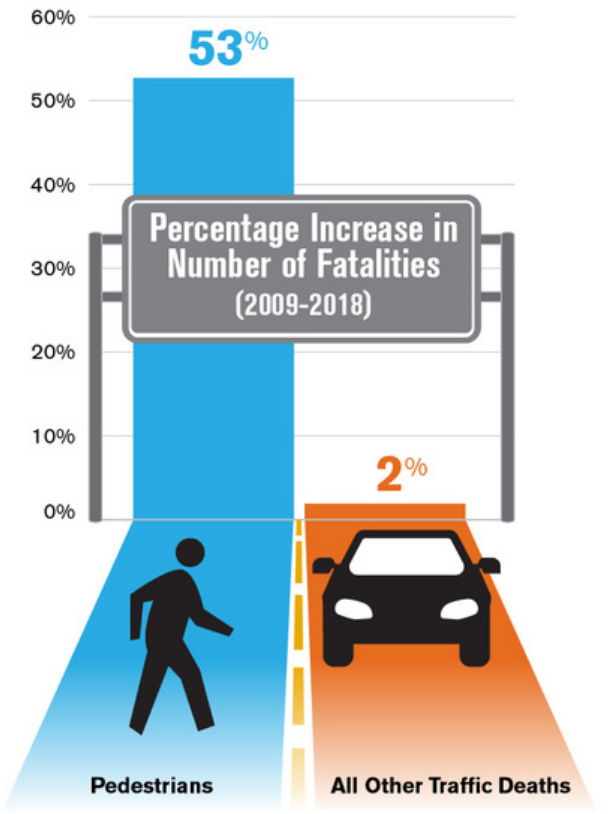
CONNECTICUT DEPARTMENT OF TRANSPORTATION

COMPREHENSIVE PEDESTRIAN SAFETY STRATEGY

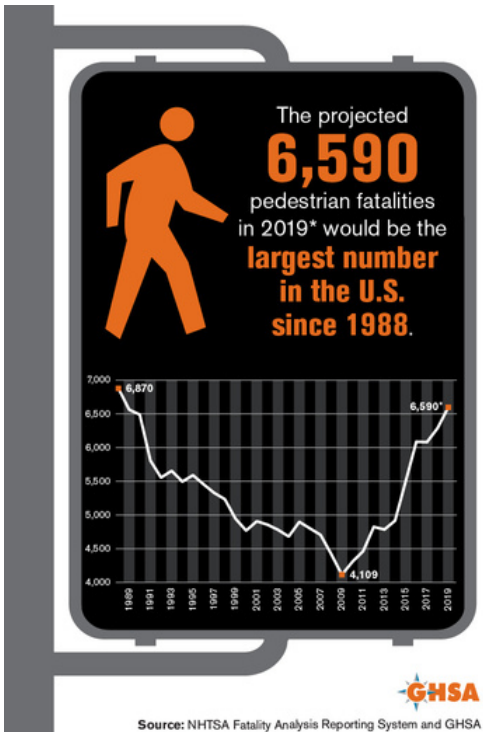
JANUARY 2021

A PATH FORWARD

After a decade of steady progress developing strong pedestrian policies and building a more pedestrian-friendly transportation infrastructure, the Connecticut Department of Transportation (CTDOT) is shifting its focus to put ***more emphasis on pedestrian safety.*** The shift is a response to the rising risks posed to pedestrians from traffic crashes.



Source: NHTSA Fatality Analysis Reporting System



Source: NHTSA Fatality Analysis Reporting System and GHSA

Nationally, pedestrian fatalities are increasing faster than any other type of traffic fatality.

Since 2009 the number of pedestrian deaths increased by 53%, while all other traffic fatalities increased only 2%. Total pedestrian deaths nationwide increased from a low of 4,109 in 2009 to 6,590 in 2019. [1]

[1] Pedestrian Traffic Fatalities by State: 2019 Preliminary Data, https://www.ghsa.org/resources/Pedestrians20, Final 2019 data was not yet available as of Nov. 2020.

The 53% increase in pedestrian deaths is a dramatic reversal from historic downward trends over the three decades prior to 2009. While there are many factors that may be contributing to the increase in pedestrian deaths, some significant factors include:

MORE PEDESTRIANS

An increasing number of people are choosing to walk and be active outside, increasing the number of pedestrians on the streets.

MORE TRAFFIC

An increasing volume of traffic on the roads, increasing the potential for pedestrian collisions.

LARGER VEHICLES

An increased percent of vehicles on the roads are large SUVs and pick-up trucks that can inflict more serious injuries to pedestrians.

MORE DISTRACTIONS

An increased use of smart phones, increasing the potential for distractions.

MORE DRUGS & ALCOHOL

An increased incidence of impaired driving and walking.

MAJOR ELEMENTS

CTDOT includes safety features in pedestrian construction projects, programs, and other roadway projects when a need is identified. A new safety strategy will build pedestrian safety into the design of all projects. The strategy will also examine ways CTDOT should integrate pedestrian safety in the operation and management of its roadways. These operational issues include setting appropriate speed limits and building more traffic[3] calming features into roadways with high concentrations of pedestrians. An enhanced safety strategy CTDOT is developing is built around these four major elements:

SPEED

Managing Speed for Pedestrian Safety

CROSSWALKS, INTERSECTIONS, & STREETS

Managing Crosswalks, Intersections, and Streets for Pedestrian Safety

PUBLIC AWARENESS, EDUCATION, & TRAINING

Public Awareness, Education, and Training for Pedestrian Safety

INTEGRATED SAFETY PROGRAM

Integrating Pedestrian Safety into the Broader Roadway Safety Program

[3] Traffic calming consists of physical design and other measures put in place on existing roads to reduce vehicle speeds and improve safety for pedestrians and cyclists. See USDOT website discussion on Traffic Calming to Slow Vehicle Speeds (https://www.transportation.gov/mission/health/Traffic-Calming-to-Slow-Vehicle-Speeds).

1. SPEED

Pedestrians are particularly vulnerable to injury in any collision with a motor vehicle, especially at high speeds. **Managing speed is essential for reducing the number of pedestrian fatalities and serious injuries.**

Why Pedestrians Are So Vulnerable to Speed

Speed contributes to vulnerability:

- As vehicle speed increases, the risk or likelihood that a vehicle-pedestrian collision will occur also increases
- As speed increases, the risk of a pedestrian receiving a serious (incapacitating) or fatal injury increases significantly

Motor vehicles are designed with multiple safety features and protections, such as seat belts and air bags, which reduce the risk of serious injury or death to vehicle occupants. Unlike drivers and passengers, pedestrians have no such protections and are directly subjected to the impact of a force from a much heavier object traveling at a much higher rate of speed. Simple physics dictate that an unprotected pedestrian is very likely to be seriously injured. The severity of the injury is largely determined by the speed of the vehicle at the time of impact.[4]

Studies have shown that the risk of serious and/or fatal injuries increases dramatically as speed increases. The risk of a fatal injury to the pedestrian is 1-in-10 (10%) at 20 mph, but increases to 5-in-10 (50%) at 30 mph, and to 9-in-10 (90%) at 40 mph.[5]

The severity of the injury is largely determined by the speed of the vehicle at the time of impact.

HIT BY A VEHICLE TRAVELING AT:

20 MPH

9 out of 10 Pedestrians Survive

HIT BY A VEHICLE TRAVELING AT:

30 MPH

5 out of 10 Pedestrians Survive

HIT BY A VEHICLE TRAVELING AT:

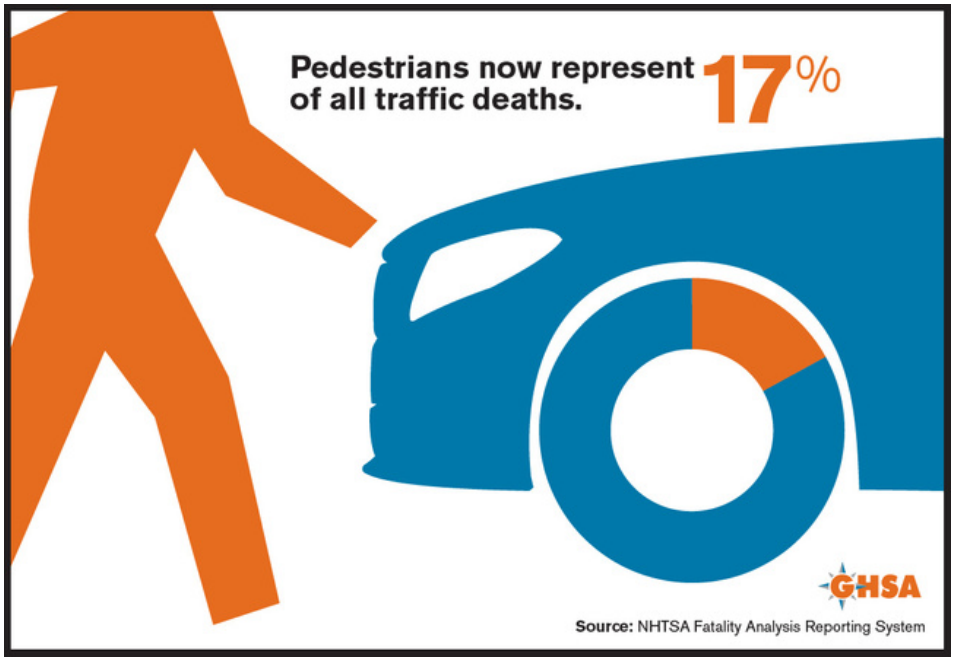
40 MPH

1 out of 10 Pedestrians Survive

[4] Vehicle speed is the primary determinant of severity, but it is also affected by vehicle size and type (car or truck), weight of the vehicle, and height of the vehicle's bumper. Other factors include angle of collision, pedestrian's age, height, and weight. (AAA, '*Impact Speed' and a Pedestrian's Risk of Serious Injury or Death*, 2011)

[5] The Road to Zero: Taking the Safe Systems Approach, ITE Journal, May 2020, https://www.ite.org/pub/?id=8B6264A1-D5A7-1560-D583-D90F54D8DDB9

Pedestrian vulnerability is reflected in national traffic crash data in which pedestrians account for **17% of traffic deaths**, despite the fact they are involved in only **1.2% of crashes.**



Strategy Solutions

In response to the disproportionate impact of speed on pedestrians, CTDOT is proposing a strategy to reduce and better manage traffic speeds in areas with significant pedestrian activity. The strategy includes:

(a) Legislation to allow municipalities to set speed limits on municipally-owned roads

(b) Legislation to allow creation of pedestrian safety zones in community centers

(c) Before and after studies to test the effectiveness of pedestrian safety zones

(d) A speed management training program

(e) A study to identify opportunities to lower traffic speeds on state routes in the center of communities

(a) Local control of speed limits on municipally-owned roads

CTDOT supports legislation to enable municipalities to set speed limits on municipally-owned roads with speeds as low as 25 mph. Most municipalities have a deep knowledge of conditions on their own roadways. Conditions that include the type and volume of traffic, the speed of traffic, the adjacent land uses, the level of pedestrian traffic, and the potential for conflicts between motor vehicles and pedestrians. Enabling municipalities to set their own speed limits will give them the ability to carefully adjust local speed limits to levels suitable for local conditions. A municipality can set a speed limit lower than 25 mph if an engineering study indicates the lower limit is justified.

(b) Pedestrian Safety Zones

CTDOT supports legislation to enable municipalities and CTDOT to establish Pedestrian Safety Zones on their respective roadways where speed limits can be set as low as 20 mph. The purpose of a Pedestrian Safety Zone is to help improve the safety of pedestrians and other vulnerable users in downtown districts and community centers where pedestrians must share the road with motor vehicles. In these specially designated zones, pedestrian safety can be enhanced through the combination of a low speed limit and other speed management treatments such as traffic calming[6] or design elements that improve safety for motorists, pedestrians and cyclists.

Municipalities would be authorized to establish these zones on municipally-owned roads in community centers provided they:

- Conduct an engineering study in accordance with the MUTCD (the Manual on Uniform Traffic Control Devices for Streets and Highways issued by the Federal Highway Administration) and other generally accepted engineering guidance. The study must address all relevant factors such as vehicles speeds and volumes, pedestrian volumes, and the risks of collisions between vehicles and pedestrians.

- Prepare and implement a speed management plan for the zone that includes incorporating or installing traffic calming measures in addition to the lower speed limit.

CTDOT could establish Pedestrian Safety Zones in community centers on state-owned roads provided they follow the same procedures as cited above for municipalities.

(c) Before and after studies to evaluate effectiveness of Pedestrian Safety Zones

CTDOT will conduct before and after studies to evaluate and document the effectiveness of individual pedestrian safety zones. The studies will be used to assess the effectiveness of the overall program and will identify the effectiveness of different traffic calming measures. The data collected as part of the municipality's engineering study will serve as the 'before' conditions. CTDOT will work with the UConn Transportation Safety Research Center (UConn T2 Center) to perform the 'after' study.

[6] All Pedestrian Safety Zones will be posted with appropriate signs, but the one shown here is only an example of the type of sign that might be used.

(d) Speed management plans and training

CTDOT will fund the UConn T2 Center to provide training to municipalities in local speed management and the preparation of speed management plans. (For more information on speed management training visit the *T2 Center's Speed Display/Driver Feedback Sign Program*).

(e) Evaluate opportunities to lower traffic speeds on state roadways in community centers

CTDOT will study how it can reduce the speed of traffic on state routes that pass through community centers. The study will include a sample of 5-10 community centers served by state roadways, in locations where there is a significant amount of pedestrian activity.

In each location, CTDOT will evaluate the option to lower the speed limit to reduce the risk of serious and fatal injuries to pedestrians. CTDOT will also evaluate traffic calming and other speed countermeasures appropriate to state routes and community centers.

The lessons learned from these studies will help identify how the CTDOT can better manage traffic speeds on its roadways to reduce the risk of fatal and serious injuries to pedestrians.

They can be applied to the community centers studied, but also more broadly to other communities throughout the state. It may also guide future changes to CTDOT policies and practices relative to pedestrian safety.

2. CROSSWALKS, INTERSECTIONS, & STREETS

While speed management is essential for pedestrian safety, there are also a variety of roadway design and safety engineering tools that can be effective in making the roadways safer for pedestrians. Specifically, in urban areas are the way we design and regulate our streets, intersections, and crosswalks.

In recent years, CTDOT implemented many projects and introduced new safety engineering initiatives that enhance pedestrian safety. These include everything from road diets (or lane reductions), to intersection reconstructions, to statewide programs to make crosswalks more visible and safer. The proposed pedestrian safety strategy builds on this foundation with a commitment to expand critical safety programs such as upgrading signalized intersections and changing state laws to enhance the visibility at pedestrian crosswalks. The proposed safety engineering component includes these three elements:

(a) Improve crosswalks for pedestrian safety

(b) Upgrade signalized intersections

(c) Implement road diets

(a) Improve crosswalks for pedestrian safety

Crosswalk safety can be improved by changing state laws to redefine when drivers must yield to pedestrians, and by not allowing cars to be parked where they obstruct a driver's view of pedestrians entering a crosswalk.

- **Yield to pedestrians**. CTDOT supports proposed legislation that redefines when drivers must yield to pedestrians in marked or unmarked crosswalks. The proposal requires drivers to yield to pedestrians who have stepped into a crosswalk or who are at the curb and wave to signal their intent to step into the crosswalk.

- **Increase visibility of pedestrians at crosswalks**. CTDOT supports a redrafting of parking restrictions in the vicinity of mid-block crosswalks. The proposal clarifies how far back from a crosswalk that a parked vehicle must be to ensure that a parked car will not block a driver's view of a pedestrian entering a crosswalk.

- **Upgrading crosswalks at unsignalized locations and intersections.** CTDOT has been modifying and upgrading unsignalized intersections for several years to reduce the risks to pedestrians. This is a statewide effort that will continue to focus on making pedestrian crossings more visible and provide advance warning to drivers.

In one such project, all school crossing signs throughout the state were replaced with new high visibility signs with retro-reflectivity and fluorescent yellow-green color.

Additionally, advance warning signs were installed, and pavements were marked for crosswalks and special sawtooth yield lines. The program will continue to address safety at unsignalized crossings through upgrades and innovative solutions such as pairing signs with Rectangular Rapid-Flashing Beacons.

(b) Upgrading signalized intersections

Recently, CTDOT started planning and programming upgrades to many of the signalized intersections on state routes. The new designs greatly enhance pedestrian safety. This reflects a major shift in CTDOT policy that now ensures that pedestrian safety is fully addressed in the design process. The projects include the full complement of pedestrian safety and convenience features in the traffic signal design and hardware. They also include all necessary adjustments to the physical layout of the intersection to safely accommodate pedestrians. These upgrades and new designs represent a major advancement in how pedestrian safety is built into the design of signalized intersections.

- **Traffic signal hardware and timing**. CTDOT is systematically upgrading its traffic signals to be fully compliant with current national standards. The upgrades will integrate the latest technology and incorporate a full complement of features designed to serve and protect pedestrians. These include features like countdown signal heads, both audible and vibrotactile (vibration through touch) walk indications, and signal retiming to provide enough time for pedestrians to cross before traffic starts.

- **Intersection layout for pedestrian safety.** The upgraded traffic signal hardware and timing plans will be complemented by modifying the intersection design or layout to include all the necessary pedestrian features such as crosswalks and sidewalk ramps. Crosswalks will be located to minimize crossing distance and increase the visibility of pedestrians to drivers.

- **Fully accessible and ADA compliant**. Signals and intersections will be designed to current ADA standards.

(a) Road diets

A road diet typically involves converting an existing four-lane, undivided roadway segment to a three-lane segment consisting of two through lanes and a center, two-way left-turn lane. Road diets are an effective traffic calming and pedestrian safety technique that CTDOT began using several years ago. Since being proved effective at early test sites, CTDOT will continue to implement road diets at appropriate locations where the number of traffic lanes can be reduced.

Road diets enhance safety, mobility, and access for all road users. Road diets are a Federal Highway Administration (FHWA) proven safety countermeasure. Some of the benefits for pedestrians include fewer lanes for pedestrians to cross; opportunity to install pedestrian refuge islands; traffic calming measures for more consistent and potentially lower vehicle speeds; and a more community-focused "complete streets" environment. A feasibility assessment for road diets on state roadways is currently ongoing. Over the next year, a feasibility assessment will be initiated to identify potential road diets on municipally-owned roadways.

3. PUBLIC AWARENESS, EDUCATION, & TRAINING

A key component of CTDOT's strategy is to increase public awareness of the growing number of pedestrian deaths and serious injuries caused by traffic crashes. It is an important state and national problem that has been increasing rapidly since 2009. Many pedestrians are unaware of the rising risk they face, and many drivers do not realize the increased risk they pose to pedestrians. The goal of this safety initiative is to raise awareness of the problem among drivers and pedestrians, and in doing so encourage safer and less risky driver and pedestrian behaviors.[7]

To increase awareness of the pedestrian safety problem, CTDOT will initiate a variety of statewide education and media campaigns. Many of these efforts will be aimed at drivers and will build on the successful Watch for Me program sponsored by CTDOT and the CT Children's Medical Center. Safety messages will be crafted around the risk drivers pose to pedestrians, and will use a variety of media including TV, radio, social media, and billboards.

7 Nationally, total pedestrian deaths were steadily trending down until 2009 when the total fatalities bottomed out at 4,109. Since then, fatalities have trended upward reaching 6,590 in 2019. The 2019 total is the highest since 1988.

Campaigns will be timed to coincide with important events such as implementation of the proposed crosswalk laws, National Pedestrian Safety Month in October, and special press events. Some will also be targeted to more local projects such as implementation of a road diet project or a new Pedestrian Safety Zone in a community.

4. INTEGRATED SAFETY PROGRAM

CTDOT's proposal to develop a comprehensive program for pedestrian safety is being done within the context of its overall roadway safety program. CTDOT's roadway safety program includes a broad array of safety initiatives aimed at reducing serious and fatal injuries to motorists and non-motorists (pedestrians, bicyclists, wheelchair users).

CTDOT is proposing some policy changes to the broader safety program as part of this pedestrian safety initiative. These policy changes reflect CTDOT's strong commitment to safety, and they will benefit pedestrians as well motorists. They include:

(a) Safe Systems. CTDOT will evaluate how to integrate safe systems[8] principles into CTDOT's planning and design practices.

(b) Toward Zero Deaths. CTDOT will adopt USDOT's Toward Zero Deaths policy that sets a long-term goal of reducing traffic fatalities to zero.[9]

[8] Sometimes referred to as the "injury minimization" approach.
[9] For more info go to: https://www.towardzerodeaths.org/

(a) Safe Systems: Evaluate safe systems principles

Safe Systems is an alternative approach to roadway design and traffic management that places more emphasis on reducing roadway fatalities and serious injuries than do many current engineering guidelines and practices. It is sometimes referred to as the "injury minimization" approach. It is particularly relevant to the design and operation of urban streets where drivers must share the road with pedestrians and where pedestrian safety is a concern. More information on Safe Systems can be accessed at the ITE website: https://www.ite.org/technical-resources/topics/safe-systems/.

- **CTDOT evaluation of Safe Systems.** CTDOT will initiate a process to evaluate how Safe Systems principles can be integrated into its planning and design practices. CTDOT's objectives in undertaking this initiative are to make our entire roadway system safer, to support our proposed Toward Zero Deaths goal, and to support our pedestrian safety program.

- **Focus on urban streets.** While the Safe Systems Approach applies to freeways as well as local streets, the initial effort will be focused on urban streets. On urban streets, pedestrians and other "vulnerable" users face a unique safety risk from motor vehicles. Their risk of serious or fatal injury is high and increases as vehicle speed increases.

(b) Toward Zero Deaths: Adopt as CTDOT goal

Toward Zero Deaths or TZD is one of several programs sponsored by different organizations that share a common vision of reducing traffic fatalities to zero. All these programs recognize it will likely take decades to reach the goal, but they believe the effort must be made and adoption of the vision and goal is a critical first step.

Toward Zero Deaths is a program sponsored by USDOT and is endorsed by most state DOTs in the country. USDOT requires that the endorsement of TZD be officially included in the state DOT's Strategic Highway Safety Plan. The Strategic Highway Safety Plan is updated on a 5-year cycle, and CT's Plan will not be updated for another year. As an interim measure, CTDOT will adopt TZD as a standalone CTDOT policy until such time as the Strategic Plan is updated.

The Strategic Highway Safety Plan is an important state safety document that establishes the strategic vision and priorities for improving highway safety over a 5-year timeframe. It is a multi-agency effort that is jointly adopted by several state agencies including DMV and the State Police. A copy of the current plan can be found at: https://t2center.uconn.edu/pdfs/shsp/17-014L-CONN_SHSP.pdf.

- **Emphasis on Pedestrians.** Pedestrian fatalities will be identified as a special emphasis area within the broader TZD goal. Pedestrian safety is already identified as safety priority within the SHSP.

BACKGROUND

CONNECTICUT DATA ON PEDESTRIAN FATALITIES & SERIOUS INJURIES

The pedestrian fatality trend in Connecticut is similar to the national trend. Fatalities have grown sharply in the past decade, but the number of fatalities is much smaller than the national number. Whereas there are typically 6,000-6,500 pedestrian deaths in the U.S. each year, the number in Connecticut ranges between 30-60 deaths. Given the relatively small number of fatalities found CT, there is typically fluctuation in deaths from year to year.

To achieve a more stable performance measure with less fluctuation, CTDOT tracks the combined total of pedestrian **deaths** plus **serious injuries**. As seen in the chart below, the trend for the combined measure is similar to the national trend for pedestrian fatalities.

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Preliminary* CT Fatalities Crash Data		
Year	Total Fatalities	Pedestrian Fatalities
2016	304	59
2017	281	49
2018	294	59
2019*	249	55
2020*	310	65
Data Source: FARS Final Files 2016 - 2018, CTDOT Preliminary Data 2019-2020 Note: The 2019 and 2020 data are preliminary and subject to change		

Definition of Serious Injury

A serious injury is generally defined as incapacitating. The detailed definition used in the federal Model Minimum Uniform Crash Criteria guideline is a non-fatal injury that results in one or more of the following:

- Severe laceration
- Broken or distorted arm or leg
- Crush injuries
- Paralysis
- Significant burns (1st or 2nd degree burns over 10% of the body
- Unconsciousness when taken from the crash scene

CTDOT'S PEDESTRIAN POLICIES, PROGRAMS, & INFRASTRUCTURE

For the past decade CTDOT has been steadily building a comprehensive program to promote pedestrian and bicycle travel. The goal is to provide more opportunities for Connecticut residents to walk and bike within and between their communities. The CTDOT has greatly expanded these opportunities through the adoption of supportive policies, creation of special funding, and creation of pedestrian and bike infrastructure.

CTDOT has helped communities build, expand, and modernize a system of multi-use trails, sidewalks, pedestrian crosswalks and signals, bike lanes, guide signs, and related infrastructure. CTDOT will continue to expand and enhance this infrastructure but will start placing **more emphasis on improving the safety of pedestrians** who use these amenities.

This section provides an overview of the progress made in the past decade in terms of CTDOT policies, programs, and projects that have helped expand and improve our active transportation infrastructure.

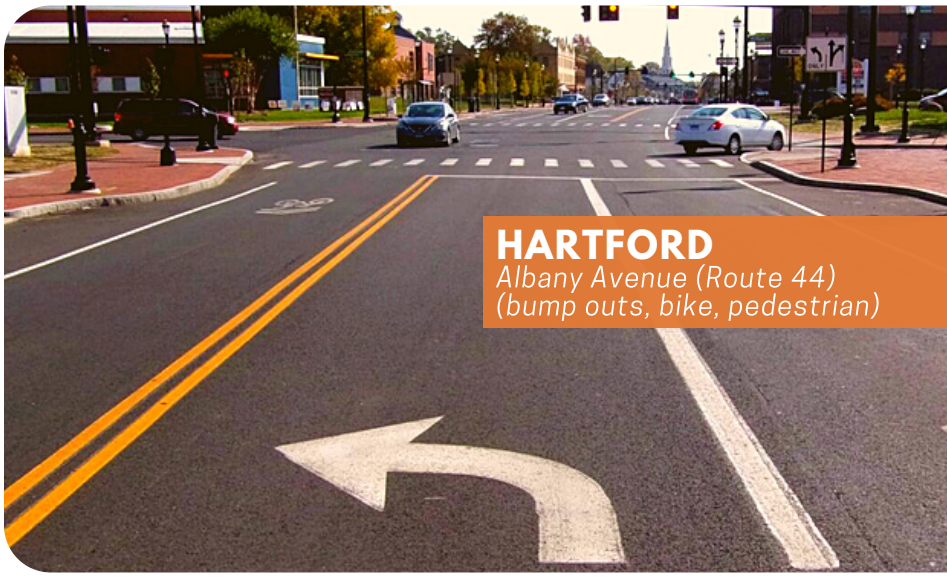
COMPLETE STREETS POLICY

Complete Streets Policy (2014). In October 2014, CTDOT adopted a Complete Streets Policy that directs every bureau in the Department to consider the needs of all roadway users (including pedestrians, bicyclists, wheelchair users, transit users, and vehicle operators) in the planning, programming, design, construction, retrofit, and maintenance of all roads and streets. Since its adoption, CTDOT has managed to fully mainstream or institutionalize the policy in all phases of its work. The policy guides the planning, design, construction, and maintenance of every project the Department undertakes and every facility it maintains.

The Department's commitment is continually reinforced and enhanced through its Complete Streets Committee. This Committee meets regularly to review progress, develop and update guidelines, and monitor compliance with the policy. Some compliance mechanisms are institutionalized. CTDOT has incorporated mandatory checklists that project engineers must complete and special independent design reviews. For example, the Bureau of Planning's Active Transportation workgroup annually reviews between 100 and 130 project design plans to ensure all needs of pedestrians and bicyclists have been addressed.

The CTDOT has developed many special programs intended to develop and deliver projects supportive of walking and bicycling forms of travel. The Complete Streets policy has probably had greater impact than any of the special programs. No other program or policy directly impacts every project the Department undertakes. The policy assures that the needs of pedestrians are considered during the design and development of every project. Those needs might be small in some projects, but they can be considerable in others. It is the responsibility of the project engineer to identify needs, balance those needs with competing or conflicting requirements within the project and limited financial resources.

STONINGTON
West Broad Street (Route 1)



HARTFORD
Albany Avenue (Route 44)
(bump outs, bike, pedestrian)

NEW HAVEN
West River Project
(trail, sidewalks, roundabout)

BROOKFIELD
Town Center, Route 202

COMMUNITY CONNECTIVITY GRANT PROGRAM

The Community Connectivity program provides modest grants to municipalities to enhance pedestrian and bicycle connectivity within urban, suburban, and rural community centers. The goal is to make it easier to walk and bike, improve quality of life, and create more vibrant downtowns. While the grants are modest, many communities use them to fill critical gaps in their sidewalk network or improve important safety features like pedestrian crosswalks. More than 80 communities received funding to date.

90+ FUNDED COMMUNITY PROJECTS

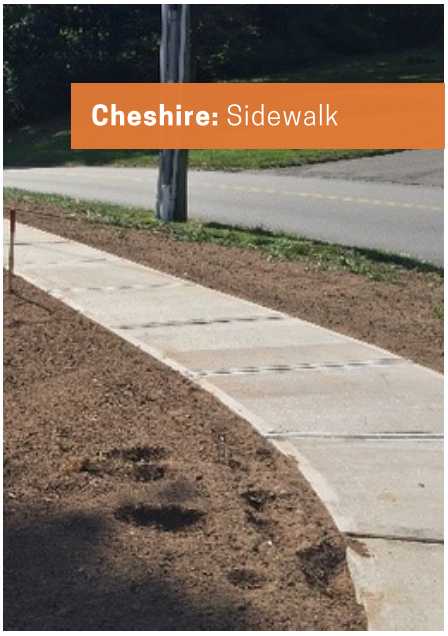
Southington: Farmington Canal Trail Connector

Ellington: Historic District Sidewalks

West Hartford: Bike Lane

Stamford: Boxer Square Sidewalks & Streetscapes

Westbrook: Rt 1 to Train Station Sidewalk



Cheshire: Sidewalk

MULTI-USE TRAIL PROGRAM

This is a funding program initiated to fill in gaps in major multi-use trails of statewide or regional significance. The program is managed by CTDOT and is intended to The focus is currently on filling in gaps in trails of statewide or regional significance. A portion of the funding goes to municipalities to complete critical segments within their own communities. The remainder is used by the CTDOT to design and build the most difficult segments that are technically or environmentally challenging and are often most expensive to build. About 291 miles of trail have been built with another 39 miles in design.

Farmington Canal Trail

291 MILES BUILT

Naugatuck River Greenway

CT*fastrak* Trail

39 MILES IN DESIGN

Farmington Canal Trail

LOCAL TRANSPORTATION PROGRAM

LOTCIP: The Local Transportation Capital Improvement Program provides over $50 million annually to municipalities to fund local transportation projects. Most of the projects are basic roadway infrastructure improvements. However, while the focus might be on roadway infrastructure, it is important to recognize that most communities use Complete Street principles to guide the design and construction their road projects. This means the reconstructed roads and bridges can safely accommodate all users – including pedestrians and bicyclists. Additionally, some communities choose to use the funds for projects that are designed exclusively for non-motorists (multi-use trails, sidewalks, etc.).

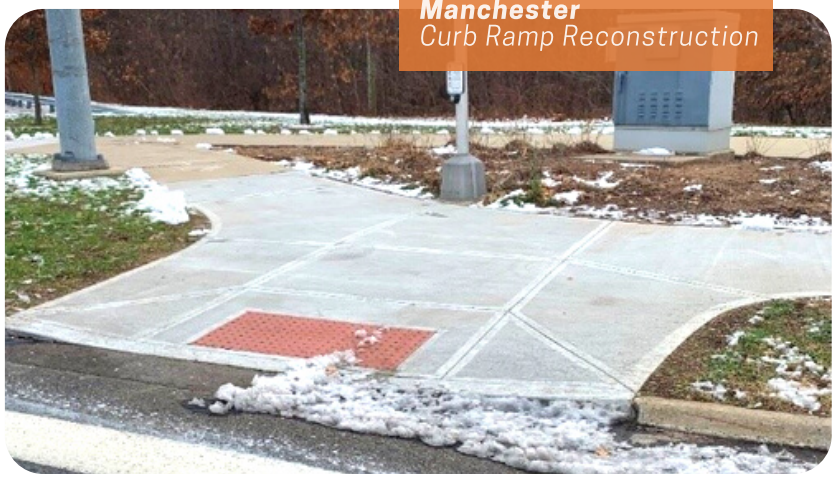
ADA CURB RAMP REPLACEMENT PROGRAM

Title II of the Americans with Disabilities Act (ADA) requires that all government facilities (including transportation facilities) be accessible to persons with disabilities. While CTDOT has integrated accessibility features into all its new projects since the early 1990s, there are still many older roadways, sidewalks, intersections, and traffic signals that have not undergone major reconstruction. In 2019, CTDOT revised and updated the Department's ADA Transition Plan to include the proposal to upgrade all non-compliant curb ramps within the State Right-Of-Way (ROW).

Middletown
Curb Ramp Reconstruction

The Department is now dedicating about $6 million annually to the curb ramp replacement program. The work is mainly being done in conjunction with the Maintenance Resurfacing Program. The program typically includes upgrading existing non-compliant curb ramps to be ADA compliant, installing curb ramps at needed locations, and providing connections from curb ramps to the existing sidewalk network.

In 2019, CTDOT also established a curb ramp inventory and collection system to keep track and monitor the curb ramp compliance status within the State ROW. An ADA Engineering Coordination Unit under Project Administration as established to monitor this progress.



Manchester
Curb Ramp Reconstruction

TRAFFIC SIGNAL IMPROVEMENT PROGRAM

CTDOT GREEN LIGHT
CONNECTICUT TRAFFIC SIGNAL PROGRAM INITIATIVE

CTDOT is conducting a multi-year program to upgrade many of the signalized intersections on state routes. The modernization program provides a unique opportunity to greatly enhance pedestrian safety. It also allows CTDOT to integrate its Complete Streets policy into the signal design process. This will ensure pedestrian needs are fully addressed when a traffic signal is upgraded or replaced.

The modernization program takes advantage of major advances in traffic signal technology. The Department can now integrate a wide array of pedestrian-focused technology components into each signal. These signal hardware advances are often complemented with changes to the physical layout of the intersection to further enhance pedestrian safety.

Design Goals

- **Design for pedestrians** as well as vehicles
- **Crosswalks**: provide on all legs where appropriate
- **Crosswalks**: design for shorter crossing distance
- **Pedestrian signal heads**: provide on all legs (crossing roadways)
- **Pedestrian push buttons**: provide on all legs (crossing roadways)
- **More time to cross:** adjust signal timing to give pedestrians adequate time to cross street.
- **Reduce conflict:** prohibit right-turn-on-red where turning vehicles conflict with pedestrians
- **Leading ped interval:** pedestrians start 3-4 seconds before cars at concurrent green signals.

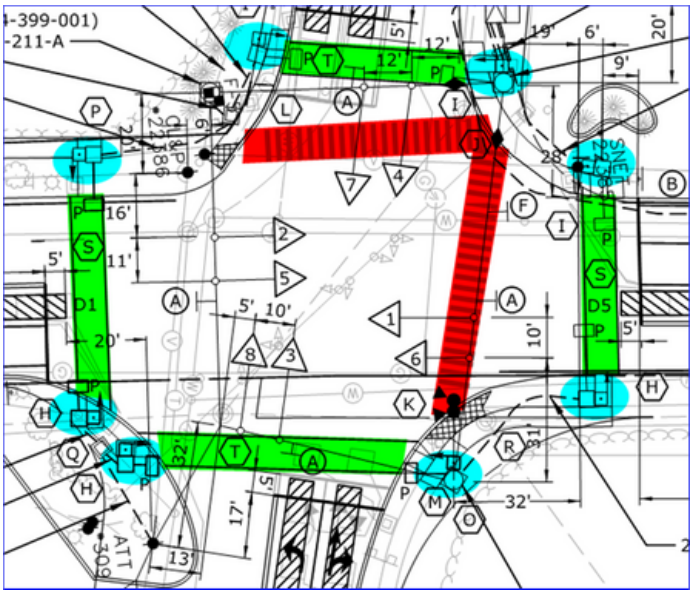
Modernization Program Early Phases Status

Adjust crossing time for pedestrians. All state-owned traffic signals were reviewed and revised to ensure pedestrians have sufficient time to cross. The re-timing work was done in 2017 -2019. During 2021, CTDOT will start a project to evaluate the signal timings at municipally owned traffic signals.

Include all needed pedestrian features:
When older signal equipment is scheduled for replacement, the entire signal system and intersection itself will be upgraded and modernized. It will include all needed pedestrian features such as **crosswalks, sidewalks and ramps, pedestrian buttons, and countdown pedestrian signal heads.**

What's next:
CTDOT will continue the upgrades statewide with a goal of eventually modernizing all 2,500 state signals.

Modernization: Typical Redesign for Pedestrian Safety



Added marked crosswalks on all legs & reduce crossing distances

Added pedestrian buttons, countdown signal heads, ADA features

Removed sidewalks

Leading Ped Interval. At concurrent green signals, pedestrians start crossing 3-4 seconds before traffic starts make them more visible to drivers (who must yield to peds).

Countdown pedestrian signal heads countdown feature reduces confusion for pedestrians and drivers

UNSIGNALIZED PEDESTRIAN CROSSING UPGRADES

Many pedestrian crossings do not have the benefit of a traffic signal to stop traffic and allow pedestrian to cross. These mid-block crossings and crossings at unsignalized intersections require different types of safety solutions than those discussed in the preceding section. In recognition of this, CTDOT started design initiatives to make crossings more visible to drivers.

Systemic Approach. Unsignalized pedestrian crossings are prevalent throughout the state on state highways and municipal roads. Due to the widespread distribution of unsignalized crossings, CTDOT is adopting a systemic approach to enhance crossing safety rather than using a more traditional project-by-project approach. The systemic approach is characterized by two qualities:

- **Statewide:** These initiatives are statewide in coverage and accomplished within 2-3 years.
- **State & Municipal Roads**: CTDOT also expanded the programs to include municipal roads (note: not all municipalities chose to participate). The inclusion of municipal roads is critical since over half of pedestrian fatalities and serious injuries occur on municipal roads.

School Warning Signs:
All school warning signs have been replaced statewide with highly reflective yellow-green signs to enhance visibility, especially during dawn and dusk periods. Under this statewide initiative, signs located on the state highway system were replaced by the fall of 2013 and signs located on the local road system were replaced by the fall of 2015.

Pedestrian warning signs:
Pedestrian warning signs have been upgraded with a fluorescent yellow background and post delineator to enhance visibility, especially during dawn and dusk periods. All mid-block crossings also received yield line pavement markings, with a "Yield Here to Pedestrians" signs installed adjacent to the yield lines. A systematic initiative to replace these signs on state routes was completed in 2017. Pedestrian signs on municipal roads were completed in 2019.

Rectangular Rapid
Flash Beacons (RRFBs). RRFBs are flashing lights designed specifically to draw drivers' attention to a pedestrian crossing sign. The pedestrian pushes a button to activate the system that includes rectangular-shaped yellow LED lights that are extremely bright (even in daylight) and flash with rapid frequency. CTDOT is screening locations statewide to systemically identify unsignalized midblock crosswalks that could benefit from a RRFB. The design of state highway projects will be done in 2021. Municipal road projects will begin design in 2021. The projects are being administered by the state in collaboration with the towns.

ROAD DIETS

Road diets are a traffic engineering tool that "shrinks" the size of a roadway with a goal of reducing traffic speed and improving traffic and pedestrian safety. It often involves reducing the number of travel lanes, reducing lane width, and providing enhanced features for cyclists and pedestrians. CTDOT has successfully reconstructed segments of several state highways using road diet methods and is now considering expanding their use based on lessons learned from the initial projects.

Given their potential to improve pedestrian safety, CTDOT is including the method in its comprehensive pedestrian safety strategy. It is also conducting a statewide study of state-owned roads to identify good locations for road diets. The screening of state highways will be followed by a similar study and screening of municipally owned roads.

For purposes of the two studies, a road diet typically involves converting an existing four-lane, undivided roadway segment to a three-lane segment consisting of two through lanes and a center, two-way left-turn lane. The fewer lanes allow for additional shoulder width that provides a wider buffer area along sidewalks. Road diets enhance safety, mobility, and access for all road users. Road diets are a FHWA proven safety countermeasure.

What's next: Once the statewide screening is complete, CTDOT will initiate road diets projects to convert the most promising candidate roads from 4 lanes to 3 lanes with appropriate traffic calming and pedestrian features.

PEDESTRIAN BENEFITS

- Fewer lanes for pedestrians to cross
- Opportunity to install pedestrian refuge islands
- Traffic calming measures for more consistent & lower vehicle speeds
- More community-focused "complete streets" environment

E. Hartford, Route 44 Road Diet
4 lanes reduced to 2 thru lane + 2 bike lane

ROAD DIET ILLUSTRATION: 4 lanes to 3 lanes
adding bike lanes, parking or wider sidewalks