Bicycle-Pedestrian Safety Corridors Study

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FINAL REPORT

for the

SWRPA BICYCLE - PEDESTRIAN SAFETY CORRIDORS STUDY

June, 2012

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Executive Summary

This report examines pedestrian and bicycle safety deficiencies in the seven high priority corridors identified by SWRPA in the *South Western Region Bicycle and Pedestrian Plan* (as well as one additional corridor) and recommends well established engineering countermeasures to address the issues identified.

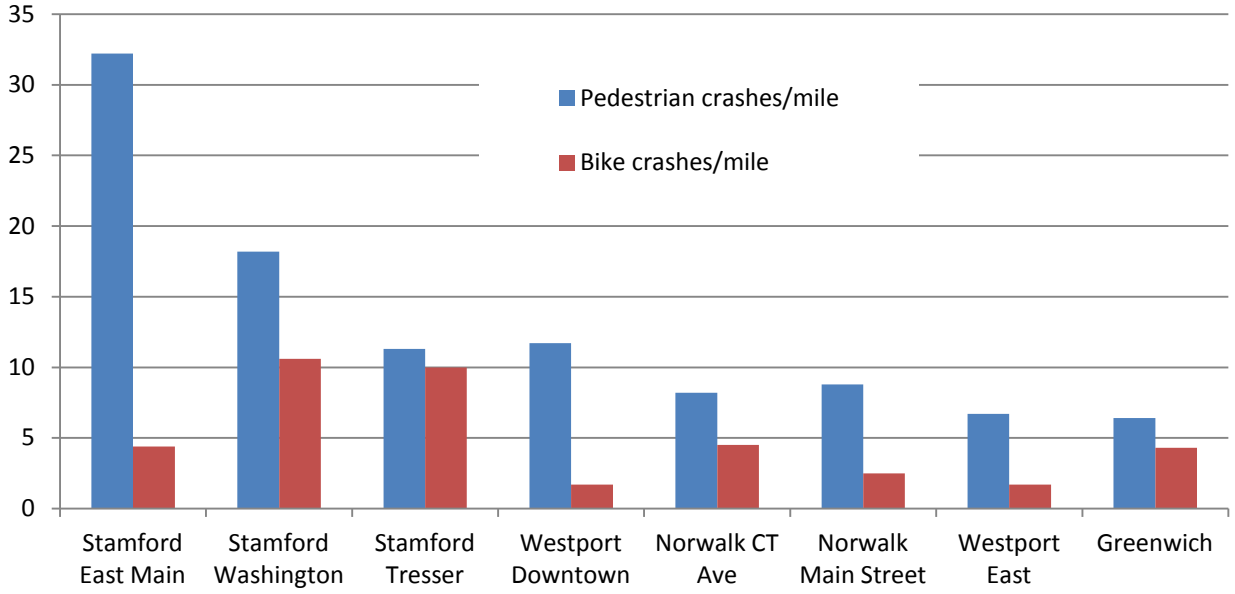
The corridors highlighted in this report have the poorest pedestrian and bicycle safety records of any State highways in the region and serve a diverse mix of land uses that generate high levels of activity. The roadway networks surrounding these corridors generally consist of curvilinear residential streets that are typical for the region, but do not offer direct routes for pedestrians and cyclists. Therefore, the corridors themselves should serve the mobility and accessibility needs for all modes of transportation in the region.

The recommendations outlined in this report will compliment the concepts and proposals already defined by other studies and planning efforts underway in the region. The recommendations strive to enhance non-motorized access in the corridors by improving pedestrian and bicycle accommodations. Proposed improvements are intended to minimize the frequency and severity of vehicle-pedestrian conflicts by reducing exposure of vulnerable road users to potentially dangerous vehicular movements and reducing vehicular speeds at potential conflict points.

For each of the eight corridors, the physical and operational characteristics differ considerably. Adjacent land uses, posted speed limits, and design vehicle accommodations vary between typical suburban and urban designs. However, in order to become more accessible thoroughfares that enhance livability, promote economic activity, and support sustainable transportation and land-use planning, modifications should be made to improve pedestrian and bicycle safety, and to create a more appealing, human scale environment for non-motorized road users. Many of these improvements can be implemented at minimal cost, and will ultimately benefit all road users.

Crash Rates and Street Design of SWRPA Safety Corridors

The crash data for pedestrian and bicycle crashes cited in this report is from the years 2006 to 2008, the latest three years available. The data was retrieved from the CTDOT's Traffic Accident Viewer System (TAVS) by SWRPA for this study. These locations were identified as "safety corridors," indicating they have some of the highest crash rates for non-motorized travelers of all roadways in the region. The character of each corridor varies greatly, as do the vehicular, pedestrian and bike traffic patterns. Crash rates also vary from corridor to corridor, but the frequency and severity of the crashes in these locations suggest that aspects of the current street environments are contributing to unsafe conditions for non-motorized travelers.



Pedestrian and bicycle crash rates per mile for each safety corridor (2006-2008)

Main Street in Norwalk is classified as a minor arterial. All other safety corridors studied are classified as principle arterials. The corridors were observed and a number of physical and operational issues were identified that are likely impacting safety for non-motorized travelers. Although in many cases these deficiencies are not uncommon for the region overall, they are likely having a disproportionate impact on safety because these roadways are functioning as arterials while also serving high volumes of pedestrians and bicycles. Many or all of the corridors exhibit the following deficiencies:

- ***Low pedestrian and bike priority at intersections.*** Many accidents in this study took place at intersections and involve turning vehicles where there is no existing bike infrastructure and pedestrian infrastructure is limited.
- ***Incomplete sidewalk networks.*** Pedestrian exposure to vehicles is increased where sections of sidewalk are missing. In many of these locations, pedestrians use landscaped areas, private property, or off-street parking areas to travel along a corridor.

High design speeds in areas with high levels of pedestrian activity (Greenwich US 1 corridor)

- ***Undesirable vehicle speeds for context of area.*** Wide travel lanes along straight sections of road result in high vehicular speeds, which is particularly problematic in areas with high pedestrian volumes.
- ***Numerous driveways, areas of continuous access, and angle parking.*** Pedestrians and cyclists are highly exposed in these areas since pedestrian space is not defined, travel paths for vehicles are not always clear, and there are a number of possible vehicular turning movements. These conditions create large conflict areas for motor vehicles, pedestrians, and bicycles.
- ***Absence of bike infrastructure.*** Most of the corridors in this study have no on-street bike infrastructure, such as exclusive bike lanes, shared lanes, or signage of any kind. In many locations, steep grades and/or higher vehicular speeds combine with this lack of infrastructure to create intimidating environments for cyclists.
- ***Large crossing distances.*** Multiple, wide travel lanes, turning lanes, and large curb-return radii contribute to uncomfortably large crossing distances at many locations. This is a hazard for pedestrians who often share the crossing phase with turning vehicles. The long crossing distances also require longer phases, which contribute to vehicular delay at some locations.
- ***Poor visibility at crosswalks.*** Pedestrian danger is increased if drivers and pedestrians cannot see each other well at crossing locations. Utility poles, signs, signal boxes, and on street parking were frequently found to obscure sight lines between pedestrians and drivers.
- ***Narrow effective sidewalk width.*** The useable width of the sidewalk is reduced in many locations along the corridors because of the placement of utility appurtenances, traffic control devices, and street furniture.
- ***Inconveniently located pedestrian crossings.*** Where pedestrian crosswalks are provided, they often are not in preferred locations. This causes pedestrians to either take a more indirect route or to ignore the provided infrastructure.

Common engineering solutions for SWRPA corridors

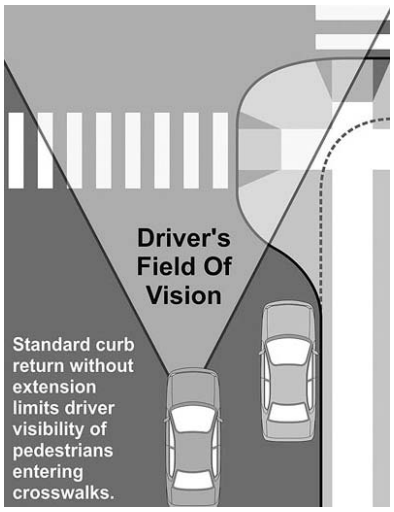
Increasing non-motorized transportation safety along the corridors requires similar solutions at multiple locations. These typical countermeasures are:

- ***Providing more bike and pedestrian accommodations at intersections.*** Establishing consistent bike and pedestrian facilities through intersections is critical for providing continuous routes for non-motorized travel in these corridors. Many locations would benefit from the addition of accommodations such as pedestrian push buttons, signal heads, pedestrian refuge islands, exclusive pedestrian signal phases, and bike boxes. Note that the installation of some improvements on a state roadway (such as green pavement markings, raised brick or landscaped islands, and textured crosswalks) would require a maintenance agreement between the municipality and CTDOT
- ***Completing pedestrian travel networks.*** Connecting sidewalk networks where they are discontinuous is critical for improving pedestrian safety and encouraging more pedestrian activity in these corridors.
- ***Reducing travel speeds by physically or visually narrowing lane widths.*** Narrowing travel lanes by restriping or constructing medians, pedestrian refuge islands, or curb extensions is an effective method to reduce vehicular speeds and increase safety for non-motorized travelers.
- ***Reducing crossing distances and increasing pedestrian-driver visibility***. Curb extensions (also called bulb outs, neck downs or knuckles) extend the curb into the travelled way, reducing the width of the street. They are commonly used at intersections, but can be used at mid-block locations to define parking areas, a bus stop or a loading zone. Other options for reducing crossing distances include the construction of pedestrian refuge islands, removal of right-turn lanes, or adjustment of curb return radii. These countermeasures improve pedestrian safety by lowering travel speeds at pedestrian-vehicle conflict points, enhancing pedestrian-driver visibility, and encouraging and facilitating pedestrian crossings at preferred locations. Note that although curb extensions and refuge islands provide great safety benefits, they may require some extra effort for snow removal.
- ***Designating roadway space for bicycles.*** Shared Lane Markings, or "sharrows," are pavement markings that indicate a shared lane environment for bicycles and vehicles. Sharrows improve safety and functionality by indicating the

Bikebox

Sharrow

Pedestrian accommodations at intersections



Visibility improvement with curb extensions (Source: ITE Designing Walkable Urban Thoroughfares Guide)

correct positioning in the lane to cyclists and reinforcing the legitimacy of bicycle traffic on the street to drivers. It should be noted that the CTDOT does not yet have a policy for installation of bike boxes and sharrows on state roadways, but they are being installed in various locations throughout the State. Bike lanes indicate the preferential or exclusive use of road space for bicyclists with striping, signage, and pavement markings.

- ***Access Management.*** Safety risks are greater for pedestrians and cyclists in areas with closely spaced driveways, continuous access, and/or angle parking. Accesses should be reconfigured, closed, and/or consolidated where possible. Additionally, the implementation of a road diet with the installation of a raised median could be considered. Also, for several areas, long-term plans for managing redevelopment in a corridor should be drafted to solve the existing safety issues for non-motorized travelers and prevent future ones from occurring.
- ***Adding on-street parking.*** The presence and availability of on-street parking serves critical needs on urban thoroughfares. It meets the parking needs of adjacent land uses, increases street activity, promotes localized economic activity, narrows adjacent travel lanes and creates a more pleasant pedestrian realm, where people are protected from moving vehicles.

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1 Greenwich: US 1 (Putnam Avenue) from Benedict Place to Indian Field Road

US 1 looking northbound towards Indian Field Road Intersection

To identify safety issues and recommend countermeasures for this corridor, it was divided into two distinct sections: the southern, urban section between Milbank Avenue and Benedict Place (0.5 miles), and the northern, residential section, between Indian Field Road and Milbank Avenue (0.9 miles). Note that US 1, although primarily aligned east-west through the southwest region, US 1 is designated as a north-south roadway and so descriptions provided in this report assume the north-south convention for US 1 corridors.

The southern section is located in downtown Greenwich. The street cross section consists of two 10-foot travel lanes and two 8-foot (metered) parking lanes. There are sidewalks of varying widths on both sides of the street, and the generally dense, human scale character of the buildings, mixed land use, and small block size (around 400 feet) in this section, results in consistently high levels of pedestrian activity.

The northern section is straight and generally consists of four 12-foot lanes with no shoulders or on-street parking. The roadway widens near Greenwich High School in order to allow for a northbound left-turn lane at Hillside Drive. There is a significant elevation change in this section, with the low point at the High School. There is a posted speed limit of 30 miles per hour, although street design characteristics allow for substantially higher travel speeds.

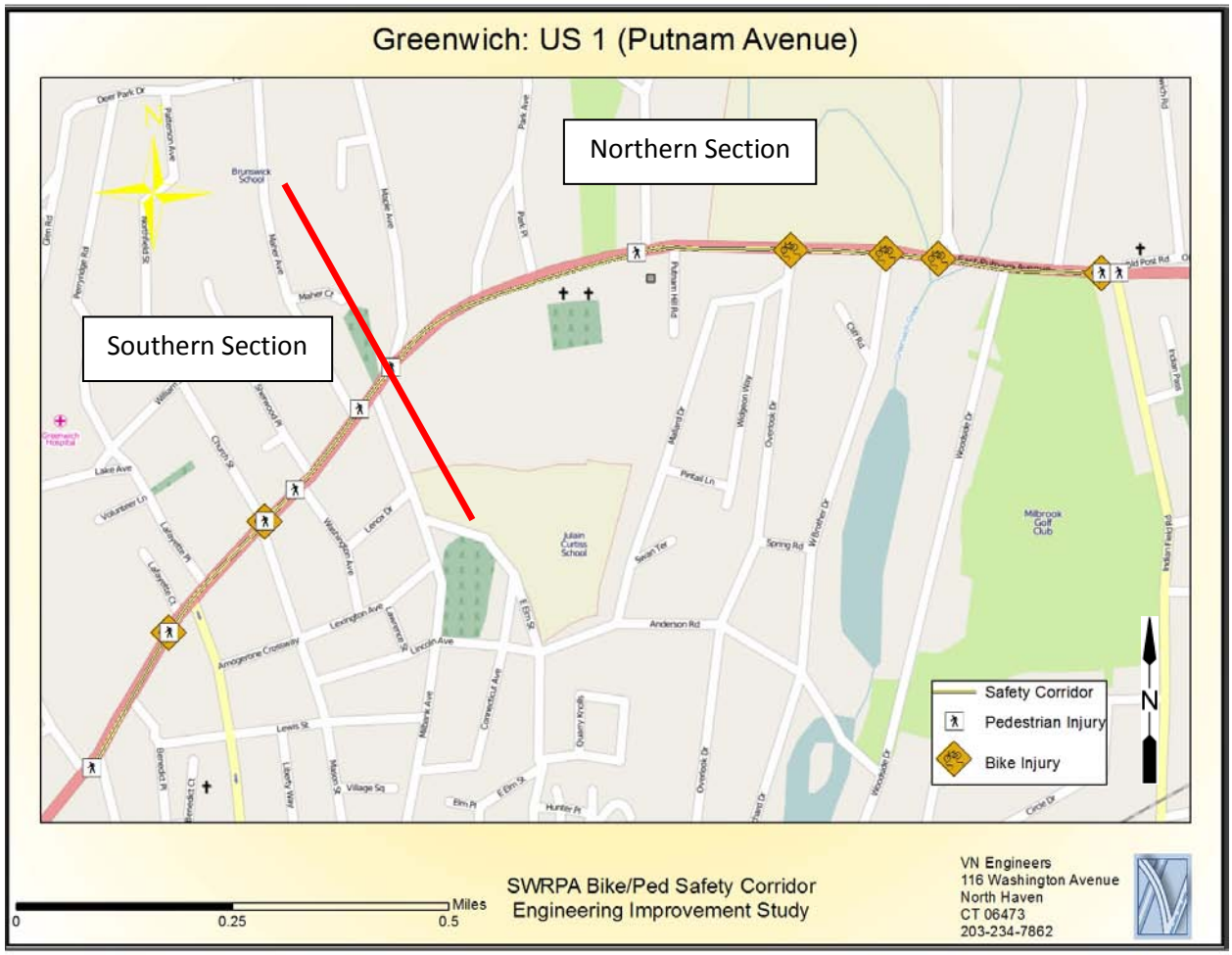


Figure 1: Bicycle/Pedestrian Accident Locations for Greenwich US 1 (Putnam Avenue) Corridor

Table 1: Bicycle/Pedestrian Accident Data for Greenwich US 1 (Putnam Avenue) Corridor

Section	Length (miles)	Ped. Accidents	Ped Accidents/mile	Bike Accidents	Bike Accidents/mile	Total Accidents/mile
Southern	0.5	5	10	2	4	14.0
Northern	0.9	4	4.4	4	4.4	8.9
Total	1.4	9	6.4	6	4.3	10.7

Of the nine pedestrian accidents, four were deemed the fault of the pedestrian. Although both sections have poor bike and pedestrian safety records, the higher pedestrian accident rate in the southern downtown section is expected due to the much higher volume of pedestrians. However, the collisions in this section are likely to be less severe than those on the northern section, due to lower vehicular speeds.

The *South Western Region Bicycle and Pedestrian Plan* identified and recommended countermeasures for three priority locations. They are as follows:

- ***US 1 (West Putnam Avenue) at Lafayette Court intersection.*** Improve lighting, re-paint crosswalks, and install curb extensions.
- ***US 1 (East Putnam Avenue) at Washington Avenue and Maher Avenue intersections.*** Install new crosswalks and modify stop line at Maher Ave
- ***US 1 (East Putnam Avenue) near Overlook Drive.*** Add on-street bicycle treatment, such as a bicycle lane or shoulder, and install 'Share the Road' Signage.
- ***US 1 (East Putnam Avenue) at Indian Field Road.*** Improve signage and install curb extensions.

These sections of roadway are also discussed in SWRPA's *Route 1 Greenwich-Stamford Study*, which included the following items as part of the study's implementation plan:

- Install bulb outs at six signalized intersections in downtown Greenwich between Dearfield Drive and Maple Avenue
- Install pedestrian accommodations at the intersection of US 1 (Putnam Avenue) at Maher Avenue/Millbank Avenue/Maple Avenue
- Implement a road diet between Old Church Road and Sinawoy Road

1.1 Existing Conditions

1.1.1 Southern Section - Downtown Greenwich

Sidewalk quality and pedestrian comfort is high along this section. Sidewalk widths vary from 6 feet to 17 feet and are protected from traffic by metered on-street parking and a planted buffer in some locations. The sidewalk network is continuous on both sides of the street.

Sidewalk on southbound side of north section

There are five signalized crosswalks over US 1 with pedestrian signal heads and exclusive pedestrian phases. Crossing distances vary from 60 to 75 feet, depending on the presence of turning lanes, and crosswalks are up to 800 feet apart.

Pedestrian refuge at Hillside Drive

Side street crossings are wheelchair accessible and have standard markings (two parallel white lines). Large turning radii, turning lanes, and angled intersections at side streets increase crossing distances and contribute to potentially higher vehicle speeds at pedestrian-vehicle conflict points.

High level of pedestrian comfort in Downtown section

Crosswalk over side street

Pedestrians climbing railings in front of Whole Foods Market

Milbank Avenue right-turn (slip) lanes

A walk audit, conducted in January, 2012 revealed risky and illegal behavior by pedestrians and cyclists, suggesting inadequate accommodations for non-vehicular travel. Pedestrians were observed crossing US 1 at the signalized intersections, although most did not wait for the pedestrian signal phase. Many pedestrians were also observed crossing at more convenient, unmarked mid-block locations. This was especially evident in front of the Whole Foods Market where pedestrians were seen crossing US 1 directly in front of the store, rather than using the existing crosswalks at Church Street or Maher Avenue, which are 820 feet apart. Once on the sidewalk, the pedestrians then climbed over a railing in order to take a direct route to the store entrance.

The Milbank Avenue intersection is particularly dangerous for pedestrians. The angle of the slip lanes and the 45-foot turning radius allow for potentially high vehicular speeds. Drivers may be preoccupied with looking left to find a safe gap in traffic, and may not see pedestrians trying to cross from the right. During the walk audit, an elderly pedestrian was observed navigating the Milbank Avenue side street intersection with great difficulty, taking a very indirect route to avoid crossing the slip lanes.

The *Town of Greenwich Bicycle Master Plan* currently identifies the entire length of US 1 through the town as not meeting recommended guidelines for any type of bicycle facility and having considerable constraints to widening. There is no on-street bicycle infrastructure along this section, where current street markings suggest only vehicles have a right to be in the travel lane. Despite posted signs forbidding it, the two observed cyclists in this section were riding on the sidewalk.

The short distance between traffic signals in the southern section of this corridor results in generally low vehicular speeds, which could enable cyclists to share the road with vehicles with some level of comfort. However, there is no reassurance that bikes have the right to be in the travel lane, and there is currently no designated bike parking in this area. Signs prohibiting riding on the sidewalks are the only acknowledgement of cyclists. The lack of bicycle accommodations in this area results in some undesirable bicycle movements: illegal riding on sidewalks, riding on the wrong side of the road, or riding in the 'door zone,' all of which increase the likelihood of crashes involving cyclists.

1.1.2 Northern Section

The northern section of this corridor features a continuous five to six foot sidewalk along the northbound side of the road that is protected by a barrier from just north of West Brother Drive to Woodside Drive. The sidewalk network on the southbound side of the street is generally complete, although there is a missing section from Park Avenue to Maple Avenue. This sidewalk is also five to six feet in width, and is separated from the street by a two-foot grass buffer.

Bicycling Prohibited Sign


Cyclist riding on sidewalk

There are crosswalks over US 1 at the following signalized intersections: Old Church Road, Overlook Drive, Hillside Road (Greenwich High School entrance), and Indian Field Road. These all feature exclusive pedestrian phases and crossing distances of 50 to 65 feet. Crosswalks over side streets are marked at some locations, and signalized at Overlook Drive and Hillside Road. There is also a pedestrian refuge island on the Hillside Road leg of the intersection.


Unmarked crosswalk over Old Church Road side street

Pedestrians observed during the walk audit in this section generally consisted of high school students walking to the Sonoco gas station at the Indian Field Road intersection. To reach the gas station, they must cross US 1. Although most of the observed pedestrians used the Hillside Road crosswalk, none were observed waiting for the pedestrian signal phase. Other pedestrians were observed crossing at unmarked locations, suggesting existing crossings do not offer sufficiently direct routes to destinations.

The *Town of Greenwich Bicycle Master Plan* identifies the entire length of US 1 through the town as not meeting recommended guidelines for any type of bicycle facility and having considerable constraints to widening. There are no bicycle accommodations in the northern section of this corridor. Higher vehicular speeds in this area create an uncomfortably large speed differential between cyclists and vehicles, particularly on the uphill sections between Hillside Road and Indian Field Road northbound, and Hillside Road to Milbank Avenue southbound.

Cyclist riding on the sidewalk

Cyclist behavior observed during the walk audit showed the preference of cyclists to be separated and protected from traffic, choosing to cross the street and use the protected pedestrian sidewalk. However, the current sidewalk does not have sufficient width to be used safely as a shared bike and pedestrian side path.

1.2 Recommended Safety Improvements

Safety improvements are discussed for the two corridor segments in the following sections and are summarized in Table 2.

1.2.1 Southern Section - Downtown Greenwich

A number of actions can be undertaken to address the observed bicycle and pedestrian safety issues along the more urban, southern section. These include:

- Improve pedestrian accommodations at signalized intersections, particularly in the vicinity of Maher Avenue, Milbank Avenue, Maple Avenue as recommended in the *Route 1 Greenwich-Stamford Study*. Install or replace curb ramps, crosswalk striping, push buttons, and pedestrian signal heads and adjust signal timings as needed. Add crossings over as many legs as possible/reasonable.
- Install curb extensions along US 1 at intersections where conditions allow for them, as recommended in the *Route 1 Greenwich-Stamford Study*. In particular, curb extensions at the intersection with Greenwich Avenue should be considered.
- Further investigate pedestrian volumes and behaviors in front of Whole Foods Market including how site access and layout for Whole Foods are contributing to unsafe conditions. Consider options to encourage pedestrians to use existing crosswalks, add other treatments to facilitate safer crossing, or possibly install a crosswalk mid-block or at the Sherwood Place intersection.

- Investigate removing unnecessary turn lanes on side streets. In particular the right-turn (slip) lanes on the Milbank Avenue approach to US 1, since the severe angle of this approach limits visibility between drivers and pedestrians.
- Although the *Town of Greenwich Bicycle Master Plan* identifies this corridor as below minimum guidelines for bicycle facilities, the lower speeds and downtown character of this section of US 1 provide a greater opportunity for bicycles to more easily share existing roadway facilities with vehicles. Therefore, consider the installation of sharrows and bicycle signage throughout this section. As a later phase bicycle improvement, bike boxes could be installed at signalized intersections.

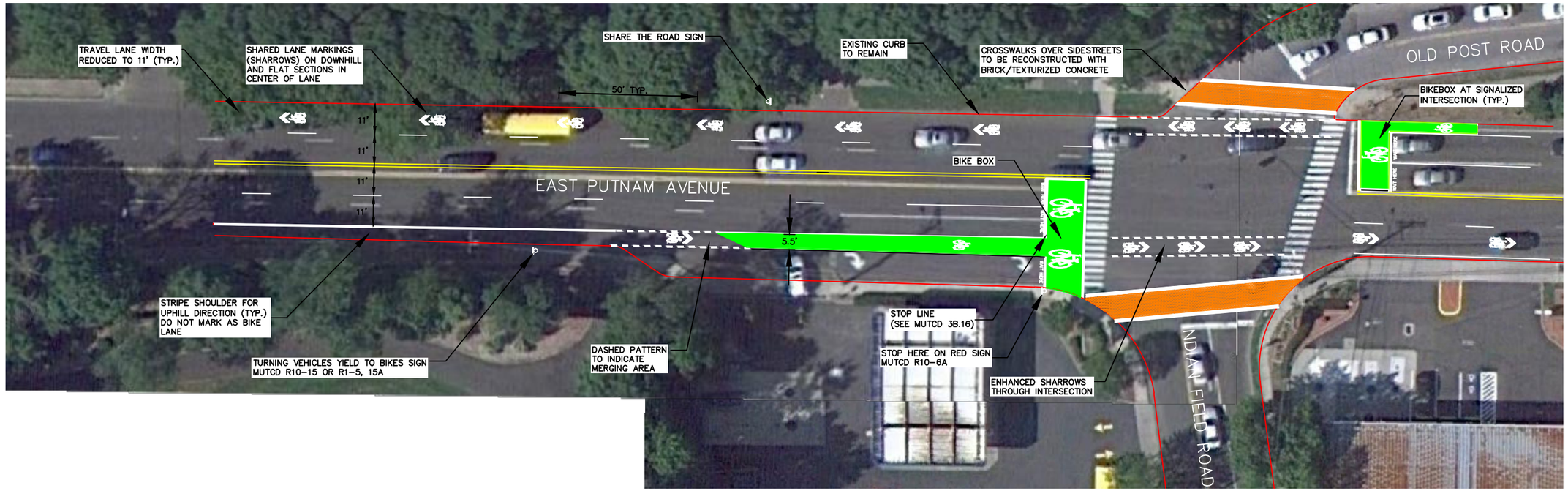
1.2.2 Northern Section

In the northern, more suburban section of this corridor, the recommended improvements are similar to those identified in the southern section with some site-specific modifications.

- Improve pedestrian accommodations at signalized intersections. Install or replace curb ramps, crosswalk striping, push buttons, and pedestrian signal heads and adjust signal timings as needed. Add crossings over as many legs as possible.
- Install a crosswalk over US 1 on the north leg of the Hillside Road intersection with a pedestrian refuge in the existing striped median.
- As a short-term solution, add sharrows to the outer through lanes on downhill and flat sections and add bike boxes at intersections. Also consider restriping lanes as 11 feet wide and striping a shoulder on uphill sections for use by bicycles. Figure 2 shows a conceptual design incorporating these improvements for US 1 at the Indian Field Road intersection.
- As a longer-term solution, conduct further analysis to investigate whether a road diet can be implemented through this corridor, as recommended in the *Route 1 Greenwich-Stamford Study*. Preferably, the final roadway section would include protected bike lanes.
- Consider reconfiguration of the intersection of Indian Field Road (where two recent pedestrian crashes occurred) to eliminate the Old Post Road leg and redirect traffic to access US 1 at a different location. The alignment of the Old Post Road parallel to US 1 is contributing to awkwardly configured intersections skewed at extreme angles with minimal visibility between drivers and pedestrians. The alignment of the sidewalk in this area also creates an indirect route for pedestrians.

Table 2: Recommended Actions to Improve Safety for Greenwich US 1 (Putnam Avenue) Corridor

Improvement	Location	Time to Implement	Approx. Cost	Priority
Southern Section – Downtown Greenwich				
Improve pedestrian accommodations at signalized intersections	Maher Avenue, Milbank Avenue, and Maple Avenue	0-2 years	<$100K	High
Install curb extensions	Throughout downtown area	3-5 years	$100K-$2M	Moderate
Study options for providing safer pedestrian crostsing	Between Church Street/Mason Street and Maher Avenue	0-2 years	<$100K	Moderate
Study option to remove right-turn lanes	Milbank Avenue approach to US 1	0-2 years	<$100K	Moderate
Install sharrows and bike boxes	Throughout corridor	0-2 years	<$100K	Moderate
Northern Section				
Improve pedestrian accommodations at signalized intersections	Throughout corridor	0-2 years	<$100K	High
Install Crosswalk and pedestrian refuge island	North leg of US 1 at Hillside Road intersection	0-2 years	<$100K	Moderate
Install sharrows and bike boxes; restripe uphill sections to provide shoulder	Throughout corridor	0-2 years	<$100K	Moderate
Study option to implement road diet	Throughout corridor (and beyond)	0-2 years	<$100K	Moderate
Study option to reconfigure intersection layout	Indian Field Road intersection	0-2 years	<$100K	High



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1" = 40'

20 0 40

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Figure 2: Conceptual Improvements for US 1 at Indian Field Road Intersection

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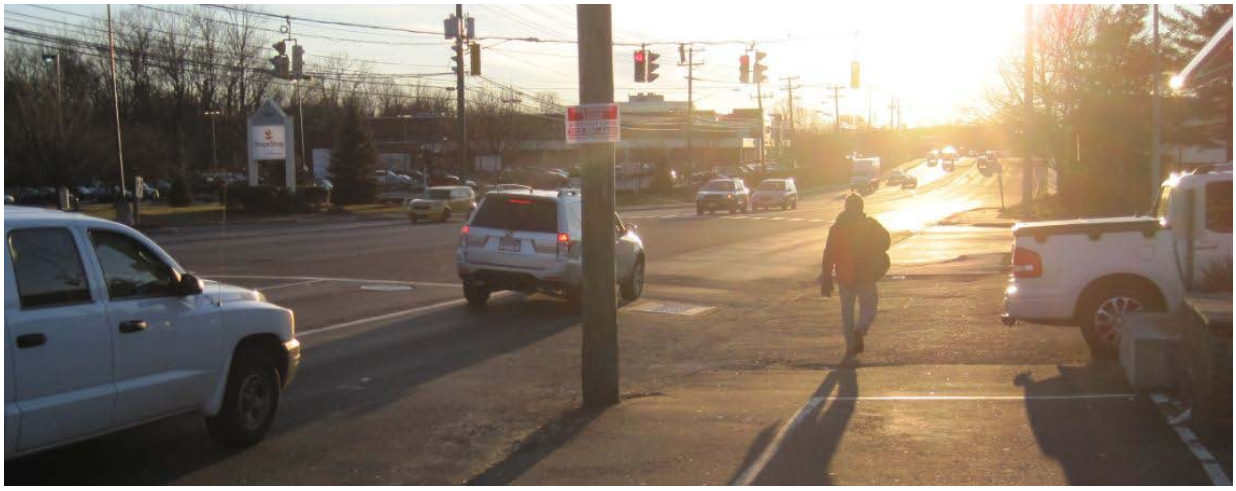
2 Norwalk: US 1 (Connecticut Avenue) from Keeler Avenue to I-95 S Exit 14



Stop and Shop Intersection

This 1.1 mile commercially zoned section of US 1 between Richards Avenue and the I-95 exit 14 interchange is the most heavily travelled of all the corridors in the study, with an ADT of over 25,000 vehicles. The alignment of this corridor is straight, and the typical section includes two through lanes in each direction and additional turn lanes at intersections. In many locations, the roadway width is 70 to 80 feet. The posted speed limit is 35 miles per hour, but observed travel speeds appear much higher.

Big box stores line this section, and are set back around 200 feet from the curb. The area between the curb and the buildings is generally surface parking.

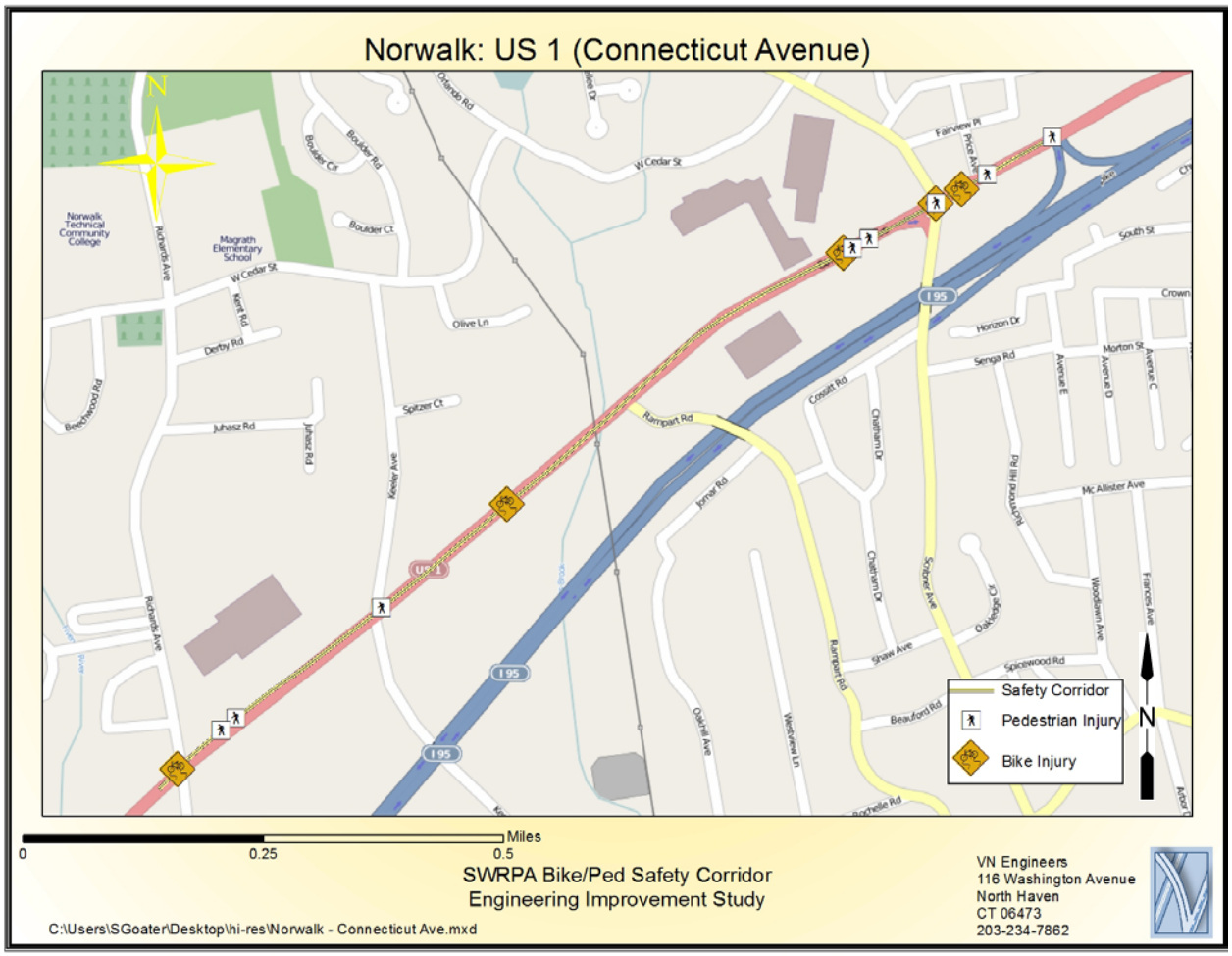


Figure 3: Bicycle/Pedestrian Accident Locations for Norwalk US 1 (Connecticut Avenue) Corridor

Table 3: Bicycle/Pedestrian Accident Data for Norwalk US 1 (Connecticut Avenue) Corridor

Length (miles)	Ped. Accidents	Ped Accidents/mile	Bike Accidents	Bike Accidents/mile	Total Accidents/mile
1.1	9	8.2	5	4.5	12.7

The *South Western Region Bicycle and Pedestrian Plan* identified and recommended countermeasures for the following two priority locations:

- ***US 1 (Connecticut Avenue) from Scribner Avenue intersection to Rampart Road.*** Improve Lighting and re-paint crosswalks
- ***US 1 (Connecticut Avenue) between Prince Avenue and I-95 Interchange 14.*** Complete Sidewalks.

2.1 Existing Conditions


Incomplete sidewalk network at northern end of corridor

Sidewalks along this corridor are generally 7 feet in width, and in good condition. Some sidewalks are separated from travel lanes by a landscaped buffer area. However, the sidewalk network is discontinuous along both the northbound and southbound sides of the street and surface parking lots or landscaped areas function as makeshift sidewalks in these locations. Near I-95 interchange 14 (at the north end of corridor) sidewalks are missing on both sides of the street. Sidewalks will be added north of Scribner Avenue as part of State project number 102-278, which should begin construction in 2012 or 2013. There is no on-street parking along this corridor.


125-foot pedestrian crossing over Keeler Avenue

There are five striped crosswalks at signalized intersections across US 1, and some crosswalks are striped over side streets. The distance between crosswalks is up to 1,300 feet. Crossing distances over US 1 are generally 80 feet. Multiple turning lanes, skewed approaches, and large curb-return radii contribute to crossing distances over side streets being much longer (125 feet across one leg of the Keeler Avenue intersection).


Pedestrian crossing at unmarked location

Crosswalks are not striped over business driveway entrances, although some of these crossings are substantial and signalized. For example, pedestrians must cross 80 feet (five lanes) at the parking lot entrance to the Barnes and Noble/Shop Rite shopping plaza.

A walk audit was conducted in the corridor in January, 2012. Critical observations noted include:


Intimidating environment for cyclists

- High levels of pedestrian activity
- Low levels of pedestrian comfort, suggesting that pedestrians and cyclists observed in this corridor may have no access to another travel mode for their journey
- Pedestrians crossing at unmarked locations
- No on-street bicycle infrastructure. Multiple, wide travel lanes, frequent parking lot driveways crossing the sidewalk, and large curb-return radii make this section extremely hazardous for cyclists who chose to use this road.


Cyclists using pedestrian infrastructure

- Cyclists in this area were observed using the sidewalks and crosswalks to travel.

2.2 Recommended Safety Improvements

Re-engineering this corridor to become a truly safe, walkable urban thoroughfare will require long-term planning and zoning changes that limit surface parking lots and encourage denser, mixed-use development that is more conducive to pedestrian activity. In the near term, however, some simple changes would improve the safety of the section considerably. Safety improvements are summarized in Table 4 and described in detail as follows:

- Improve pedestrian accommodations at intersections, particularly signalized driveways and at the Scribner Drive intersection. Install or replace curb ramps, crosswalk striping, push buttons, and pedestrian signal heads and adjust signal timings as needed. Add crossings over as many intersection legs as possible.
- Eliminate areas of continuous driveway access and consolidate driveway access where possible to reduce the number of conflict areas with pedestrians. Particular areas of concern include the northbound side of Connecticut Avenue north of the Kohl's shopping center access driveway (since no sidewalk is provided on the southbound side of that section) and on both sides of Connecticut Avenue north of Scribner Avenue.
- Complete the pedestrian network by installing sidewalks where they are currently missing (they will be added north of Scribner Avenue as part of an upcoming State Project).
- Consider removal of the 150-foot southbound US 1 right-turn lane into the Kohl's shopping center access driveway in order to construct a sidewalk. Figure 4 shows this possible improvements in the vicinity of this intersection including the removal of the southbound right-turn lane.

View of southbound right turn lane proposed for replacement with a sidewalk

- Reconfigure the Keeler Avenue intersection to include a channelizing right-turn island for the US 1 southbound right-turn lane, which will reduce crossing distance on the Keeler Avenue leg, act as a refuge for pedestrians, and allow for the addition of a crosswalk over US 1 on the north leg.
- Ensure future medians constructed on side street and driveway approaches extend far enough into the intersection to provide refuge areas for pedestrians, instead of being terminated in advance of a crosswalk. Also, extend existing medians as intersections are upgraded.
- If and when major roadway reconstruction or widening is planned, consider the addition of a raised median and bike lanes.

Table 4: Recommended Actions to Improve Safety for Norwalk US 1 (Connecticut Avenue) Corridor

Improvement	Location	Time to Implement	Cost	Priority
Improve pedestrian accommodations at signalized intersections	Throughout corridor, particularly signalized driveways and Scribner Avenue	0-2 years	<$100K	High
Reconfigure access driveways	North of Kohl's shopping center access drive and north of Scribner Avenue	3-5 years	$100K-$2M	Moderate
Install sidewalks to complete pedestrian network	Throughout corridor	0-2 years	<$100K	High
Remove right-turn lane and replace with sidewalk	Southbound approach to Kohl's shopping center access driveway	3-5 years	$100K-$2M	High
Add channelizing island for right-turn lane to act as pedestrian refuge	Southbound right-turn lane at Keeler Avenue	0-2 years	<$100K	Moderate
Extend existing medians to act as pedestrian refuges	On side street and driveway approaches	0-2 years	<$100K	Moderate
Add raised median and bike lanes with future widening	Throughout corridor (and beyond)	>10 years	>2M	Low

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Figure 4: Conceptual Improvements for US 1 at Kohl's Shopping Center Access Driveway Intersection
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South Western Regional Planning Agency

3 Norwalk: Main Street from Ward Street to Cross Street

School children crossing Main Street near Union Avenue intersection

This 0.8-mile corridor runs along Main Street in Norwalk, between the Ward Street intersection in the north and the intersection with US 1 (Cross Street/North Avenue) in the south. There is a mix of land uses in the corridor including auto-oriented strip development, village center type commercial, multi-family housing, and small office buildings. The street is part of a fairly well defined grid network with block lengths generally around 300 feet. This corridor has the lowest ADT of all the corridors (14,100 vehicles per day) and a posted speed limit of 30 miles per hour.

The northern Section, from Ward Street to New Canaan Avenue (0.2 miles long) is comprised of a 60-foot right-of-way that includes two 10-foot travel lanes in each direction, 5 to 7 foot wide sidewalks on both sides of the roadway, striped two-foot wide shoulders, and no on-street parking.

The Southern Section runs from New Canaan Avenue to Cross Street/North Avenue (0.6 miles long). This section is comprised of a 55-foot right-of-way that includes 40 feet of roadway width accommodating one travel lane in each direction and on-street parking on both sides. Sidewalks of varying widths are also provided on both sides of the street.

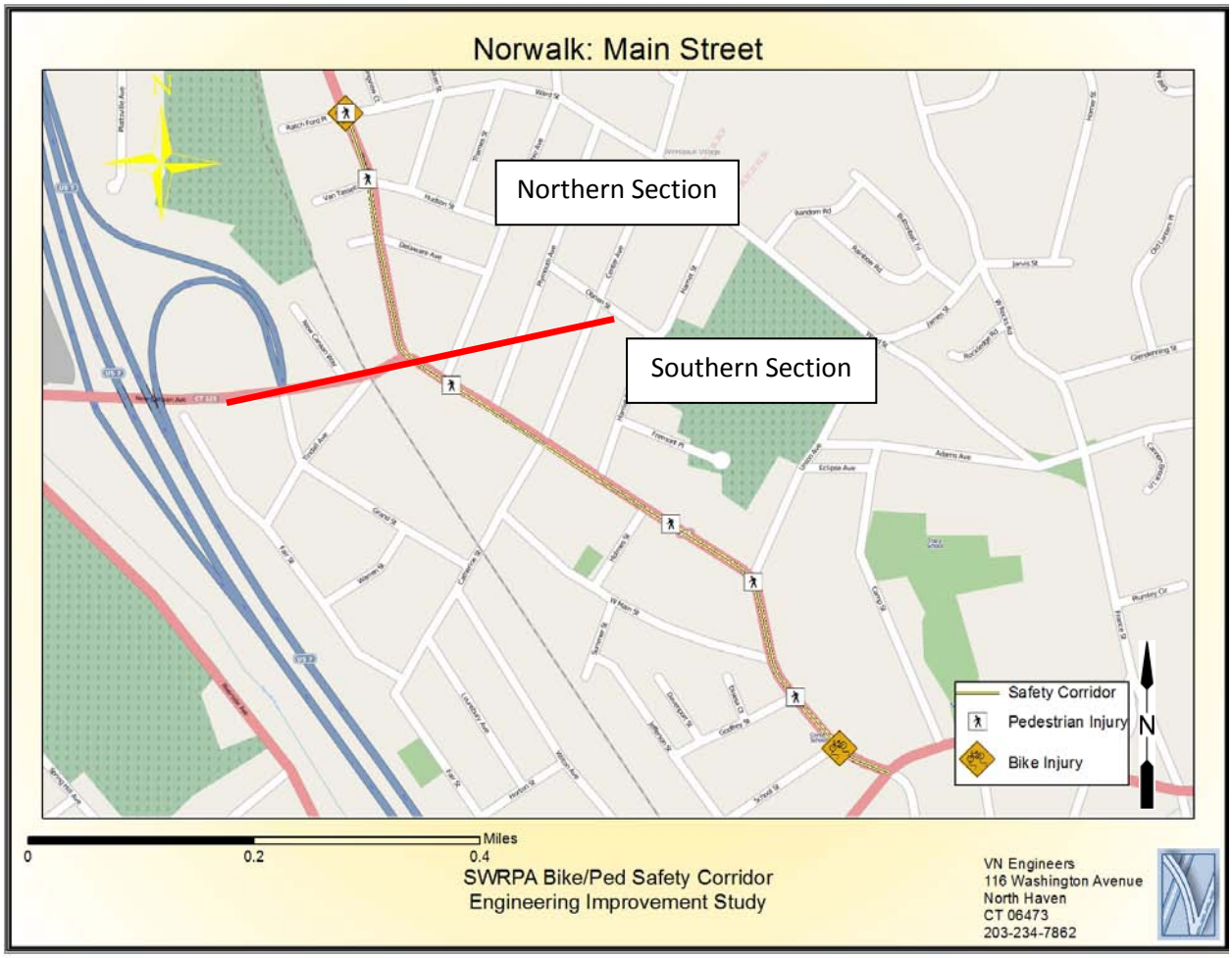


Figure 5: Bicycle/Pedestrian Accident Locations for Norwalk Main Street Corridor

Table 5: Bicycle/Pedestrian Accident Data for Norwalk Main Street Corridor

Section	Length (miles)	Ped. Accidents	Ped Accidents/mile	Bike Accidents	Bike Accidents/mile	Total Accidents/mile
Northern	0.2	3	15	1	5	20
Southern	0.6	4	6.7	1	1.7	8.3
Total	0.8	7	8.8	2	2.5	11.3

Although no priority locations were identified, the *South Western Region Bicycle and Pedestrian Plan* recommended the following countermeasures:

- Mark or remark crosswalks,
- Add bulb outs at intersections

3.1 Existing Conditions

High pedestrian comfort just south of Center Avenue

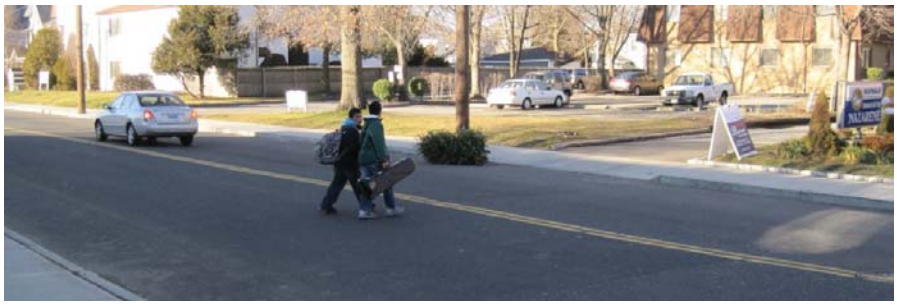
Sidewalks are generally 6 to 7 feet in width, and the sidewalk network is complete along the length of the corridor. However, sidewalk quality and pedestrian comfort vary considerably. New sidewalks have recently been installed along most blocks between New Canaan Avenue and Cross Street/North Avenue. The reported crash rates predate these recent improvements and therefore do not account for their impact on safety conditions. Pedestrian comfort is highest where there is a 13-foot parking-protected sidewalk on the northbound side of the street between Plymouth Avenue and Center Avenue. Pedestrian comfort and safety is reduced at locations where wide driveways cross the sidewalk, there is no on-street parking and effective sidewalk width is reduced.

Low pedestrian comfort near Plymouth Avenue

Striped crosswalks over Main Street that vary from 50 to 65 feet in width are currently provided at the following signalized intersections: Ward Street, New Canaan Avenue, Center Avenue, Union Avenue, and Cross Street. The distance between crossings along Main Street ranges between 700 and 1,100 feet. Crosswalks are not present over cross streets at unsignalized intersections in the corridor, although most locations feature ADA compliant curb ramps.

Typical side street crossing

Pedestrians observed on this corridor were mainly schoolchildren walking home after being dropped off by the bus. Pedestrians used sidewalks, but did not go out of their way to use the marked crossings.



Pedestrians crossing near Holmes Street intersection

There is no designated bicycle infrastructure along this corridor and Main Street is not currently identified as a bicycle corridor in the *Norwalk Pedestrian and Bikeway Transportation Plan.* Since Main Street north of New Canaan Avenue provides a major link to interchange 40 of the Merritt Parkway, it may not be possible or desirable to reduce the number of lanes in this section to provide more bicycle

accommodations. However, this section can be re-evaluated if traffic patterns evolve and as bicycle infrastructure throughout Norwalk becomes more developed.

3.2 Recommended Safety Improvements

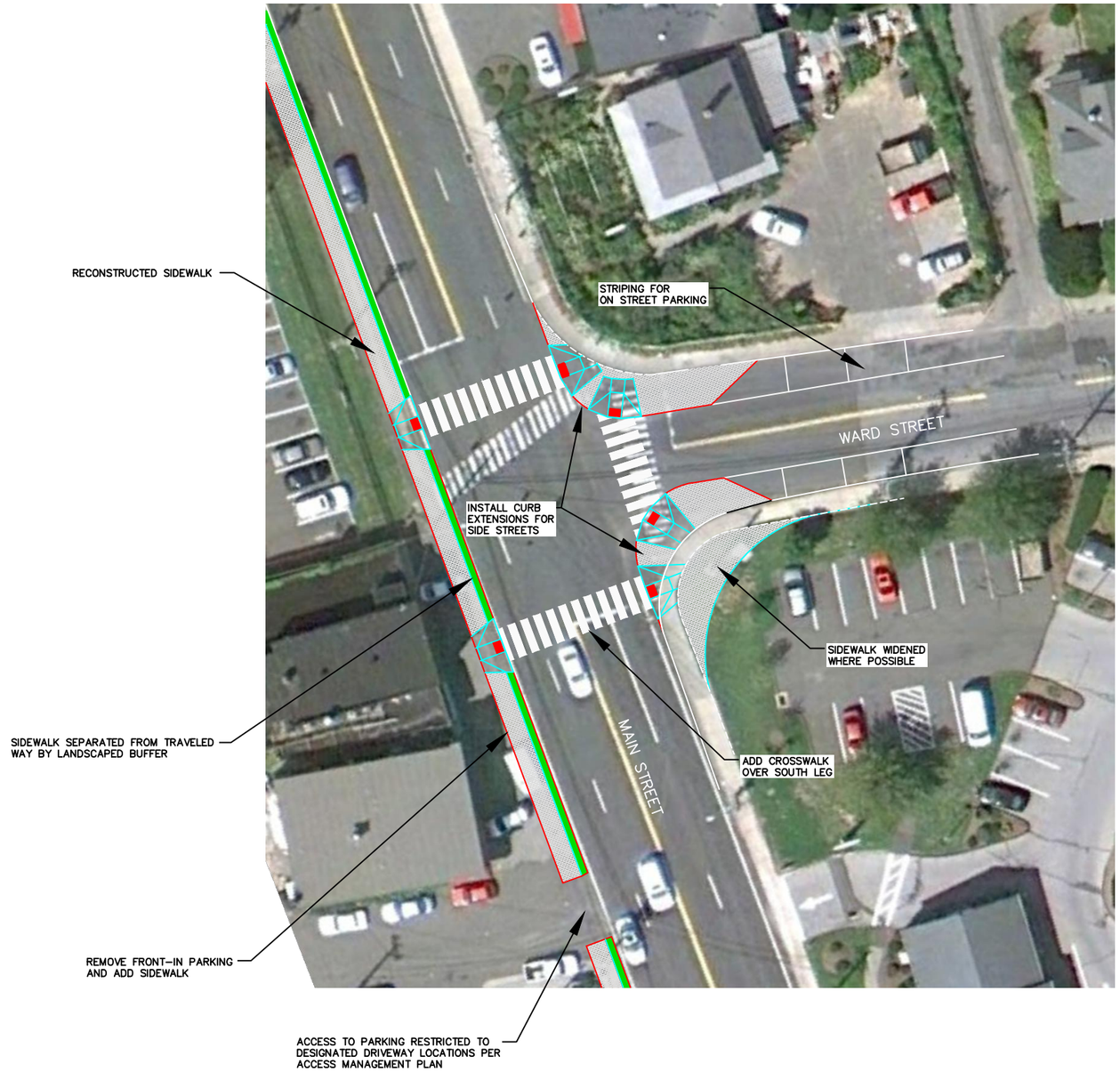
Recent improvements to the pedestrian infrastructure (sidewalks) have been made in this corridor. Monitoring the crash patterns over the next several years will provide important information on whether safety conditions have improved. In addition to improvements that have already been made, recommended pedestrian and bicycle improvements are summarized in Table 6 and described in detail as follows:

- Improve pedestrian accommodations at signalized intersections, particularly at Ward Street, New Canaan Avenue, Union Avenue, and Cross Street. Add crossings over as many legs as possible and install or replace curb ramps, crosswalk striping, push buttons, and pedestrian signal heads and adjust signal timings as needed.
- If an alternative parking area is available, remove angled parking with continuous access on the southbound side of Main Street at its intersection with Ward Street and replace it with a sidewalk.
- The Ward Street intersection has been the location of two pedestrian, and one bicycle crash, and has been designated a priority intersection by SWRPA. In addition to upgrading pedestrian accommodations at the intersection and adding a sidewalk on the southbound side of the roadway as mentioned above, consider installing curb extensions on Ward Street to increase pedestrian visibility and reduce crossing distance. Figure 6 shows conceptual improvements for this location.
- Improve quality of sidewalks in areas with damaged or non-existent curbing or poor surface quality between Ward Street and New Canaan Avenue, similar to the recent sidewalk improvements installed in the southern section of the corridor. Areas that need particular attention include both sides of the roadway south of Hudson Street, the southbound side of the roadway south of Van Tassell Court, and the northbound side of the roadway south of Delaware Avenue.
- Install curb extensions in the southern part of the corridor where on-street parking is allowed. In particular, consider the intersections with Center Avenue, Holmes Street, and Union Avenue. This would improve visibility for pedestrians at these crossings, better define parking areas, and slow traffic in this section. The addition of a marked crosswalk at the Holmes Street intersection could also be considered as a future improvement if further safety improvements are needed.
- Provide visual and physical separation between sidewalks and paved parking areas with the addition of planter boxes, bollards, curb stops, or other markers to provide a greater level of pedestrian comfort by defining the space for pedestrians and guiding vehicles to correct driveway locations. Areas to consider include the northbound side of the roadway south of Hudson Street, the southbound side of the roadway north of New Canaan Avenue, the northbound side of the roadway at New Canaan Avenue, both sides of the roadway south of Center Avenue, the northbound side of the roadway north of Union Avenue, and on the southbound side of the roadway south of West Main Street.
- When properties are redeveloped, reduce driveway widths and consolidate access points where possible.

- Hudson Street and Delaware Avenue both have two travel lanes and two parking lanes and intersect with Main Street at 55-degree angles, creating long crossing distances for pedestrians. There was one pedestrian crash at the Hudson Street intersection for the time period reviewed. Consider installing curb extensions and crosswalks on these side streets to enhance pedestrian comfort and safety.

Table 6: Recommended Actions to Improve Safety for Norwalk Main Street Corridor

Improvement	Location	Time to Implement	Approx. Cost	Priority
Improve pedestrian accommodations at signalized intersections	Ward Street, New Canaan Avenue, Union Avenue, and Cross Street	0-2 years	<$100K	High
Replace angle parking with sidewalk	South of Ward Street	0-2 years	<$100K	High
Install curb extensions	Ward Street intersection	0-2 years	<$100K	Moderate
Reconstruct sidewalks	Between Ward Street and New Canaan Avenue	0-2 years	<$100K	High
Separate pedestrian space from vehicular space	Throughout corridor	0-2 years	<$100K	High
Reduce driveway widths and consolidate access points as corridor redevelops	Throughout corridor	>10 years	<$100K	Moderate
Install curb extensions	Hudson Street and Delaware Avenue intersections	0-2 years	<$100K	Moderate



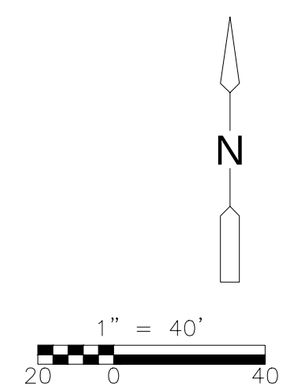


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Figure 6: Conceptual Improvements for Main Street at Ward Street Intersection

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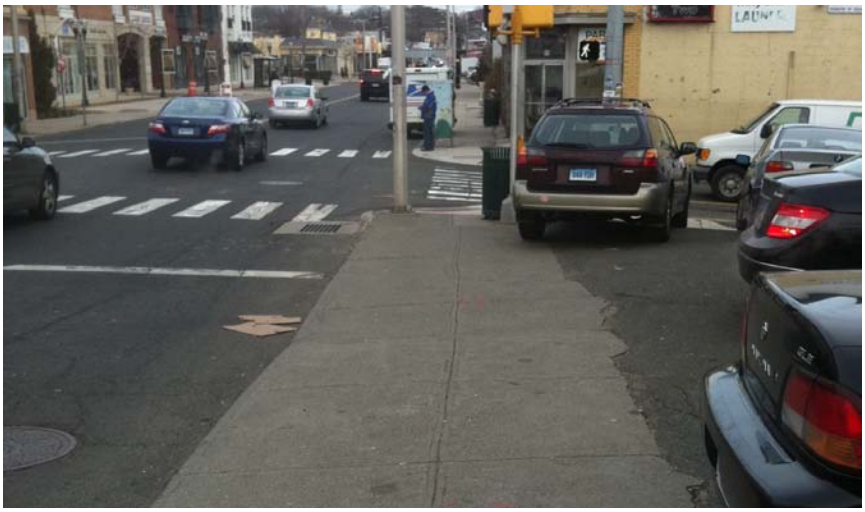
4 Stamford: US 1 (East Main Street) from Broad Street to Standish Road



Vehicles are able to cross the sidewalk at many locations along the northern section

This 0.9-mile long section of US 1 has the highest accident rate of any of the corridors in this study, with 30 reported bike and pedestrian crashes over a three-year period. Pedestrian activity is high in this section, due to the adjacent densely populated neighborhoods, and the wide variety of small businesses in the area.

The roadway, generally consisting of two 12-to-15 foot lanes each direction, narrows to one 20-to-25 foot lane (including on-street parking) each way in the vicinity of the rail bridge. There is a substantial grade change in the northern section, and the current 4-lane configuration contributes to high vehicular speeds, despite a posted 30 mile per hour speed limit.

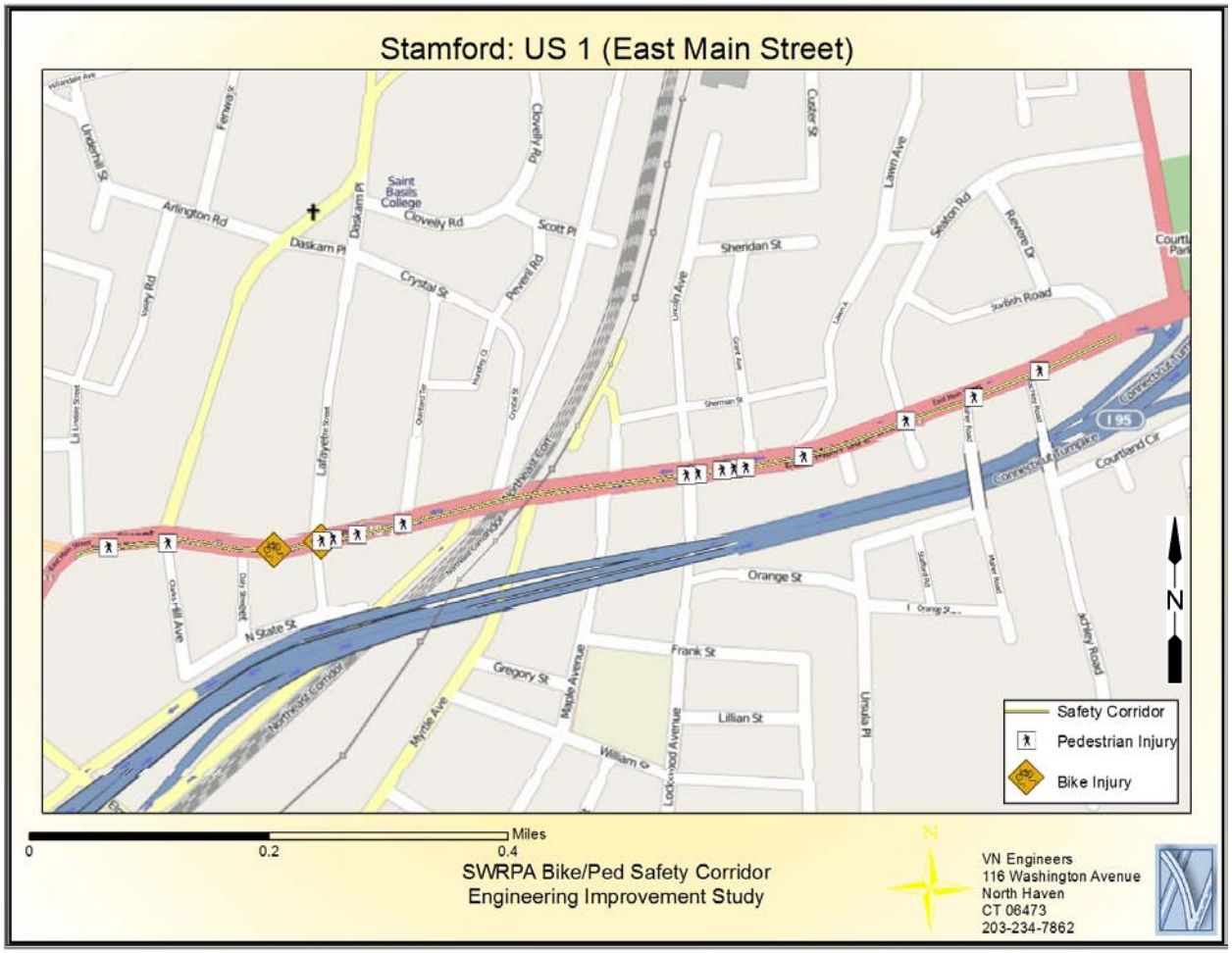


Figure 7: Bicycle/Pedestrian Accident Locations for Stamford US 1 (East Main Street) Corridor

There are significant accident clusters where the cross section changes from two lanes to one, in both directions. For example, there were 9 accidents reported in the 600-foot stretch between Lawn Avenue and Lincoln Avenue (a rate of 82 accidents per mile). These areas are complicated for both pedestrians and vehicles to navigate. Vehicles are turning in and out of driveways while through-moving traffic is merging. Pedestrians are highly exposed because of the number and configuration of driveways combined with the complex driving conditions.

Table 7: Bicycle/Pedestrian Accident Data for Stamford East Main Street Corridor

Length (miles)	Ped Accidents	Ped Accidents/mile	Bike Accidents	Bike Accidents/mile	Total Accidents/mile
0.9	26	32.2	4	4.4	33.3

The *South Western Region Bicycle and Pedestrian Plan* identified and recommended countermeasures for the following five priority locations:

- ***US 1 (East Main Street) at Lafayette Street intersection.*** This location has the highest number of bicycle and pedestrian crashes of all intersections in the South Western Region. Add leading

pedestrian interval or exclusive signal phase, better lighting, improved street markings and bicycle signage for lane merging area.

- ***US 1 (East Main Street) at Lockwood Avenue intersection.*** Improved lighting, re-paint crosswalks.
- ***US 1 (East Main Street) at Lawn Avenue.*** Improved lighting, re-paint crosswalks.
- ***US 1 (East Main Street) at Seaton Road.*** Add unsignalized striped crosswalk.
- ***US 1 (East Main Street) at Blachley Road.*** Improved lighting, re-paint crosswalks.

4.1 Existing Conditions

The sidewalk network along this corridor is almost complete, although there are numerous sections that are in very poor condition. The missing sections are located on the northbound side of the northern section. Pedestrian comfort is highest on the southbound side of the northern section, where the sidewalk condition is adequate, not interrupted by numerous driveways, and is separated from the roadway by a landscaped buffer area. The sidewalks in the more urban parts of the corridor have very low levels of pedestrian comfort and high levels of exposure to turning vehicles. Wide driveways and properties with continuous access and/or angle parking create large conflict areas where pedestrians risk being struck by turning or backing vehicles.

Worn in pedestrian footpath where sidewalk is missing

Deteriorated sidewalk conditions and unpredictable turning movements

There have been some recent improvements in the southern part of the corridor including the addition of "do not block intersection" cross hatch markings at the Glenbrook Road intersection, an upgraded sidewalk separated from the roadway by a tree-lined stamped brick buffer on the southbound side of East Main Street north of Glenbrook, and the addition of a raised median to prevent southbound left turns into the gas station on the corner of the Glenbrook Road intersection. Additionally, according to accounts from City staff and the *East Main Street Neighborhood Corridor Plan*, the Lafayette Street intersection used to be an area where day laborers would congregate and be picked up for work. Note that the reported crash rates do not take into account these recent changes that should have a favorable impact.

Jaywalking between Lockwood Avenue/Sherman Street and Lawn Avenue

There are crosswalks at six signalized intersections in the East Main Street corridor at Glenbrook Road/Clarks Hill Avenue, Lafayette Street, North State Street, Myrtle Avenue, Sherman Street, and Blachley Road. These crosswalks have pedestrian signal heads and concurrent pedestrian phases, but not all have accessible curb ramps. Crossing distances vary from 30 to 95 feet. The intersection of US 1 at Myrtle Avenue, which meets at a skewed angle creating an 85-foot crossing distance over the Myrtle Avenue leg, will be significantly reconstructed as part of Urban Transitway phase II. Distances between these crosswalks along East Main Street range from 400 to 1,500

feet. 'Unsafe Use of Highway by Pedestrian', was reported as a contributing factor in 10 of the 26 pedestrian crashes in this corridor. The distance between crosswalks, as well as the poor quality and comfort of sidewalks in some locations may account for the common occurrence of jaywalking and crashes involving pedestrians crossing at unmarked locations. This behavior was observed during the walk audit.


95-foot signalized crosswalk at Myrtle Avenue

There is a short bike lane section along southbound East Main Street between Glenbrook Road and Lafayette Avenue, although there is no bicycle stencil to identify it. Except for this segment, there is no other on-street bicycle infrastructure in this corridor and high motor vehicle traveling speeds and unpredictable turning movements create an intimidating environment for cyclists. All cyclists observed in this section were riding on the sidewalk.

4.2 Recommended Safety Improvements

It appears that many crashes involving bicycles and pedestrians along East Main Street stem in part from the poor access management that has evolved as the corridor developed. Ultimately this problem will require a comprehensive plan to manage redevelopment as it occurs. In the interim, however, there are a number of recommended improvements summarized in Table 8 and described in detail as follows:

- As a short-term improvement, provide visual and physical separation between sidewalks and paved parking areas with the addition of planter boxes, bollards, curb stops, or other markers to provide a greater level of pedestrian comfort by defining the space for pedestrians and guiding vehicles to correct driveway locations. In particular, examine areas and work with property owners between Glenbrook Road and North State Street as well as between Maple Avenue and Lawn Avenue.
- Improve quality of sidewalks throughout the corridor where there are areas with damaged or non-existent curbing or poor surface quality.
- Improve pedestrian accommodations at signalized intersections, particularly at Lafayette Street, North State Street, Sherman Street, and Blachley Road. Add crossings over as many legs as possible and install or replace curb ramps, crosswalk striping, push buttons, and pedestrian signal heads and adjust signal timings as needed.
- When the Myrtle Avenue intersection is reconfigured as part of the Urban Transitway phase II project, ensure accommodations are included at the intersection to improve safety and accessibility for pedestrians and cyclists such as those mentioned above.
- Although the City of Stamford does not typically use exclusive pedestrian phases, they are commonly used at signalized intersections on state-maintained roads throughout Connecticut. Their use should be reconsidered in Stamford throughout the City, particularly in high-risk pedestrian corridors such as US 1.
- Investigate the possibility of adding an unsignalized crosswalk over East Main Street at Seaton Road and/or Lawn Avenue if there is sufficient pedestrian demand at one of those locations. The

use of signage or flashing beacons should also be considered to alert drivers to the possible presence of pedestrians.

- Develop a plan to implement access management in the corridor. Driveway widths should be reduced and consolidated where possible. If current property owners are receptive, work with them to address safety issues that result from their access and parking configurations. In the future, require stricter standards for driveway designs in the corridor. According City of Stamford Officials, there is potential for redevelopment of the shopping plaza at the East Main Street at Lafayette Avenue intersection and for the redevelopment of parcels between Lafayette Avenue and the railroad bridge. Additionally, design of a new railway bridge is underway which will allow for widening of the roadway section underneath. These projects are all opportunities for pedestrian and bicycle improvements.
- Conduct analysis to investigate whether this corridor, along with adjacent sections, can be reconfigured to provide two through lanes and a raised median. The median will reduce the number of turning movements mid block and limit the risk to pedestrians from driveway turning movements. Figure 8 shows a conceptual layout for this potential improvement between Sherman Street and Lawn Avenue.

Table 8: Recommended Actions to Improve Safety for Stamford East Main Street Corridor

Improvement	Location	Time to Implement	Cost	Priority
Separate pedestrian space from vehicular space	Throughout corridor	0-2 years	<$100K	High
Reconstruct sidewalks	Throughout corridor	0-2 years	<$100K	High
Improve pedestrian accommodations at signalized intersections	Lafayette Street, North State Street, Sherman Street, Blachley Road	0-2 years	<$100K	High
Ensure pedestrian accommodations are included in intersection reconstruction	Myrtle Avenue	0-2 years	<$100K	High
Reconfigure signal phasing to include exclusive pedestrian phase	Throughout corridor	0-2 years	<$100K	High
Develop access management plan	Throughout corridor	0-2 years	<$100K	High
Study option to install a raised median	Throughout corridor and beyond	0-2 years	<$100K	Moderate

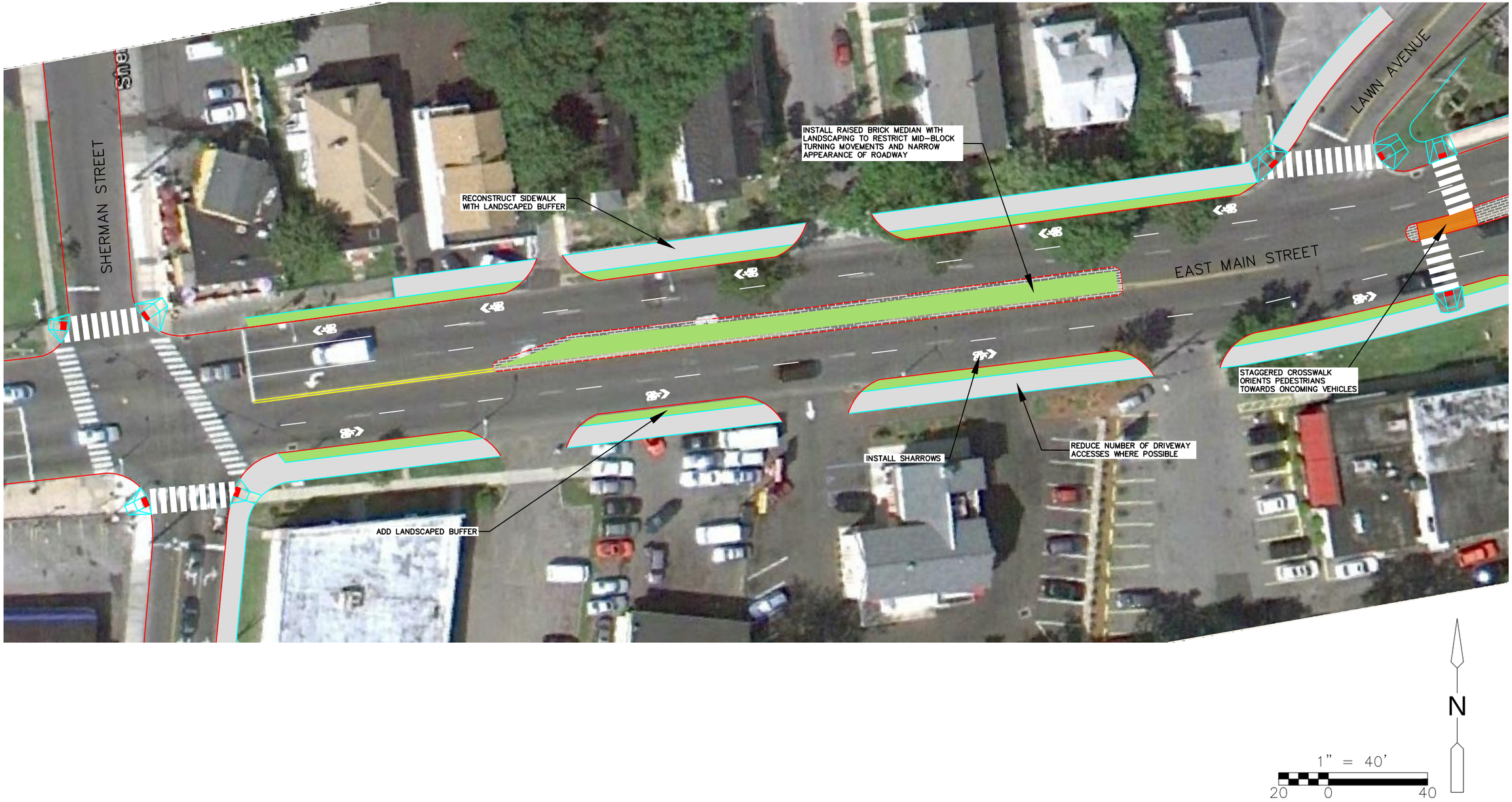


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Figure 8: Conceptual Improvements for US 1 between Sherman Street and Lawn Avenue

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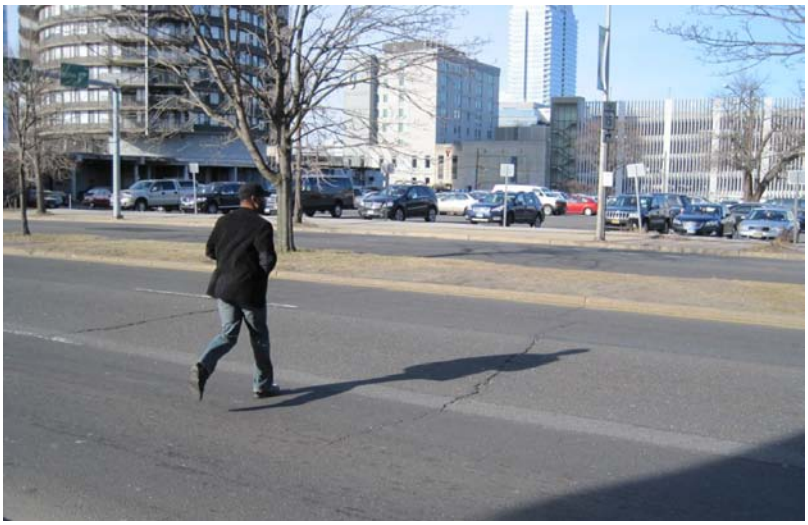
5 Stamford: US 1 (West Main Street and Tresser Boulevard) from Spruce Street to the Marriott Hotel



Pedestrian crossing at unmarked mid-block location between Washington Boulevard and Atlantic Street

Although this entire corridor is designated as US 1, it consists of two distinct roadway sections. The southern section, West Main Street between Spruce Street and Greenwich Avenue, is a short (0.18 mile) segment. The general land use pattern here is dense, with neighborhood type land uses and buildings fronting the sidewalks. There are a range of commercial businesses on the northbound side of the street, and a dense townhome/condominium development on the southbound side of the street. Blocks are small at approximately 300 feet in length. The 50-foot roadway cross section includes 6-foot sidewalks on each side of the street and a 38-foot roadway with one travel lane in each direction and parking on both sides. There is a substantial grade change sloping down to the north and the posted speed limit along this section is 25 miles per hour.

The northern section, Tresser Boulevard between Greenwich Avenue and Canal Street, serves Stamford's Central Business District, is 0.6 miles in length and larger in scale than the southern section. The 100-foot wide roadway section includes 10-foot sidewalks on each side of the street, a 15-foot median, and three 10 to 12-foot travel lanes each direction. Left-turn lanes are provided at intersections by reducing the median width. Adjacent land uses include large office buildings and a shopping mall. The posted speed limit in this section is 30 miles per hour.

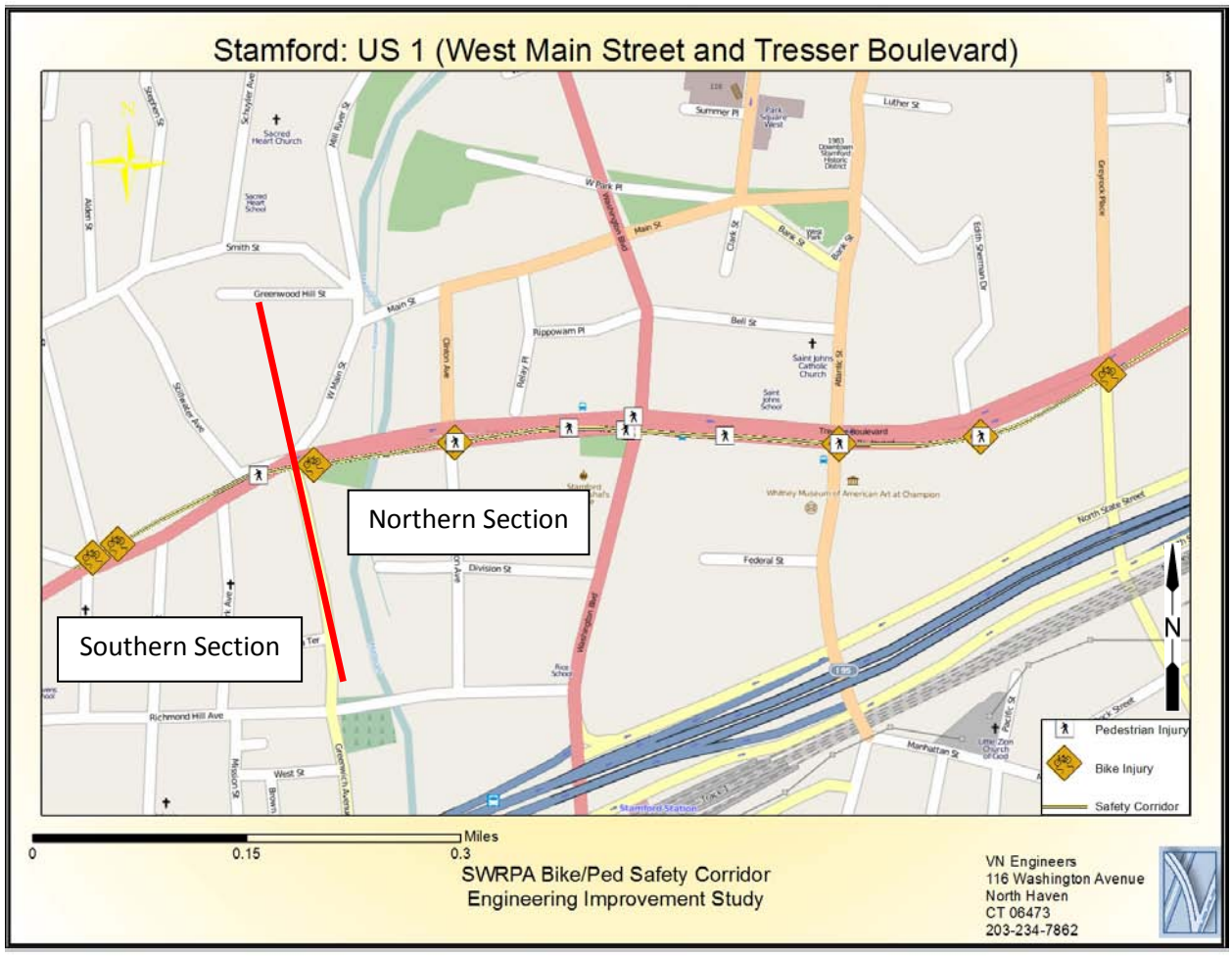


Figure 9: Bicycle/Pedestrian Accident Locations for Stamford US 1 (Tresser Boulevard) Corridor

Table 9: Bicycle/Pedestrian Accident Data for Stamford US 1 (Tresser Boulevard) Corridor

Section	Length (miles)	Ped. Accidents	Ped Accidents/mile	Bike Accidents	Bike Accidents/mile	Total Accidents/mile
West Main St	0.18	1	5.6	2	11.1	16.7
Tresser Blvd	0.62	8	12.9	6	9.7	22.3
Total	0.8	9	11.3	8	10	21.3

Five priority locations were identified and the following countermeasures were recommended for this corridor in the *South Western Region Bicycle and Pedestrian Plan*. They are as follows:

- ***US 1 (West Main Street) at Stillwater Avenue intersection.*** Better lighting, planned roundabout for adjacent US 1 (West Main Street) at Greenwich Avenue intersection.
- ***US 1 (Tresser Boulevard) at Atlantic Street.*** Add median islands on US 1.
- ***US 1 at access to mall parking garage between Atlantic Street and Greyrock Place.*** Improve signage.
- ***US 1 (Tresser Boulevard) at Greyrock Place.*** Replace channelized right-turn lanes with curb extensions and urban curb radii.

Portions of this corridor were analyzed in SWRPA's *Route 1 Greenwich-Stamford Study*, and the following changes were recommended:

- Create a consistent roadway section for US 1 (West Main Street) between Havemeyer Lane and Greenwich Avenue with one travel lane in each direction and a center turn lane or two-way left turn lane as applicable. Define parking areas with curb extensions.
- Install a 2/1 hybrid roundabout at US 1 (Tresser Boulevard) at West Main Street/Greenwich Avenue intersection

5.1 Existing Conditions

5.1.1 Southern Section - West Main Street

In this section, the sidewalks are in fair condition, and are generally 4 to 5 feet wide, although in some places the effective width is less due to as the placement of signs, and utility poles. The narrow effective width is problematic, as one of the reported accidents in this section involved a jogger using the road. The sidewalks are located directly behind the curb, and are buffered on the northbound side of the road from the travel lanes by a parking lane.


Narrow effective sidewalk width

The sidewalk has recently been improved and widened to around 9 feet in width towards the Greenwich Avenue intersection. Though narrow, pedestrian refuge islands are provided in the median at this location. Recent improvements have also been made at that intersection to eliminate the channelized northbound and southbound right-turn lanes. The crash rates reported pre-date these improvements.

There are three crosswalks over US 1 (West Main Street), located at the intersections with Hazel Street/Spruce Street, Stillwater Avenue, and Greenwich Avenue. These crosswalks are signalized, and have concurrent pedestrian phases.


Recently improved pedestrian infrastructure at Greenwich Avenue intersection

Crosswalks across side streets at unsignalized intersections with Ann Street and Rose Park Avenue are marked, but are in very poor condition. The small turning radii and short crossing distances limit pedestrian danger at these locations. Crosswalks are not present across Spruce Street or the 30-foot wide residential unit driveways.

The dense and diverse land use in this area results in consistently high pedestrian volumes. Pedestrians used the crosswalks, but many pedestrians were seen crossing mid-block between Spruce Street and Stillwater Avenue. Only one accident involving a pedestrian was reported for this section, near the Stillwater Avenue intersection.

Bicycling on the narrow sidewalks through this section would be difficult due to the proximity of storefronts, pedestrian activity, and the presence of signs and utility poles as previously mentioned. Vehicular speeds are low enough in this section that cyclists can share roadway facilities with some level of comfort on the downhill section. However, there are no existing on-street bicycle facilities in this section (no signs or markings) to reinforce a cyclist's right to use the roadway. This can result in cyclists riding in the 'door zone', on the wrong side of the road, or on the sidewalk. The two accidents involving bicycles in this section were recorded near the complex intersection of US 1 (West Main Street) at Hazel Street/Spruce Street.

5.1.2 Northern Section - Tresser Boulevard

In this section, continuous sidewalks are provided on both sides of the roadway. They are 10 feet wide and in good condition, but are not buffered from the vehicle travel lanes.

Pedestrian crossing at mid-block location

Crosswalks are striped across all legs of signalized intersections, but the high number of accidents reported at intersections in this corridor suggests that there are safety deficiencies with the intersection layout or signal operation. Crossing distances at crosswalks are large (85 to 95 feet) and no exclusive pedestrian phases are provided. Instead, pedestrian phases are concurrent with through and permitted turning movements, which can make crossing at such a large intersection dangerous and stressful since traffic conditions can change in the large amount of time it takes to cross the roadway. Pedestrians were observed using the curbed medians at intersections as refuge islands. Most medians in the corridor do not extend past the crosswalk, so they cannot be utilized by the disabled. There were also high numbers of pedestrians observed crossing at mid-block locations, where wide medians act as a refuge, and traffic movements are less complicated. This could be due to the long distances between signalized crossings as well as the limited accommodations at those intersections.

Shared turning and Pedestrian phase at crosswalks over Tresser Boulevard

There is currently no existing infrastructure to indicate where cyclists should ride or that bikes have any right to be in the travel lane. Although the posted speed limit is 30 miles per hour, the roadway layout allows for much higher vehicular speeds, and so cyclists observed in this section were all riding on the pedestrian sidewalk.

5.2 Recommended Safety Improvements

Safety improvements are discussed for the two corridor segments in the following sections and are summarized in Table 10.

5.2.1 Southern Section

A number of actions can be undertaken to address the issues identified in the southern section of the corridor. These include:

- Install curb extensions on US 1 (West Main Street) at intersections along the section to define parking areas, reduce crossing distances and increase pedestrian visibility. This will also ensure that vehicles do not park too close to crosswalks or in intersections as was observed near Stillwater Avenue.
- Repair street surface where needed. In particular, significant damage was observed in a crosswalk at Rose Park Avenue. Poor road conditions are particularly dangerous for cyclists, but also limit accessibility for people using wheelchairs or strollers.
- A consistent roadway section was proposed in the *Route 1 Greenwich-Stamford Study*, for the segment between Havemeyer Lane and Greenwich Avenue. Any change to the existing roadway section should include the addition of bicycle accommodations. If the section will change, the addition of bike lanes is recommended.
- If the existing roadway section will be retained, speeds are low enough in this section that the installation of sharrows should be considered for alerting cyclists and vehicle drivers to the correct location for bicycles to operate and to reinforce their right to use the roadway. Installation of sharrows, or any bicycle facility, in this section should be consistent with adjacent sections of US 1 to the south. As a later improvement, bike boxes could be added at intersections.

Poor crosswalk condition over Rose Park Avenue

- As was stated in other studies, the design of a roundabout is being pursued for the intersection of US 1 (West Main Street) at Greenwich Avenue. Special attention should be made to accommodate pedestrians and bicycles in that design.
- Reevaluate the layout and operation of the intersection of US 1 (West Main Street) at Spruce Street/Hazel Street since the bicycle accidents in this section occurred at or near this location. The five legs and skewed angles may be contributing to some unexpected driver and bicycle movements.

5.2.2 Northern Section

Recommendations for the northern section of this corridor are as follows:

- Since most of the crashes involving pedestrians were reported at signalized intersections with crosswalks, push buttons, and pedestrian signal heads, the signal phasing and timing should be evaluated. In particular, the interaction between pedestrians and left-turning vehicles (during permitted phases) seemed to be problematic. Consider the use of exclusive pedestrian phases

instead of concurrent phases, as are used extensively throughout Connecticut, or consider the use of protected-only left turn phasing.

- Consider the removal of exclusive right turn lanes on side streets, replacing them with curb extensions, and on-street parking. Specific locations to consider include the right-turn lanes at the Washington Boulevard intersection, the right-turn lane at Atlantic Street intersection, and the right-turn lane at the Greyrock Place intersection. Curb extensions could also be installed on Clinton Avenue, where on-street parking already exists. There is a heavily used bus stop on the south leg of Washington Boulevard in advance of the intersection with Tresser Boulevard. The installation of a curb extension at this location is not recommended due to the heavy use of this lane by buses and vehicles. Figure 10 shows a conceptual layout including this and other improvements for the US 1 at Washington Boulevard intersection.
- Evaluate the potential for extending medians further into signalized intersections to provide refuges for pedestrians and to reduce vehicular turning speeds. Particular locations to consider are the Clinton Avenue intersection, the Washington Boulevard intersection, the Atlantic Street intersection, the Edith Sherman Drive intersection, and the Greyrock Place intersection.
- Many pedestrians were observed crossing mid-block between Washington Boulevard and Atlantic Street. There are currently large apartment complexes with surface parking lots in this area, but there are plans to redevelop the buildings and parking lot on the southbound side of the street. Redevelopment in this area will change pedestrian patterns and provide an opportunity for directing pedestrians to signalized crossings with appropriate site design. If it is anticipated that the existing walking patterns in this area will continue for a while, an evaluation should be done to determine where pedestrians are coming from and going to, in order to determine appropriate measures to discourage or accommodate mid-block crossing.
- While the section of US 1 south of Greenwich Avenue has two travel lanes and US 1 north of Elm Street has four, the one-mile section between Greenwich Avenue and Elm Street has six travel lanes. Consider conducting a study to investigate if a road diet could be implemented to remove two travel lanes (one in each direction). This would allow for the addition of curb extensions at intersections and on-street parking or a buffered bike lane mid block. This will improve safety for pedestrians and bicyclists and help create a more human scale in this corridor.

Table 10: Recommended Actions to Improve Safety for Stamford US 1 (Tresser Boulevard) Corridor

Improvement	Location	Time to Implement	Approx. Cost	Priority
Southern Section				
Install curb extensions	Throughout southern section	3-5 years	$100K-$2M	Moderate
Repair street surface	Rose Park Avenue intersection	0-2 years	<$100K	High
Include bike lanes if the typical roadway section changes	Throughout southern section (and further south)	>10 years	>$2M	Low
Install sharrows	Throughout southern section	0-2 years	<$100K	Moderate
Ensure pedestrians and bicycles are accommodated in roundabout design	Greenwich Avenue	3-5 years	<$100K	High
Re-evaluate intersection layout	Spruce Street/Hazel Street	0-2 years	<100K	High
Northern Section				
Evaluate signal phasing for pedestrian accommodation	Throughout northern section	0-2 years	<$100K	High
Remove right turn lanes from side streets and replace with curb extensions	Clinton Avenue, Washington Boulevard, Atlantic Street, Greyrock Place	3-5 years	$100K-$2M	Moderate
Extend medians past crosswalks to provide pedestrian refuges	Clinton Avenue, Washington Boulevard, Atlantic Street, Edith Sherman Drive, Greyrock Place	0-2 years	<$100K	Moderate
Evaluate pedestrian crossing	Between Washington Boulevard and Atlantic Street	0-2 years	<$100K	Moderate
Study option to implement road diet	Throughout northern section	0-2 years	<$100K	Moderate

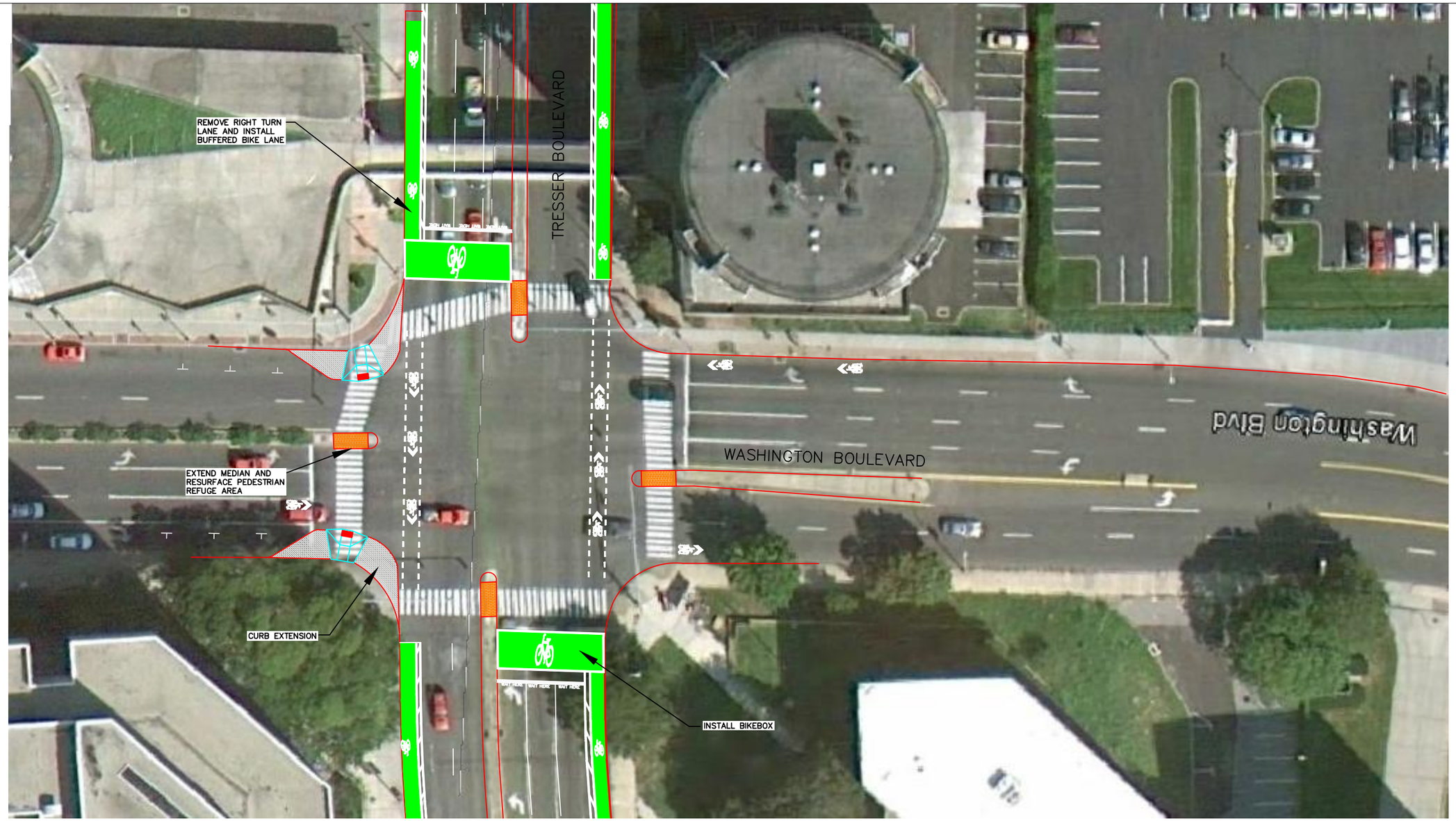


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Figure 10: Conceptual Improvements for US 1 at Washington Boulevard Intersection

Bicycle-Pedestrian Safety Corridors Study

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6 Stamford: CT 493 and CT 137 (Washington Boulevard) from Station Place to Broad Street

South State Street intersection looking West

This 0.66-mile section of Washington Boulevard stretches between Station Place in the south and Broad Street in the north. The 80 to 100-foot roadway section generally consists of four travel lanes with turn lanes at intersections, striped or raised medians in most areas, and 10-foot sidewalks on both sides. Block lengths are between 300 and 500 feet long in the southern section, and 700 to 1,000 feet long in the northern section. Stamford Transportation Center, the busiest train station in Connecticut, is located at the southern end of this corridor, adjacent to the Station Place intersection. North of this intersection, Washington Avenue runs under the rail station platforms, intersects the northbound frontage road (McCullough Street/South State Street), runs under the I-95 mainline, and intersects the I-95 southbound frontage road (North State Street) and on-ramp before continuing north towards downtown Stamford. This corridor also includes an intersection with Tresser Boulevard, a separate corridor evaluated in Section 5 of this report.

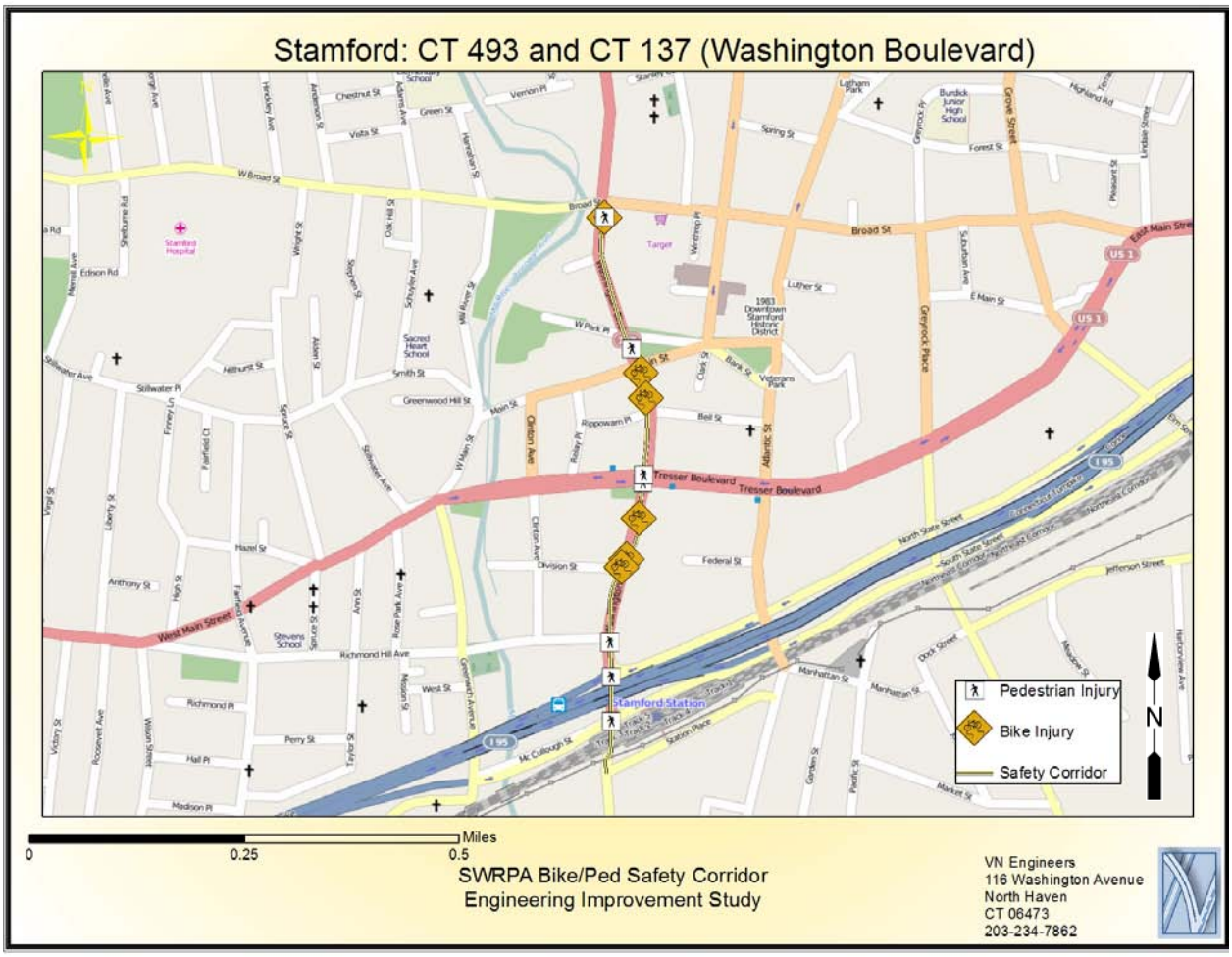

Figure 11: Bicycle/Pedestrian Accident Locations for Stamford Washington Boulevard Corridor

Table 11: Bicycle/Pedestrian Accident Data for Stamford Washington Boulevard Corridor

Section	Length (miles)	Ped. Accidents	Ped Accidents/mile	Bike Accidents	Bike Accidents/mile	Total Accidents/mile
North of Tresser	0.33	7	21.2	4	12.1	33.3
South of Tresser	0.33	5	15.2	3	9.1	24.2
Total	0.66	12	18.2	7	10.6	28.8

Accident rates along Washington Boulevard are the second highest of any study corridor. This is likely due to the auto-centric street design and high vehicular speeds which conflict with the high levels of pedestrian activity along the roadway. Nearby pedestrian destinations include the Stamford Transportation Center, the UConn Stamford campus (just north of Broad Street), multiple office buildings, and commercial destinations on Main Street.

The *South Western Region Bicycle and Pedestrian Plan* identified and recommended countermeasures for the following three priority locations:

- ***Washington Boulevard at North State Street/Richmond Hill Avenue intersections.*** New office building was recently opened, developer agreed to make intersection and signal improvements. Future plans for roadway section include a median barrier to prevent mid-block pedestrian crossings.
- ***Washington Boulevard at Broad Street.*** Add median islands.
- ***Washington Boulevard entire corridor.*** Improve signage and pavement markings for bicycles, complete Mill River Greenway further north (to provide an alternate bike route).

6.1 Existing Conditions

Pedestrian infrastructure is highly variable through this section of Washington Boulevard. Sidewalk widths vary from five feet under the highway, to 25 feet in front of the UBS building (on the northbound side of the roadway north of North State Street). The placement of signposts in the sidewalk reduces the effective width of the sidewalk in some areas.

Narrow effective sidewalk width under rail bridge

Crossing distances over Washington Boulevard vary considerably in the corridor from 56 feet across the south leg of the Bell Street intersection to 125 feet across the south leg of the South State Street intersection, although most crossings are approximately 70 feet. Although some observed pedestrians opted to cross Washington Boulevard at mid-block locations, most used the available pedestrian infrastructure, and waited for the signal to cross.

There is no bicycle infrastructure in this corridor and the solitary cyclist observed in this section during the walk audit was riding on the sidewalk. According to City staff, however, there are plans to sign and mark sharrows in this corridor south of Tresser Boulevard as part of a TIGER grant.

6.2 Recommended Safety Improvements

This corridor varies considerably, providing access between major transportation facilities in the south (I-95, Stamford Station) and areas of downtown Stamford in the north. There are a number of improvements that can be made to enhanced non-motorized travel in the corridor which are summarized in Table 12 and described in detail as follows:

- Install a channelized right-turn lane on the eastbound approach of the South State Street intersection, similar to the one recently installed for the westbound approach of the North State Street intersection to act as a pedestrian refuge island.
- Consider removing exclusive right-turn lanes at intersections and replacing them with on-street parking and curb extensions. Particular locations to consider include: northbound, southbound and westbound approaches to the Broad Street intersection, and northbound and southbound approaches to Main Street. Figure 12 shows conceptual improvements to the Washington Boulevard at Broad Street intersection.

- Install sharrows and bicycle signage as planned south of Tresser Boulevard.
- Extend or install raised medians through crosswalks to act as pedestrian refuges and to reduce vehicle turning speeds. In particular, consider the south leg of the South State Street intersection, the north leg of the North State Street intersection, the north and south legs of the Main Street intersection, and the north and south legs of the Broad Street intersection.
- For improvements to the Tresser Boulevard intersection, see recommendations for the Tresser Boulevard corridor, included in section 5.2.2 of this report.
- Consider conducting a study to investigate removing one through lane from each direction between Station Place and North State Street to provide exclusive bicycle lanes for improving access to the Stamford Transportation Center. Although there may be some queuing problems in this area of closely spaced intersections, it appears that lanes are added and dropped through this section and that queues could be reorganized to shift further upstream, allowing for the removal of two through lanes. Providing dedicated bike lanes in this high-risk area of the corridor would complement the planned installation of sharrows north to Tresser Boulevard.

Table 12: Recommended Actions to Improve Safety for Stamford Washington Boulevard Corridor

Improvement	Location	Time to Implement	Cost	Priority
Install island for channelized right-turn lane to serve as pedestrian refuge	Eastbound approach to South State Street intersection	0-2 years	<$100K	Moderate
Remove right turn lanes from side streets and replace with curb extensions	Broad Street, Main Street	3-5 years	$100K-$2M	Moderate
Install sharrows as planned	South of Tresser Boulevard	0-2 years	<$100K	Moderate
Extend or install raised medians to act as pedestrian refuges	South State Street, North State Street, Main Street, Broad Street	0-2 years	<$100K	Moderate
Study option to remove one through lane from each direction	Between Station Place and North State Street	0-2 years	<$100K	Moderate

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Figure 12: Conceptual Improvements for Washington Boulevard at Broad Street Intersection
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Figure 13: Existing and proposed concept views looking South on Washington Boulevard at Broad Street

7 Downtown Westport: US 1 (Post Road) from Riverside Avenue to Compo Road

View from downtown area towards Riverside Avenue intersection

This 0.6-mile corridor runs along US 1 from the intersection with Route 33 (Riverside Avenue) to the intersection with Compo Road. The corridor's character changes from high-density town center land uses with commercial establishments along sidewalk frontages and consistently high pedestrian volumes near the Saugatuck River, to increasingly auto-oriented strip development towards Compo Road. The corridor serves approximately 20,000 vehicles per day and the existing posted speed limits vary from 25 to 30 miles per hour.

Right-of-way width is generally 60 feet, and includes 3 to 4 travel lanes, with sidewalks on both sides of the street. The roadway section generally includes 40 to 55 feet of travel lanes. Travel lane widths vary from 10 to 12 feet, and up to 20 feet where unmarked on-street parking is allowed. There are four 11-foot lanes across the Saugatuck Bridge, and two to three lanes through the Downtown area, where on-street parking is allowed. There is significant elevation change in the northern section of the corridor between Myrtle Avenue and Compo Road.

Improving pedestrian accommodations in this corridor will enhance safety and comfort for non-motorized travelers and make the area more attractive to economic development. This can be achieved using simple, cost effective improvements, such as reassigning underutilized street space, reducing pedestrian crossing distances, and adding on-street parking.

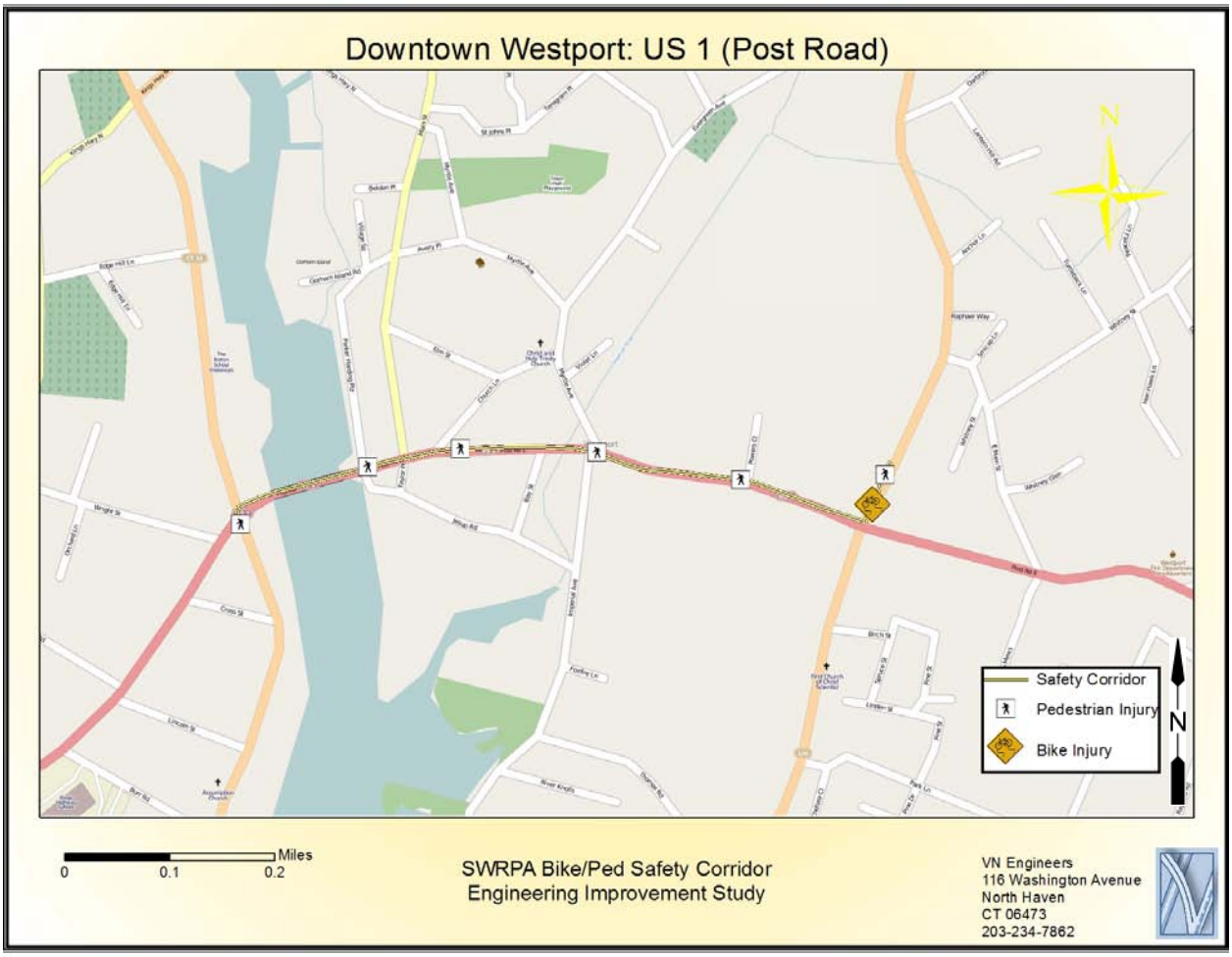

Figure 14: Bicycle/Pedestrian Accident Locations for Westport US 1 Downtown Corridor

Table 13: Bicycle/Pedestrian Accident Data for Westport US 1 Downtown Corridor

Length (miles)	Ped. Accidents	Ped Accidents/mile	Bike Accidents	Bike Accidents/mile	Total Accidents/mile
0.6	7	11.7	1	1.7	13.3

The *South Western Region Bicycle and Pedestrian Plan* identified and recommended countermeasures for the following three priority locations:

- ***US 1 (Post Road) at CT 33 (Riverside Avenue) intersection.*** Leading pedestrian interval, curb extension for the north leg sidewalk, add crosswalk over US 1 on south leg.
- ***US 1 (Post Road) entire corridor.*** Re-mark crosswalks, use more urban curb radii, add signage and street markings.

7.1 Existing Conditions


Poor visibility at crosswalk waiting area

The existing sidewalk network in the area is complete on both sides of the street, and is generally in good repair. The width is typically 6 feet, although effective width is reduced in places due to street features such as utility poles, newspaper dispensers, and signage. Street clutter contributes to safety issues and diminished functionality by reducing visibility between pedestrians and drivers, and causing pedestrians to stray into the road, particularly if sidewalks are crowded.


Parking protected, brick sidewalk

Sidewalks are protected from moving vehicles by on-street parking for roughly half of the corridor, between Main Street and Myrtle Avenue. The level of pedestrian comfort varies from very high on the wide, buffered brick sidewalks in the downtown area, to very low on narrow, more exposed sections. In the northern portion of the corridor pedestrians are vulnerable where sidewalks run adjacent to parking lots and roadways with no buffers to separate pedestrian space from vehicle space. Also contributing to hazardous conditions for pedestrians in this portion are wide driveways and a property (286 Post Road East) with continuous access and angle parking.


Parked vehicle obscuring pedestrian-driver visibility where parking is allowed up to crosswalk

There are crosswalks at 6 signalized locations and one unsignalized location in the corridor. A crosswalk has recently been removed from the corridor across US 1 between Church Lane and Main Street. During the walk audit, several pedestrians were observed crossing the 80-foot section of US 1 at this location, where demand seems to be high since it is the most direct route between the shopping destinations on Main Street, and on the northbound side of US 1. Pedestrians were also witnessed crossing at other unmarked locations and crossing at marked crosswalks without waiting for the pedestrian signal phase. This suggests that current crosswalks are not conveniently located, and that pedestrians do not perceive traffic and roadway conditions as dangerous enough to deter them from crossing against a signal phase or without a


Unprotected concrete sidewalk


Pedestrians crossing at former crosswalk location at Main Street intersection, where visibility is currently obscured by parked vehicles.

crosswalk.

Characteristics of crosswalks over US 1 are as follows:

- Route 33 (Riverside Avenue) - no pedestrian signal heads, 60-foot crossing
- Parker Harding Plaza - no pedestrian signal heads, 62 and 43-foot crossings
- Taylor Place – signalized, no pedestrian signal heads, 45-foot crossing
- Church Lane - pedestrian signal head one direction only, 50-foot crossing
- Bay Street – unsignalized 50-foot crossing
- Myrtle Avenue - no pedestrian signal head, 60-foot crossing
- Compo Road - pedestrian signal head both directions, exclusive pedestrian phases, 80 and 95-foot crossings

Sixty foot crosswalk over US 1 at Myrtle Avenue/Imperial Avenue intersection, side street crosswalks not marked

Pedestrian crossing at unmarked location downtown

Most of these crosswalks do not feature pedestrian signals heads and none feature pedestrian refuge islands or curb extensions. Only one intersection (Compo Road) features an exclusive pedestrian phase.

Crosswalks over side streets are provided at most intersections in the corridor, but are not provided at the signalized intersection with Myrtle Avenue.

Pedestrian crashes at the Riverside Avenue intersection could be due to visibility issues between vehicles turning right from Riverside Avenue to northbound US 1 and pedestrians crossing US 1 on the north leg of the intersection. The setback stop bar and building front along the back of the sidewalk limit visibility of pedestrians, who cross concurrently with the Riverside Avenue through movements. The large turning radius on that corner allows right turn movements to be made with considerable speed, compounding the problem. The traffic signal at this location has been designed by CTDOT as part of State Project #173-403 which will address some of these issues. The plan includes crosswalks on the north, south, and east legs of the intersection.

There is no on-street bicycle infrastructure along this corridor. In the northern portion, the current street design allows for high-speed vehicular traffic, and is intimidating to cyclists who try to use the road. Conditions are particularly dangerous for cyclists on the uphill section

Intimidating environment for cyclists

between the Sunoco gas station and the Compo Road intersection, where the speed differential between bicycles and vehicles is greatest.

The southern portion is a lower-speed urban environment, in which cyclists should be able to ride comfortably in traffic. However, the wide travelled way, multiple travel and turning lanes, and frequent driveways create an intimidating environment, even for experienced cyclists. No cyclists were observed in this section during the walk audit.

7.2 Recommended Safety Improvements

There are a number of opportunities to improve safety for non-motorized travelers in this corridor which are summarized in Table 14 and described in detail as follows:

- Ensure that the revision planned for the traffic signal at the Riverside Avenue intersection will provide an exclusive pedestrian phase, with pedestrian signal heads, push buttons, and ADA compliant curb ramps for all of the proposed crosswalks. A curb extension for the crosswalk over the north leg of US 1 combined with a smaller curb radius for the right turn from Riverside Avenue onto northbound US 1 would also improve safety conditions for pedestrians as visibility would be improved and vehicular speeds would be reduced.
- Install curb extensions at intersections in the downtown area where there is adjacent on-street parking. This will increase pedestrian visibility, reduce crossing distances, and define parking areas.
- Consider installing sharrows and bicycle signage in the downtown (lower speed) portion of the corridor to improve safety conditions for cyclists. This would provide some connectivity between the downtown area and the Riverway Corridor shown on the Town of Westport's bicycle and pedestrian plan as part of the Town's *2007 Plan of Conservation and Development*.
- Reconfigure the Main Street/Taylor Place/Church Lane intersection in the heart of the downtown area to give higher priority to pedestrians.
    - Initial improvements should include an upgrade to the traffic signal to provide pedestrian signal heads, push buttons, and an exclusive pedestrian signal phase. The crosswalk should be re-installed on the north leg of the Main Street/Taylor Place intersection since there appears to be high demand for a crossing in this location.
    - One option for additionally improving the Main Street/Taylor Place/Church Lane intersection is to install a raised median as a pedestrian refuge (where there was previously a striped one). This option is labeled "Alternative A" and is shown in Figure 15 along with other recommended improvements for this location.
    - A second option for improving the Main Street/Taylor Place/Church Lane intersection is to remove a lane on the southbound approach to Main Street, greatly widen the sidewalk area in front of the YMCA building, and realign Church lane to form a T intersection with US 1. A traffic signal would be installed at the new intersection which should be coordinated with the existing one at Main Street/Taylor Place. This option also proposes the closure of Taylor place to vehicular traffic for the creation of a pedestrian plaza. These improvements will greatly limit pedestrian exposure and create more functional public space in the heart of downtown. This option is labeled "Alternative B" and is shown in Figure 16. Figure 17 shows a street-level view of this area as it currently exists and as it is conceived in Alternative B.

- Improve pedestrian accommodations at other signalized intersections, particularly at Myrtle Avenue/Imperial Avenue. Although crosswalks have recently been re-striped at this intersection, crossings over as many legs as possible should be provided, and ADA compliant curb ramps should be installed, push buttons and pedestrian signal heads should be provided, and signal timings adjusted to allow for a pedestrian phase.
- As a short-term improvement, work with property owners to add planter boxes, bollards, curb stops, or other markers to provide a greater level of pedestrian comfort by defining the space for pedestrians and guiding vehicles to correct driveway locations. The particular area of concern is along the northbound side of the roadway between the Myrtle Avenue/Imperial Avenue and the Compo Road intersections. As a long-term improvement, work to limit driveway widths and consolidate accesses.
- Off-street parking is free and plentiful in this area. On-street parking is also free, although harder to find. Conduct a parking study for the downtown area and consider collecting parking fees for on-street spaces. Funds collected could be used to finance transportation projects in the area, such as streetscape improvements, as agreed upon by local business owners and neighborhood associations.

Table 14: Recommended Actions to Improve Safety for Westport US 1 Downtown Corridor

Improvement	Location	Time to Implement	Cost	Priority
Ensure traffic signal revisions provide pedestrian accommodations	Riverside Avenue	0-2 years	<$100K	High
Install curb extensions	Downtown area	3-5 years	$100K-$2M	Moderate
Install sharrows	Downtown area	0-2 years	<$100K	Moderate
Reconfigure intersection	Main Street/Taylor Place/Church Lane	3-5 years	$100K-$2M	High
Improve pedestrian accommodations at signalized intersections	Myrtle Avenue/Imperial Avenue	0-2 years	<$100K	High
Separate pedestrian space from vehicular space	Between Myrtle Avenue/Imperial Avenue and Compo Road	0-2 years	<$100K	High
Conduct parking study	Downtown area	0-2 years	<$100K	Moderate

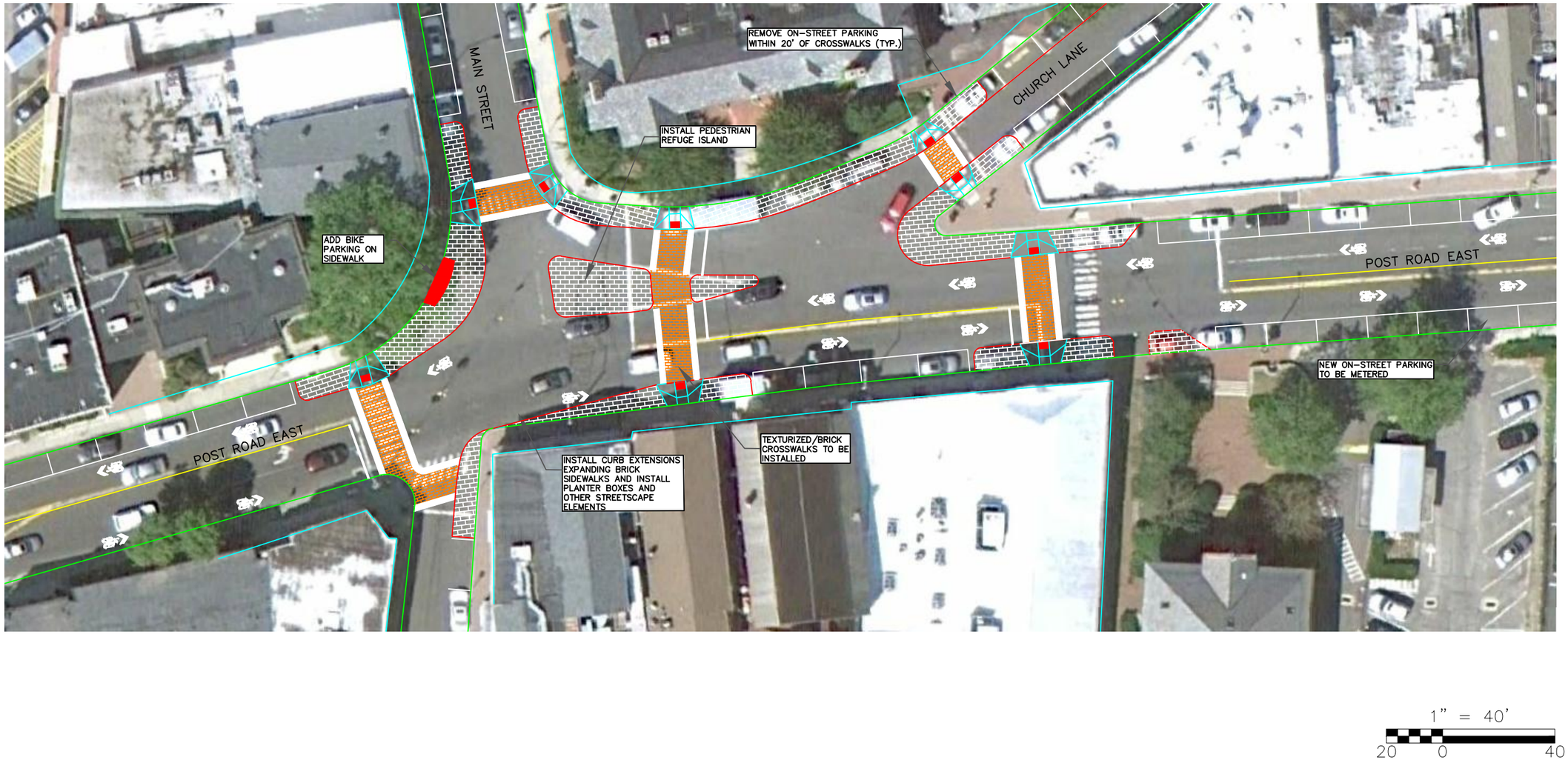

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Figure 15: Alternative A Concept for US 1 at Main Street/Church Lane/Taylor Place Intersection

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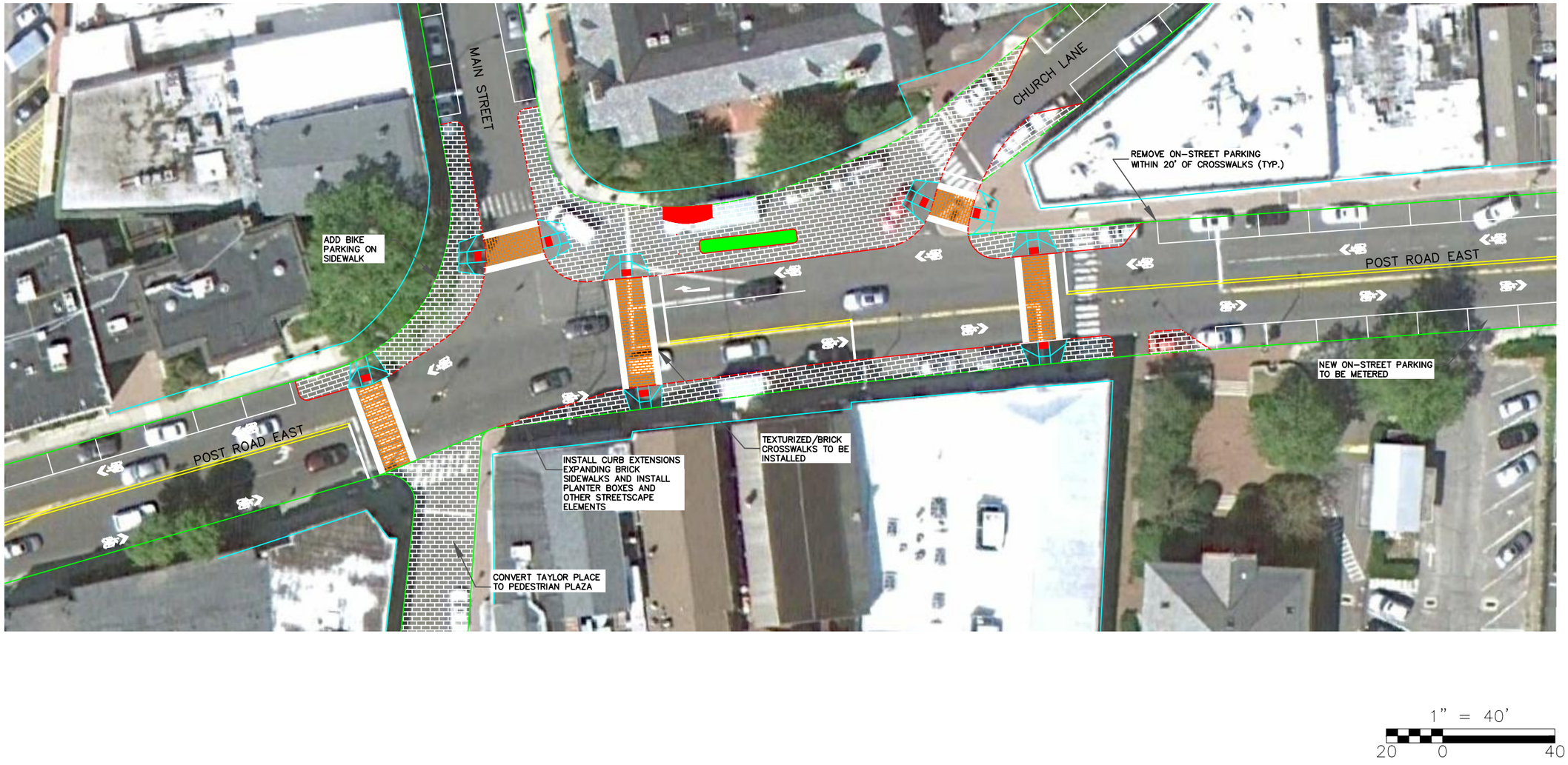

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Figure 16: Alternative B Concept for US 1 at Main Street/Church Lane/Taylor Place Intersection

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Figure 17: Existing and Alternative B concept views looking North on US 1 at Main Street/Church Lane/Taylor Place

8 Westport: US 1 (Post Road) from Maple Avenue to Bulkley Avenue

Strip development with continuous access and angle parking

This 0.6-mile section of US 1, between Maple Avenue and Bulkley Avenue is characterized by highly auto-centric commercial strip development, high vehicular speeds, and sporadic pedestrian infrastructure. The corridor is straight, with a continuous 50 to 55 foot roadway section throughout. The section contains four travel lanes varying in width from 11 to 17 feet and a striped shoulder at most locations. The only turn lanes in the corridor are northbound and southbound left-turn lanes at Maple Avenue. However, there are many turning movements being made throughout corridor, since there are a large number of driveways. There are also continuous areas of angle parking adjacent to roadway lanes. Topography in the corridor is flat and the posted speed limit is 35 miles per hour, although much higher speeds were observed.

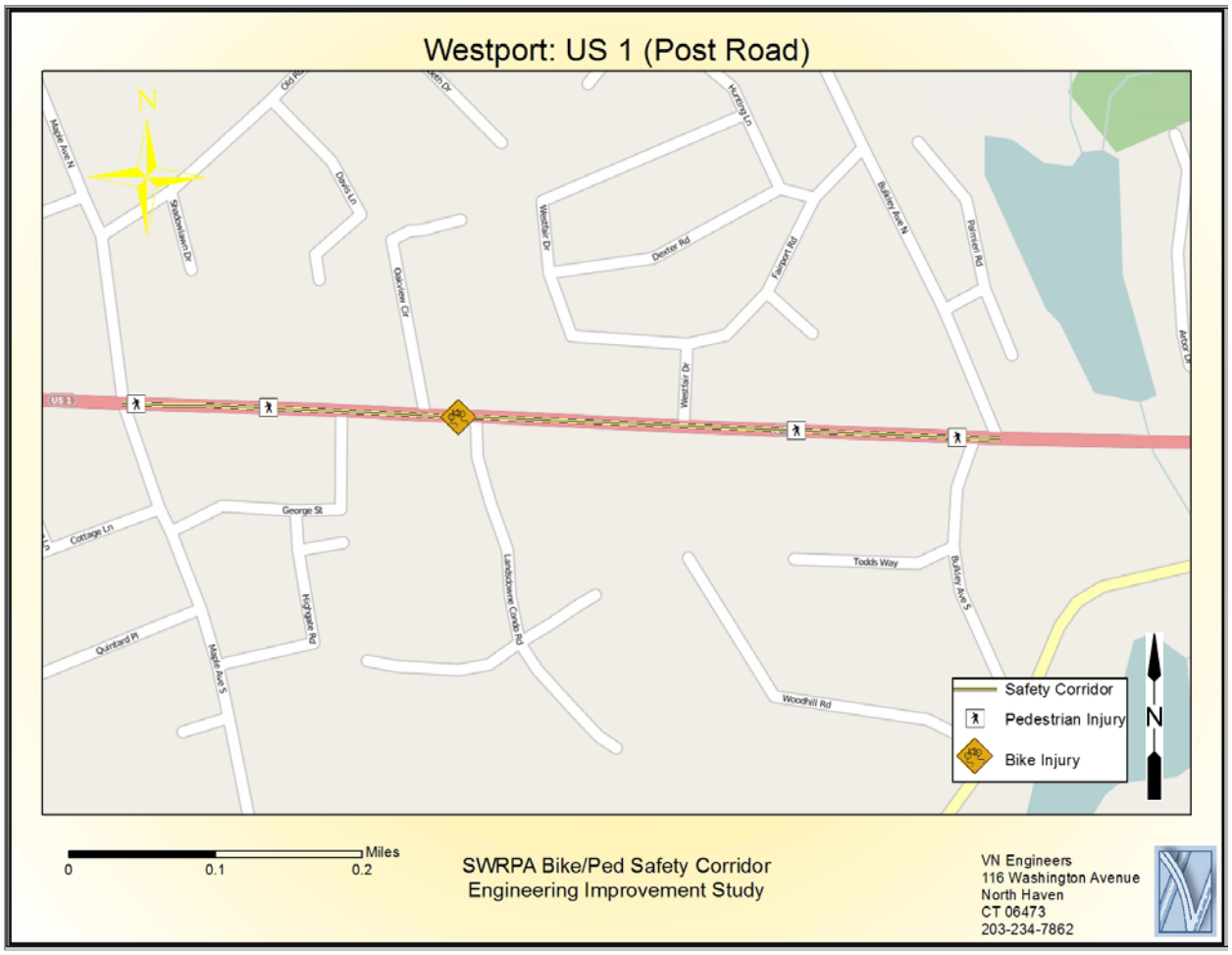

Figure 18: Bicycle/Pedestrian Accident Locations for Westport US 1 North Corridor

Table 15: Bicycle/Pedestrian Accident Data for Westport US 1 North Corridor

Length (miles)	Ped. Accidents	Ped Accidents/mile	Bike Accidents	Bike Accidents/mile	Total Accidents/mile
0.6	4	6.7	1	1.7	8.3

A discussion of this corridor was not included in the *South Western Region Bicycle and Pedestrian Plan*.

8.1 Existing Conditions

The sidewalk network along this corridor is incomplete, and absent in most locations. Where sidewalks are provided, mostly on the southbound side of the street, they are 5 feet in width and separated from roadway lanes by a grass buffer area that varies in width. Where

Buffered sidewalk

there is no sidewalk, pedestrians were observed walking through parking areas of adjacent properties. In some locations the existing curb and landscaping forces pedestrians into the road.

There are four crosswalks over US 1 in this corridor. There are two are signal controlled, crosswalks at the intersections at either end of the corridor, at Buckley Avenue, and Maple Avenue. The other two pedestrian crossings at Landsdowne Condo Road, and Westfair Drive are unsignalized, although there are signs warning drivers of the crossing. The Lansdowne Condo Road crossing also features a flashing sign that is activated by a pedestrian push button. During the walk audit pedestrians were observed crossing with the flashing beacon activated, although it did not appear to cause any drivers to reduce their speed or stop for pedestrians trying to cross. The crosswalks in the corridor are spaced from 700 to 1,300 feet apart.


Parking areas adjacent to travel lanes


Curb and landscaping forcing pedestrians into travelled way

The recently painted shoulder works to visually narrow the width of the travel lanes and does provide a small improvement for cyclists who may use it as a makeshift bike lane.


Flashing pedestrian signal at Landsdowne Condo Road

8.2 Proposed Safety Improvements

The development of this corridor has occurred with minimal consideration of non-motorized travelers in both the public right-of-way and on adjacent private properties. The nature of land use in this corridor is such that people patronizing more than one business in the corridor would likely drive from one shopping center to the other, instead of parking in one location and walking, even though walking distances would be reasonably short. Reconfiguring this corridor to become truly safe and accessible for all transportation system users will require long-term planning and zoning changes that encourage denser, mixed-use development that is more conducive to pedestrian activity as well as redesigning the roadway section within the right-of-way to prioritize pedestrians and bicycles. In the near term, however, there are a few changes that could improve the safety conditions in the corridor.

- Eliminate areas of continuous driveway access and consolidate driveway access where possible to reduce the number of conflict areas with pedestrians. This is a particular problem along the northbound side of the roadway, although there are some areas on the southbound side of the road that need to be addressed as well.
- To the extent possible given the existing access configuration, complete the pedestrian network by installing sidewalks where they are currently missing.
- There have been some preliminary plans developed to improve the Bulkley Avenue intersection that including the reconfiguration of the Bulkley Avenue legs so they are properly aligned through the intersection. There have also been preliminary considerations for consolidating and reconfiguring access to the gas station on the northbound side of the road at the intersection and adding additional sidewalks in the area. These efforts should all be pursued as they would improve overall safety and operations at the intersection. As the plans progress, additional elements should be included to improve pedestrian safety including smaller curb radii, crosswalks on all legs, ADA compliant curb ramps, pedestrian signal heads, push buttons, and an exclusive pedestrian signal phase.
- Conduct analysis to investigate whether this corridor, along with adjacent sections, can be reconfigured to provide two through lanes, two bike lanes and a raised median (road diet). The median will reduce the number of turning movements mid block and limit pedestrian exposure at the corridors large number of driveways.
- Develop an access management plan for this corridor with guidelines for site layouts and driveway placement and spacing. Identify areas in the plan where driveway widths should be reduced or where a number of driveways should be consolidated. Then work with the CTDOT's State Traffic Commission and Permitting departments to realize the plan as the corridor is developed and improved. If current property owners are receptive, work with them to address safety issues that result from their access and parking configurations and work with them to accommodate pedestrians and bicycles with site improvements (such as providing bike parking and connections to the sidewalk). As redevelopment occurs, the corridor will ultimately become safer for all modes of transportation.

Table 16: Recommended Actions to Improve Safety for Westport US 1 North Corridor

Improvement	Location	Time to Implement	Cost	Priority
Eliminate and consolidate access driveways	Throughout corridor	3-5 years	$100K-$2M	Moderate
Install sidewalks to complete pedestrian network	Throughout corridor	0-2 years	<$100K	High
Ensure intersection plans improve safety for pedestrians	Bulkley Avenue	3-5 years	$100K-$2M	Moderate
Study options to install a raised median and bike lanes	Throughout corridor	0-2 years	<$100K	Moderate
Develop and access management plan	Throughout corridor	0-2 years	<$100K	High

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